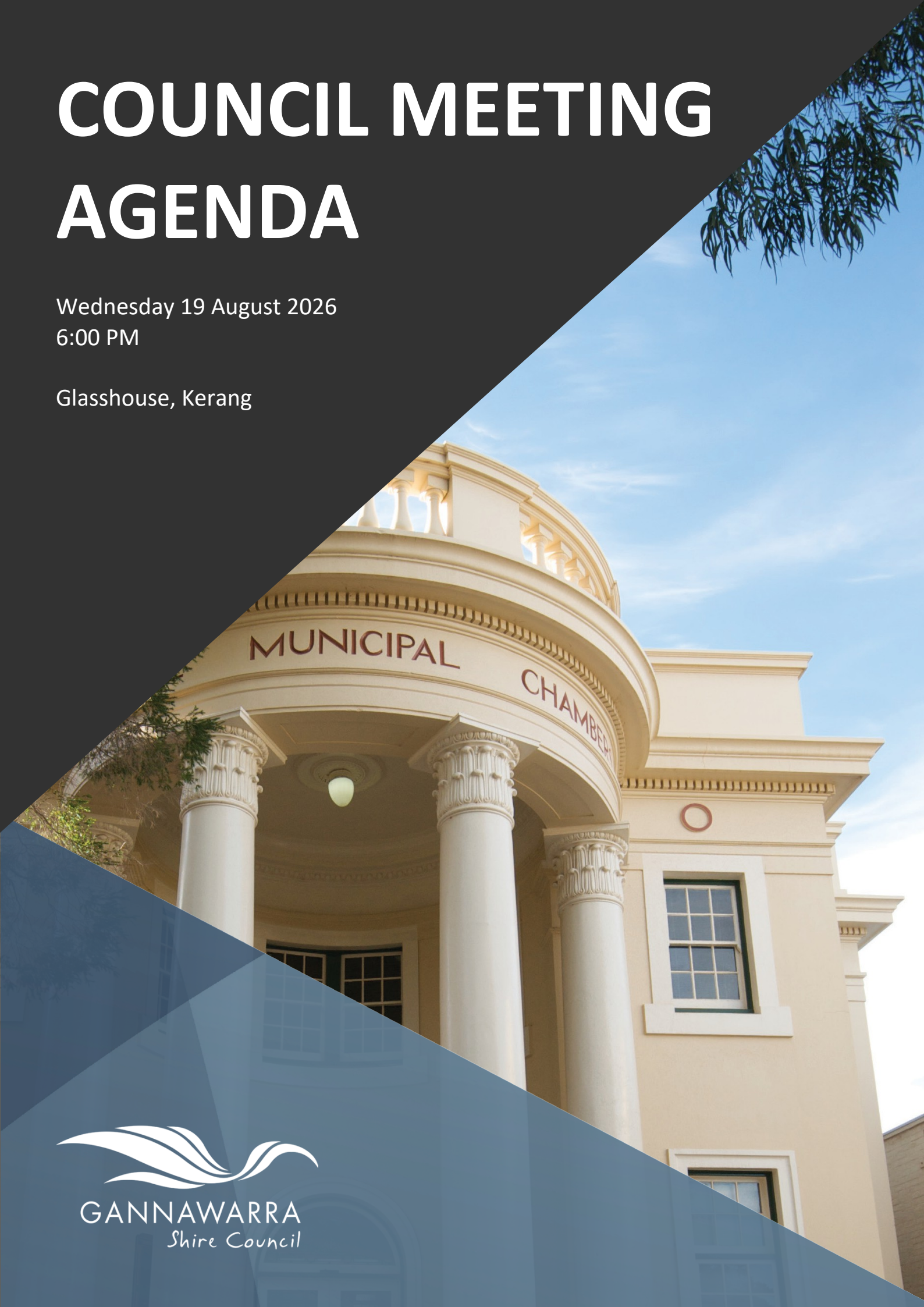
COUNCIL MEETING AGENDA

Wednesday 19 August 2026
6:00 PM

Glasshouse, Kerang



GANNAWARRA
Shire Council

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GEOFF ROLLINSON
CHIEF EXECUTIVE OFFICER

1 WELCOME TO COUNTRY

Playing of the Welcome to Country video clip.

2 OPENING DECLARATION

We, the Councillors of the Shire of Gannawarra, declare that we will undertake the duties of the office of Councillor, in the best interests of our community, and faithfully, and impartially, carry out the functions, powers, authorities and discretions vested in us, to the best of our skill and judgement.

3 APOLOGIES AND LEAVE OF ABSENCE

Cr Keith Link

4 CONFIRMATION OF MINUTES

That the minutes of the Council Meeting held on 15 July 2026 be confirmed.

5 DECLARATION OF CONFLICT OF INTEREST

General Conflict of Interest

Unless exempt under section 129 of the *Local Government Act 2020* (the Act) or regulation 7 of the *Local Government (Governance and Integrity) Regulations 2020*, a Councillor or member of Council staff has a general conflict of interest in a matter if an impartial, fair-minded person would consider that the person's private interests (as defined in section 127(2) of the Act) could result in that person acting in a manner that is contrary to their public duty.

Material Conflict of Interest

Unless exempt under section 129 of the *Local Government Act 2020* or regulation 7 of the *Local Government (Governance and Integrity) Regulations 2020*, a Councillor or member of Council staff has a material conflict of interest in respect of a matter if an affected person (as defined in section 128(3) of the Act) would gain a benefit or suffer a loss depending on the outcome of the matter.

Disclosure of a Conflict of Interest

A Councillor who has a conflict of interest and is attending a meeting of the Council must make a full disclosure of that interest by either advising:

a) the Council at the meeting immediately before the matter is considered at the meeting; or
b) the Chief Executive Officer in writing before the meeting –

whether the interest is a general conflict of interest or a material conflict of interest; and the nature of the interest.

Note: If a Councillor advises the Chief Executive Officer of the details under b) above, the Councillor must make a disclosure of the class of interest only to the meeting immediately before the matter is considered at the meeting.

In accordance with section 130 of the Act, a Councillor who has disclosed a conflict of interest in respect of a matter must exclude themselves from the decision-making process in relation to the matter, including any discussion or vote on the matter at any Council meeting, and any action in relation to the matter.

Failure to comply with section 130 of the Act may result in a penalty of 120 penalty units.

6 BRIEFING SESSIONS

6.1 RECORD OF COUNCILLOR BRIEFING - 8 JULY 2026 TO 4 AUGUST 2026

Author: **Dylan Taylor, Governance Officer**
Authoriser: **Geoff Rollinson (Chief Executive Officer)**

RECOMMENDATION

That Council note the Records of Councillor Briefings from 8 July 2026 to 4 August 2026.

EXECUTIVE SUMMARY

This report presents to Council written records of Councillor Briefings in accordance with clause 31 of the Gannawarra Shire Council Governance Rules.

DECLARATIONS OF CONFLICT OF INTEREST

The Officer preparing this report declares that they have no conflict of interest in regard to this matter.

COUNCIL PLAN

Goal 3. Sustainability - achieve long-term financial and environmental sustainability
4. Ensure transparent, inclusive decision-making through effective leadership.

BACKGROUND INFORMATION

In accordance with clause 32 of the Gannawarra Shire Council Governance Rules, a written record of a meeting held under the auspices of Council is, as soon as practicable, reported at a meeting of the Council and incorporated in the minutes of that Council meeting.

The record must include:

- The names of all Councillors and members of Council staff attending.
- The matters considered.
- Any conflict-of-interest disclosures made by a Councillor attending.
- Whether a Councillor who has disclosed a conflict of interest left the meeting.

CONSULTATION

Consultation with Councillors and staff has occurred to ensure the accuracy of the Councillor Briefing records.

CONCLUSION

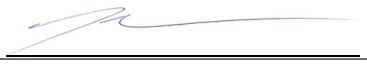
To ensure compliance with clause 32 of the Gannawarra Shire Council Governance Rules, it is recommended that Council note the Councillor Briefing records as attached to this report.

ATTACHMENTS

1. 6.1 Councillor Briefing Record - 3 August 2026 [**6.1.1** - 2 pages]

RECORD OF A COUNCILLOR BRIEFING

Type of Meeting	**Councillor Briefing Session**
Date:	Monday, 3 August 2026
Time:	8.30 am – 5.00 pm
Location:	The Glasshouse, Kerang
In Attendance: (*Councillors*)	Cr Garner Smith, Mayor Cr Ross Stanton, Deputy Mayor Cr Daniel Bolitho Cr Lisa Farrant Cr Charlie Gillingham Cr Keith Link
Apologies:	Cr Pat Quinn
In Attendance: (*Officers*)	Geoff Rollinson, Dylan Taylor, Amanda Wilson, Wade Williams, Paul Fernee, Leigh Hollingworth, Narelle O'Donoghue, Scott Wishart, Dmitry Belyakov, Jasmine Saparamadu, Stevie Pearce, Jodie Hartley.
In Attendance: *(Presenters)*	Steve Bartlett, Securitec Lawyers Nathan Heinrich, Coliban Water Dale Rogers, Coliban Water Jason Liu, RES Group Kim Stone, RES Group Kallista Puarr, RES Group Alex Barker, ATMOS Renewables Don Webb, Wind Farmers Graham Webb, Wind Farmers
Matters Discussed:	2.1 – Council Policy No. 133 - Appointment of Acting CEO 2.2 – Christmas Closure 2026 2.3 – Koondrook Caravan Park, Koondrook Retreat and Cohuna Waterfront Caravan Park 2.4 – Planning Permit Application P25022, 10 Dalton Street, Koondrook. 2.5 – Council Policy No. 123 - Roadside, Parks and Reserves Trading 2.6 – Council Policy No. 121 - Smoke and Vape Free Zones 2.7 – Council Policy No. 128 - Asset Disposal & Rationalisation 2.8 – 2026 Residential Kerbside Reform Survey and Glass Advocacy 2.9 – Gannawarra Urban Stormwater Management Plan 2.10 – Draft GROW Gannawarra Children and Youth Strategy 2026-2030 2.11 – Planning Permit Application P25056 for Lot 1, PS318856, 190 Chuggs Road, Cohuna and Lot 2, PS428326, 215 Chuggs Road, Cohuna 3.1 – Risk Appetite Statement 3.2 – Future Listing Report Councillors/CEO/Directors Discussion CEO & Councillors Discussion Councillor Only Session

Conflict of Interest Disclosures		
Matter No.	Councillor/Officer making disclosure	The Councillor/Officer left the meeting for the discussion
Completed By:	Geoff Rollinson – Chief Executive Officer 	

7 BUSINESS REPORTS FOR DECISION

7.1 LEAVE OF ABSENCE

Author: **Amanda Wilson, Director Corporate Services**
Authoriser: **Geoff Rollinson (Chief Executive Officer)**

RECOMMENDATION

That Council approve a leave of absence for Cr Keith Link from 6 August 2026 to 6 November 2026 inclusive.

EXECUTIVE SUMMARY

Cr Keith Link has submitted a written request to the Mayor for leave of absence from all duties as a Councillor of Gannawarra Shire Council from 6 August 2026 to 6 November 2026 inclusive due to medical reasons.

This report presents the request to Council for consideration in accordance with clause 14 of the Gannawarra Shire Council Governance Rules.

PURPOSE

The purpose of this report is to seek Council's approval of Cr Keith Link's request for a leave of absence from all Councillor duties from 6 August 2026 to 6 November 2026 inclusive, in accordance with the Gannawarra Shire Council Governance Rules.

DISCUSSION

Cr Link submitted a written request to the Mayor seeking leave of absence from all Councillor duties for the period 6 August 2026 to 6 November 2026 inclusive. The request was made on medical grounds. A medical certificate has been provided to Council to support this request.

Clause 14(3) of the Governance Rules provides that a Councillor intending to take a leave of absence should submit the request in writing to the Mayor. Clause 14(4) requires the Mayor to seek to have the request included in the agenda of the next Council meeting.

Under clause 14(6), Council will not unreasonably withhold approval of a leave of absence request.

Section 35 of the *Local Government Act 2020* requires Council to grant any reasonable request for leave.

Clause 18 of the Governance Rules provides that meeting notices and agendas do not need to be served on a Councillor who has been granted leave of absence, unless the Councillor asks the Chief Executive Officer in writing to continue receiving them during the period of leave.

RELEVANT LAW

- *Local Government Act 2020*
- Gannawarra Shire Council Governance Rules

OPTIONS

Cr Link has submitted the required written request to the Mayor and has provided supporting medical documentation. The request is consistent with the process set out in Council's Governance Rules.

Section 35 of the *Local Government Act 2020* requires Council to grant any reasonable request for leave. Therefore, no alternate option is provided or recommended by the officer preparing this report.

COLLABORATION

The Mayor, Cr Link and the Chief Executive Officer have been consulted in relation to the request and the preparation of this report.

FINANCIAL VIABILITY

There are no direct financial implications arising from approval of the leave of absence.

COUNCIL PLANS AND POLICIES

Goal 3: Sustainability - Achieve long-term financial and environmental sustainability. 4. Ensure transparent, inclusive decision-making through effective leadership.

TRANSPARENCY OF COUNCIL DECISIONS

This report will be considered in an open Council Meeting.

CONFLICT OF INTEREST

The officer preparing this report declares that they have no conflict of interest in this matter.

ATTACHMENTS

Nil

7.2 PLANNING PERMIT APPLICATION P25056 FOR LOT 1, PS318856, 190 CHUGGS ROAD, COHUNA AND LOT 2, PS428326, 215 CHUGGS ROAD, COHUNA

Author: Fiona Gormann, Manager Planning and Regulatory Services
Authoriser: Wade Williams (Director Infrastructure & Development)

Applicant: Coliban Water
Owner: Coliban Water
Proposal: Use and development of land for a utility installation (construction of two new lagoons in association with the existing Cohuna Water Reclamation Plant) and associated works and removal of native and non-native vegetation
Location: 190 and 215 Chuggs Road, Cohuna

RECOMMENDATION

That Council approve Planning Application P25056 for use and development of land for a utility installation (construction of two new lagoons in association with the existing Cohuna Water Reclamation Plant) and associated works and removal of native and non-native vegetation in accordance with the endorsed plans subject to the following conditions:

General requirement

1. **The use and development of the site for the proposed buildings and works as detailed with the application and shown as the endorsed plans must not be altered or modified without the written consent of the Responsible Authority.**

Drainage

2. **All stormwater and surface water discharging from the buildings and works including the sewage lagoons must be retained on the site to the satisfaction of the Responsible Authority.**

Excavation works

3. **Earth-moving works involving trucks, excavators, earth-moving machinery and the like may be carried out on the land at 215 Chuggs Road only between the hours of 8.00am and 6.00pm on Monday to Friday, excluding Public Holidays.**

General amenity

4. **The use and development must be managed so that the amenity of the area is not detrimentally affected, through the:**
    a. **transport of soil or other materials to, from or within the land**
    b. **appearance of any building, works or materials**
    c. **emission of noise, smell, dust, light, waste water or waste products**
    d. **presence of vermin including rabbits, cats and foxes**
    to the satisfaction of the Responsible Authority.

In the event of effects on amenity which are unreasonable in the opinion of the Responsible Authority, the operator must take measures to reduce the effects as directed by the Responsible Authority.

Dust suppression

5. **All internal roads, soil stockpiles and vacant or grazed areas must be maintained to avoid dust nuisance to any nearby land to the satisfaction of the Responsible Authority.**

No mud on roads

6. **Appropriate measures must be implemented throughout the construction stage of the development to rectify and/or minimise mud, crushed rock or other debris being carried onto public roads from the subject land, to the satisfaction of the Responsible Authority.**

Parking areas and access

7. **Before the development of land at 215 Chuggs Road begins, the area(s) set aside for the parking of vehicles and access lanes on the whole site must be:**

    a. **Constructed**
    b. **surfaced with an all-weather-pavement**
    c. **Drained**

    to the satisfaction of the Responsible Authority.

    At all times car spaces, access lanes and driveways must be kept available for these purposes.

    Once constructed, these areas must be maintained to the satisfaction of the Responsible Authority.

Landscape plan

8. **Before the development starts on the land at 215 Chuggs Road, a landscape plan for the land at 215 Chuggs Road must be approved and endorsed by the Responsible Authority. The landscape plan must:**

    a. **be prepared to the satisfaction of the Responsible Authority**
    b. **be prepared by a suitably qualified person**
    c. **have plans drawn to scale with dimensions**
    d. **be submitted in electronic form**
    e. **include the following:**
        i. **layout of landscaping and planting within all open areas of the subject land**
        ii. **preservation of existing trees on the land at 215 Chuggs Road wherever practicable**
        iii. **grass or pasture cover for all land not excavated**
        iv. **at least five rows of trees or shrubs planted generally on the west side of the land at 215 Chuggs Road between the soil stockpile area and the west boundary of the land. The tree screening must be approximately 15 metres wide and 340 metres long.**
        v. **an outline of the land to be used for stockpiles, and proposals for revegetating this land when stockpiled material is removed.**
        vi. **a dust-proof fence within the site but close to the eastern boundary of the property at 207 Chuggs Road.**

    Landscape planting must be established within three months of the approval of this permit, and thereafter maintained to the satisfaction of the Responsible Authority, including the replacement of any dead or diseased plants.

Topsoil

9. **All topsoil removed during the earthworks must be stockpiled, maintained in a weed-free condition, stabilised to minimise erosion and re-used, all to the satisfaction of the Responsible Authority.**
10. **All soil stockpile areas at 215 Chuggs Road must be setback a minimum of 30 metres from the northern property boundary (frontage) and western boundaries of the land. Soil stockpiles must be covered, wetted, or otherwise managed so as to minimise wind-blown dust.**

Department of Energy, Environment and Climate Action

Construction Environmental Management Plan (CEMP)

11. **Prior to commencement of native vegetation removal, a Construction Environmental Management Plan to the satisfaction of the responsible authority must be submitted to and approved by the Department of Energy, Environment and Climate Action. When approved, the plans will be endorsed and will form part of this permit. The plans must include:**
    a. **a detailed description of the measures to be implemented to protect the native vegetation to be retained during construction works, and the person/s responsible for implementation and compliance. These measures must include the erection of a native vegetation protection fence around all native vegetation to be retained on site, to the satisfaction of the Department of Energy, Environment and Climate Action, including the tree protection zones of all native trees to be retained. All tree protection zones must comply with AS 4970-2025 Protection of Trees on Development Sites, to the satisfaction of the Department of Energy, Environment and Climate Action.**
    b. **a site plan, drawn to scale with dimensions and georeferences (such as VicGrid94 co ordinates), that clearly shows:**
        i. **The location and identification of the land affected by this permit, including standard parcel identifiers for freehold land**
        ii. **The location and area of all native vegetation present, including scattered trees, that are permitted to be removed under this permit**
        iii. **All areas of native vegetation to be retained**
        iv. **No go zones**
        v. **Construction zones, stockpiling and laydown zones and other ancillary work zones.**

Notification of permit conditions

12. **Before works start, the permit holder must advise all persons undertaking the vegetation removal or works on site of all relevant permit conditions and associated statutory requirements or approvals.**

Protection of vegetation to be retained

13. **Before works start, a native vegetation protection fence must be erected around all patches of native vegetation to be retained on site. This fence must be erected around the patch of native vegetation at a distance of 15 metres from retained native vegetation. The protection fence must be constructed of star pickets/chain mesh/or similar to the satisfaction of the Department of Energy, Environment and Climate Action. The protection**

fence must remain in place until all works are completed to the satisfaction of the Department of Energy, Environment and Climate Action. All tree protection zones must comply with AS 4970-2025 Protection of Trees on Development Sites, to the satisfaction of the Department of Energy, Environment and Climate Action.

14. **Except with the written consent of the Department of Energy, Environment and Climate Action, within the area of native vegetation to be retained and any tree or vegetation protection zone associated with the permitted use and/or development, the following is prohibited:**
    a. **Vehicular access;**
    b. **Trenching or soil excavation;**
    c. **Storage or dumping of any soils, materials, equipment, vehicles, machinery or waste products;**
    d. **Entry and exit pits for the provision of underground services;**
    e. **Any other actions or activities that may result in adverse impacts to retained native vegetation.**

Native vegetation permitted to be removed, destroyed or lopped

15. **The native vegetation identified in NVRR ID 321_20260324_1KI and permitted to be removed, destroyed or lopped under this permit is 2.401 hectares of native vegetation, which is comprised of:**
    a. **2.401 hectares patches of native vegetation.**

Native vegetation offsets

16. **To offset the removal of 2.401 hectares of native vegetation, the permit holder must secure a native vegetation offset in accordance with the Guidelines for the removal, destruction or lopping of native vegetation (DEECA, Version 1.1). The permit holder must secure the following offsets:**
    a. **A general offset of 0.6 general habitat units:**
        i. **located within the North Central Catchment Management boundary or Gannawarra Shire LGA municipal area**
        ii. **with a minimum strategic biodiversity value of at least 0.2714.**

Offset evidence

17. **Before any native vegetation is removed, evidence that the required offset for the project has been secured must be provided to the satisfaction of the responsible authority. This evidence must be one or both of the following:**
    a. **an established first party offset site including a security agreement signed by both parties, and a management plan detailing the 10-year management actions and ongoing management of the site,**
    b. **credit extract(s) allocated to the permit from the Native Vegetation Credit Register.**

    A copy of the offset evidence will be endorsed by the responsible authority and form part of this permit.

18. **Within 30 days of endorsement of the offset evidence by the responsible authority, the permit holder must provide a copy of the endorsed offset evidence to the Department of Energy, Environment and Climate Action at pe.assessment@deeca.vic.gov.au.**

Note: If a planning permit is granted, you should also note the following:

- ***All wildlife in Victoria is protected under the Wildlife Act 1975. Prior to removal of vegetation landholders are advised to determine whether a Wildlife Act 1975 authorisation is required. For further information please visit https://www.vic.gov.au/wildlife-licences-and-permits.***
- ***Works or other activities on public land, which may affect protected native plants, may require a Protected Flora Permit under the Flora and Fauna Guarantee (FFG) Act 1988. All native vegetation likely to be affected should be checked against the most up to date Protected Flora List (DEECA) to determine whether FFG approvals are required. Protected Flora Permits can be obtained from the regional DEECA office (Loddonmallee.Environment@deeca.vic.gov.au regional BAS email address).***

Powercor

19. **No construction works can be undertaken within the vicinity of the existing power line through the property until it has been relocated from the property.**
20. **Any works must comply with the clearances required by the Electricity Safety (Installations) Regulations.**
21. **Any construction work must comply with the Energy Safe Victoria's "No Go Zone" rules.**

Note: To apply for a permit to work go to our website: https://customer.portal.powercor.com.au/mysupply/CIAWQuickCalculator and apply online through the No Go Zone Assessment.

Goulburn Murray Water

22. **All construction activities must follow sediment control principles outlined in EPA Publication 1834.2 Civil Construction, Building and Demolition Guide (September 2025). On-going use of the site must be undertaken in a manner whereby no polluted, or sediment laden run-off can be discharged directly or indirectly into any waterways.**
23. **All works associated with the construction of the system and its on-going use, including re-use of wastewater must be in accordance with the relevant EPA Operating Licence.**
24. **The lagoon must be lined with an impervious liner and if clay is used it must be compacted to a seepage rate of not greater than 1x 10-9 m/sec. The lagoon must be operated to a minimum level of effluent to ensure the liner does not dry out and crack.**
25. **The lagoon must be designed and constructed so that surface water cannot enter through run-off.**
26. **No effluent shall be discharged from the lagoons or permitted to enter any surface drainage systems (including Barr Creek Drain) either directly or indirectly.**
27. **The lagoons must not be located within 100 metres of any waterways or Goulburn-Murray Water drains.**
28. **Irrigation of reclaimed water must be done to optimize the uptake of water, nutrients and other pollutants such that they don't leach to groundwater or runoff to surface waters. The rate and application method must be consistent with the capability of the land and**

appropriate for the type of plant grown, the soil type and topography. Appropriate harvesting/mowing must be undertaken to ensure nutrient removal.

29. **Irrigation and wastewater reuse must be managed in accordance with the principles and requirements outlined in EPA Publication 1910.2 Victorian Guideline for Water Recycling (March 2021), 1911.2 Technical Information for the Victorian Guideline for Water Recycling (March 2021) and 168.3 Guidelines for Irrigation with Recycled Water (October 2022).**
30. **No irrigation of reclaimed water must occur within the following distances from Goulburn –Murray Water Irrigation drains (Barr Creek Drain and Drain Number 16):**
    a. **100 metres for flood/high pressure spray irrigation**
    b. **50 metres for low pressure spray irrigation**
    c. **30 metres for trickle or subsurface irrigation**
31. **Appropriate monitoring bores must be installed around the lagoons. The monitoring program must be established and undertaken to the satisfaction of the EPA and comply with conditions as specified in the Operating Licence. Results must be documented and available to Goulburn-Murray Water upon request.**
32. **Any soil excavated as a result of vegetation removal must be stabilised to ensure that sediment is not transported to waterways during a rainfall event.**

Useful information:

1. ***Any new or otherwise vehicular entrances to the subject land from the road, must be constructed at a location and of a size and standard satisfactory to the Responsible Authority. Consent for 'Works Within the Road Reserve' must be obtained from Council prior to carrying out any vehicle crossing works.***
2. ***North Central Catchment Management Authority***

   Information available at North Central CMA indicates that the location described above is not subject to flooding from any designated waterway based on a flood level that has a probability of occurrence of 1% in any one year. It would be in your best interest to contact the relevant Local Council regarding the impact of overland flows associated with the local drainage system.
3. ***Environmental Protection Authority Victoria***

- ***This permit is not an EPA permission/approval. Before the use or development authorised under this permit starts, the permit holder must ensure that any obligations or duties that arise under the Environment Protection Act 2017 are met. This may include obtaining an EPA permission, approval or exemption, in accordance with the Environment Protection Regulations 2021.***
- ***The Environment Protection Act 2017 imposes duties on individuals and/or businesses undertaking the activity permitted by this permit. If your business engages in activities that may give rise to a risk to human health or the environment from pollution or waste, you must understand those risks and take action to minimise them as far as reasonably practicable.***

For further information on what the laws mean for Victorian businesses and community go to: https://www.epa.vic.gov.au/general-environmental-duty

4. ***This approval must be read in conjunction with EPA Development Licence (Licence ID: DL000300074, issued on 14 October 2025) and any other relevant statutory approvals.***

EXECUTIVE SUMMARY

This report is being presented to Council to determine a planning application for use and development of land for a utility installation (construction of two new lagoons), associated works and removal of native and non-native vegetation. This proposed development is in association with the existing Cohuna Water Reclamation Plant and relates to land known as Lot 1 PS318856, 190 Chuggs Road, Cohuna and Lot 2 PS428326, 215 Chuggs Road Cohuna.

The application was advertised to surrounding property owners and occupiers and three written objections were received.

The proposal has been considered by a number of referral agencies, including those agencies who have specific technical expertise in areas relating to surface water and groundwater quality, development impacts on flood water/flood levels, the protection and management of native vegetation and the protection of human health and the environment from the impacts of pollution and waste. It is important to note that these referral agencies have not objected to the proposal; it is therefore considered to be appropriate for the site. In addition, the proposal is considered consistent with the provisions of the Gannawarra Planning Scheme. The application has thus been recommended for approval with conditions.

PURPOSE

To seek Council's decision on planning application P25056 for use and development of land for a utility installation (construction of two new lagoons in association with the existing Cohuna Water Reclamation Plant) and associated works and removal of native and non-native vegetation

BACKGROUND INFORMATION

The parcels of land relevant to this application are Lot 1 PS318856 190 Chuggs Road, Cohuna and Lot 2 PS428326 215 Chuggs Road, Cohuna.

190 Chuggs Road comprises a total area of 30.25ha and is the site of the existing Cohuna Water Reclamation Plant. The Water Reclamation Plant is operated by Coliban Water and treats wastewater from the Cohuna township. The Water Reclamation Plant includes four lagoons which store, treat and dispose of wastewater.

215 Chuggs Road which is located south of the existing Water Reclamation Plant, and is separated from this site by Chuggs Road, comprises a total area of 51.85 ha. The subject land predominantly comprises of farmland which is laid out for irrigation. A dwelling is established towards the north western corner of the site, cattle yards are located within the paddock area approximately 300m west of Danahers Road, a watercourse is situated towards the southern boundary of the property and a number of planted trees are established throughout the site.

Coliban Water is seeking planning approval to undertake upgrades to the existing Cohuna Water Reclamation Plant and the development of a new evaporation lagoons. The project as a whole includes the following:

- Construction of two new lagoons on 215 Chuggs Road. The total surface area of the proposed new lagoons is 15ha with lagoon 5 having a storage capacity of 78.8ml of wastewater and lagoon 6 having a storage capacity of 75.9ml of wastewater. The proposed lagoons are setback 28m from the road reserves of both Danahers Road and Chuggs Road.

- Relining and refurbishment of lagoons 3 and 4 located within the existing Water Reclamation Plant at 190 Chuggs Road.
- Provision of depth gauges and monitoring equipment.
- Installation of a new pumping station adjacent existing lagoons 3 and 4. This component of the project consists of one 15 L/s operational pump and one standby pump. The purpose of the proposed pumping station is to transfer wastewater from existing Lagoons 3 and 4 to proposed new Lagoons 5 and 6 and includes the installation of a pipeline beneath Chuggs Road connecting the existing lagoons to the proposed two new lagoons.
- Construction of a new road crossover to access proposed Lagoons 5 and 6 and construction of internal access tracks.
- Removal of native vegetation (2.401ha) and non-native vegetation to facilitate the project works.
- Stockpiling of excavated material
- Installation of new fencing and planting of vegetative screening.

Coliban Water seeks to refurbish and remediate existing Lagoons 3 and 4 to address seepage issues and mitigate potential impacts to groundwater. The proposed construction of two new lagoons seeks to provide additional storage capacity to meet predicted increased community growth and demand. The sizing of proposed Lagoons 5 and 6 seeks to meet inflow projections to the year 2053.

There are approximately six sensitive receptors (dwellings) within a 1km radius of the proposed new lagoons, three of which are located within 500m of the proposed expansion area. The Cohuna aerodrome is located less than 350m north east of the proposed new development and the Barr Creek is located approximately 320m east of the proposed new lagoons. The Cohuna Township is approximately 1.9km north of the proposed two new lagoons. The closest dwelling (receptor) is on the property at 207 Chuggs Road, which is surrounded by the Coliban land at 215 Chuggs Road. Development on 207 Chuggs Road comprises an old house due to be demolished, some sheds, and a new dwelling just completed in the south-east corner of the land. The property at 207 Chuggs Road is not owned by Coliban Water.

A Development Licence was granted by EPA on 14 October 2025 for the whole project. This Licence which is referred to as DL000300074 covers the proposed works which are subject to this planning application. The Licence requires detailed work plans to be prepared and approved by EPA before works begin.

CONSULTATION

The application was required to be referred to the Department of Energy, Environment and Climate Action and Environment Protection Authority Victora pursuant to section 55 of the *Planning and Environment Act 1987* (the Act). Due to an error Powercor was referred the application rather than receiving notice of the application. DEECA and Powercor offered no objection to the granting of a planning permit subject to conditions. Similarly EPA offered no objection to the granting of a permit however it recommended the inclusion of two permit notes.

Notice of the application was given to North Central Catchment Management Authority, Goulburn Murray Water, CASA and Coliban Water under section 52 of the Act. GMW offered no objection to the granting of a planning permit subject to the inclusion of a number of conditions. Similarly NCCMA, offered no objection to the granting of a permit flood level advice was provided. Whilst CASA offered no objections to the proposal it was commented that as the proposal may see an

increase in bird activity, regular operators to and from the Cohuna Aerodrome and aircraft owners based at the airstrip should be advised to be aware of increased bird activity. As part of the advertising process a notice of the application was sent to the Referrals section of Coliban Water. To date no response has been received from Coliban Water.

The application was referred internally to Council's Engineering and Environmental Health Department, neither department offered any objections. Whilst no conditions were provided by the Environmental Health Department, conditions were provided by the Engineering Department with respect to the proposed development.

Notice of the application was given to adjoining property owners on 4 December 2025. In addition two onsite notices were put up for display one notice being located on 190 Chuggs Road and the other at 215 Chuggs Road. Notice was placed once in the Gannawarra Times on 16 December 2026, a post was also placed on Council's Facebook page around the same time further advertising the application.

Three written objections to the application have been received. The key issues raised in the objections were:

- Concern regarding the impacts of seepage on adjoining properties and the impact upon soil and water quality and neighboring landowners ability to safely produce food on their properties.
- Concern regarding odour impacts on the surrounding area and neighboring residents.
- Concern regarding visual impact of the proposed new development on the rural character of the area.
- Concern regarding the proposals compatibleness with the amenity of the surrounding area.
- Concerns regarding property devaluation.
- Issues identified with the revised design and siting of the proposed lagoons and inconsistency with layout designs originally discussed with neighboring landowners.
- Concern expressed that the land may be further developed with additional lagoons into the future.
- Question regarding the necessity of the new lagoons if excess water from the Cohuna Water Treatment Plant is no longer being directed to the Water Reclamation Plant.
- Question regarding why the Cohuna Aerodrome site was not further considered as a possible location for the construction of the new lagoons.

Following receipt of the objection a copy of the correspondence was forwarded to the permit applicant for consideration/comment to which a response was received on 17 February 2026. Following receipt of this correspondence it was considered that the most appropriate next step was to present the application to Council for a decision. It is noted that no mediation session between the permit applicant and objectors has occurred.

ASSESSMENT

190 Chuggs Road, the site of the existing Cohuna Water Reclamation Plant, is zoned Public Use Zone 1 (PUZ1). The purpose of this public land use is for Service and Utility. One of the purposes of the PUZ1 is 'To provide for associated uses that are consistent with the intent of the public land reservation or purpose.'

As noted in the background section of this report Coliban Water is seeking to undertake the following development activities on 190 Chuggs Road:

- Relining and refurbishment of existing lagoons 3 and 4.
- Installation of a new pumping station adjacent existing lagoons 3 and 4.
- Installation of a pipeline which seeks to transfer wastewater from existing lagoons 3 and 4 to proposed new lagoons 5 and 6 and
- Removal of native and non-native vegetation

Clause 36.01-1 of the GPS indicates that use of land for service and utility is a section 1 Use, permit not required, provided that the use is carried out by or on behalf of the public land manager. As the use of land for utility installation (water reclamation plant) is already established and the use of land is to remain unchanged a planning permit is not triggered per clause 36.01-1. The site is continued to be utilized by Coliban Water who is the relevant public land manager for this site.

As the works and building activities sought to be carried out on 190 Chuggs Road are in association with the use of land per section 1 of clause 36.01-1 a planning permit is not triggered pursuant clause 36.01-2 of the GPS.

The whole of 190 Chuggs Road is covered by the Environmental Significance Overlay Schedule 4. One of the purposes of the Environmental Significance Overlay is 'To ensure that development is compatible with identified environmental values.' One of the environmental objectives to be achieved by Schedule 4 to the Environmental Significance Overlay is 'To ensure that any development maintains the free passage and temporary storage of floodwaters, minimises flood damage, is compatible with the flood hazard and with local drainage conditions and will not cause any significant rise in flood levels or flow velocity.' Given the earthworks associated with the installation of the new pipeline will not raise ground level by 500mm, the relining and refurbishment of lagoons 3 and 4 are considered repairs and routine maintenance to existing works and the proposed new pumping station comprises a floor area less than 200m^2 a planning permit is not required to undertake these buildings/works pursuant to clause 42.01-2. A planning permit is however required per clause 42.01-2 of the GPS to remove native and non-native vegetation from the subject land, given that Schedule 4 to the Environmental Significance Overlay does not contain any permit exemptions relating to the removal, destruction or lopping of vegetation (native and non-native) and the table to clause 42.01-3 does not provide a permit exemption for utility installations. It should be noted that the permit applicant is not relying upon the Utility Installations exemption under 52.17-7 with a permit being required to remove native vegetation under the provisions of clause 52.17.

The property is also covered by the Specific Controls Overlay Schedule 2. The purpose of the Specific Controls Overlay is 'To apply specific controls designed to achieve a particular land use and development outcome in extraordinary circumstances.' This Overlay is not relevant to the assessment of this planning application.

In summary the only component of the project works which requires planning approval, as it relates specifically to 190 Chuggs Road, is the removal of native and non-native vegetation per clause 42.01-2.

215 Chuggs Road, the proposed site of lagoons 5 and 6, is zoned Farming Zone (FZ), One of the purposes of the FZ is 'To encourage the retention of productive agricultural land.' Another purpose of the FZ is 'To ensure that non-agricultural uses, including dwellings, do not adversely affect the use of land for agriculture.' A third purpose of the FZ is 'To encourage use and development of land based on comprehensive and sustainable land management practices and infrastructure provision.'

As noted in the background section of this report Coliban Water is seeking to undertake the following development activities on 215 Chuggs Road:

- Construction of two new lagoons in association with the existing Cohuna Reclamation Plant, including the provision of depth gauges and monitoring equipment.
- Construction of a new road crossover to access proposed Lagoons 5 and 6 and construction of internal access tracks.
- Stockpiling of excavated material.
- Installation of new fencing and planting of vegetative screening.

Clause 35.07-1 of the GPS indicates that the use of land for a utility installation, which is considered the best land use term to describe the proposal, is a section 2 Use meaning a permit is required to use land in this manner. It should be pointed out that the proposal is not regarded as a minor utility installation by virtue of the area serviced by the water reclamation plant. Whilst a minor utility installation is defined within the Planning Scheme as land used for a utility installation comprising a sewerage treatment plant and any associated disposal works required to serve a neighbourhood, a utility installation is defined as land used to collect, treat and dispose of sewage. Given that the Cohuna Water Reclamation Plant services the entire Cohuna township and not just a neighbourhood for example Island Rise Estate it has been determined that the existing reclamation plant and proposed new ponds sought to be established on part of 215 Chuggs Road are in fact part of a utility installation. It is important to distinguish the difference between a minor utility installation and utility installation, as unlike a utility installation a minor utility installation (other than if in the PCRZ) does not require planning approval for its use nor development pursuant to clauses 62.01 and 62.02-1 of the GPS.

A planning permit is also required to carry out the works associated with the construction of proposed Lagoons 5 and 6 pursuant to clause 35.07-4. This includes not only the construction of the lagoons themselves and provision of depth gauges and monitoring equipment, but it also covers the construction of internal access tracks, temporary stockpiling of excavated material and planting of vegetative screens. Whilst clause 35.07-4 directs that a permit is required to construct or carry out earthworks which change the rate of flow of the discharge point of water across a property boundary it is noted that NCCMA did not indicate in their referral reply to Council that the earthworks associated with the construction of proposed lagoons 5 and 6 is likely to change the rate of flow or the discharge point of water across the properties boundaries.

The whole of 215 Chuggs Road is covered by the Environmental Significance Overlay Schedule 4. Clause 42.01-2 directs that a permit is required to construct or carry out works, this does not apply if a schedule to the overlay specifically states that a permit is not required. Whilst Schedule 4 to the ESO provides a permit exemption for earthworks less than 500mm in height this exemption can not be relied upon this is given that the banks of the lagoons will be between a height of 600mm to 1.1 metres above the existing ground level.

As mentioned previously a planning permit is required per clause 42.01-2 to remove native and non-native vegetation, that is unless the table to clause 42.01-3 specifically states that a permit is not required. Whilst the submitted Ecological Assessment and Native Vegetation Report prepared with respect to this planning application indicates that no native vegetation was found on 215 Chuggs Road, the Existing Conditions and Demolition Plan indicate that ten trees are to be removed from the subject land. It is obvious in reviewing the submitted plans that the ground cover vegetation within the construction boundary footprint is also required to be removed or destroyed in order to facilitate the construction of proposed Lagoons 5 and 6. As the ten trees proposed to be removed from 215 Chuggs Road are considered planted vegetation and the ground cover vegetation located

within the existing paddock areas is likely to have been planted or grown as a result of direct seeding for crop raising or grazing animal production a planning permit is not required to remove this vegetation per clause 42.01-3 this is given that the Planted Vegetation exemption is deemed to apply.

The property is also covered by the Specific Controls Overlay Schedule 2. The purpose of the Specific Controls Overlay is 'To apply specific controls designed to achieve a particular land use and development outcome in extraordinary circumstances.' This Overlay is not relevant to the assessment of this planning application.

In summary the project works which requires planning approval, as it relates specifically to 215 Chuggs Road, include use of land for a utility installation, works/development associated with a section 2 Use of clause 35.07-1 and the construction or carrying out of works within the Environmental Significance Overlay Schedule 4.

THE PLANNING POLICY FRAMEWORK (PPF)

- Clause 12.01-2S (Native vegetation management): The objective is 'To ensure that there is no net loss to biodiversity as a result of the removal, destruction or lopping of native vegetation.'
- Clause 12.03-1S (River and riparian corridors, waterways, lakes, wetlands and billabongs): The objective is 'To protect and enhance waterway systems including river and riparian corridors, waterways, lakes, wetlands and billabongs.'
- Clause 13.02-1S (Bushfire Planning): The objective is 'To strengthen the resilience of settlements and communities to bushfire through risk-based planning that prioritises the protection of human life.'
- Clause 13.03-1S (Floodplain Management): One of the objectives is 'To assist the protection of life, property and community infrastructure from flood hazard, including coastal inundation, riverine and overland flows.'
- Clause 13.06-1S (Air quality management): The objective is 'To assist the protection and improvement of air quality.'
- Clause 13.07-1S (Land use compatibility): The objective is 'To protect community amenity, human health and safety while facilitating appropriate commercial, industrial, infrastructure or other uses with potential adverse off-site impacts.'
- Clause 14.01-S (Protection of agricultural land): The objective is 'To protect the state's agricultural base by preserving productive farmland.'
- Clause 14.01-2L (Sustainable farming): One of the strategies listed is 'Avoid the conversion of land to non-soil based use and development unless there is no other suitable site for the proposal and it would contribute to a public benefit. '
- Clause 14.02-1S (Catchment planning and management): The objective is 'To assist the protection and restoration of catchments, waterways, estuaries, bays, water bodies, groundwater, and the marine environment.'
- Clause 14.02-2S (Water quality): The objective is 'To protect water quality.'
- Clause 19.03-3S (Integrated water management): The objective is 'To sustainably manage water supply and demand, water resources, wastewater, drainage and stormwater through an integrated water management approach.'

PARTICULAR PROVISIONS

- Clause 52.17 (Native Vegetation): The purpose of this clause is 'To ensure that there is no net loss to biodiversity as a result of the removal, destruction or lopping of native vegetation. This is achieved by applying the following three step approach in accordance with the Guidelines for the removal, destruction or lopping of native vegetation (Department of Energy, Environment and Climate Action, 2025) (the Guidelines):

  1. Avoid the removal, destruction, or lopping of native vegetation.
  2. Minimise impacts from the removal, destruction, or lopping of native vegetation that cannot be avoided.
  3. Provide an offset to compensate for the biodiversity impact if a permit is granted to remove, destroy or lop native vegetation.

  To manage the removal, destruction or lopping of native vegetation to minimise land and water degradation.

  A permit is required pursuant to clause 52.17-1 of the Gannawarra Planning Scheme (GPS) as the proposed remediation works to existing Lagoons 3 and 4 and the installation of the new pumping system at the existing Water Reclamation Plant will result in the removal of 2.401ha of native vegetation.

  The native vegetation removal report indicated that the removal of native vegetation falls within the Detailed Assessment Pathway. As such the application was required to be referred to the Department of Energy, Environment and Climate Action (DEECA) in accordance with section 55 of the *Planning and Environment Act 1987* and pursuant to Clause 62.02-2 of the GPS.

  DEECA initially objected to the granting of a planning permit as the application to remove, destroy of lop native vegetation did not meet the application requirements under clause 52.17 Native vegetation and the Guidelines for the removal, destruction or lopping of native vegetation (DEECA, Version 1.1). However, following the submission of an updated and amended native vegetation assessment report and Native Vegetation Removal Report, and response to DEECA's further request for further information dated 22 April 2026, DEECA provided a revised referral response on 4 May 2026 to which it was indicated that the Department does not object to a planning permit being granted subject to conditions.

- Clause 53.02 (Bushfire Planning): The proposed development, as it relates to both sites being 190 Chuggs Road and 215 Chuggs Road, is located within the Bushfire Prone Area. However as the application does not seek approval to construct a building or construct or carry out works associated with the use of land for accommodation, education centre, hospital, indoor recreation facility, major sports and recreation facility or place of assembly the provisions of Clause 53.02 do not apply in this instance.

- Clause 53.10 (Uses and activities with potential adverse impacts): The purpose of this clause is 'To identify those types of uses and activities, which if not appropriately designed and located, may cause offence or unacceptable risk to the neighbourhood.' The use of land for sewerage treatment plant exceeding a design or actual flow rate of 5,000 litres per day is listed in the table to clause 53.10-1. Given the threshold distance from any part of the land used for the purpose of a sewerage treatment plant to land in a Commercial 1 Zone, residential zone or land used for a hospital, education centre or corrective institution is not specified the application was required to be referred to the Environment Protection Authority under section 55 of the Act and pursuant to clause 66.02-7 of the GPS.

The application was also required to be referred to EPA pursuant to clause 66.02-1 of the GPS. The clause directs that any kind of planning application for use or development requiring an amendment of a Development Licence in accordance with Part 4.3 of the *Environment Protection Act 2017* requires referral to EPA in accordance with section 55 of the Act.

A Development Licence is an EPA permission to design, construct or modify complex high risk industrial or waste management activities. Coliban Water was granted an amended Development Licence by EPA on 14 October 2025. This licence which is referred to as DL000300074 covers the proposed works which are subject to this planning application. The Development Licence is subject to a number of conditions.

THE DECISION GUIDELINES OF CLAUSE 65:

The Decision Guidelines have been considered by officers in evaluating this application.

The proposal is considered generally consistent with clauses 65.01.

RELEVANT PLANNING SCHEME AMENDMENTS:

Nil.

DISCUSSION

Whilst it is acknowledged that the proposed development of two new lagoons at 215 Chuggs Road, Cohuna does not support nor enhance agricultural production and will result in the permanent removal of land from agricultural production the proposed lagoons are necessary to support the ongoing future delivery of critical wastewater infrastructure services to the local community.

Should any additional lagoons sought to be constructed into the future separate approvals will be required to be obtained, this includes planning permission.

It should be noted that loss of property values is not a planning consideration, an objection to a planning application must be on planning grounds.

Whilst Council Officers acknowledge the important matter of concern raised by objectors regarding the potential impacts of seepage and impacts on groundwater quality as a result of the proposed Water Reclamation Plant expansion it is noted that notice of the application was given to Goulburn Murray Water. Goulburn Murray Water requires that development proposals do not impact detrimentally on the flow and quality of surface water and groundwater. Goulburn Murray Water has offered no objection to the grant of a planning permit subject to a number of conditions, these are set out earlier in this report.

Council Officers also acknowledge the important matters raised by objectors regarding concerns with respect to odour impacts and the proposals compatibility with the amenity of the surrounding area. As noted previously the application was required to be referred to EPA in accordance with section 55 of the Act. EPA is the state's independent environmental regulator whose role is to protect human health and the environment from the impacts of pollution and waste. EPA has advised that it does not object to the issue of a planning permit. It was commented by EPA in there referral reply that they were aware of the amenity risks posed to nearby sensitive receptors by the wastewater treatment operations and that these were considered in the assessment of the proposed works. However, given that the proposed works are aimed at improving water treatment efficiency and reducing potential odour emissions through broadening out treatment processing EPA expects that the proposal will result in the reduction of the risks of odour impacts. EPA also commented that whilst there will be additional noise impacts during the construction phase it is not expected that noise impacts will be increased from the outcome of the proposed infrastructure

upgrade. EPA considers risks to human health and the environment from the proposal to be low. As noted previously EPA have granted a Development Licence, DL000300074. The Licence is subject to a number of conditions including a requirement that before the commencement of any construction a odour management plan, dust management plan and noise management plan be prepared.

Although proposed lagoons 5 and 6 are planned to be located on land that is identified as an area of poor drainage or potentially subject to inundation, consideration has been given to the potential impact of the total development upon the passage of overland flows and the compatibility with flood hazard. The application was referred to NCCMA, the key agency in flood planning and management, with no objections to the proposed development being provided by NCCMA.

It is acknowledged that 2.401ha of native vegetation will be lost from the existing Cohuna Water Reclamation Plant in providing remediation works to existing lagoons 3 and 4 and to accommodate the new pumping station and pipeline installation. However it is important to note that DEECA, as a section 55 referral authority, no longer offers any objection to the proposed development provided any approval granted is subject to the conditions contained in their referral response dated 4 May 2026. As was commented by the Department in their correspondence dated 4 May 2026, the application meets the three-step approach and is an adequate compromise between meeting the key objectives of the development and minimising the impacts of the proposal on native vegetation.

In order to seek to minimize the visual impact of the proposed new development on the surrounding rural landscape it is recommended that a condition be applied to any planning approval granted requiring the preparation of a landscape plan. The condition in part requires that five rows of trees or shrubs be planted on the west side of the land at 215 Chuggs Road, between the soil stockpile area and the west boundary of the land, this planting must be undertaken within three months of the permit being issued and must thereafter be maintained. Additionally, the landscape plan requires that the stockpile site must be identified and the land must be revegetated once stockpiled materials have been removed.

It is acknowledged that noise, dust and movement of vehicles may impact neighbouring properties, particularly the new dwelling at 207 Chuggs Road, particularly during the construction of lagoons 5 and 6. Conditions 3 and 4 seek to ensure that the amenity of the area is not detrimentally impacted to an unreasonable extent.

OPTION ANALYSIS

Council has two options in relation to this report:

- To approve Planning Application P25056 and issue a Notice of Decision to grant a planning permit subject to appropriate conditions. The objectors have the opportunity to appeal Council's decision at VCAT.
- To refuse Planning Application P25056 and issue a Notice of Refusal stating the grounds of refusal. The permit applicant has the opportunity to appeal Council's decision at VCAT.

RISK IMPLICATIONS

There are no risk implications to Council.

FINANCIAL IMPLICATIONS

No significant financial impacts anticipated for Council.

CONCLUSION

The proposed development is considered to be appropriate for this site.

The application was advertised to adjoining property owners, and three written objections were received.

It is considered that the proposal is generally consistent with the Gannawarra Planning Scheme, in particular clauses 35.07, 42.01 and 52.17.

Given the above, it is recommended that the application be approved subject to conditions as outlined earlier in this report.

COUNCIL PLANS AND POLICIES

Goal 2: Growth - Grow the Gannawarra through a diverse and broad economy.
3. Plan land use to enable growth and expand housing opportunities.

TRANSPARENCY OF COUNCIL DECISIONS

This report will be considered in an open Council Meeting.

CONFLICT OF INTEREST

The officer preparing this report declares that they have no conflict of interest in this matter.

ATTACHMENTS

1. PA Application Form P 25056 Redacted [**7.2.1** - 4 pages]
2. Cohuna WRP Planning Report [**7.2.2** - 6 pages]
3. Plans Redacted [**7.2.3** - 4 pages]
4. 12670048- RE P-0- Cohuna Water Reclamation Plant Development Licence Application Redacted_ [**7.2.4** - 562 pages]
5. D L 000300074 - Statutory Document Redacted [**7.2.5** - 16 pages]

GANNAWARRA Shire Council

Office Use Only		Fee:	
Application No.:		Receipt No.:	
Date Lodged:	22/08/2025	Ward:	
Date Allocated:		Zone(s):	
Allocated to:		Overlays(s):	

Planning Enquiries
Phone: (03) 5450 9333
Web: www.gannawarra.vic.gov.au

Application for

Planning Permit

Use this form to make an application for a planning permit and to provide the information required by section 47 of the *Planning and Environment Act 1987* and regulations 15 and 38 of the Planning and Environment Regulations 2005.

Supplementary information requested in this form should be provided as an attachment to your application. ▨ Please print clearly or complete the form electronically (refer to How to complete the Application for Planning Permit form).

Privacy notice

Information collected with this application will only be used to consider and determine the application. It will be made available for public inspection in accordance with section 51 of the *Planning and Environment Act 1987.*

Need help with the application?

If you need help to complete this form, read *How to complete the Application for Planning Permit form*. For more information about the planning process, refer to *Planning: a Short Guide*. These documents are available from your local council, the Planning Information Centre (Ph: 03 9637 8610, 8 Nicholson Street, Melbourne), or www.dse.vic.gov.au/planning.

Contact council to discuss the specific requirements for this application and obtain a planning permit checklist. Insufficient or unclear information may delay your application.

① Has there been a pre-application meeting with a council officer?

☐ Yes ☐ No

If yes, with whom?: Stevie :) Date: 22/08/2025

The Land

② Address of the land. Complete the Street Address and one of the Formal Land Descriptions.

Street Address

Street No.: 190	Street Name: Chuggs Road
Suburb/Locality: Cohuna	Postcode: 3568

Formal Land Description
⚠This information can be found on the certificate of title.

☐ ○ Lodged Plan ○ Title Plan ○ Plan of Subdivision ☐

OR

③ Title Information

☐ Attach a full, current copy of title information for each individual parcel of land, forming the subject site.

④ Describe how the land is used and developed now.

eg. single dwelling, three dwellings, shop, factory, medical centre with two practitioners, licensed restaurant with 80 seats.

190 Chuggs Road is the current Water Reclamation Plant, 215 Chuggs Road has historically been used as agricultural land.

☐ Attach a plan of the existing conditions. Photos are also helpful.

Street Address

Street No.: 215	Street Name: Chuggs Road
Suburb/Locality: Cohuna	Postcode: 3568

Formal Land Description
⚠This information can be found on the certificate of title.

	○ Lodged Plan	○ Title Plan	○ Plan of Subdivision	

OR

③ Title Information

☐ Attach a full, current copy of title information for each individual parcel of land, forming the subject site.

④ Describe how the land is used and developed now.

eg. single dwelling, three dwellings, shop, factory, medical centre with two practitioners, licensed restaurant with 80 seats.

190 Chuggs Road is the current Water Reclamation Plant, 215 Chuggs Road has historically been used as agricultural land.

☐ Attach a plan of the existing conditions. Photos are also helpful.

The Proposal

⚠
You must give full details of your proposal and attach the information required to assess the application.
If you do not give enough detail or an adequate description of the proposal you will be asked for more information. This will delay your application.

⑥For what use, development or other matter do you require a permit? Read How to complete the Application for Planning Permit form if you need help in describing your proposal.	**Coliban Water is seeking a planning permit to cover buildings and works associated with the upgrade. This will also result in the removal of some native and non-native vegetation.** **The work will facilitate more efficient water treatment for Cohuna's wastewater. The works that will trigger planning include:** • **The construction of two new lagoons,** • **The cleaning and relining of the existing lagoons,** • **The construction of new pump station cabinetry.** • **The removal of native vegetation.**
⑦Encumbrances information about the proposal. Contact council or refer to council planning permit checklists for more information about council's requirements.	☑ Attach additional information providing details of the proposal, including: ☐ Any information required by the planning scheme, requested by council or outlined in a council planning permit checklist. ☐ Plans showing the layout and details of the proposal. ☐ If required, a description of the likely effect of the proposal (eg. traffc, noise, environmental impacts).

⑧Encumbrances on title. Encumbrances are identified on the certificate of title.	Is the land affected by an encumbrance such as a restrictive covenant, section 173 agreement or other obligation on title such as an easement or building envelope? Attach a copy of the document (instrument) specifying the details of the encumbrance. Does the proposal breach, in any way, the encumbrance on title? No, go to 9. Yes, contact council for advice on how to proceed before continuing with this application.	⚠ **Note** Council must not grant a permit that authorises anything that would result in a breach of a registered restrictive covenant (sections 61(4) and 62 of the Planning and Environment Act 1987). Contact council and/or an appropriately qualified person for advice.

Costs of buildings and works/permit fee

Most applications require a fee to be paid. Where development is proposed, the value of the development affects the fee. Contact council to determine the appropriate fee.

⑨Estimated cost of development for which the permit is required.	Cost $[redacted] ⚠ You may be required to verify this estimate. Write 'NIL' if no development is proposed (eg. change of use, subdivision, removal of covenant, liquor licence)
⑩Do you require for the permit fee?	☐ Yes ☐ No

Contact, applicant and owner details

Provide details of the contact, applicant and owner of the land.

☐ Same as contact. If not, complete details below.

Applicant The person or organisation who wants the permit.	Coliban Water / Water Organisation (if applicable): Coliban Water Postal address:

Postcode:

Owner

The person or organisation who owns the land.

☐ Same as contact. ☐ Same as applicant

Where the owner is different from the applicant or contact, provide the name of the person or organisation who owns the land.

Name: (if applicable): Coliban Water

Organisation (if applicable): Coliban Water

Postal address:

Postcode:

Checklist

Declaration

This form must be signed by the applicant*

⚠ Remember it is against the law to provide false or misleading information, which could result in a heavy fine and cancellation of the permit

I declare that I am the applicant; and that all the information in this application is true and correct and the owner (if not myself) has been notified of the permit application.

[redacted]

This application has been lodged online. The declaration has been electronically signed.

Date:22 August 2025

day / month / year

Lodgement

Lodge the completed and signed from and all the documents with:	Gannawarra Shire Council Patchell Plaza, 47 Victoria Street Kerang VIC 3579 Telephone: Fax:
For help or more information	Email: council@gsc.vic.gov.au

Coliban WATER

Planning permit application

Upgrade to Cohuna Water Reclamation Plant

2025

coliban.com.au | 1300 363 200 |

Planning permit application

Upgrade to Cohuna Water Treatment Plant

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Introduction

Coliban Water is seeking a planning permit to enable upgrades to meet community needs to the Cohuna Water Reclamation Plant.

An application has been submitted to the EPA for the development; this will run concurrently with the planning application. Cohuna Water Reclamation Plant (WRP) is approximately 2 km southwest of the Cohuna, in the Loddon Mallee region of north-west Victoria. The Cohuna WRP is operated by Coliban Water to treat wastewater from the Cohuna township. The current WRP includes four lagoons which store, treat and dispose of wastewater through evaporation. It receives and treats approximately 260 ML annually, including both sewer inflows and discharge flows from the Cohuna Water Treatment Plant.

The existing lagoon surface area (four lagoons) is insufficient to evaporate incoming flows for the business planning horizon, with demands projected to reach up to 290 ML/year by 2040.

The project includes the relining/refurbishment of lagoons 3 and 4 and new 'greenfield' evaporation site to support compliance with EPA licence requirements. Initial design has this site set up as two new lagoons – 5 and 6 – sharing a common lengthwise embankment.

The following report provides the relevant provisions of the Gannawarra Planning Scheme. This report should be read in conjunction with the attached plans, photographs, and other supporting documentation.

Sites and surrounds

Project area	Site maps and photographs are attached. The project area comprises the following titles: 1/PS318856 containing the existing Water Reclamation Plant and 2/PS428326H south of the road which is proposed to contain the new lagoons. Copies of the title documents are attached. Two zones and three overlays apply to the project area: • Public Use Zone 1 (PUZ1) • Farming Zone (FZ) • Environmental Significance Overlay, Schedule 4 (ESO4) • Specific Controls Overlay Schedule 2 (SCO2)

Proposal

Coliban Water is seeking a planning permit to cover buildings and works associated with the upgrade. This will also result in the removal of some native and non-native vegetation.

The work will facilitate more efficient water treatment for Cohuna's wastewater. The works that will trigger planning include:

- The construction of two new lagoons,
- The cleaning and relining of the existing lagoons,
- The construction of new pump station cabinetry.
- The removal of native vegetation.

The works are illustrated in the plans and documents attached.

Planning and policy controls

Planning policy framework	The following clauses of the State Planning Policy Framework (SPPF) are considered relevant to this application: • Clause 11 (Settlement): Planning is to prevent environmental, human health and amenity problems created by siting incompatible land uses close together. • Clause 12.01-1S (Protection of biodiversity): The objective is 'To protect and enhance Victoria's biodiversity.' • Clause 12.03-1S (River and riparian corridors, waterways, lakes, wetlands and billabongs): • The objective is 'To protect and enhance waterway systems including river and riparian corridors, waterways, lakes, wetlands and billabongs.' • Clause 13.07-1S (Land Use Compatibility): The objective is 'To protect community amenity, human health and safety while facilitating appropriate commercial, industrial, infrastructure or other uses with potential adverse off-site impacts.' • Clause 14.02-1S (Catchment Planning and Management): The objective is 'To assist the protection and restoration of catchments, waterways, estuaries, bays, water bodies, groundwater, and the marine environment.' • Clause 14.02-2S (Water Quality): The objective is 'To protect water quality.' • Clause 15.01-2S (Building Design): The objective is 'To achieve building design and siting outcomes that contribute positively to the local context, enhance the public realm and support environmentally sustainable development.' The proposed upgrade to the Water Reclamation Plant has been carefully planned and designed to align with the relevant Victorian planning policy objectives. While some native vegetation removal is required, the extent has been minimised through strategic site planning and design integration. Reducing the impact to be restricted to the growth within the existing lagoons. The proposal supports orderly development by ensuring the upgraded infrastructure is appropriately sited adjacent to an established water reclamation plant. This minimises land use conflict and avoids adverse environmental, human health, or amenity impacts from incompatible land uses. Native vegetation removal has been minimised to the greatest extent practicable, following the principles of avoid, minimise, and offset. Where removal is unavoidable, offsetting will be undertaken in accordance with the Guidelines for the removal, destruction or lopping of native vegetation. The upgrade will also contribute to long-term environmental benefits through improved wastewater management. The upgrade maintains appropriate buffers and controls to ensure that off-site impacts such as odour are managed. The works will support the continued safe operation of essential infrastructure in a manner compatible with surrounding land uses. By improving the quality and reliability of wastewater treatment, the upgrade supports catchment health objectives. Erosion and sediment control measures will be implemented during construction. The upgraded plant will enhance the treatment of wastewater. This directly supports the objective of protecting water quality and reducing nutrient and contaminant loads to receiving environments.

Zoning controls	The project is in the Public Use Zone 1 and the Farming Zone.	
	Public Use Zone 1 (PUZ1)	The purpose of this zone is: • To implement the Municipal Planning Strategy and the Planning Policy Framework. • To recognise public land use for public utility and community services and facilities. • To provide for associated uses that are consistent with the intent of the public land reservation or purpose. Clause 36.01-1 states that a permit is not required for any use where the use must be for the purpose described in the table to Clause 36.01-6 which corresponds to the notation on the planning scheme map. The use must be carried out by or on behalf of the public land manager, which is Coliban Water in this case. Clause 36.01-6 states that PUZ1 is for Service and Utility, which matches the proposed use.
	Farming Zone	The purpose of this zone is: • To implement the Municipal Planning Strategy and the Planning Policy Framework. • To provide for the use of land for agriculture. • To encourage the retention of productive agricultural land. • To ensure that non-agricultural uses, including dwellings, do not adversely affect the use of land for agriculture. • To encourage the retention of employment and population to support rural communities. • To encourage use and development of land based on comprehensive and sustainable land management practices and infrastructure provision. • To provide for the use and development of land for the specific purposes identified in a schedule to this zone. A planning permit triggers for the use and development of land for a utility installation (Water Reclamation Plant). The following is a response 35.07-6. The proposed upgrade to the Water Reclamation Plant has been designed with full consideration of the land's capability to accommodate the development, including the safe and effective disposal of effluent in accordance with environmental and regulatory standards. The site is already established for infrastructure purposes, making it inherently suitable and compatible with its ongoing use, without encroaching on or limiting adjacent or nearby agricultural activities. The project supports sustainable land management by improving wastewater treatment capacity and water quality outcomes, reducing environmental risks to surrounding land and waterways. The development uses existing infrastructure, services, and access routes, avoiding unnecessary land disturbance or the need for new service corridors. While the site is not used for agricultural production, the upgrade will not impact the broader region's agricultural capacity, soil quality, or water availability. The extent of native vegetation removal has been minimised through careful design. The lagoons will be managed to prevent nutrient runoff to waterways, thereby supporting the long-term environmental integrity of the site and its surrounds.

Overlay controls	The project is affected by the Environmental Significance Overlay, Schedule 4 (ESO4) and the Specific Controls Overlay 2 (SCO2)	
	Environmental Significance Overlay Schedule 4 (ESO4)	Statement of significance Flooding is a major issue for Gannawarra Shire. The municipality is located on the alluvial plains of four major waterways, the Murray, Loddon and Avoca Rivers and Pyramid Creek. Each of these waterways has a natural tendency to flood over a wide area. Significant areas of the municipality are subject to poor drainage. This overlay will assist in the implementation of floodplain management studies and support strategic policies in the Municipal Planning Strategy. The buildings and works and vegetation removal will all trigger under the ESO4. The proposed upgrade to the Water Reclamation Plant has been developed with a clear understanding of the flood-prone nature of the Gannawarra Shire. The infrastructure is located outside identified high-risk flood zones. The project will not exacerbate existing drainage conditions. The buildings will be minimised and only include pump cabinetry. The NCCMA have been consulted prior to application, the advice provided is attached to the application.
	Specific Controls Overlay	Specific Controls: Goulburn-Murray Water: Connections Project and Water Efficiency Project Incorporated Document, November 2021
Particular Provisions	The proposal will trigger the following particular provisions:	
	Clause 52.17 Native Vegetation	The purpose of clause 52.17 is: • To ensure that there is no net loss to biodiversity as a result of the removal, destruction or lopping of native vegetation. This is achieved by applying the following three step approach in accordance with the Guidelines for the removal, destruction or lopping of native vegetation (Department of Environment, Land, Water and Planning, 2017) (the Guidelines): 1. Avoid the removal, destruction or lopping of native vegetation. 2. Minimise impacts from the removal, destruction or lopping of native vegetation that cannot be avoided. 3. Provide an offset to compensate for the biodiversity impact if a permit is granted to remove, destroy or lop native vegetation. • To manage the removal, destruction or lopping of native vegetation to minimise land and water degradation. The vegetation removals trigger 52.17. See attached NVR and vegetation report for details.

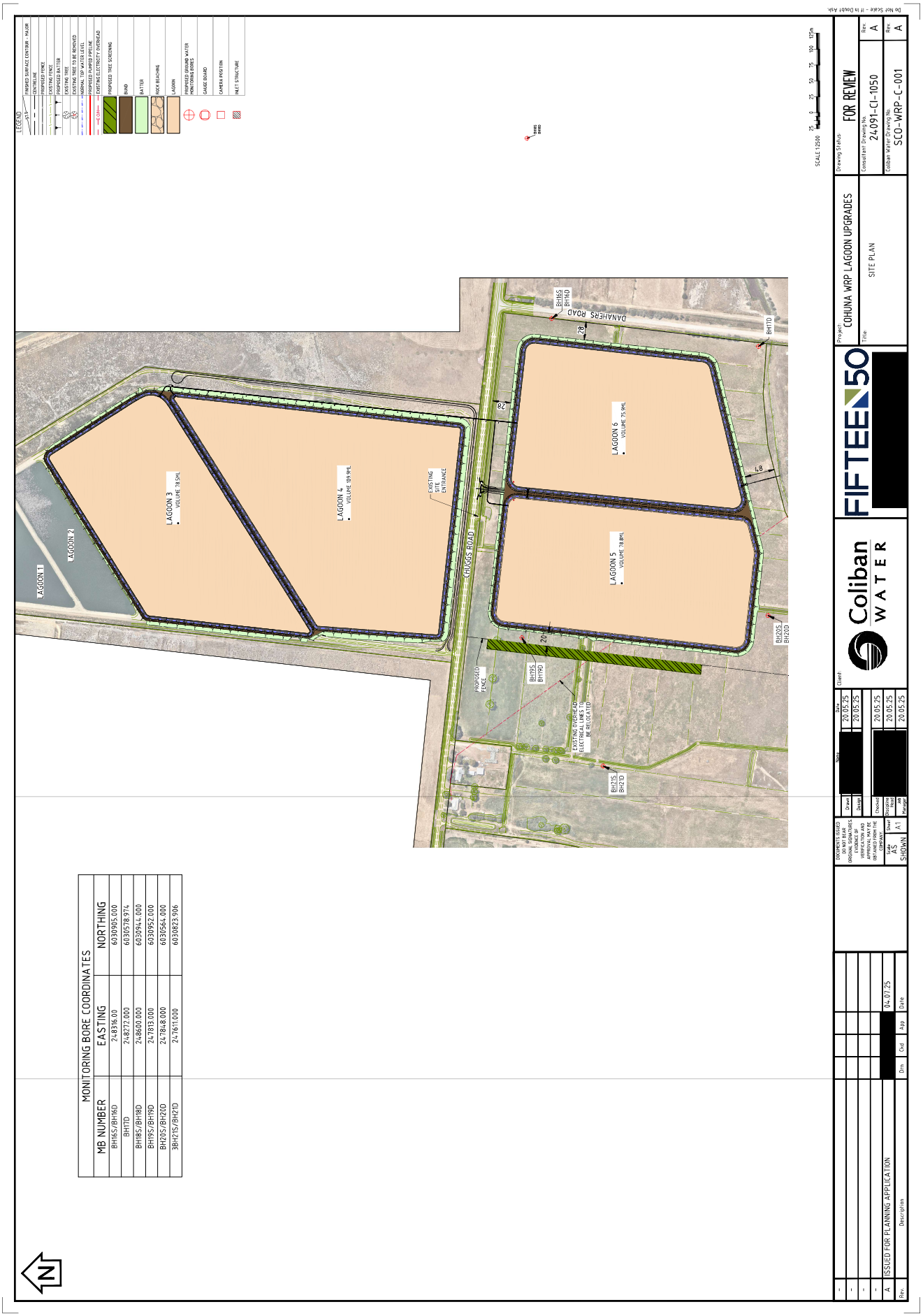
Aboriginal Cultural Heritage

The project area is not mapped as having aboriginal cultural heritage sensitivity.

Conclusion

The proposal is considered to comply with the relevant objectives of the PPF as well as the decision guidelines of the relevant overlays and Clause 65 of the planning scheme.

Given the above, it is our submission that this proposal has regard to all relevant planning considerations. We therefore request that a planning permit be granted in respect of this application.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PROPOSED BATTER
EXISTING TREE
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PROPOSED BURIED PIPELINE
EXISTING ELECTRICITY OVERHEAD
PROPOSED TREE SCREENING
BUND
BATTER
ROCK REACHING
LAGOON
PROPOSED GROUND WATER MONITORING BORES
GAUGE BOARD
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LAGOON 2
LAGOON 3
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LAGOON 4
VOLUME 109.9ML
LAGOON 5
VOLUME 78.8ML
LAGOON 6
VOLUME 75.9ML
EXISTING SITE ENTRANCE
CHUGGS ROAD
DANAHERS ROAD
BH16S BH16D
BH17D
BH19S BH19D
BH20S BH20D
BH21S BH21D
PROPOSED FENCE
EXISTING OVERHEAD ELECTRICITY LINES TO BE RELOCATED
28
24
L8
MONITORING BORE COORDINATES
MB NUMBER | EASTING | NORTHING
BH16S/BH16D | 248316.00 | 6030905.000
BH17D | 248272.000 | 6030578.974
BH18S/BH18D | 248600.000 | 6030944.000
BH19S/BH19D | 247813.000 | 6030952.000
BH20S/BH20D | 247848.000 | 6030564.000
BH21S/BH21D | 247611.000 | 6030823.906
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Title: SITE PLAN
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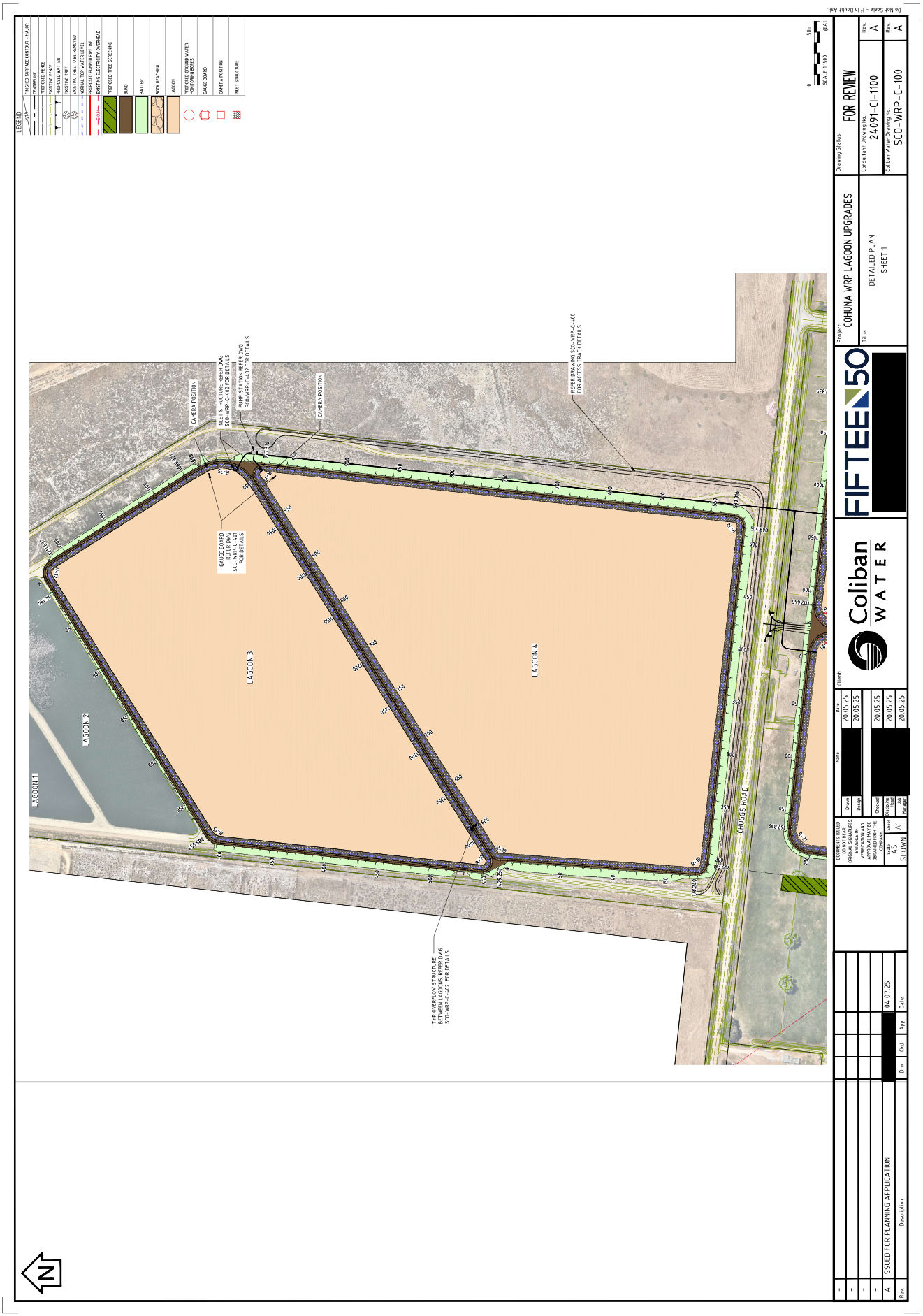
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BUND
BATTER
ROCK BEACHING
LAGOON
PROPOSED GROUND WATER MONITORING BORES
GAUGE BOARD
CAMERA POSITION
INLET STRUCTURE
SCALE: 1:500
LAGOON 1
LAGOON 2
LAGOON 3
LAGOON 4
CHUGGS ROAD
CAMERA POSITION
CAMERA POSITION
GAUGE BOARD REFER DWG SCO-WRP-C-401 FOR DETAILS
INLET STRUCTURE REFER DWG SCO-WRP-C-401 FOR DETAILS
PUMP STATION REFER DWG SCO-WRP-C-401 FOR DETAILS
REFER DRAWING SCO-WRP-C-400 FOR BASSWOOD TRAIL DETAILS
TYP OVERFLOW STRUCTURE BETWEEN LAGOONS REFER DWG SCO-WRP-C-402 FOR DETAILS
FOR REVIEW
COHUNA WRP LAGOON UPGRADES
DETAILED PLAN
SHEET 1
24091-CI-1100
SCO-WRP-C-100
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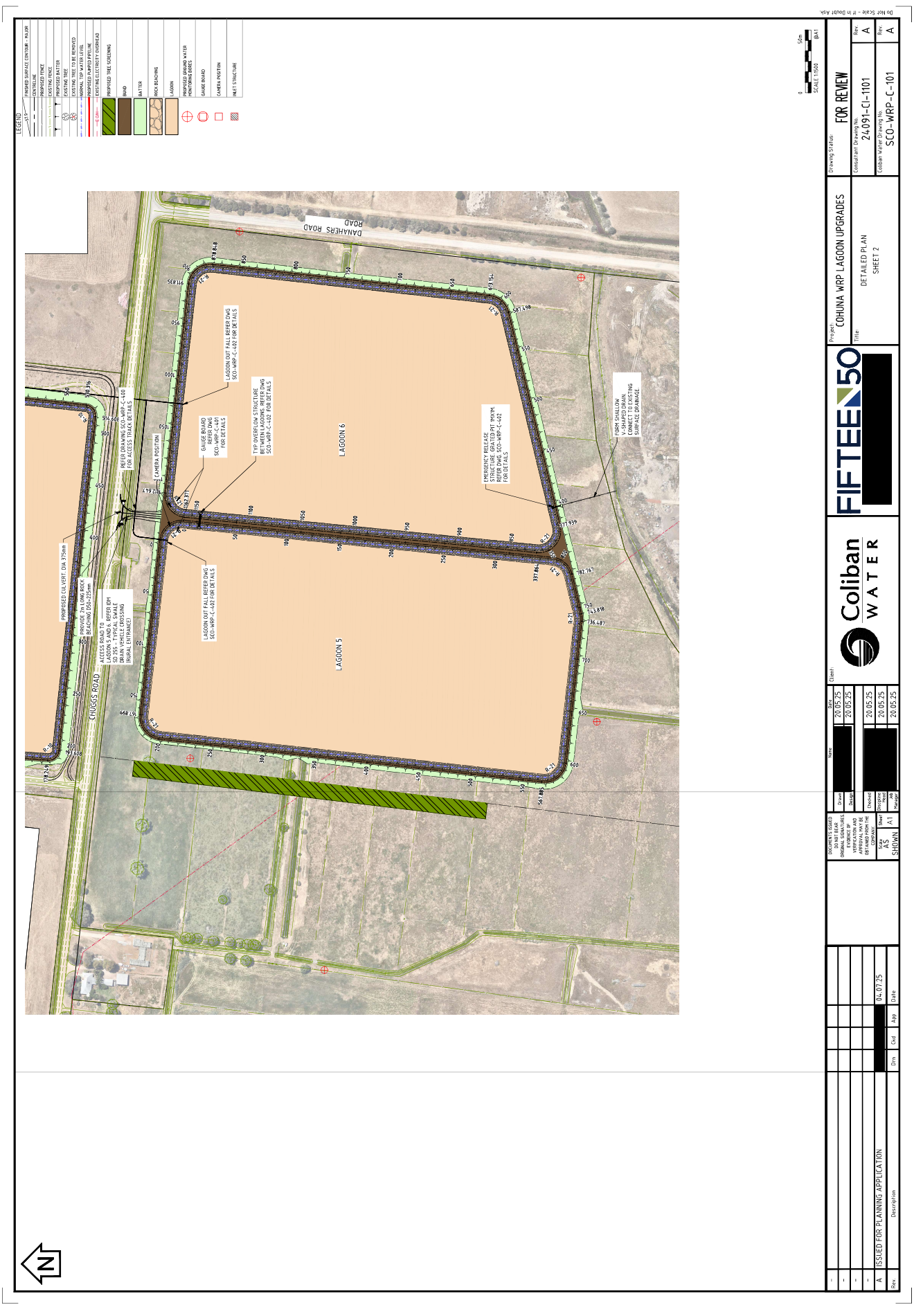
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PROPOSED POWER POLE
EXISTING ELECTRICITY OVERHEAD
PROPOSED TREE SCREENING
BUND
BATTER
ROCK BEACHING
LAGOON
PROPOSED GROUND WATER MONITORING BORES
GAUGE BOARD
CAMERA POSITION
INLET STRUCTURE
DANAHERS ROAD
CHUGGS ROAD
LAGOON 6
LAGOON 5
LAGOON OUT FALL REFER DWG SCO-WRP-C-402 FOR DETAILS
GAUGE BOARD REFER DWG SCO-WRP-C-402 FOR DETAILS
TYP OVERFLOW STRUCTURE BET-WEEN LAGOONS REFER DWG SCO-WRP-C-402 FOR DETAILS
EMERGENCY RELEASE STRUCTURE GRATED PIT 1MX1M. REFER DWG. SCO-WRP-C-402 FOR DETAILS
FORM SHALLOW V-DRAIN ACROSS ROAD CONNECT TO EXISTING SURFACE DRAINAGE.
REFER DRAWING SCO-WRP-C-400 FOR ACCESS TRACK DETAILS
CAMERA POSITION
PROPOSED CULVERT DIA 375mm
PROVIDE 2m LONG ROCK BEACHING (D50=250mm)
ACCESS ROAD TO LAGOON AREA REFER TDM SD 705 - TYPICAL SWALE DRAIN VEHICLE CROSSING (RURAL ENTRANCE)
DO NOT SCALE - IF IN DOUBT ASK
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Title: DETAILED PLAN SHEET 2
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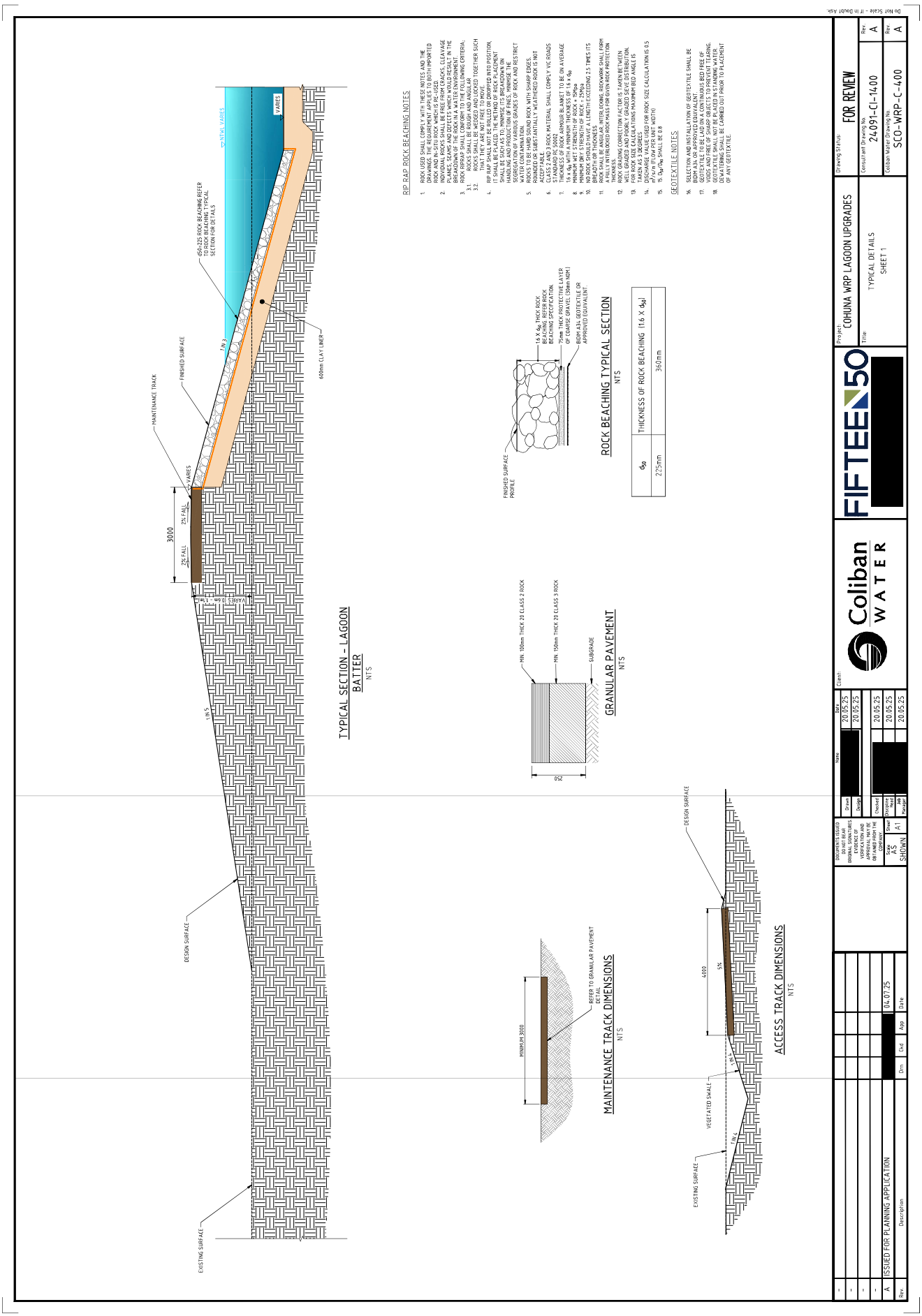
TYPICAL SECTION - LAGOON BATTER
NTS
MAINTENANCE TRACK
FINISHED SURFACE
650-725 ROCK BEACHING REFER TO ROCK BEACHING TYPICAL SECTION FOR DETAILS
NWL VARIES
VARIES
1 IN 3
600mm CLAY LINER
3000
2% FALL
2% FALL
VARIES
1 IN 5
DESIGN SURFACE
EXISTING SURFACE
RIP-RAP ROCK BEACHING NOTES
1. ROCK USED SHALL COMPLY WITH THESE NOTES AND THE DRAWINGS. THE REQUIREMENT APPLIES TO BOTH IMPORTED ROCK AND IN-SITU ROCK WHERE RE-USED.
2. ROCK SHALL BE FREE FROM SEAMS, CRACKS, CLEAVAGE PLANES, SEAMS AND DEFECTS WHICH WOULD RESULT IN THE BREAKDOWN OF THE ROCK IN A WATER ENVIRONMENT.
3. ROCK SHALL BE SOUND AND DURABLE AND COMPLY WITH THE FOLLOWING CRITERIA:
3.1. ROCKS SHALL BE ROUGH AND ANGULAR
3.2. ROCKS SHALL BE WEDGED AND LOCKED TOGETHER SUCH THAT VOIDS ARE MINIMISED.
4. RIP RAP SHALL NOT BE ROLLED OR DROPPED INTO POSITION. IT SHALL BE PLACED. THE METHOD OF ROCK PLACEMENT SHALL ALLOW FOR THE MINIMUM DEGRADATION DURING HANDLING AND PRODUCTION OF FINES. MINIMISE THE SEGREGATION OF VARIOUS GRADES OF ROCK AND RESTRICT MOVEMENT OF FINES.
5. ROCKS TO BE HARD SOUND ROCK WITH SHARP EDGES. ROUNDED OR SUBSTANTIALLY WEATHERED ROCK IS NOT ACCEPTABLE.
6. CLASS 2 AND 3 ROCK MATERIAL SHALL COMPLY VIC ROADS STANDARD RC 500Z
7. THICKNESS OF ROCK ARMOUR BLANKET TO BE ON AVERAGE 1.5 x d_{50} WITH A MINIMUM THICKNESS OF 1.0 x d_{50}
8. MINIMUM WET STRENGTH OF ROCK = 15Mpa
9. MINIMUM DRY STRENGTH OF ROCK = 25Mpa
10. ROCK SHALL HAVE A SPECIFIC GRAVITY EXCEEDING 2.5 TIMES ITS BREADTH OR THICKNESS
11. ROCK SHALL BE ANGULAR, INTERLOCKING, DEWORK SHALL FORM A FIRM, STABLE AND INTERLOCKING CONSTRUCTION
12. VERY GRADING CORRECTION FACTOR IS 1 MINIMUM WITH GRADING AND POORLY GRADED SIEVE DISTRIBUTION.
13. FOR ROCK SIZE CALCULATIONS MAXIMUM BED ANGLE IS TAKEN AS 3 DEGREES
14. DESIGN FLOW RATE USED FOR RIRCK SIZE CALCULATION IS 0.5 $m^3/s/m$ (FLOW PER UNIT WIDTH)
15. $0.84d_{50}$ SHALL BE 0.8
GEOTEXTILE NOTES
16. SELECTION AND INSTALLATION OF GEOTEXTILE SHALL BE ESSENTIAL TO PREVENT SOIL MIGRATION.
17. GEOTEXTILE TO BE LAID IN A CONTINUOUS BED FREE OF VOIDS AND FREE OF SHARP OBJECTS TO PREVENT TEARING.
18. GEOTEXTILE SHALL BE PLACED SMOOTHLY AND WRINKLE FREE. DEWATERING SHALL BE CARRIED OUT PRIOR TO PLACEMENT OF ANY GEOTEXTILE.
FINISHED SURFACE PROFILE
1.6 X d_{50} THICK ROCK BEACHING. REFER ROCK BEACHING SPECIFICATION
300mm THICK GRADED FILTER LAYER OF CRUSHED GRAVEL (20mm NOM) OR APPROVED EQUIVALENT
800M A3s GEOTEXTILE OR APPROVED EQUIVALENT
ROCK BEACHING TYPICAL SECTION
NTS
d_{50} | THICKNESS OF ROCK BEACHING (1.6 X d_{50})
225mm | 360mm
MIN 100mm THICK 2N CLASS 2 ROCK
MIN 150mm THICK 2N CLASS 3 ROCK
SUBGRADE
250
GRANULAR PAVEMENT
NTS
MINIMUM 3000
REFER TO GRANULAR PAVEMENT DETAILS FOR PAVEMENT THICKNESS
MAINTENANCE TRACK DIMENSIONS
NTS
DESIGN SURFACE
4000
5%
1 IN 4
VEGETATED SWALE
EXISTING SURFACE
ACCESS TRACK DIMENSIONS
NTS
Coliban WATER
FIFTEEN50
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Title: TYPICAL DETAILS SHEET 1
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Coliban Water Drawing No: SCO-WRP-C-400 Rev A
Client
Name
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Cohuna Water Reclamation Plant

EPA Development Licence Application

Coliban Water

16 July 2025

→ **The Power of Commitment**

Project name		Coliban Water Cohuna WRP Lagoon Upgrades EPA Approvals					
Document title		Cohuna Water Reclamation Plant | EPA Development Licence Application					
Project number		12670048					
File name		12670048-REP-Cohuna Water Reclamation Plant Development Licence Application.docx					
Status Code	**Revision**	**Author**	**Reviewer**		**Approved for issue**		
			Name	**Signature**	**Name**	**Signature**	**Date**
S4	0	[redacted]					16/07/2025
[Status code]							
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→ The Power of Commitment

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1. Introduction

1.1 Overview

Coliban Water has engaged GHD to prepare a report that provides technical support for an application to the Environment Protection Authority Victoria ('EPA') for a development licence for maintenance and upgrades to its Cohuna Water Reclamation Plant (Cohuna WRP).

1.2 Scope and limitations

This report has been prepared by GHD for Coliban Water and may only be used and relied on by Coliban Water for the purpose agreed between GHD and Coliban Water as set out in section 1.4 of this report.

GHD otherwise disclaims responsibility to any person other than Coliban Water arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by Coliban Water, and others who provided information to GHD, which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

1.3 Project background

Cohuna Water Reclamation Plant (WRP) is approximately 2 km southwest of the Cohuna, in the Loddon Mallee region of north-west Victoria. The Cohuna WRP is operated by Coliban Water to treat wastewater from the Cohuna township. The current WRP includes four lagoons which store, treat and dispose of wastewater through evaporation. It receives and treats approximately 260 ML annually, including both sewer inflows and discharge flows from the Cohuna Water Treatment Plant.

Since 2013, the Cohuna WRP has experienced issues with its lagoons, including seepage to groundwater which have resulted in a range of compliance actions by the EPA. Coliban Water has taken measures to address these issues, including remediation of two of the lagoons (Lagoons 1 & 2) and isolating and drying Lagoon 3. This development licence application relates to proposed maintenance and upgrades to further address these issues by remediating Lagoons 3 & 4 and construction of two additional lagoons (Lagoons 5 & 6) to increase storage capacity.

The project aims to reduce impacts to groundwater by resolving issues with the linings of Lagoons 3 & 4, and to increase resilience and prepare for future influent flows by providing additional capacity to the WRP. The proposed maintenance and upgrade works will cost approximately [redacted] and construction is targeted for summer 2025/26 (pending approvals) during the high evaporation period when there are appropriate construction conditions.

Coliban Water has an existing operating licence for the site which allows for the prescribed activity A03 (Sewage treatment). While the activity still falls under the activity A03, the proposal includes works outside of the current operating licence site. The proposed location of the two additional lagoons (Lagoon 5 & 6) is on Coliban Water owned land immediately adjacent to the current operating licence site and an amendment to the operating licence will be sought following approval of the development licence for the works to include this parcel of land.

1.4 Purpose and scope of this report

The purpose of this report is to support an EPA application for a development licence for the construction and commissioning of maintenance works and upgrades to the Cohuna WRP.

To meet each of the relevant requirements for an application for a development licence the scope of this report has been prepared to meet the requirements of the *Environment Protection Act 2017* and Environment Protection Regulations 2021, as well as EPA Publication 2011: *Development licence application guidance*.

1.5 Reference documents

Guidance for the proposal is provided through the following legislation, regulations and guidance documents:

- *Environment Protection Act 2017* (referred to as the EP Act in this report)
- Environment Protection Regulations 2021 (referred to as the EP Regs in this report)
- Environmental Reference Standard (ERS) 2022
- Australian Guidelines for Water Recycling 2006
- AS/NZS 1547 – On-Site domestic wastewater management 2012
- EPA Publication 2011: Development licence application guidance 2021
- EPA Publication 1698 Liquid storage and handling guidelines 2018
- EPA Publication 1910: Victorian guideline for water recycling 2021
- EPA Publication 1911.2: Technical information for the Victorian guideline for water recycling 2021
- EPA Publication 1834.1 Civil construction, building and demolition guide 2023
- EPA Publication 1826.4 Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues 2021
- EPA Guideline for onsite wastewater management 2024
- EPA Guideline for effluent dispersal and recycling systems 2024

2. General information

2.1 Company legal entity

Legal entity details	
Applicant type	State Government Entity
Full name of company	Coliban Region Water Corporation
ABN	[redacted]
Registered Address	[redacted]
ASIC Search	N/A – State Government Entity
Application Contact	
Organisation	Coliban Region Water Corporation
Contact	[redacted]

2.2 Site details

Site and works details	
Site address	Current WRP site: Cohuna WRP, Lot 12 Chuggs Rd, Cohuna, VIC, 3568 Proposed site of new lagoons: Lot 2/PS428326 See Figure 1 and Figure 2 for maps of the existing licenced site and site of the proposed new lagoons.
Proposed works	**Cohuna WRP Upgrades:** – Design and construction of additional lagoons for evaporation disposal capacity and winter storage (Lagoons 5 & 6) in a new lot directly south of the current licenced site – Lagoons 5 & 6 will have a 15 ha surface area, and approximately 2 m high embankments – Design and construction of a pump station to transfer wastewater from Lagoons 3 & 4 to the new Lagoons 5 & 6 – Relining and remediation of Lagoons 3 & 4 on existing WRP property
Licence details	
EPA Licence	OL000069534 (Appendix A)
Prescribed permission activities	A03 (Sewage treatment)

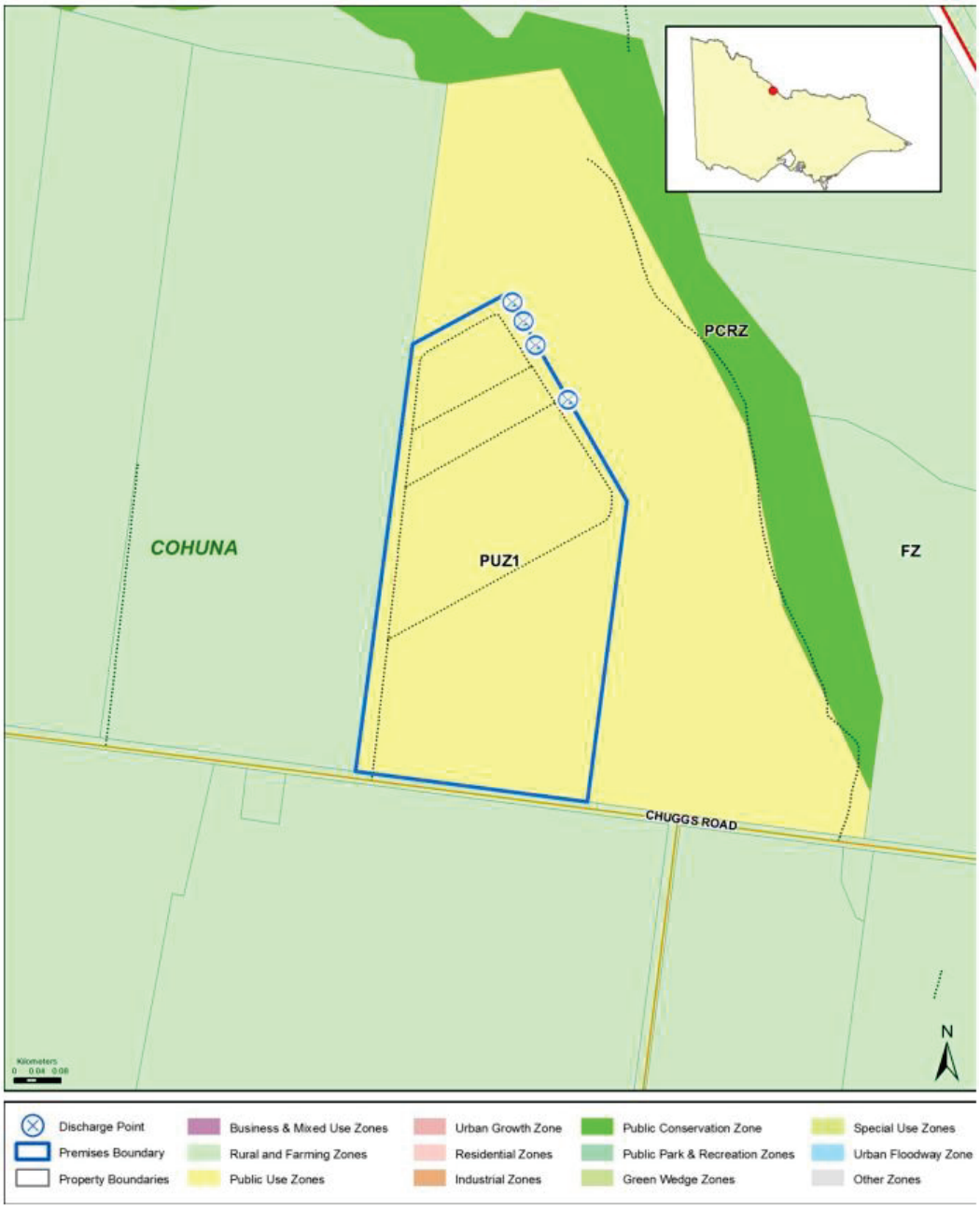

Figure 1 Map showing boundary of current licenced premises

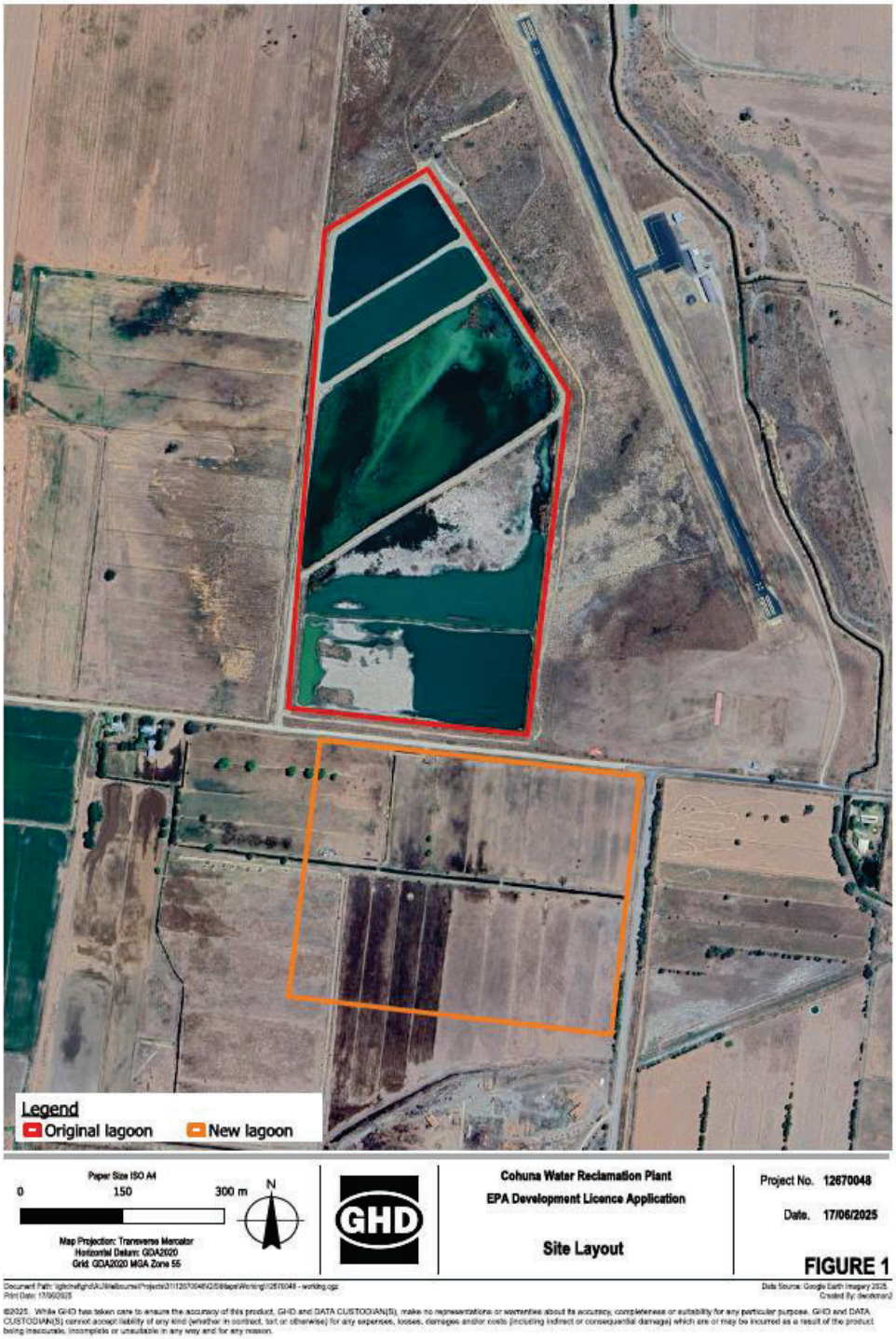

Figure 2 *Map showing location of existing Lagoons 1-4 (red, within existing licenced premises boundary) and the new Lagoons 5 & 6 (orange, outside of existing licenced premises boundary)*

2.3 Estimated cost and application fee

Estimated costs	
Cost of works	[redacted]
Application fee	

2.4 Land use

2.4.1 Planning and other approvals

Planning Approvals	
Planning Authority	Gannawarra Shire Council
Planning Zone	– PUZ1 Public Use Zone – Service and Utility (Lagoons 3 and 4) – FZ Farming Zone (proposed Lagoon 5)
Status of planning permit application	Based on initial discussions with Gannawarra Shire Council, a planning permit is required for the works. The planning permit application is still in preparation, but not yet submitted to Council. Coliban Water intends to submit the planning permit application in July 2025.

2.5 Track record

EPA interactions since 2013 relating to the WRP are summarised in Table 1. The EPA has issued four pollution abatement notices (PANs) and one penalty infringement notice (PIN) to Coliban Water relating to performance of the lagoons at the Cohuna WRP. In response to the PANs, Coliban Water has taken remedial actions including:

– Refurbishing Lagoons 1 and 2 including relining and repairs to embankments

– Permeability testing

– Isolating Lagoon 3 and allowing it to dry out via evaporation

– Implementing an observation-based monitoring program in addition to ongoing groundwater quality monitoring

The proposed maintenance works to Lagoons 3 & 4, form the next step of Coliban Water's works to rectify issues raised by the EPA in its PANs. Remediating the lagoons will address the seepage and potential impacts to groundwater from Lagoons 3 and 4. The new Lagoons 5 & 6 will provide additional capacity to facilitate the remediation works as well as providing additional storage to meet predicted growing inflows.

Table 1 EPA remedial notices and directions

Date	Type	Summary	Coliban Water response
6/02/2013	Notice to Produce	Request for information including reports, documents and monitoring programmes for the assessment of impacts to groundwater, and a water balance of treated wastewater. This was issued in response to Coliban Water reporting a non-compliance in its 2011-2012 Annual Performance Statement.	– Responded to by Coliban Water on 22/02/2013 with information including report sections which identified a risk of wastewater seepage to groundwater
7/05/2013	Pollution Abatement Notice (PAN 90003396)	PAN was issued following a licenced site inspection on 9/01/2013. The EPA identified a risk of seepage from the WRP to groundwater. The PAN identified the following requirements: – Assess the risk of embankment failure – Integrity testing of Lagoon 3 and 4 liners – Impact assessment on lagoon seepage	– Prepared a Cohuna WRP Lagoon Embankment Integrity Assessment (7/8/2013) – Undertook a Cohuna WRP Groundwater Investigation – (September 2013) – Issued a PAN final report which detailed the actions taken to address the PAN (7/10/2013), including permeability testing in Lagoon 4 which met EPA requirements and groundwater testing. The report recommended mitigation works to embankments.
9/12/2013	Pollution Abatement Notice (PAN 90004347)	PAN was issued following Coliban Water's responses to the previous PAN (PAN 90003396). Based on the reports provided to address the PAN requirements, EPA identified that significant erosion and rabbit infestation on the Lagoon 1 and 2 embankments and the potential for embankment failure. It identified that a process or activity was being carried out that is likely to cause or has caused pollution of waters. The PAN identified the following requirements: – Modifying the external embankments of lagoons 1 and 2 to prevent burrowing/erosion and the risk of bank failure – Modifying the internal embankments of lagoons 1 and 2 to prevent burrowing/erosion and the risk of bank failure – Reporting requirements	– PAN Reporting Requirement Update 1 (31/01/2014) – PAN Reporting Requirement Update 2 (26/08/2014) – PAN Reporting Requirement Update 3 (25/01/2016) – Seepage impact assessment undertaken (4/02/2016) – Issued a final PAN report which detailed the actions taken to address the PAN (27 June 2016). This included actions to control rabbit infestation and the risk of bank failure, and remediation works to Lagoons 1 and 2 to address seepage and the risk of embankment failure.
2/07/2015	Amended Pollution Abatement notice (PAN 90004347)	Following a request from Coliban Water on 26 May 2015, this amended PAN updated the compliance dates.	
3/03/2016	Pollution Abatement Notice (PAN 90006753)	PAN issued in response to treated wastewater entering an adjoining property via subsurface seepage. This was during the remediation works to Lagoons 1 and 2 (undertaken to address PAN 90004347), when inflows to the plant were diverted to Lagoons 3 and 4.	– PAN Final Report (28/06/2016) which details actions taken to address the PAN including bypassing Lagoon 3, geotechnical testing of Lagoon 4, undertaking a water balance, and groundwater analysis. The report also detailed Coliban Water's master planning process to identify solutions to ensure long term compliance and meeting long term capacity requirements. This includes re-engineering Lagoons 3 & 4.
4/03/2016	Official Warning	Official warning received from EPA	

Date	Type	Summary	Coliban Water response
31/07/2017	Pollution Abatement Notice (PAN 90007907)	PAN issued following receipt of a hydrological assessment report from Coliban Water (13/06/2017) and an EPA site inspection (19/7/2017). EPA observed a potential impact from seepage of treated wastewater from Lagoon 3 to adjacent land. The PAN identified the following requirements: – Install controls to prevent the risk of seepage from treated wastewater storages, including Lagoons 3 and 4 – Supply a report specifying the outcomes of remedial works to Lagoons 3 and 4 – Reporting requirements	– PAN Final Report (30/10/2018) which details actions taken to address the PAN, including isolating Lagoon 3 and allowing it to dry out via evaporation, and implementing an observation-based monitoring program in addition to ongoing groundwater quality monitoring.
5/09/2017	Penalty Infringement Notice (PIN 532371)	PIN for seepage of storage lagoon (same incident as PAN 90007907).	

2.6 Community and stakeholder engagement

Coliban Water's community consultation and stakeholder engagement regarding the proposal is summarised in Table 2. Coliban Water recognises the importance of early engagement and has completed early engagement to understand key stakeholder feedback and mitigate the potential impacts as necessary. Future engagement has been planned, and Coliban Water will continue to collect feedback as the proposed project progresses.

Table 2 Engagement activities to date

Stakeholder	Date	Activity	Feedback received	Mitigation
EPA	25 May 2022	Letter about Coliban Water upcoming infrastructure investment program, including the project	None	N/A
General public	26 July 2024	Facebook and Twitter post (introducing project) Posted on Connect Coliban webpage (updated as required)	None	N/A
Neighbouring property owners	19 July 2024 23 July 2024 2 August 2024	Letter introducing project Door knock	– Visual amenity concerns	– Coliban Water to add screening trees
			– Salinity of groundwater	– Aim of works is to mitigate impact on groundwater (however it should be noted that the regional aquifer has high salinity levels) – Regular testing of water quality in groundwater bores
			– Odour concerns	– Most odours arise from pre-existing Lagoon 1 and 2. New lagoons will have higher water quality and thus odour production will be minimal

Stakeholder	Date	Activity	Feedback received	Mitigation
			– Questioning lagoon geometry (why it is large)	– Education on the role of evaporative ponds given high salinity of inflows (large surface area required for evaporation)
			– Questioning why wastewater can't be reused	– Coliban Water continues to educate affected stakeholder on their questions (e.g., lagoon function, groundwater salinity in the region) and has a Customer Support Team
			– Concerns over existing operations	– Aim of works is to mitigate impacts to groundwater – Coliban Water has offered to share groundwater bore salinity results for those who have requested them
			– Query on opportunity to extend 3 phase power to houses	– Powercor is decision maker on this
Cohuna Airport (Lions)	12 September 2024	Email	None	N/A
Gannawarra Shire Council	12 September 2024	Email	Discussions confirmed that a planning approval is required for the works. This is being applied for in parallel with EPA approvals.	-
Goulburn Murray Water	12 September 2024	Email	None	N/A
Peter Walsh MP	25 October 2024	Email	None	N/A
Barapa Land and Water	25 October 2024	Email	None	N/A
Yorta Yorta Nation	25 October 2024	Email	None	N/A
North Central Catchment Management Authority	25 October 2024	Email	– North Central CMA confirmed that in the event of a 1% AEP flood event it is unlikely that the location of the proposed works will be subject to inundation – North Central CMA does not object in principle to the construction of an additional wastewater lagoon at the Cohuna reclamation plant	-

Coliban Water has also produced a communication plan, which is included as Appendix B of this application.

3. Proposed activity

3.1 Existing operation

The Cohuna WRP serves an estimated population of 2000 people and receives predominantly domestic sewage with some minor trade wastes and supernatant and alum sludge from the Cohuna Water Treatment Plant. It functions as a treatment and evaporation plant, consisting of four lagoons arranged in series:

– Lagoon 1: Treatment Lagoon (1.9 ha, 26.5 ML capacity)

– Lagoon 2: Treatment Lagoon (1.8 ha, 25.6 ML capacity)

– Lagoon 3: Evaporative Lagoon (7.9 ha, 79 ML capacity)

– Lagoon 4: Evaporative Lagoon (11.7 ha, 58.5 ML capacity)

This is graphically outlined in the process flow diagram in Figure 3 below.

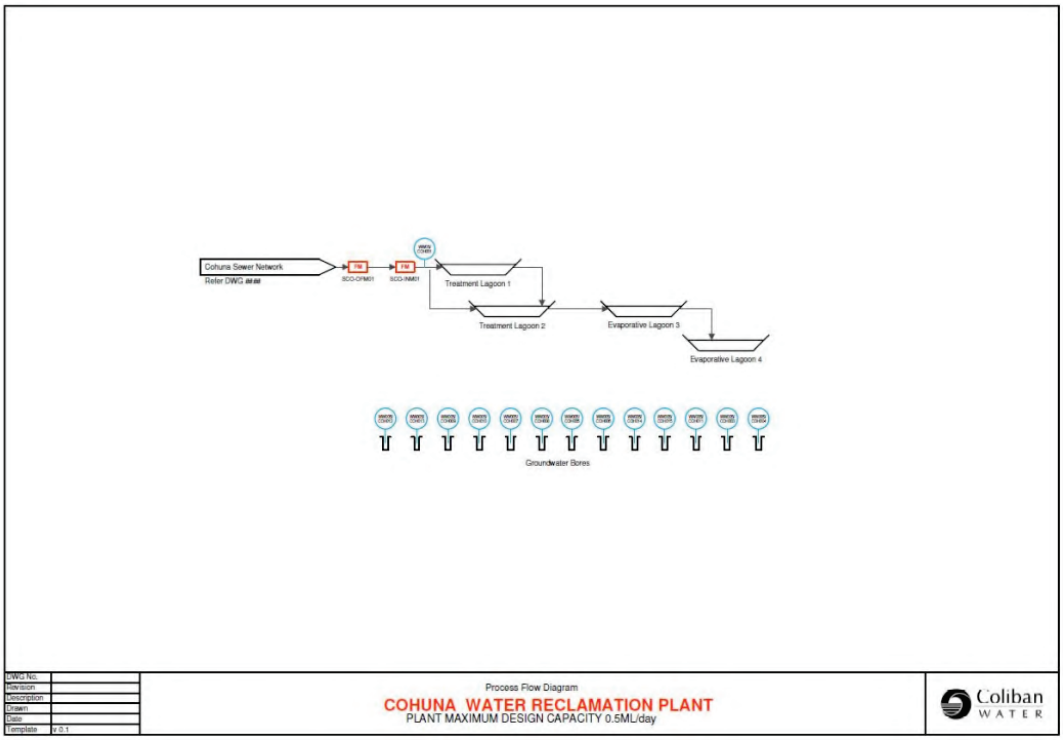

Figure 3 Current Cohuna WRP Process Flow Diagram

Currently the WRP receives inflows from the Cohuna sewer network (including Cohuna Water Treatment Plant (WTP) waste flows). By 2053 the increased sewer network flows (with reduced WTP waste flows) is modelled to be annual inflow to the WRP of 245 ML.

Due to the high water table and high salinity of groundwater in the area, the Cohuna WRP receives highly saline inflows. As such, the site operates through evaporation and there is no effluent irrigation system nor a regulated discharge of effluent to the environment. See Figure 4 below for the current design of the Cohuna WRP.

Figure 4 Current Cohuna Water Reclamation Plant

Geotechnical studies have been undertaken on the lining of existing Lagoons 3 & 4. The findings of the geotechnical studies indicate that the existing clay liners in these lagoons are inadequate. The results of the most recent study for Lagoons 3 and 4 are summarised in Table 3. Full geotechnical reports have been included as Appendix C.

Table 3 Summary of most recent geotechnical findings for the existing Lagoons 3 and 4

Geotechnical study date	Lagoon	Findings relevant to existing site
March 2016 (Report 16C 0144)	Lagoon 4	– Permeability meets the required rate of $1x10^{-9}$ m/s – In situ material below 100 to 300 mm is suitable for the base of the water storage lagoon – "It is not possible to say that the base has an engineered clay liner"
21 March 2025 (Report 24C 0528-01)	Lagoon 3 (note: Lagoon 4 not able to be tested)	– Existing clay liner is generally 400 mm across base, but in some locations as little as 100 to 200 mm thick – Material below liner ranges from high to low plasticity clay and silt. Low plasticity clay and silt are of moderate to high permeability – Moist to wet, soft material observed up to 1.0 metres below floor level – Medium and high plastic clays across the site meet the required permeability of $1x10^{-9}$ m/s, but low plastic clays do not

Since 2017, Lagoon 3 has been offline following bypass works completed in response to seepage issues (see section 2.5).

3.2 Description of proposed activity

The key feature of the proposal as depicted in Figure 5 include remediation of the existing Lagoons 3 & 4 and the construction of additional Lagoons 5 & 6 to the south of the existing WRP site. A small pump station would also be constructed to facilitate the transfer of water from Lagoons 3 & 4 to the newly constructed Lagoons 5 & 6.

Key design documents have been included as Appendix D.

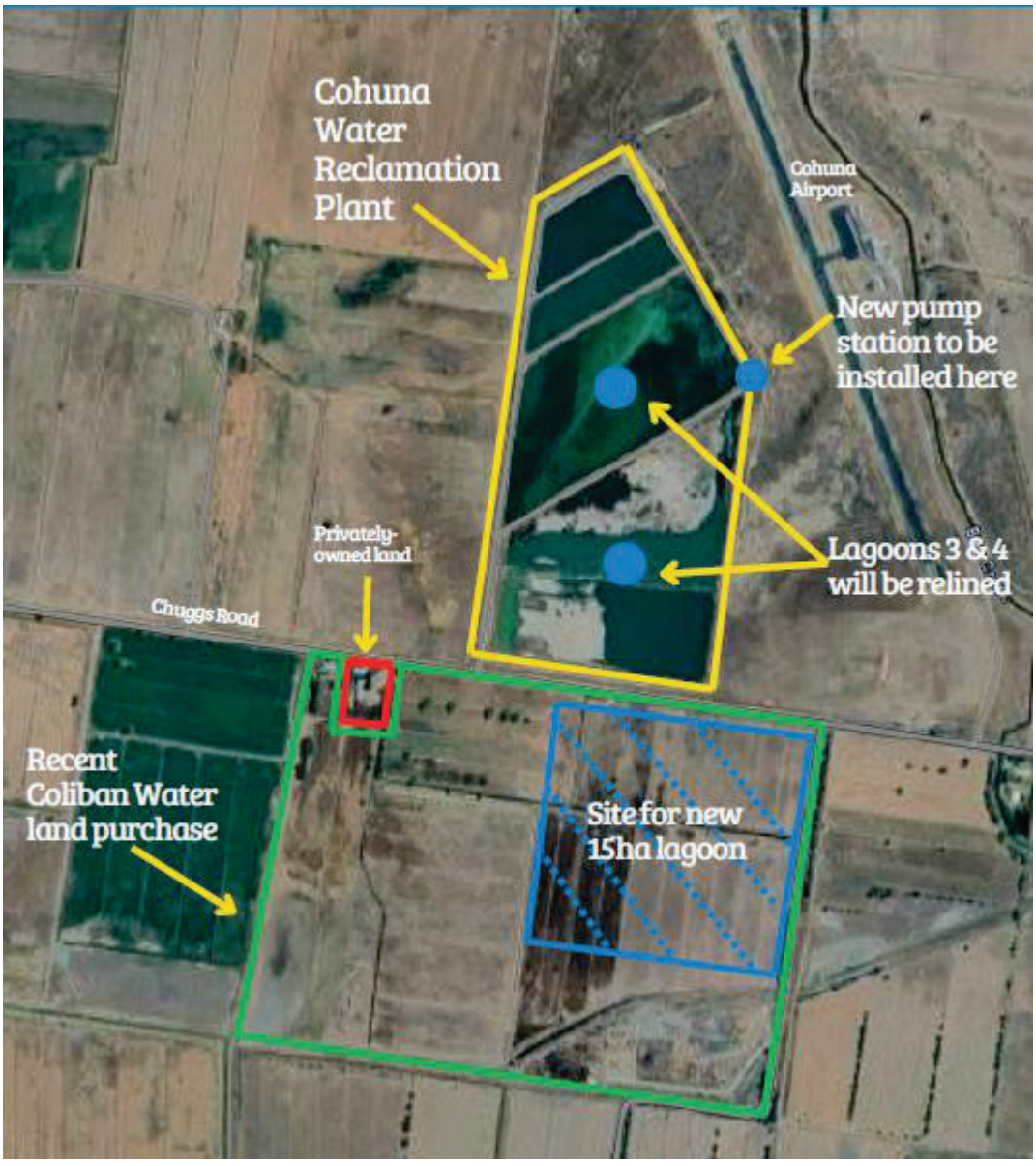

Figure 5 Proposed Upgrades to the Cohuna Water Reclamation Plant

3.2.1 Construction of new Lagoons 5 & 6

Coliban Water has obtained a new property directly south of the existing WRP operation (across Chuggs Rd) for the construction of new Lagoons 5 & 6. These would have a total surface area of 15 ha with average depth of 1.0 m and batters providing 1 m of freeboard to increase Coliban Water's evaporation disposal capacity and winter storage. See section 3.4.1 for details of the lagoon design.

These will be designed to meet EPA's containment compliance requirement (refer section 3.6.2) and to ensure Coliban Water can meet its operating licence conditions to 2053.

Construction of new Lagoons 5 & 6 would include:

- Excavation of topsoil / silt material in the vegetative zone (approx. 100-200 mm)
- Excavation of lagoon to design levels
- Stockpiling of excavated material, separating high and medium plasticity clay from low plasticity clays
- Ripping to a depth of 300 mm, moisture conditioning to within 2% of optimum moisture content and compaction to achieve a minimum density ratio of 98% standard (AS1289)
- Compaction of exposed base and walls
- Placement of on-site clay (medium and high plastic), moisture conditioning and compaction to achieve a minimum density ratio of 98% standard (AS1289)
- Finishing surface with a smooth drum roller or grader
- Rock beaching of internal batters

While the geotechnical study completed on the site of the proposed Lagoons 5 & 6 suggested a minimum clay liner thickness of 300 mm (refer to report 24C 0548 attached in Appendix C), Coliban Water proposes to use a 600 mm thick layer of compacted clay consistent with industry standard practice.

Upon completion of construction, topsoil material will be spread over the banks to aid in revegetation and prevent erosion.

3.2.2 Pumping station

Installation of a pumping station consisting of one 15 L/s operational pump and one standby pump to transfer wastewater from existing Lagoons 3 & 4 to the new Lagoons 5 & 6 (see Section 3.4.2 for details on the pumping infrastructure).

3.2.3 Remediation of Lagoons 3 & 4

As described in section 2.5, there are known issues with the permeability of Lagoons 3 & 4. In order to address these issues, Coliban Water proposes to remediate and reline these lagoons.

The works would follow the following procedure:

- Excavation of topsoil/silt material in the vegetative zone (approx. 100-200 mm)
- Excavation of existing liner and underlying soft material
- Stockpiling of excavated material, separating high and medium plastic clay from low plastic silts and clays
- Ripping to a depth of 300 mm, moisture conditioning to within 2% of optimum moisture content and compaction to achieve a minimum density ratio of 98% standard (AS1289)
- Compaction of exposed base and walls
- Placement of on-site clay (medium and high plastic), moisture conditioning and compaction to achieve a minimum density ratio of 98% standard (AS1289)
- Finishing surface with a smooth drum roller or grader
- Rock beaching of internal batters

While the geotechnical study completed on Lagoon 3 suggested a minimum clay liner thickness of 400 mm (refer to report 24C 0548-1 attached in Appendix C), Coliban Water proposes to use a 600 mm thick layer of compacted clay consistent with industry standard practice. Lagoon 4 will also use a 600 mm thick layer of compacted clay.

3.2.4 Construction activities in order of staging

Construction works are targeted during summer 2025/2026, subject to receipt of required EPA approvals and planning approval from Gannawarra Shire. The proposed works including plant and equipment to be installed have been described below. The preferred plant and equipment have been identified following an options assessment, with consideration of the best available techniques and technologies (refer to Section 3.5 for further details). The concept schematic is shown in Figure 6 below.

In summary the key construction activities, in order of staging, include:

Emptying Lagoon 3

– Progressively empty Lagoon 3 (noting that a bypass is already in place from Lagoon 2 to Lagoon 4)

Establishing power supply and constructing pump station

– Install power supply to Cohuna WRP site as early as practical (by Powercor)

– Construct the pump station and pipework to allow future transfer of effluent from Lagoon 3 & 4 to new lagoons as early as practical

Excavation of Lagoon 5

– Excavate Lagoon 5 and store excavated material as spoil and clay stockpiles for later use

Relining and commissioning of Lagoon 3

– Excavate Lagoon 3 to the base of new liner and transfer spoil to the site of Lagoons 5 & 6

– Place and compact clay floor and embankment lining, rock beaching for Lagoon 3

– Re-commission Lagoon 3 and return online

Emptying Lagoon 4

– Progressively empty Lagoon 4 and dewater

Constructing and recommissioning Lagoons 5 & excavating Lagoon 6

– Partially construct Lagoon 5 with available clay

– Excavate Lagoon 6 and store excavated material as spoil and clay stockpile for later use

– Complete Lagoon 5 using available clay and return online

Constructing Lagoon 6 and relining Lagoon 4

– Excavate net spoil from Lagoon 4 and place spoil beneath Lagoon 6 up to base of new clay liner

– Use clay stockpile to construct Lagoons 6 & 4, complete lining and rock beaching, bring online

– All lagoons (Lagoons 3, 4, 5 & 6) now functional and online

The above staging of project works and installation of equipment is proposed in order both to allow that WRP capacity is maintained throughout works, and to allow the reuse of clay borrow material from the construction of the new lagoons. Construction staging and clay volumes are also displayed graphically in the earthwork sequencing schematic (refer to Appendix E).

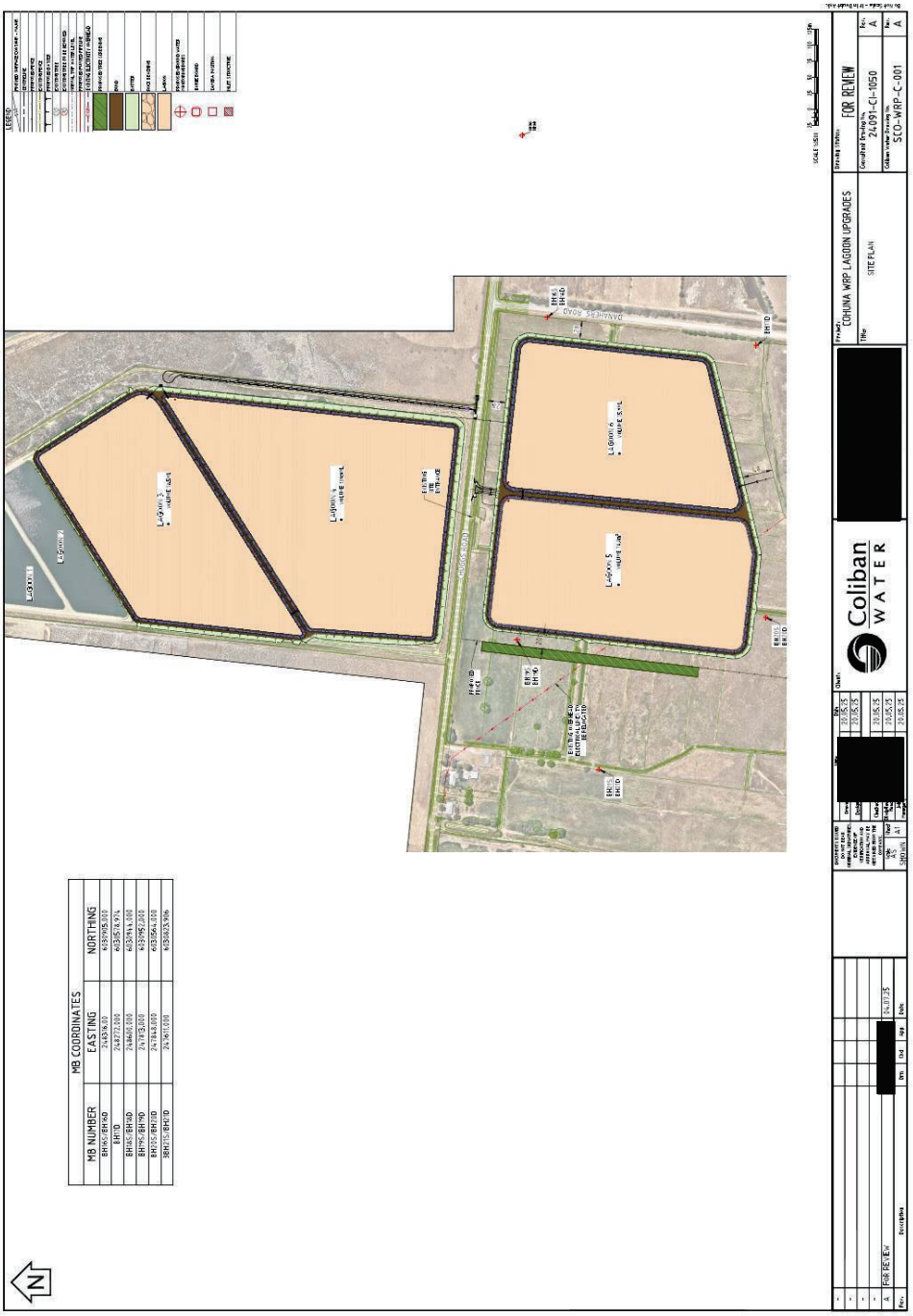

Figure 6 Cohuna WRP Upgraded Layout

3.3 Benefits of the proposed activity

The proposal would have the following key benefits:

1. Mitigating and reducing the risk of adverse impacts to human health and the environment from the WRP due to lagoon seepage. As outlined in Section 2.5, there have been concerns around lagoon permeability and potential impacts to groundwater. The proposed relining of Lagoons 3 & 4 would bring the lagoons up to standard to mitigate seepage. Additionally, the construction of additional Lagoons 5 & 6 would provide contingency storage capacity to reduce the risk of lagoon overflow and associated impacts to land and water.
2. Increasing capacity of the WRP to meet increased community growth. The sizing of Lagoons 5 & 6 has been undertaken to meet 30-yr inflow projections to 2053, taking into account lowered seepage rates following Lagoon 3 & 4 relining. Increasing the capacity of the WRP has the related benefit of enhancing adaptive capacity and resiliency to climate change by providing additional storage capacity that could accommodate future climate patterns.

In addition, the proposal would contribute to the achievement of Coliban Water's Strategy 2030. In particular, it would contribute to the following strategic directions:

– **Water security and zero carbon** by increasing the WRP's resilience to extremes of rainfall variability and contributing to Coliban Water's target of zero carbon by 2040 by adopting a largely passive water treatment approach with minimal electricity use that is offset through renewable electricity.

– **Healthy people and environment** by minimising impacts on groundwater quality by addressing leakages and maintaining a reliable and affordable service to meet community needs.

– **Prosperous economies** by integrating sustainable and reliable water cycle infrastructure, avoiding the potential for stranded assets by maintaining and upgrading the existing WRP to ensure it can continue to provide the required service, and by adopting a lower technology solution which provides the required service in a cost-effective manner.

The proposed activity is consistent with the principles of environment protection, specifically:

– **The principle of proportionality and the integration of environmental, social and economic considerations**; an options assessment, and consideration of the risk to the environment, has been undertaken to consider the preferred option (see section 3.6).

– **Principle of primacy of prevention**; the purpose of this proposal is primarily to prevent impacts to the environment and has prioritised this over remedial or mitigation measures. Potential environmental impacts have been identified, assessed and mitigation measures have been identified (see section 5).

– **Principle of waste management hierarchy**; this proposal maximises the reuse of on-site spoil, including the reuse of clay from construction of Lagoons 5 & 6 as lining material for the remediation of Lagoons 3 & 4 (see section 5.7).

– **Principle of accountability**; significant consultation has been undertaken with nearby property owners and other stakeholders and their interests have been taken into account in the design of the proposal (see section 2.6).

– **Principle of evidence-based decision making**; design of the proposal has been based on evidence obtained through a water balance (see section 3.6.2) and geotechnical studies (Appendix C).

3.4 Proposed plant or equipment to be installed

3.4.1 New Lagoons 5 & 6

Coliban Water proposes to construct two new winter storage and evaporation lagoons (Lagoons 5 & 6). These would have the following key features. Key design documents are provided as Appendix D.

Lagoon 5

– 7.5 ha surface area
– 1.0 m average depth
– 75 ML storage capacity
– 1 m freeboard
– Lining constructed of 600 mm clay, compacted to achieve a minimum density ratio of 98% standard (AS1289) and permeability of 1 x 10^{-9} m/s or less
– 225 mm thickness of rock beaching from inside crest to internal batter toe
– Lagoon batters with the following characteristics:
    - Internal batter: 1:3 slope
    - External batter: 1:5 slope
    - 3 m crest width

Lagoon 6

– 7.5 ha surface area
– 1.0 m average depth
– 75 ML storage capacity
– 1 m freeboard
– Lining constructed of 600 mm clay, compacted to achieve a minimum density ratio of 98% standard (AS1289) and permeability of 1 x 10^{-9} m/s or less
– 225 mm thickness of rock beaching from inside crest to internal batter toe
– Lagoon batters with the following characteristics:
    - Internal batter: 1:3 slope
    - External batter: 1:5 slope
    - 3 m crest width

For both lagoons, depending on the exact quantities of on-site spoil generated during construction, the embankment slope may be altered to achieve soil balance across the site (e.g. if there is additional spoil, a shallower slope may be adopted to use the excess).

3.4.2 Pumping equipment summary

Pumping equipment will be installed at the eastern end of the common bank area between Lagoon 3 and Lagoon 4. This pumping system includes:

– One duty pump (operational)
– One standby pump (backup)
– Pumps will have a power capacity of 3 kW
– Pipeline size of 100 mm (DN100 size (discharge Ø))
– Flow rate of 15 L/s at 9 m head height

The pumping station would transfer treated water from Lagoons 3 & 4 to Lagoons 5 & 6 and would be used as required, depending on the water levels of the lagoons and storage needs.

3.5 Proposed processes and systems to be developed

The following processes and systems will be employed to construct, commission, operate and monitor the performance of the remediated Lagoons 3 & 4 and new Lagoon 5 & 6.

3.5.1 During construction

As part of the tender process the chosen contractor will be required to prepare environmental management documentation to manage the risks to the environment during construction (e.g., construction environmental management plan (CEMP), and safe work method statements (SWMS)) and submit these documents to Coliban Water for approval prior to work starting. Coliban Water will review the contractor's CEMP to ensure it covers the key elements and management controls, such as a risk register and environmental management controls for all relevant construction activities.

Contractors will be responsible for regularly reviewing their documentation to confirm they continue to adequately address environmental management requirements relevant to their scope of services. Any changes to the contractor's approved documentation would be discussed and agreed prior to implementing the changes.

3.5.2 During commissioning

Coliban Water will have the clay liner verified by a suitably qualified geotechnical engineer. This will include a construction verification report detailing construction of the lagoons and liner as per the specifications including liner thickness, compaction and permeability.

3.5.3 During operation

Given the proposed development is the construction of additional winter storage lagoons connected to an existing WRP site, the risks and systems for controlling those risks are anticipated to be the same as the current WRP facility. The environmental management systems currently in place are described in section 7.3 and include Coliban Water's RMMP, and site-specific risk assessment for the Cohuna WRP. These will be updated following construction of the new lagoons to account for Lagoons 5 & 6 and the pump station.

Specifically in relation to managing operation of the new Lagoons 5 & 6, a level sensor will be installed and linked to a SCADA monitoring system with alarms if lagoon water levels exceed set points. This is consistent with the system for managing existing lagoons.

3.6 Best Available Techniques and Technologies (BATT)

3.6.1 Options assessment

A number of options for upgrades to the Cohuna WRP were considered in identifying the BATT for achieving project outcomes. These options included:

– Transfer wastewater from Cohuna to other WRPs within the region. High-level cost estimates found that the cost of this option, including the installation of pipelines, pumping stations, and other supporting infrastructure, would be prohibitive.

– Discharge treated effluent to a Goulburn Murray Water main channel system. This was not adopted due to Goulburn-Murray Water advice that acceptability from downstream users and community was highly unlikely.

– Repair liners for Lagoons 3 & 4 and construct additional evaporation lagoons at the Cohuna WRP to increase storage and evaporation capacity.

– Install a groundwater interception scheme consisting of a series of interception bores along the boundary of lagoons to reduce the impact of seepage from the existing lagoons. This scheme would not address the cause of seepage to groundwater, but rather address the impacts, and would be costly.
– Take measures to reduce wash water inflows from the Cohuna water treatment plant to the WRP – including greater efficiency and the reuse of water within the Cohuna water treatment plant.
– Discharge treated WRP effluent from the lagoon system to Barr Creek. This was not considered an acceptable long-term solution as it would add salinity and nutrient load to the creek over time.
– Do nothing.

Possible options were subjected to an options screening assessment and peer review process that identified retaining treatment and disposal at the Cohuna WRP as the most viable option.

Coliban Water has opted to undertake both the repair of liners and construction of evaporation lagoons and taking measures to reduce wash water inflows from the Cohuna water treatment plant. These options are considered to have the best outcome for the environment and to best address the root cause of the issues, being lagoon seepage. The “Do nothing” option was not considered acceptable as it would not address compliance and seepage at the site.

3.6.2 Water balance modelling

The sizing of Lagoons 5 & 6 has been determined based on water balance modelling by RMCG. RMCG (2021) prepared water balance modelling to support the recommendation for lagoon sizing; surface area, storage depth/volume and configuration (number of cells), including a maximum allowance for WTP wash water disposed to sewer.

Key inputs into the water balance model included:

– Site-specific climate data (rainfall, evaporation 1976-2024)
– Inflow profile to 2053, inclusive of sewer, infiltration and inundation and Cohuna Water Treatment Plant wash water volumes
– Annual inflow distribution (% annual flow per month)
– Existing and proposed lagoon geometry (surface area, average depth, volume)
– Evaporation reduction factors due to oasis effect (0.9) and increased salinity of wastewater (0.70) – total reduction factor 0.63
– Lagoon seepage rate (assumed at EPA min. $1x10^{-9}$ m/s)
– Initial lagoon volume (100 ML) and model start month (February)

The water balance model included the following outputs:

– A time series of wastewater volume in storage over the model duration indicating the ability of the existing and proposed lagoons complex to dispose (evaporate) the annual inflow profile to 2053 and ability to meet EPA licence requirements for the WRP.
– A series of 50-month projections of the performance of the lagoon complex based on starting year, month and initial volume indicating the resilience of the existing and proposed lagoon complex to contain and dispose of inflows in different climatic conditions. The model was run starting in each year from 1976 to 2018.

The modelled lagoon geometry was an additional 15 ha surface area of lagoons at a depth of 1.4 m and a total of 398 ML of storage, and increasing the operational depth of Lagoon 4 by 0.1 m. This offered required benefits while still considering the socio-economic and financial business case of this regional asset. Although the adopted design has lower depths for the new Lagoons 5 & 6, this is offset by an increase in the adopted depth for Lagoon 4. In this way, the total WRP lagoon volume in design (396.5 ML storage) is approximately equal to the lagoon volumes modelled in the water balance. Therefore, the results of the water balance remain valid.

The EPA licence for the Cohuna WRP provides ability for temporary controlled release of treated wastewater during extreme wet weather conditions (above the 90th percentile). The water balance showed that under the proposed total volume, the lagoon was able to contain all but one rain event – when the model was started with year 2010 inflows, which was year with annual rainfall above the 95th percentile which would be consistent with EPA Guidance for wet weather discharges.

This was also including 55 ML per year inflows of wash water from the Cohuna Water Treatment Plant. In parallel with the Cohuna WRP maintenance and upgrades, Coliban Water is also undertaking a separate project to reduce wash water flows from Cohuna Water Treatment Plant through a range of measures including greater efficiency, the reuse of water within with water treatment plant. This has the potential to significantly reduce the volume of water entering the WRP.

3.6.3 Lagoon liners

Coliban Water proposes 600 mm compacted clay liners to be installed in Lagoons 3, 4, 5 & 6.

EPA Publication 1911.2 *Technical information for the Victorian guideline for water recycling*, section 3.7.10 Storage, gives the following guidance on the selection of clay liner thickness. Lagoons 3, 4, 5 & 6 all have capacities above 3 ML and water depths under 1.5 m, so the recommended liner thickness is 300 mm. The selected liners are higher than this recommended thickness.

Table 4 Recommended clay liner thicknesses per EPA guidance

Storage capacity (ML)	Water depth (m)	Filling frequency	Liner thickness (mm)
<3	<1.5	Intermittently	Compacted surface clay soils
≥ 3	<1.5	Permanently	300
≥ 3	~3	Permanently	600
≥ 3	>5	Permanently	1,000

Geotechnical studies at the project site have found that the medium and high plastic clays across the site meet the required permeability rate of 1 x 10^{-9} m/s while low plastic clays and silts do not meet this required rate. By separating and only using medium and high plastic clays for lagoon lining, the required permeability for lagoons will be able to be met. Permeability testing will be conducted to ensure liners meet these requirements (refer section 8).

EPA Publication 1911.2 also suggests a high-density polyethylene (HDPE) liner or composite liner may be more appropriate if the storage is proposed for an area with sandy soils, and/or shallow (unconfined) aquifer and good quality groundwater. As outlined in section 4.4, the site has a topsoil of sandy silt overlying silty clay and, as outlined in section 4.5, groundwater quality is poor in the area.

3.7 Climate change considerations

Based on information from the Climate Change In Australia Cluster Report for the Murray Darling Basin (CSIRO BOM, 2015), the projected climate trends from the Murray Basin Cluster are:

– A substantial increase in the temperature maximums reached on the hottest days, the frequency of hot days and the duration of warm spells is projected with a very high confidence.

– There is high confidence that the intensity of heavy rainfall events will increase. However, there is also a high confidence that cooler seasons will bring reduced rainfall.

– Increased solar radiation in winter and spring is projected with a high level of confidence. With this comes increases to evaporation rates and reduced soil moisture.

– Continued increases in mean, daily maximum and daily minimum temperatures are projected with very high confidence.

– There is high confidence that changing climates will result in a harsher fire-weather in the future.
– There is medium confidence that the time spent in meteorological drought will increase, and the frequency of extreme droughts will increase.

The impacts of these projected climatic changes on the WRP could include greater peaks in inflows during heavy rainfall events, also a higher rate of evaporation from the storage and evaporation lagoons during winter and spring.

The proposal has considered the impacts of climate change through:

– New Lagoons 5 & 6 will provide additional capacity to the WRP which will help accommodate high rainfall events.
– While the water balance for the new Lagoons 5 & 6 was based on historic rainfall data, rather than future projections, it includes replication of climatic conditions for every year from 1976 to 2018 and was found to meet containment consistent with EPA guidance. The water balance also included conservative assumptions such as a reduced evaporation factor which provides an effective factor of safety of 1.6 on the expected long-term performance of the WRP.
– The property that Coliban Water purchased to house the new Lagoons 5 & 6 has more land beyond the footprint of the proposed lagoons, providing the option of adding additional lagoons if required to further increase capacity into the future.
– While the broader piece of land is subject to a Land Subject to Inundation Overlay, the existing WRP and proposed new site for Lagoons 5 & 6 are not within this overlay. The WRP site did not flood or overflow during 2010 or 2022 flood events that affected the broader region. Additionally, consultation with the North Central CMA confirmed that in the event of a 1% AEP flood event it is unlikely that the location of the proposed works will be subject to inundation.
– The site of the new Lagoons 5 & 6 is a historically cleared farm block, which reduces bushfire risk.

The design of the proposal has also sought to reduce greenhouse gas emissions. The minimisation of greenhouse gases is further discussed in section 5.1.

4. Background environmental condition

4.1 Site description and siting considerations

The WRP property is located in the regional town of Cohuna, located in northern Victoria, on the Gunbower Creek and close to the New South Wales border. It is approximately 60 km north-west of Echuca and 230 km from Melbourne. The existing WRP area is zoned PUZ1 Public Use Zone – Service and Utility (e.g., Lagoons 1-4) and the proposed project area for the new lagoons is zoned FZ – Farming Zone (see Figure 7).

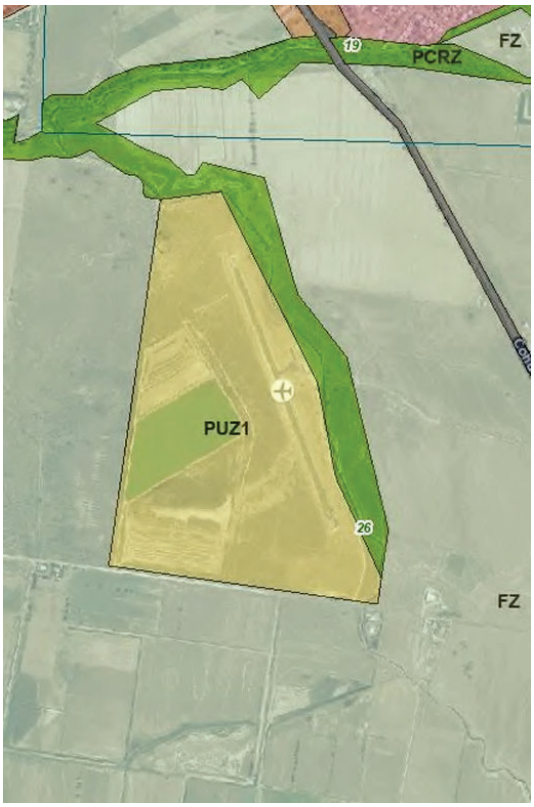

Figure 7 Zoning of project area

The project area includes the existing property (Lot 12 Chuggs Road) where works are proposed to remediate and reline existing Lagoon 3 & 4 and install a pump station (see Section 3.4.2 for further detail on the pump station).

The project area also includes a new property directly south (across Chuggs Rd) of the existing operations to construct and house new Lagoons 5 & 6. The new property for Lagoons 5 & 6 is formerly a bay irrigated broadacre property. Considering the existing WRP is directly north of this new property across Chuggs Rd, distances to sensitive receptors do not dramatically change (magnitude of 0.5 km change) (see Section 4.2 below).

Coliban Water considered numerous sites within a 5 km radius of the existing WRP for the potential siting of new Lagoons 5 & 6 (see Figure 8). This considered ownership, community value, distance to the existing site and soil type suitability. To summarise the considerations for each site:

- Site 1 east of the WRP offered many advantages (e.g., owned by Coliban Water, close proximity), however, the site is important to the Cohuna community as it houses the Cohuna Airport, thus Coliban Water deemed the parcel not appropriate.
- Site 2 west of the WRP showed advantages such as enabling a continuous single site for the wastewater management and increased separation distance between Lagoons and private land. This lot has been subject to prior discussions between the landholder and Coliban Water about purchasing the land. The sandy soil of site 2 would increase development costs.
- Site 3 north-west of the WRP and Site 4 south-west of the WRP were both privately owned, for sale, and had suitable soil properties. However, these sites are further away from the existing site and thus would require additional pipelining and pumping.
- Site 5 was privately owned and composed of favourable clay soils, which decreases development cost. From this, a section of the fifth parcel of land was chosen as most appropriate.

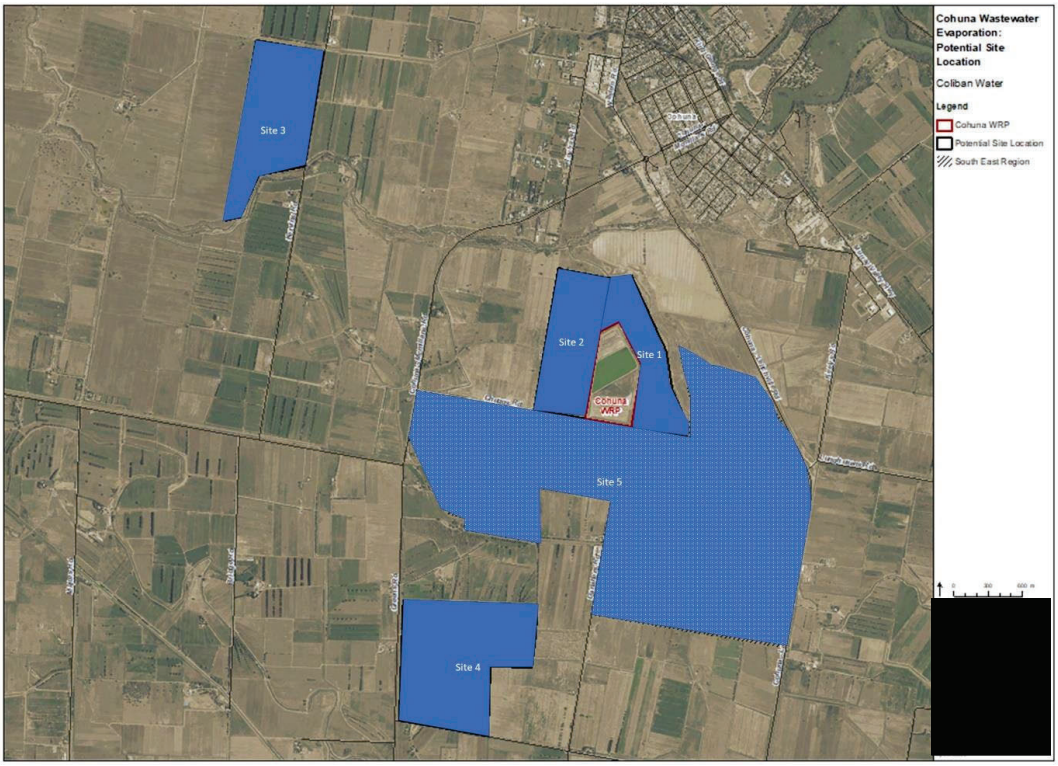

Figure 8 *Cohuna WRP evaporation lagoon assessed land parcels*

4.2 Surrounding land use and sensitive receptors

The surrounding land is zoned as Farming Zone – Schedule 1 (FZ1) and is primarily used for agricultural purposes. Nearby land uses include residential properties and the Cohuna Airport. Sensitive ecological features in proximity to the site include Barr Creek (~250 m East from the existing WWTP, ~300m away from the proposed lagoons), Gunbower Bushland Reserve and the Murray River Reserve (~4 km East). The Cohuna town centre is located approximately 5.5 km North-north-east from the project area.

The nearest sensitive receptors are residential properties R9 (207 Chuggs Road) and R10 (215 Chuggs Road), located approximately 205 m and 251 m west of the wastewater treatment plant boundary, respectively, based on shortest-line distance measurements.

The southeast corner of the property (designated for Lagoons 5 & 6) is leased to a third party for composting activities. The Cohuna airstrip is located directly east of the site.

Key sensitive receptors include:

– Immediate residential neighbour (R9, 207 Chuggs Rd – 205 m west)

– Adjacent residential property (R10, 215 Chuggs Rd – 251 m west)

– Nine additional residential properties located within an approximate 1 km radius

– Cohuna Airport (~1 km northeast)

– Native flora and fauna (refer to Section 4.7 Flora and fauna)

Table 5 Key sensitive receptors

Receptor	Type	Latitude	Longitude	Distance to WWTP (m)
R1	House	-35.833698	144.217385	335
R2	House	-35.833080	144.219420	512
R3	House	-35.834050	144.219840	560
R4	House	-35.842890	144.227640	1489
R5	House	-35.843013	144.230523	1728
R6	House	-35.842592	144.231048	1753
R7	House	-35.840700	144.210410	497
R8	House	-35.841550	144.209610	600
R9	House	-35.832290	144.205750	205
R10	House	-35.832180	144.205230	251
R11	House	-35.831223	144.190839	1554
R12	House	-35.835840	144.190730	1548
R13	House	-35.837760	144.191810	1465
R14	House	-35.841091	144.196463	1180
R15	House	-35.828674	144.192030	1474
R16	House	-35.825235	144.191630	1549
R17	House	-35.824065	144.192887	1449
R18	House	-35.817703	144.201601	1104
R19	House	-35.817804	144.203182	1017
R20	House	-35.817836	144.204046	976
R21	House	-35.816421	144.217502	1143
R22	House	-35.829882	144.225039	1079

Legend

Sensitive recievers

Original lagoon

New lagoon

Paper Size ISO A4

0 250 500 m

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 55

N

GHD

Cohuna Water Reclamation Plant

EPA Development Licence Application

Sensitive Recievers

Project No. 12670048

Date. 16/06/2025

FIGURE 9

Document Path: \\ghdnet\ghd\AU\Melbourne\Projects\31\12670048\GIS\Maps\Working\12670048 - working.qgz
Print Date: 16/06/2025

Data Source: Google Earth Imagery 2025.
Created By: dworkman2

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4.3 Topology

The project site is relatively flat at an elevation of approximately 80 mAHD with only a slight fall in the land towards Barr Creek east and north of the site (see Figure 10 below).

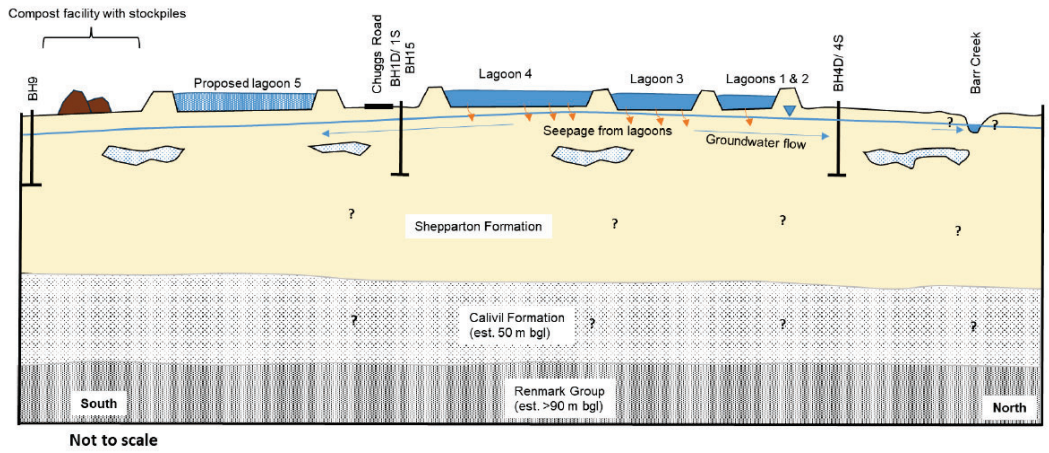


Figure 10 Conceptual hydrogeological model of the Cohuna WRP including proposed additional lagoon

4.4 Geology and soils

4.4.1 Geology

The geology of the existing Cohuna WRP site has been previously documented by GHD in 2017 and is presented in Table 6 below. The relevant water table aquifer for the site is the Shepparton Formation.

Table 6 Summary of regional geology and hydrogeology at the existing Cohuna WRP site

Geological period	Lithological Unit	Hydrostratigraphic Unit	Lithology	Aquifer	Depth below surface (m)
Quaternary	Shepparton Formation	Quaternary Aquifer/Upper Tertiary (UTQA)	Layered clay, sand and silt. Shoe-string sands and gravels of the fluvial Shepparton Formation form local aquifers with surrounding clay and silt rich deposits functioning as aquitards	Aquifer porous media. Minor where sufficient saturated thickness exists	0 to 49
Tertiary	Calivil Formation	Upper Tertiary Aquifer (UTAM)	Sand		49 to 90
	Renmark Group	Lower Tertiary Aquifer (LTA)	Sands, gravels, clay, silt and minor coal		90 to 135
Palaeozoic (Ordovician)	Castlemaine Group	Basement Rocks (BSE)	Sandstone, siltstone, mudstone, shale (fractured). Volcanics, granite, granodiorites (fractured)	Aquifer where fractured or weathered	>135

In 2024, a geotechnical investigation was performed by Geotechnical Testing Services (GTS) on the new lot for Lagoons 5 & 6. The site was generally confirmed to be underlain by Quaternary sedimentary deposits of the Shepparton Formation. The lithology encountered during the field program included sandy silt (<0.15 m), sandy silty clay (to 1.7 m) underlain by silty clay. This indicates similar geology to the existing Cohuna WRP site.

4.4.2 Soils

Existing Cohuna WRP site (Lagoon 3 & 4)

In 2025, GTS investigated the area of Lagoon 3 (see Appendix C). The soil profile was generally uniform across the site. Soil permeability ranged from 3 x 10^{-9} m/s to 6 x 10^{-10} m/s. The foundation included silty clay at depths below 0.1 meters with medium to high plasticity, brown colouring, with trace fine sand and trace medium gravel, that is stiff. At depths below 6.3 meters, the foundation contained clayey sand that is fine to coarse, pale brown mottled grey, with low plasticity fines, and medium density.

In 2016, GTS investigated the area of Lagoon 4 (see Appendix C). Soil permeability ranged from 1 x 10^{-10} m/s to 9 x 10^{-11} m/s. The subsurface profile was relatively uniform across the site. The foundation included silty clay to depths between 0.1 and 0.3 meters with low to medium plasticity, dark grey and black colouring, that is dry and stiff to very stiff. This overlayed silty clay to termination depths with medium to high plasticity, grey and pale brown colouring, that is moist and firm to stiff.

New lot for Lagoons 5 & 6

In 2024 GTS performed a geotechnical investigation where soil samples were taken to understand the geo-characteristics of the new site for Lagoons 5 & 6 (see Appendix C). Soil samples were taken from the boreholes and underwent an array of tests (see Figure 11 below for location of boreholes).

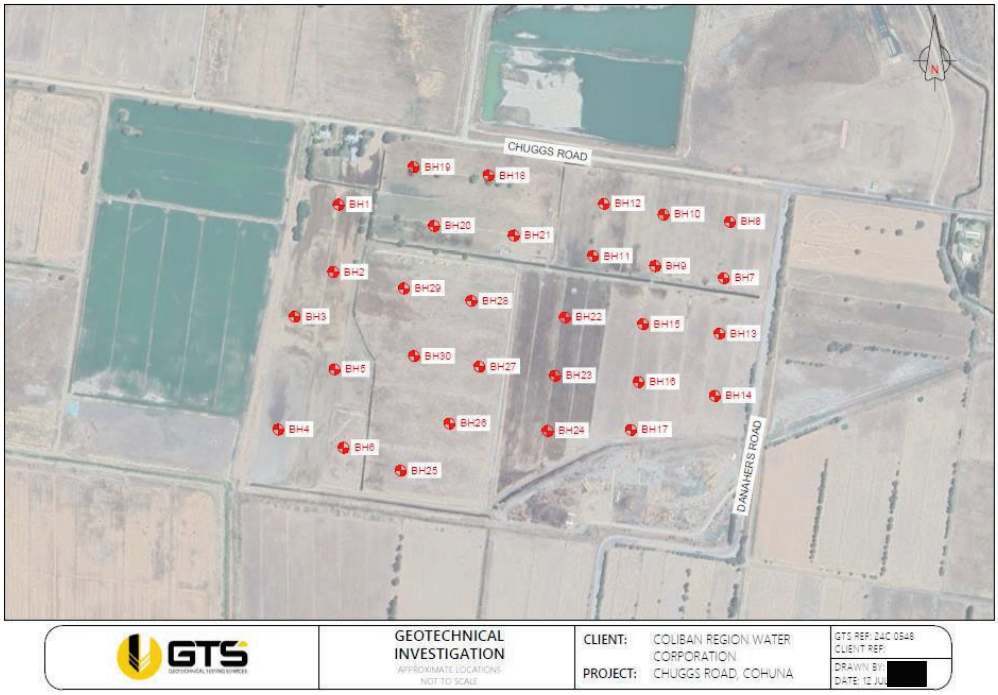


Figure 11 Geotechnical investigation boreholes in GTS 2024

Permeability was tested at the boreholes identified in Figure 11 and ranged from 8 x 10^{-9} m/s to 6 x 10^{-11} m/s. The soil profile was generally uniform across the site.

Key characteristics of the soil profile include:

– A topsoil of sandy silt with low plasticity to a depth between 0.1 to 0.15 meters (brown, fine sand, stiff)

– Overlying (sandy) silty clay with low or low-to-medium plasticity to a depth of between 0.6 to 1.7 metres (brown, pale brown, fine to coarse sand when present, trace fine to medium gravel when present, soft to stiff)

– Overlying silty clay with medium or high plasticity to termination depths (pale brown, pale grey, grey, trace fine to coarse sand when present, stiff to very stiff)

4.5 Hydrogeology

From the historical monitoring of the site, the understanding of the site-specific hydrogeology includes a Shepparton Formation Aquifer, watertable salinity of 5000 – 36,000 mg/L TDS (Segment D), and shallow depths to groundwater with a depth to watertable of approximately 0.5 to 2.5 metres. This indicates the WRP site contains shallow groundwater that is more saline than the region. This is generally considered unsuitable for drinking or irrigation without treatment and thus groundwater is generally not used by the community due to the elevated salinity. No extractive uses of groundwater have been identified within 5 km of the site (GHD 2024).

Most recently, GHD (2024) performed a groundwater monitoring network review for the Cohuna WRP (see Appendix F). Based on this work, groundwater levels are likely to be <1 to 2 mbgl at the proposed locations of Lagoon 5 & 6. This somewhat aligns with the groundwater levels (1.4 to 3.9 mbgl) encountered by GTS (2024) during geotechnical drilling (note that these are the depths encountered during drilling not necessarily the stabilised levels which represent the actual water table depth).

The WRP site has a groundwater monitoring network to monitor site-specific conditions. This includes 20 groundwater monitoring bores, these bores and their inferred flow contours groundwater are shown in Figure 12 below.

Figure 12 Groundwater bores and their inferred flow contours at the project site

4.6 Surface water and drainage

There are two waterways located close to the site, Barr Creek and Gunbower Creek. Barr Creek is the closest to the site (approximately 300 m at closest point) and flows east and north of the site. Across the general area, the creek flows north-west through agricultural land before joining the Loddon River near Murrabit West. Barr Creek is used by the region to drain surrounding irrigated farmland. As a result, a large portion of the flow in the creek stems from intersected groundwater.

Gunbower Creek is located further afield (2 km at its closest point) north-east of the site. Gunbower Creek is an anabranch of the Muray River with land between the Murray River (located around 10 km north-east of the site) and Gunbower Creek forming a floodplain. Gauge boards were installed along Barr Creek, upstream and downstream of the site in 2020 to enable surface water monitoring.

4.7 Flora and fauna

A Protected Matters search within a 5 km radius of the project was completed using the DCCEEW search tool. The search identified areas upstream of seven wetlands of International Importance (RAMSAR), five listed Threatened Ecological Communities, 40 Listed Threatened Species and eight Listed Migratory Species that may occur within a 5 km radius of the project area (see Appendix I).

A database search was carried out on the Victorian Biodiversity Atlas (VBA) to identify any nearby records of any threatened species. The search found no records for flora and ten records of threatened fauna within a 5 km radius of the project site (Appendix J). These are presented in Table 7 below, noting all of the species were last seen over 25 years ago with the exception of the Australasian Shoveler (*Spatula rhynchotis*) which was seen last in 2017. The VBA search revealed that the existing Cohuna ponds have historically been a location where various terrestrial birds, such as the Australasian Shoveler, have been sighted. The proposed works would not impact this outside the relining periods, which would have a temporary impact, and the construction of the new ponds could provide additional area for this activity.

Table 7 Victorian Biodiversity Atlas Search in 5 km radius of project site obtained from Victorian Biodiversity Atlas

Species	Conservation Status	Count of Sightings	Last Sighting
Hydroprogne caspia (Caspian Tern)	Vulnerable	1	25/10/1999
Pluvialis fulva (Pacific Golden Plover)	Vulnerable	1	12/01/1999
Tringa nebularia (Common Greenshank)	Endangered	3	13/04/1999
Tringa stagnatilis (Marsh Sandpiper)	Endangered	9	11/04/1999
Egretta garzetta (Little Egret)	Endangered	1	14/02/1999
Spatula rhynchotis (Australasian Shoveler)	Vulnerable	18	12/03/2017
Oxyura australis (Blue-billed Duck)	Vulnerable	2	13/01/1999
Biziura lobata (Musk Duck)	Vulnerable	3	11/06/1999
Hieraaetus morphnoides (Little Eagle)	Vulnerable	8	15/02/2000
Pomatostomus temporalis (Grey-crowned Babbler)	Vulnerable	1	13/10/1998

A desktop assessment using the online vegetation software Nature Kit 2.0 indicated the presence of four Ecological Vegetation Classes (EVC) within the surrounding project area which is a part of the Murray Fans bioregion (see Figure 13 and Table 8 below). The additional Lagoons (Lagoons 5 & 6) do not have any EVC within the project area, however, Lagoons 3 and 4 show coverage of EVC 829 (Chenopod Grassland). These are listed as having a common geographic occurrence. Impacts to the Chenopod Grassland are unable to be avoided when relining Lagoons 3 & 4. Biodiversity impacts of the proposal are being assessed through the planning approval process.

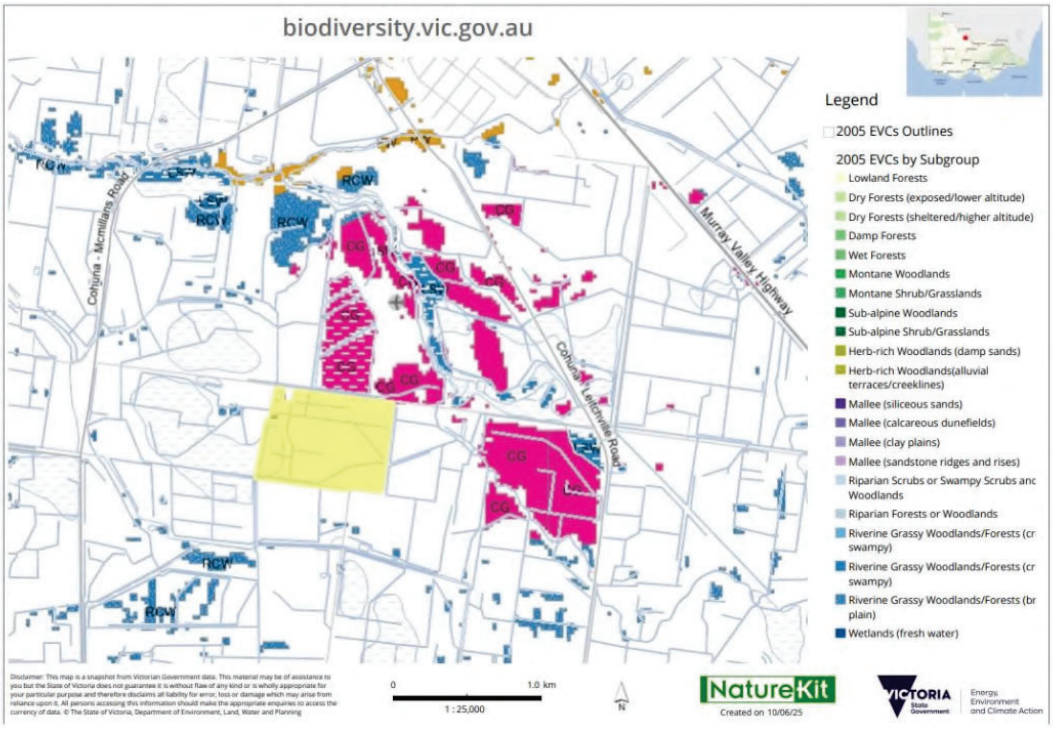


Figure 13 Nature Kit Victoria map results for the project area

Table 8 Nature Kit Victoria results for the project area

Ecological Vegetation Classes (EVC)	Bioregional Conservation Status	Geographic Occurrence	Location in Relation to Project
EVC 803 (Plains Woodland)	Endangered	Common	Within Barr Creek, north-west of Lagoons 3 & 4
EVC 823 (Lignum Swampy Woodland)	Vulnerable	Common	Within Barr Creek, north-west and east of Lagoons 3 & 4
EVC 103 (Riverine Chenopod Woodland)	Endangered	Common	Scattered around project area, mainly north and south-west of the Lagoons
EVC 829 (Chenopod Grassland)	Endangered	Common	In project area – area overlaps with Lagoons 3 & 4

4.8 Cultural Heritage

The Yorta Yorta Nation is the Traditional Owner group for a significant area of north-central Victoria and southern New South Wales, including parts of the Murray and Goulburn River regions. Represented by the Yorta Yorta Nation Aboriginal Corporation (YYNAC), they play a key role in the protection and management of Country, particularly where works are proposed on Crown land or where there may be Aboriginal cultural heritage to consider.

The Barapa Barapa people are Traditional Owners who have lived in present-day Victoria and New South Wales for over 60,000 years and maintain a deep spiritual and cultural connection to the land and water. Represented by Barapa Land and Water, they also play a key role in the region. This involves managing Aboriginal cultural heritage sites of the region including Gunbower Forest and Creek, Kerang Lakes, Guttrum Forest, the Loddon River, Sheepwash Creek, and the Little Murray and Murray Rivers.

The project area is not on cultural heritage sensitivity area as outlined by the Aboriginal Cultural Heritage Register and Information System (ACHRIS) (see Figure 14 below). Native Title Vision also does not show any Native Title on the project area (see Figure 15 below). Nonetheless, Coliban Water has engaged with Yorta Yorta Nation Aboriginal Corporation and Barapa Land and Water about the project (see section 2.6).

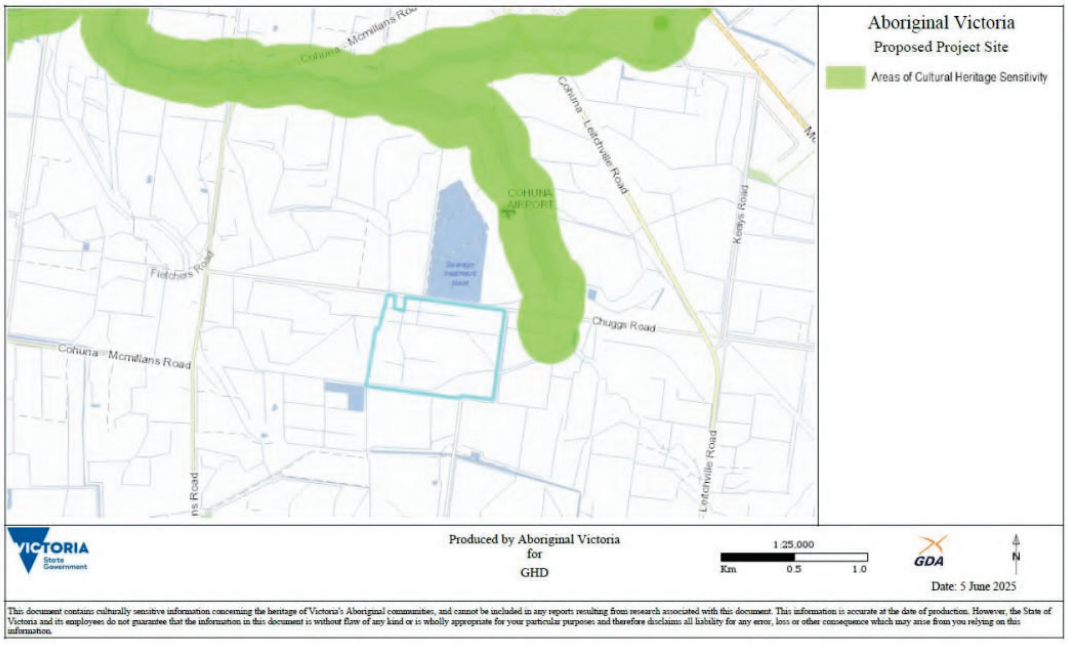


Figure 14 ***Aboriginal Victoria - Aboriginal cultural heritage register and information system (ACHRIS) for the proposed project area***

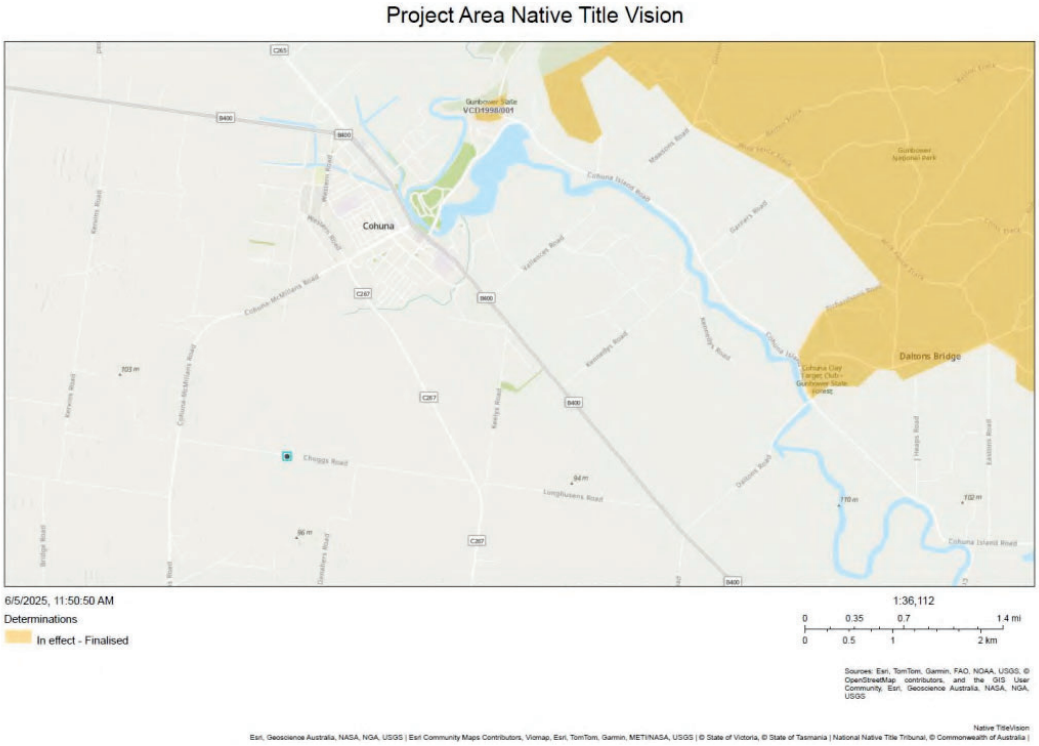


Figure 15 Native Title Vision of the proposed project area

5. Environmental Risk Assessment

Coliban Water's environmental risk management procedures follow Coliban Water's Risk Management Framework (summarised in Section 5 of the RMMP in Appendix G). The aim of the risk identification process is to generate a comprehensive list of things that potentially or actually cause risk to Coliban Water's ability to achieve its objectives or risk to the environment as a result of Coliban Water's operational activities.

A site based environmental risk assessment for each of the main activities associated with the Cohuna WRP operations has been undertaken based on *EPA Publication 1695.1, Assessing and controlling risk: A guide for business*. The aim of the risk assessment was to:

1. Identify environmental aspects and impacts related to the treatment and reuse of wastewater
2. Assess the likelihood and consequence of these impacts occurring and then assign a risk rating to each impact (inherent risk)
3. Identify existing controls that may reduce the likelihood and consequence of these impacts, So Far As Reasonably Practicable (SFARP)
4. Assign a risk rating for each impact, considering the existing controls (i.e. the residual risk)

An extract of the risk register with relevant identified risks at the Cohuna WRP is provided in Appendix H. Both of the highest residual risks identified for the Cohuna WRP (rated very high after controls have been put in place) are associated with the permeability of the current winter storage lagoons (3 and 4) due to deterioration of the clay liner or damage to the liner during desludging events resulting in leakage and contamination or moulding of localised groundwater (refer to Table A3_2 of the RMMP in Appendix G). The proposed upgrades to the lagoon systems that are the subject of this application will improve the permeability of the winter storage lagoons and reduce the associated risk rating. All other risks associated with the existing winter storage lagoons are rated medium or lower.

The risks to each environmental aspect as a result of existing or proposed activities and the systems and processes to minimise these risks are detailed in the following sub-sections.

5.1 Air

5.1.1 Details of any existing or proposed emissions to air

There is the potential for dust emissions to be generated during the construction phase of the project.

There are no point source emissions to air from the current operations at the Cohuna WRP and no proposed point source emissions from the prosed upgrades to the lagoons. Potential diffuse sources of odour emissions are discussed in section 5.6.

5.1.2 Details of the systems and processes that prevent or minimise the impact of air emissions

During construction, management controls for potential dust generation will be identified and managed through a CEMP. Controls will include the use of vegetative stabilisation, where possible, watering to suppress dust and having a complaint and incident response procedure if dust or other air quality complaints are received.

5.2 Greenhouse gases

5.2.1 Details of predicted greenhouse gas emissions

Scope 1 emissions

GHG emissions of methane and nitrogen (nitrous oxide) can be generated from wastewater treatment processes. The existing primary treatment lagoons are diffuse sources of Scope 1 emissions reported to the National Greenhouse and Energy Reporting (NGER) scheme. The proposed addition of storage lagoons (Lagoons 5 & 6) do not contribute to Scope 1 emissions as water storage does not generate greenhouse gas emissions.

Scope 2 emissions – indirect emissions from electricity consumption

The proposed pump station will indirectly emit greenhouse gases (GHG) to our air environment through electricity consumption (Scope 2 emissions) of the new pumping station. Using a conservative assumption that each year 100 ML is pumped to Lagoons 5 & 6 and with proposed pump sizing (see section 3.4.2), the estimated annual greenhouse gas emissions from the pumping station are 4.8 tCO_2e. These Scope 2 emissions are minimal and will be mitigated by Coliban Water's purchase of renewable electricity, see below.

Scope 3 emissions – other indirect emissions

The proposal would generate emissions generated through other sources not within the direct control of the WRP, e.g. contractor fuel use (Scope 3 emissions). The Scope 3 emissions attributed to the proposed remediation of the Lagoons 3 & 4 and construction of the new storage lagoons (Lagoons 5 & 6) are minimal.

5.2.2 Details of the systems and processes that prevent or minimise greenhouse gas emissions

Scope 2 GHG emissions from the proposed upgrades to the winter storage lagoons will be minimised through the use of efficient suitably sized pumps to minimise electricity usage. In addition, Coliban Water will purchase sufficient green power to offset the electricity use of the pump.

The procurement of green power is in accordance with Coliban Water's commitment to achieve net zero carbon emissions by 2030 through carbon reduction offset projects, investment in renewable energy, the purchase of green power, and one-percenters like transitioning Coliban Water's fleet to electric vehicles. Coliban Water also has a target of increasing its investment in renewables to shift to 100% renewable electricity by 2025.

5.3 Noise

5.3.1 Details of any existing or proposed emissions of noise

The current operations at Cohuna WRP, which is a lagoon-based treatment plant, does not have any significant noise emissions and there are no historical noise complaints from the site.

The proposed upgrades to the lagoons and additional pump station are consistent with current operations and are unlikely to significantly increase noise emissions from the site or cause nuisance noise beyond the boundary of the site.

There is the potential for increased noise emissions during construction works from vehicles and construction equipment.

5.3.2 Details of the systems and processes that prevent or minimise the impact of noise emissions

The noise from the new pump station will be minimised through the use of efficient suitably sized pumps. The pump station will be located over 700 m from the nearest sensitive receptor and will be maintained and operated in accordance with the manufacturer's guidance. The management of noise from the pump will be included in an update to the risk management and monitoring program (RMMP).

Noise generated by the pumping station will be monitored and if noise issues are detected, the pumping station is able to be enclosed to attenuate noise levels to ensure compliance with the requirements of EPA Publication 1826.4 *Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues*. This is not anticipated to be necessary due to the small size of the pumps, the distance to the nearest receptor and low likelihood of nuisance noise.

During construction management controls for potential noise impacts will be identified and managed through a CEMP. Controls will include site work to be conducted during daytime hours, maintaining vehicles and equipment in accordance with manufacturer's guidance, notifying nearby residents of construction works prior to works starting and having a complaint and incident response procedure if noise complaints are received.

5.4 Surface water

5.4.1 Details of any existing or proposed emissions to surface water

There are no point source emissions to surface water from the current operations at the Cohuna WRP and no point source emissions to surface water from the proposed upgrades to the lagoons.

The site-specific risk register (refer to Appendix H) has identified the following risks relating to the existing Lagoons 3 & 4:

– Overtopping during high rainfall events leading to flows to surface water

– Infiltration to groundwater discharging to the creek

In addition, specific risks to surface water associated with the new lagoons and lagoon remediation have been identified in the GHD Monitoring Bore Network Review (see section 7 of Appendix F). These include:

– Leakage of treated effluent from the new Lagoons 5 & 6 to underlying soil, migrating to Barr Creek

– Spillage from the storage and handling of hazardous materials infiltrating the soil and shallow groundwater, and impacting Barr Creek – both during construction and operation

– Overflow of wastewater from lagoons due to reaching capacity, leading to runoff of treated effluent to Barr Creek

– Infiltration of treated effluent into soil and shallow groundwater migrating to Barr Creek

All of these risks have the potential to impact surface water quality and ecosystem health of the waterway.

It is noted that Lagoons 3, 4, 5 & 6 are the last in the process line, which reduces the risk of overflow from these lagoons.

5.4.2 Details of the systems and processes that prevent or minimise the impact to surface water

As described in section 3.5.1, a CEMP would be developed, which would include controls to manage the risks to surface water during construction. This would include, at a minimum, the provision of spill kits and response procedures and would consider relevant EPA Publications and Australian Standards for liquid storage and handling. An Operations Management Plan is in place for the site, which documents performance standards and the operation & maintenance methodology.

The proposed remediation and upgrades to the WRP lagoons will reduce the risks from both infiltration and overtopping by increasing the capacity of the lagoon system and reducing the risk of leakage to groundwater from the lagoons (with improved clay linings). Clay liners would be constructed in accordance with EPA Publication 1911.2 *Technical information for the Victorian guideline for water recycling* including a 600 mm thickness and permeability of less than 1 x 10^{-9} m/s.

The following measures have been undertaken to reduce the risk of overtopping:

– As described in section 3.6.2, the lagoon sizing has been undertaken based on a water balance which takes into account predicted inflow volumes to 2053, including conservative assumptions about WTP wash water volumes (which Coliban Water intends to reduce through a range of initiatives) and a conservative evaporation reduction factor to account for the oasis effect and lagoon salinity

– The design of the lagoons includes 1 m freeboard to crest level, which provides freeboard volume equivalent to the working volume of the lagoons

– During operations, there would be SCADA monitoring of the levels of each lagoon with alarms triggered if levels exceed set points

The above contingency measures significantly reduce the risk of overflow. In the event that levels in the lagoons risk overflow, an overflow structure is included in the south west corner of Lagoon 6 which would allow for controlled discharge from Lagoons 5 & 6 to an existing Goulburn-Murray Water drain. This Goulburn-Murray Water drain discharges to Barr Creek, which flows northwest to the Loddon River and ultimately to the Little Murray River and Murray River

There is an existing Barr Creek surface water monitoring site at Chuggs Rd Bridge which is sampled quarterly for water quality. An additional surface water monitoring site is proposed upstream of the new Lagoons 5 & 6 at Cohuna's Leitchville Rd Bridge to monitor for any potential impacts from the lagoons. Monitoring would include both water quality monitoring and reading of the gauge board. This would help to detect water quality impacts from issues with the integrity or performance of the clay liners.

5.5 Land and groundwater

5.5.1 Details of any existing or proposed emissions to land and groundwater

There are no point source emissions to groundwater from the current operations at the Cohuna WRP and no point source emissions to groundwater water from the proposed upgrades to the lagoons. As described in section 3.2.3, reducing impacts to groundwater is a key driver and benefit of this proposal.

The site-specific risk register (refer to Appendix H) has identified the following risks relating to the existing Lagoons 3 & 4:

– Permeability of clay liner exceeding 1 x 10^{-9} m/s due to deterioration of clay liner or damage during desludging leading to contamination or mounding of localised groundwater

– Permeability of clay liner exceeding 1 x 10^{-9} m/s due to deterioration of clay liner or damage during desludging leading to contamination of regional groundwater

– Overtopping of embankment due to excessive inflows. It is noted that Lagoons 3, 4, 5 & 6 are the last in the process line, which reduces the risk of overflow from these lagoons

In addition, specific risks to land and groundwater associated with the new lagoons and lagoon remediation have been identified in the GHD Monitoring Bore Network Review (see section 7 of Appendix F). These include:

– Spillage from the storage and handling of hazardous materials infiltrating the soil and shallow groundwater, and impacting groundwater quality – both during construction and operation

– Leakage of treated effluent from the new Lagoons 5 & 6 to underlying soil, impacting groundwater quality including an increase in nutrients and decrease in salinity

– Leakage of treated effluent from the new Lagoons 5 & 6 to underlying soil changing the environmental value of land due to water logged soils

– Overflow of treated wastewater from lagoons to the surrounding environment changing the environmental value of land

– Overflow of treated wastewater from lagoons due to lagoon reaching capacity when treated effluent infiltrating soil and shallow groundwater, impacting groundwater quality including an increase in nutrients and decrease in salinity
– Excavations/earth works to create lagoon intersect groundwater triggering the need to dewater, which could cause changes in local groundwater flows impacting Barr Creek. This is considered unlikely as Coliban Water are not planning on undertaking any dewatering activities during construction.

5.5.2 Details of the systems and processes that prevent or minimise the impact to land and groundwater

There is significant cross-over between the mitigation measures relating to surface water (described in section 5.4.2) and those for land and groundwater.

As described in section 3.5.1, a CEMP would be developed, which would include controls to manage the risks to land and groundwater during construction. An Operations Management Plan is in place for the site, which documents performance standards and the operation & maintenance methodology.

The proposed remediation and upgrades to the WRP lagoons will reduce the risks from both infiltration and overtopping by increasing the capacity of the lagoon system and reducing the risk of leakage to groundwater from the lagoons (with improved clay linings).

Clay liners would be constructed in accordance with EPA Publication 1911.2 *Technical information for the Victorian guideline for water recycling* including a 600mm thickness of compacted clay and permeability of less than 1 x 10^{-9} m/s.

The following measures have been undertaken to reduce the risk of overtopping:

– As described in section 3.6.2, the lagoon sizing has been undertaken based on a water balance which takes into account predicted inflow volumes to 2053, including conservative assumptions about WTP wash water volumes (which Coliban Water intends to reduce through a range of initiatives) and a conservative evaporation reduction factor to account for the oasis effect and lagoon salinity
– The design of the lagoon includes 1 m freeboard to crest level, which provides freeboard volume equivalent to the working volume of the lagoons
– During operations, there would be SCADA monitoring of the levels of each lagoon with alarms triggered if levels exceed set points

The above contingency measures significantly reduce the risk of overflow. In the event that levels in the lagoons risk overflow, an overflow structure is included in the south west corner of Lagoon 6 which would allow for controlled discharge from Lagoons 5 & 6 to an existing Goulburn-Murray Water drain. This Goulburn-Murray Water drain discharges to Barr Creek, which flows northwest to the Loddon River and ultimately to the Little Murray River and Murray River.

There is an existing groundwater monitoring network of 20 bores, largely located around the existing WRP footprint. As described in section 7.5, regular groundwater monitoring with an extended sampling plan is proposed. An additional 12 bores in six locations are proposed around the new Lagoons 5 & 6 (Figure 16), with the final locations to be determined subject to detailed site assessment including an Assessment of Cultural Heritage. The monitoring program will be reviewed annually and updates made as needed, in line with a risk-based approach. .

Figure 16 Existing and proposed groundwater and surface water monitoring locations (from GHD 2024, see Appendix F)

5.6 Odour

5.6.1 Details of any existing or proposed emissions of odour

The risk register (Appendix H) has identified a low risk of increased odour generation from the maturation and winter storage Lagoons from excessive suspended solids and the presence of algal toxins in treated water (particularly blue-green algae).

Furthermore, the risk of increased odour generation from the proposed works of re-lining Lagoon 3 & 4, and construction of Lagoons 5 & 6 is also anticipated to be low. While Coliban Water has received some historical odour complaints in Cohuna (7 cases since 2019), these have not been related to the WRP. There have been no odour complaints from the maturation or winter storage Lagoons (Lagoon 3 & 4) or the broader WRP in the period since 2019.

There is a risk of odour emissions while de-watering Lagoon 4 prior to remediation, however this is considered unlikely given there were no reported odour complaints when Lagoon 3 was de-watered in 2017 and Lagoon 4 has a higher quality of water as a storage lagoon.

The closest dwelling to the existing WRP (Lagoons 3 & 4) is approximately 200 meters away and sensitive receptor distances to the WRP do not significantly change with the proposed works to Lagoons 3-6. As such, Coliban Water has not, and is not anticipating having, significant odour emissions from the WRP.

5.6.2 Details of the systems and processes that prevent or minimise the impact of odour emissions

Considering the proposed works relates to higher water quality Lagoons (e.g., not treatment lagoons) – Coliban Water is not anticipating any significant increase to odour generation. As discussed above, the site-specific risk register attributes the risk of odour generation to excessive suspended solids and the presence of algal toxins in treated water (particularly blue-green algae). Coliban Water is not expecting sludge to be generated in Lagoons 3 & 4 given they are storage lagoons, and in line with the Cohuna WRP RMMP, any sludge is pre-treated in-situ to pro-actively manage this risk of odour from biosolids.

Coliban Water will continue to monitor odour and respond to any odour complaints received – especially during construction and re-lining of Lagoons 3 & 4 while activities outside of business-as-usual occur.

5.7 Waste

5.7.1 Waste management during construction

A CEMP will be required to be developed by the Contractor for approval by Coliban Water. The CEMP will include a description and overview of the environmental and operational controls during construction for waste management.

Table 9 summarises the anticipated waste streams from remediation of Lagoons 3 & 4. The key waste stream is excavated material which would be reused onsite as much as possible, in line with the ‘reuse’ level of the waste management hierarchy. Any excavated material that is unsuitable for reuse would be disposed of at a suitably licenced facility.

Table 9 Anticipated waste generation during remediation of Lagoons 3 & 4

Description of material	Waste code	Estimated quantity	Proposed treatment or disposal method
Excavated material from remediation of Lagoons 3 & 4	N122	65,060 m^3	Provided this material is found to have suitable characteristics (pending testing), it would be reused onsite as fill below clay liners and embankment fill. See the earthworks sequencing schematic for details of how spoil would be reused (Appendix E). A small amount of this material might be unsuitable for reuse and need to be disposed of, such as the very top surface layer of the floor of Lagoons 3 & 4, estimated at 4,900 m^3. This would be disposed of at a suitable licenced facility.
Biosolids	K400-H	None expected.	There is understood to be very little, if any, biosolids in Lagoons 3 & 4. However, if biosolids sludge is excavated during lagoon remediation, it would be tested and disposed of at a suitable licenced facility. Coliban Water has a licenced facility at Dunolly which is licenced to take K400-H biosolids. Any contaminated waste would be disposed at licenced landfill.
Asbestos cement pipe waste	N220	5 m^3	Disposed of at accredited landfill.

Materials excavated during construction of the new Lagoons 5 & 6 would be separated into topsoil, high and medium plasticity clay, and low plasticity clay and stockpiled onsite for use during remediation of Lagoons 5 & 6. The intention is to use on-site medium and high plasticity clay from the excavation of Lagoons 5 & 6 as the clay liner for Lagoons 3, 4, 5 & 6, and for topsoil material and low plasticity clay to be used for landscaping and to aid revegetation and prevent erosion . Low plasticity clay can also be used in the outer zone of the embankment.

5.7.2 Waste management during operation

The proposal is not anticipated to generate any additional waste streams during operation.

The primary waste stream from evaporative lagoon treatment systems is usually sludge from occasional desludging, however since Lagoons 3, 4, 5 & 6 will operate as storage lagoons, sludge is not anticipated to be generated during operation.

6. Human Health risk assessment

6.1 Details of the potential human health impacts

Human health risks associated with the storage of treated wastewater in the winter storage lagoons is considered low due to the quality of wastewater after the facultative lagoons break down the majority of the incoming organic load. There are no bores with 5 km of the site that are used for extractive uses therefore the human health risks due to leakage to groundwater are also considered very low. The proposed additional winter storage lagoons will reduce the risk to human health from exposure to wastewater through overtopping of the lagoons or groundwater extraction further downgradient by preventing leakage to groundwater and reducing the risk of overtopping.

The detailed design of the winter storage lagoons will be critically reviewed from a health and safety perspective, so that hazards and associated risks with construction, maintenance, operations and end users are eliminated, or where this is not possible, reduced to as low as reasonably practicable.

6.2 Details of the systems and process that prevent the potential human health impacts

Control measures will be adopted in the detailed design including appropriate batter slopes, security fencing, locked gates and signage.

As described in section 3.5.1, a CEMP would be developed, which would include controls to manage the risks to human health during construction including:

– Dust and air quality management
– Noise management
– Soil management (including management of potentially contaminated soil)
– Traffic management

7. Environmental management

7.1 General Environmental Duty

The GED (section 25(4) of the *Environment Protection Act 2017*) requires risks to be minimised so far as reasonably practicable. The key elements of the GED that ensure compliance with the GED include:

- Use and maintain plant, equipment, processes and systems in a manner that minimises risks of harm to human health and the environment from pollution and waste
- Use and maintain systems for identification, assessment and control of risks of harm to human health and the environment from pollution and waste that may arise in connection with the activity, and for the evaluation of the effectiveness of controls
- Use and maintain adequate systems to ensure that if a risk of harm to human health or the environment from pollution or waste were to eventuate, its harmful effects would be minimised
- Ensure that all substances are handled, stored, used or transported in a manner that minimises risks of harm to human health and the environment from pollution and waste
- Provide information, instruction, supervision and training to any person engaging in the activity to enable those persons to comply with the GED

Coliban Water's RMMP ensures compliance with the GED by periodically revisiting and undertaking risk assessments to identify all relevant risks associated with Cohuna WRP's activities and processes and environmental management measures to minimise these risks. Coliban Water is committed to ensuring the application of high-level control measures that minimise environmental risks, so far as reasonably practicable (refer to Figure 17) and has a low appetite for these risks.

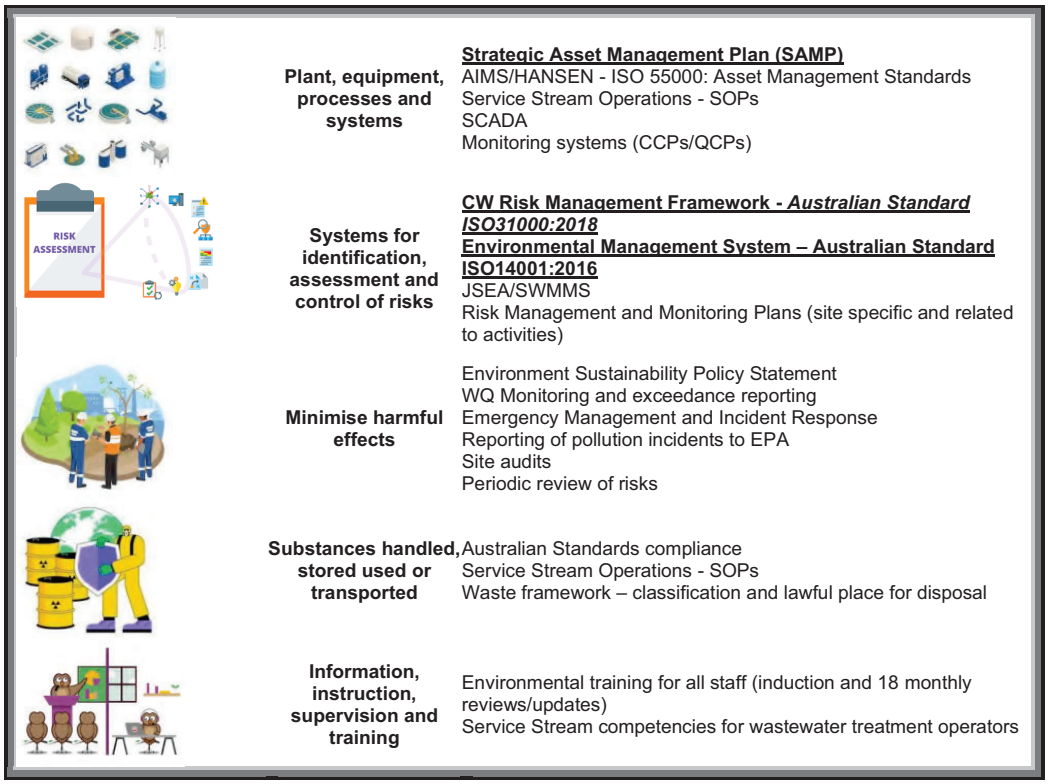


Figure 17 Coliban Water's GED processes in place to minimise and respond to risks taken from the RMMP

7.2 Other applicable duties

7.2.1 Duties relating to pollution incidents

Coliban Water's RMMP outlines their process for environmental incident and emergency response and includes EPA notification requirements for pollution incidents. There would be no changes required to these processes during the construction or operation of the additional winter storage lagoon.

7.2.2 Duties relating to contaminated land

No EPA Priority Sites are located within the project site area. No known soil contamination exists within the project site area however due to the historical use of the site as a WRP there is the potential for the project to encounter contaminated soils requiring management. During the construction of the additional winter storage lagoons the CEMP will include measures to identify, assess, report and manage contaminated soil if encountered.

7.2.3 Duties relating to waste

As discussed in section 5.7 there is not anticipated to generate any additional waste streams during operation. During construction waste will be managed in accordance with the CEMP which will include requirements for wastes to be managed in accordance with EPA publication 1968.1 and 1828.2 including:

– Appropriate segregation, categorisation, and disposal of wastes in accordance with the waste hierarchy, including reuse onsite of material wherever possible

– All wastes disposed of to a lawful place

7.3 Environmental management systems

The Coliban Water Environmental Management System (EMS) is certified to the international standard AS/NZS ISO 14001:2016 and provides a formalised framework to manage environmental performance. The EMS is the primary vehicle through which Coliban Water plan, monitor, report and review the delivery of the intent of Coliban Water's Environment and Sustainability Policy Statement.

A risk management and monitoring program (RMMP) has been developed for all of Coliban Water's Lagoon WRPs (including the Cohuna WRP) in accordance with the GED and condition OL_G5 of EPA OL000069534. The RMMP outlines the management process to identify and mitigate risk to the environment and human health so far as reasonably practicable. A site-specific risk assessment has been undertaken for the Cohuna WRP and is regularly reviewed and updated if required. The risk register identifies the preventative control measures and further actions to be undertaken to prevent or minimise the potential environmental impacts. These measures are captured in additional management documentation such as site inspection checklists, maintenance and desludging schedules, monitoring programs (e.g., wastewater quality and groundwater), and operational management procedures.

A CEMP will be required to be developed by the Contractor for approval by Coliban Water. The CEMP will include:

– Responsibilities for implementing the CEMP

– Site induction and any training/awareness requirements

– Communication and emergency and incident response procedures, including complaint management

– Description and overview of the environmental and operational controls during construction, including controls for:

  - Groundwater management (including avoidance of groundwater
  - Flora and fauna
  - Noise and vibration
  - Air emissions including dust
  - Erosion and sediment

- Soil and contamination
- Chemicals, fuels and wastes
- Traffic

7.4 Training and competency

The training and awareness requirements for operators at Lagoon WRPs such as Cohuna WRP are outlined in section 10 of Coliban Water's RMMP. This includes providing training in the relevant operation management plans and standard operating procedures and their responsibilities in the RMMP. Training records are documented in training registers.

Given that the proposed additional lagoons are consistent with the current operations at the site, there are no additional training requirements for the ongoing operation of proposed additional lagoons.

Training and awareness requirements for the construction of the proposed lagoons will be documented in the CEMP and will include:

– Site induction

– Awareness of the CEMP including the environmental control measures and their responsibilities

– Competency training if required to undertake their work and implement the environmental control measures identified in the CEMP

– Emergency response and incident reporting requirements

7.5 Monitoring and review

7.5.1 Groundwater and surface water monitoring

There are no point source discharges or irrigation of the treated wastewater from the Cohuna WRP. Therefore historically, in addition to quarterly influent water quality monitoring, the main environmental monitoring program undertaken at Cohuna WRP has been a groundwater monitoring program at boreholes across the site, plus surface water monitoring at Barr Creek.

Coliban Water is proposing to extend the current water quality monitoring to include:

– Quarterly effluent monitoring (at lagoon 4 – winter storage)

– Monthly monitoring an upstream and a downstream monitoring point in Barr Creek

– Quarterly groundwater monitoring of an additional 12 bores with an extended suite of parameters as summarised in Table 10

Table 10 Extended groundwater monitoring program

Locations	Frequency	Groundwater chemical analysis	Groundwater chemical parameters
Proposed: 32 bores in 20 locations, additional 12 bores (BH16D, BH16S, BH17D, BH17S, BH18D, BH18S, BH19D, BH19S, BH20D, BH20S, BH21D, BH21S)	Quarterly	Field parameters	Dissolved Oxygen (DO), Electrical Conductivity (EC), pH
		Laboratory analysis	Salinity, measured as mg/L TDS Major ions: calcium, chloride, magnesium, sodium, potassium, sulphate, carbonate and bicarbonate Nutrients: total nitrogen, ammonia (as N), nitrate (as N), and total phosphorus Metals: As, B, Be, Cd, Co, Cu, Hg, Pb, Mn, Se, Ni, Zn E.coli

The monitoring program will be reviewed annually and updates made as needed, in line with a risk-based approach.

7.5.2 Regular inspections and maintenance schedules

The RMMP will specify the frequency and checklists for regular site inspections and maintenance schedules for the plant and equipment. These will include requirements to check pump station operation, integrity of lagoons and linings, noise surveillance and odour surveillance. Any issues identified during these inspections will be recorded and follow actions assigned if required.

8. Commissioning

In line with the staged construction approach, described in section 3.2.4, commissioning of the lagoons would also be staged.

On completion of construction of each new lagoon a commissioning plan will be implemented. This will include structured testing to have confidence that when the various operating scenarios and conditions occur the lagoons will respond as planned. There will be inspection and signoff by a site superintendent following lagoon lining, as well as sampling and testing by a suitably qualified geotechnical engineer to verify that lagoon permeability and compaction requirements have been met.

Performance testing of the pumps and surface level monitors will include:

– Pump flow rates match the expected or configured flow rate
– There are no apparent leaks from the pumps or associated pipework
– The pumps operate without failure during the testing period
– The pumps can be operated and controlled without any failures
– SCADA interface controls, settings and alarms for surface level monitors can be accessed and function correctly

9. References

CSIRO BOM. (2015). Climate Change in Australia Projections Cluster Report – Murray Basin. Retrieved from https://www.climatechangeinaustralia.gov.au/media/ccia/2.2/cms_page_media/168/MURRAY_BASIN_CLUSTER_REPORT_1.pdf

Appendices

Appendix A

Existing operating licence

Operating licence

Environment Protection Act 2017

Licence number	OL000069534
Issue date	3 June 2008
Last amended	5 January 2023
Expiry date	31 December 9999
Licence holder	COLIBAN REGION WATER CORPORATION
ABN	96549082360
Activity site(s)	COHUNA WRP LOT 12 CHUGGS RD, COHUNA, VIC, 3568, AU
Prescribed permission activities	A03 (Sewage treatment)

Issued under section 74(1)(a) of the *Environment Protection Act 2017* (the Act).

[redacted]

Team Leader, Licensing
Delegate of Environment Protection Authority Victoria (EPA)

epa.vic.gov.au
Environment Protection Authority Victoria
GPO BOX 4395 Melbourne VIC 3001
1300 372 842

Operating licence

Environment Protection Act 2017

Context

Environment Protection Authority Victoria (EPA) is Victoria's environmental regulator acting in accordance with the *Environment Protection Act 2017* (the Act). Our regulatory role is to work with community, industry and business to prevent and reduce the harmful effects of pollution and waste on Victoria's environment and people.

Why we issue operating licences

A range of operating activity types are prescribed in the Environment Protection Regulations 2021 (the Regulations) because they give rise to risks of harm to human health or the environment. We issue operating licences so applicants can lawfully undertake prescribed operating activities. Section 45 of the Act provides that a person must not engage in a prescribed operating activity except as authorised by an operating licence in respect of that activity.

When we issue operating licences

EPA can issue an operating licence under section 74(1) of the Act. When issuing an operating licence, EPA takes into account a number of factors, including the measures an applicant has taken or proposes to take in order to comply with the Act when engaging in the prescribed permission activity.

EPA can amend, suspend or revoke a licence for a range of reasons. This can include in response to changes in activities, risks or licence holder performance. All operating licence details are publicly accessible via the EPA Public Register.

Key information and obligations

Interpretation

For the purposes of this operating licence "You" means the "licence holder" identified on the first page. Unless a contrary intention appears, words or terms used in the conditions of your licence have the same meaning as in the Act, and in any regulations made pursuant to the Act.

Compliance

Your licence is subject to conditions. These conditions confer legal obligations on you as the licence holder. Some of these are general in nature, while others require you to do (or not to do) specific things. The requirements of these conditions do not detract from each other in any way, nor do they affect any other duties or obligations with which you are required to comply by law. You must fulfil all duties and perform all obligations set out in this licence or otherwise required by law.

Strict penalties apply for non-compliance with any part of your .

You must comply with the Act and regulations administered by EPA. This includes, but is not limited to, compliance with the general environmental duty (GED).

Operating licence

Environment Protection Act 2017

Duties under the Act
Under the Act, you have legal obligations in relation to your prescribed and non-prescribed activities. These legal obligations exist to minimise risks of harm to human health and the environment from pollution and waste.

You may be committing an offence and be liable to a penalty under the Act if your actions or omissions constitute a breach of these legal obligations.

General environmental duty
The Act places the onus on you to understand the risks associated with your operation or activity and requires you to minimise the risk of harm. This is called the general environmental duty (GED).

Sections 6 and 25 of the Act provide the legal basis for the GED. These sections state that a person engaging in an activity which may give rise to risks of harm to human health or the environment from pollution or waste must eliminate or minimise those risks, as far as reasonably practicable.

Duty to notify EPA of notifiable incidents
A notifiable incident is a pollution incident that causes or threatens to cause material harm to human health or the environment or is a prescribed notifiable incident. Under section 32 of the Act, you have an obligation to notify EPA of a notifiable incident as soon as practicable after you become aware of the incident.

Duty to take action to respond to harm caused by pollution incident
Under section 31 of the Act, if a pollution incident has occurred as a result of an activity (whether by act or omission) and the pollution incident causes or is likely to cause harm to human health or the environment, a person who is engaging in that activity must, so far as reasonably practicable, restore the affected area to the state it was in before the pollution incident occurred.

Duty to notify of contaminated land
Under section 40(1) of the Act, a person in management or control of land must notify EPA if the land has been contaminated by notifiable contamination as soon as practicable after the person becomes aware of the notifiable contamination.

Notifiable contamination means contamination which is prescribed in the Regulations, or contamination for which the cost of action to remediate the land is likely to exceed $50,000, or any other prescribed amount.

Duties relating to industrial waste, priority wastes and reportable priority wastes
Under parts 6.4 and 6.5 of the Act, a person has obligations in relation to the generation, receiving, recording, managing, transporting, and disposal of industrial, priority wastes and reportable priority wastes. These duties include:

- Duties of persons depositing industrial waste.

- Duties of persons receiving industrial waste.
- Duty of persons involved in transporting industrial waste.
- Duties of persons managing priority waste.
- Duty to investigate alternatives to waste disposal.
- Duty to notify of transaction in reportable priority waste.
- Duty of persons transporting reportable priority waste.

For further information on waste classifications see schedule 5 of the Regulations.

Further information and resources
To aid compliance with the Act and the Regulations, Environment Reference Standards (ERS), Compliance Codes, Position Statements and Guidelines have been developed to address a range of environmental objectives, permitted and non-permitted activities and risks.

You should understand how the Victorian environment protection framework applies to you and your activity, operation or business by making yourself familiar with the Act, Regulations, Compliance Codes and other relevant guidance material.

To assist you with understanding your obligations refer to www.epa.vic.gov.au.

Amendment
You can apply at any time to EPA for an amendment to your licence under section 57 of the Act. EPA may also decide to amend a licence under its own initiative according to section 58 of the Act.

Transfer
A person may apply to EPA for the transfer of this licence to a new licence holder pursuant to section 56 of the Act.

Duration of licence
This operating licence is subject to the expiry date identified on the first page. It will remain in force until that time unless it is first surrendered by the licence holder (with consent from EPA), or it is suspended or revoked by EPA.

Operating licence structure

Your operting licence has multiple parts:

- Conditions
- Appendix 1 – locality plan
- Appendix 2 – activity plan
- Appendix 3 – contour plan
- Appendix 4 – waste acceptance table
- Appendix 5 – air discharge table
- Appendix 6 – water discharge table

Operating licence

Environment Protection Act 2017

- Appendix 7 – landfill cell table

Operating licence

Environment Protection Act 2017

Conditions

General conditions

OL_G1	A copy of this licence must be kept at the activity site and be easily accessible to persons who are engaging in an activity conducted at the activity site. Information regarding the requirements of the licence and the Act duties must be included in site induction and training information.
OL_G2	You must immediately notify the Authority by calling 1300 EPA VIC (1300 372 842) in the event of: a) A discharge, emission or deposit which gives rise to, or may give rise to, actual or potential harm to human health or the environment; b) A malfunction, breakdown or failure of risk control measures at the activity site which could reasonably be expected to give rise to actual or potential harm to human health or the environment; or c) Any breach of the licence.
OL_G3	You must notify the Authority within 48 hours of the occurrence of any the following: (a) Any change to your name or address (including your registered address and activity site as applicable); (b) You become, or are likely to become, an insolvent under administration; (c) You become, or are likely to become, an externally administered company under the Corporations Act; or (d) A change to an officer (as defined in the Act). You must update your information in the EPA Interaction Portal if any other relevant administrative details for your business change.
OL_G4a	You must provide to the Authority with a Permission Information and Performance Statement (PIPS) in the form determined by the Authority within 2 months of receiving notification in writing from the Authority. The PIPS may be released to the public (in whole or in part).
OL_G4b	Information and monitoring records used for the preparation of, inclusion in, or support of, any reporting or notification that is required of you by the Authority (including data reporting, performance reporting, documents evidencing any risk and monitoring program) must be: a) retained for five years; and b) made available to the Authority on request.
OL_G5	1. You must develop a risk management and monitoring program for your activities which: (a) identifies all the risks of harm to human health and the environment which may arise from the activities you are engaging in at your activity site; (b) clearly defines your environmental performance objectives; (c) clearly defines your risk control performance objectives; (d) describes how the environmental and risk control performance objectives are being achieved; (e) identifies and describes how you will continue to eliminate or minimise the risks in 1(a) (above) so far as reasonably practicable (SFARP); and (f) describes how the information collated in compliance with this clause, is or will be disseminated, used or otherwise considered by you or any other entity. 2. The risk management and monitoring program must be: (a) documented in writing; (b) signed by a duly authorised officer of the licensed entity; and (c) made available to the Authority on request.

Operating licence

Environment Protection Act 2017

OL_G7	You must: (a) develop and maintain a decommissioning plan that is in accordance with the current decommissioning guidelines published by the Authority; (b) provide the decommissioning plan to the Authority upon request; (c) supply to the Authority an updated detailed decommissioning plan 40 business days prior to commencement of decommissioning, if you propose to divest a section of the licensed site, cease part or all of the licensed activity or reduce the basis upon which the licence was granted to a point where licensing is no longer required; and (d) decommission the licensed site in accordance with the detailed decommissioning plan, to the satisfaction of the Authority and within any reasonable timeframe which may be specified by the Authority.

Standard conditions

OL_DW2.8	Discharge of treated wastewater during wet weather conditions must be in accordance with specifications in "Discharge to Water" section of EPA Publication 1322 'Licence Management Guidelines'.
OL_WM14	All plant and equipment must be maintained and operated in proper working condition, in accordance with the manufacturer's specifications.

Specific conditions

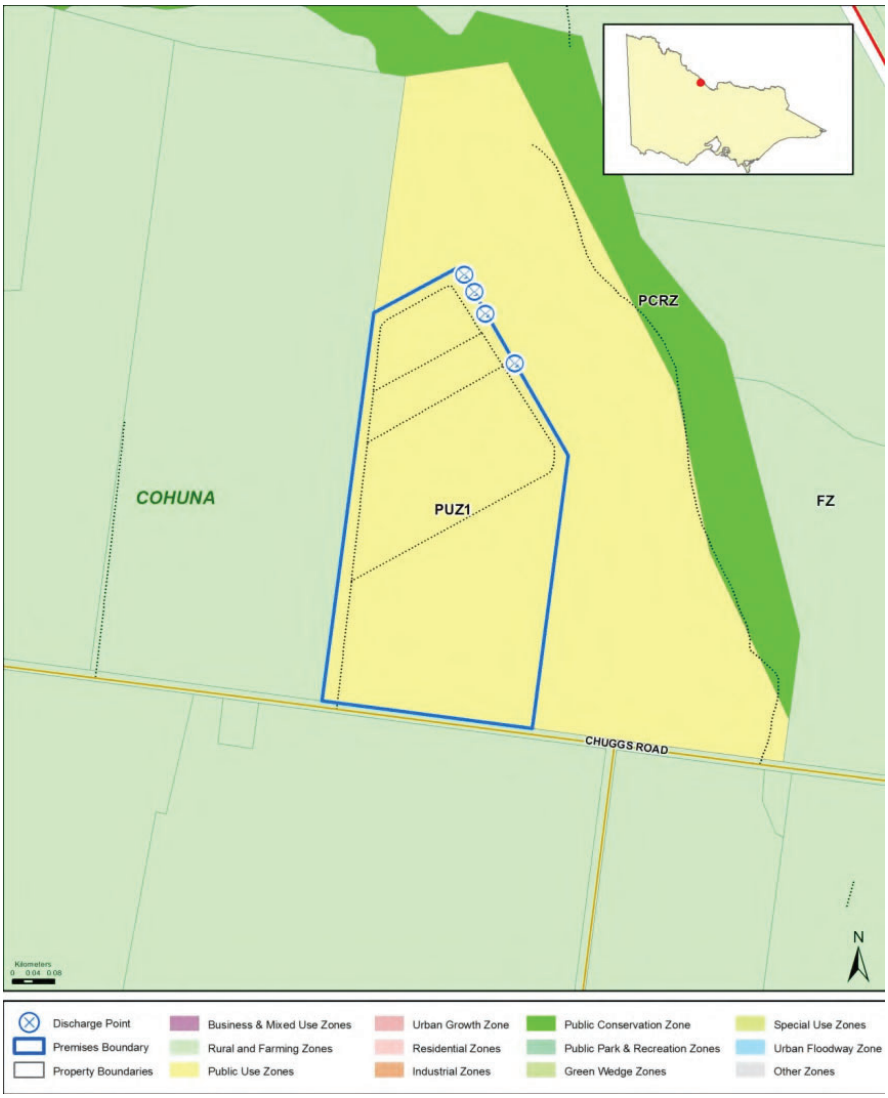
There are no specific conditions for this licence.

Operating licence

Environment Protection Act 2017

Appendices

Appendix 1 – locality plan



Before relying on the information in this map, carefully evaluate its accuracy, currency, completeness and relevance. Obtain appropriate professional advice before using this information.

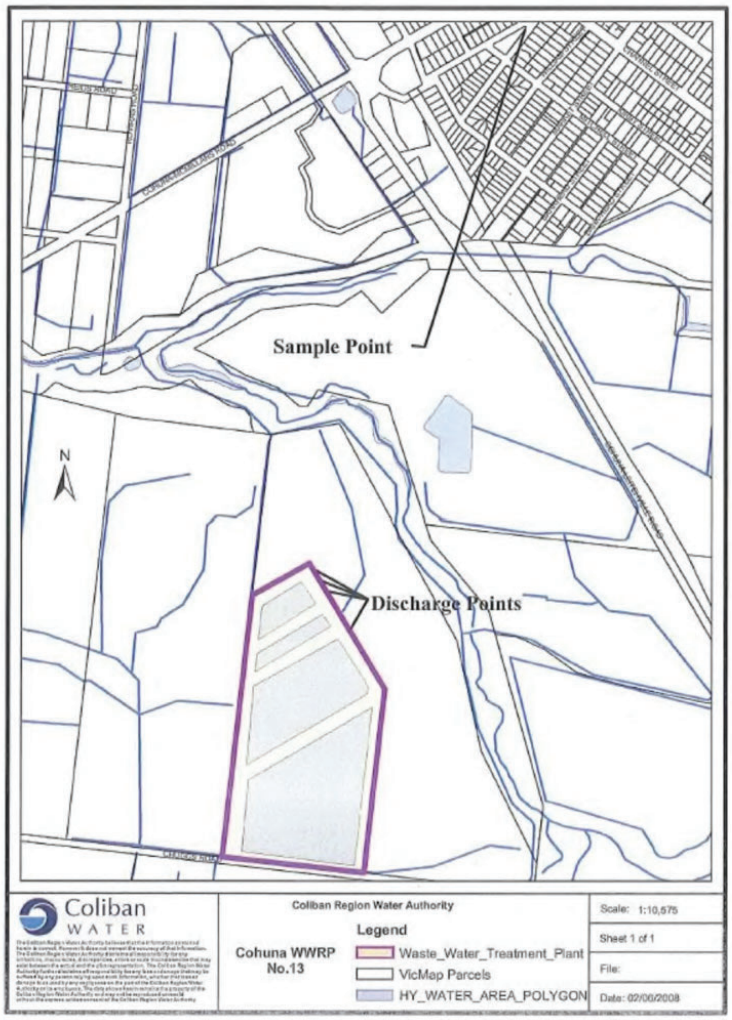
Operating licence

Environment Protection Act 2017

Operating licence

Environment Protection Act 2017

Appendix 2 – activity plan



Before relying on the information in this map, carefully evaluate its accuracy, currency, completeness and relevance. Obtain appropriate professional advice before using this information.

Operating licence

Environment Protection Act 2017

Appendix 3 – contour plan

There is no contour plan for this licence.

Operating licence

Environment Protection Act 2017

Appendix 4 - waste acceptance table

There is no waste acceptance for this licence.

Operating licence

Environment Protection Act 2017

Appendix 5 – air discharge table

There are no air discharge points for this licence.

Operating licence

Environment Protection Act 2017

Appendix 6 –water discharge table

There are no water discharge points for this licence.

Operating licence

Environment Protection Act 2017

Appendix 7 – landfill cells

There are no landfill cells for this licence.

Appendix B

Communications Plan

Communication workplan

Coliban WATER

Date prepared: Tuesday, 17 June 2025	Prepared by: [redacted]	Version number: 2

Cohuna Water Reclamation Plant lagoon upgrades

Communication assets for	Cohuna Water Reclamation Plant upgrades	
Date	Drafted 14 June 2024 Updated 21 August 2024 Finalised 23 June 2025	
Prepared by	[redacted] Communications and Engagement Coordinator [redacted]	
Material to be approved by	[redacted] Concept Development Manager [redacted]	[redacted] Project Manager [redacted]
Project code (if relevant) for timesheets	1930.2.130.2000	
Project milestones and key dates	Design period	July-October 2024
	Tender period and awarding of tender	November-December 2024
	Notification to neighbours and doorknocking	Early August 2024
	Planning Permit	To be submitted early July 2025
	Submission to EPA	To be submitted early July 2025
	Decision from EPA	Expected early-November 2025
	Construction starts	December 2025-January 2026
	Construction ends	TBC

	Testing and commissioning	Winter / Spring 2026
	Project Close Out	30 June 2027
Communication objectives	To inform those near Cohuna Water Reclamation Plant and the general Cohuna community about the planned lagoon upgrades at the plant. To keep stakeholders updated To make information about these works easily accessible via a number of communication channels, including online.	
Project background	The Cohuna Water Reclamation Plant serves an estimated population of 2,000 customers, with no major trade waste customers. The plant is accessed from Chuggs Rd at a point approximately 1.5 km south of Cohuna, and located adjacent to the Cohuna Airport. The plant has four ponds arranged in series. The plant is intended to function as an evaporation plant and as such there is neither an effluent irrigation system nor a regulated discharge of effluent to the environment. A business case has been prepared that identified the need for additional lagoon evaporation capacity and winter storage along with relining of lagoons 3 & 4. Noting some landowner engagement already carried out to date by Corporate Land Assets Coordinator [redacted]	
Potential outrage factors	• A lack of communication about this project • Difficulty finding information or knowing who to ask about it • Customer impacts that were not foreseen – smell, dust or visual impact • Growth in pre-existing impacts to amenity from the existing WRP facility, arising from construction of additional lagoon	
Communication completion schedule	Requirements	Delivery date
	Key Messages	Complete 17 June 2024
	Two letters being sent • Those who will receive letter and subsequent doorknocking (immediate neighbours) • Those who will receive letter only (Those in the area)	Complete Letters sent 23 July 2024 Saved in SRM case number 00733157
	Case created in SRM for capture of all outbound comms	Complete 1 August 2024
	Website update – Connect Coliban – establishment of page	Complete Web page is live
	Website update – Planned works/interruptions page	Complete 1 August 2024

	Update for Customer Support Team, and CSE intranet page update	Complete 26 July 2024
	Database and address information ready for door-knocking,	Complete Surrounding ownership list & map prepared by [redacted]
	Preparation of • Letter & information sheet to hand out during door-knocking • Supporting map • Specific messages for some nearby landowners. • Template to capture feedback	Complete
	Door-knocking takes place Resourcing: [redacted]	Friday 2 August 2024
	Outcomes of door-knocking saved in SRM	Complete 14 August 2024
	Add new FAQs to website	Complete 13 September 2024
	Email or letter to Cohuna Airport (Lions)	Email sent July 2024, no reply Follow up emails sent to Lions Club Treasurer and Committee on 1 July 2025.
	Email for Gannawarra Shire Council	Pre-application communications (phone, email) with GSC throughout April–June 2024.
	Email for Peter Walsh MP	Sent, no reply 25 October 2024
	Email for Barapa Land and Water	Sent, no reply 25 October 2024
	Email for Yorta Yorta Nation	Sent, no reply 25 October 2024
	Email for NCCMA	Sent, no reply 25 October 2024
	Email for GMW	Sent, no reply 1 July 2025

	Website update to timeline	Complete 12 September 2024	
	Social media	Posts went out Friday 26 July, on Facebook and Twitter. See copies of these in appendix of this plan. Further posts planned: Post 1: One week ahead of construction starting – December 2026 To cover introduction to project & what is planned. Post 2: During construction To cover: Project update Post 3: Conclusion of construction or at project completion To cover: Works have been delivered to the community	
	Consider small comms update – now that works pushed back to Summer 2025	October 2025 – TBC	
	Opportunity for SMS follow up or phone call	Two weeks ahead of construction	
	Small intranet article	TBC – at conclusion of works	
	Media release	TBC Not until after council planning and EPA process is understood and in hand.	
		Target	Actual
Success measure and evaluation	Number of customer/landowner complaints	0	
	Number of phone calls received on this project	0	
How we'll close the loop	What follow-up communications are required?	• Website content updated at conclusion of works • Check in with Customer Support Team on any feedback received • Close out SMS – TBC • Close out letter for neighbours – works are complete • Close out social media post – works complete	

Audience and stakeholder analysis

Who	**Stakeholders**	**Stakeholders**	**Internal**
	2,000 customers serviced by the plant Neighbouring landowners (documented in 'surrounding ownership Cohuna' document by [redacted], and in particular noting: • [redacted] • [redacted] • [redacted] Cohuna Airport (adjacent to plant. Lions Club is manager of airport)	Barapa Land and Water Murray Plains MP Peter Walsh Gannawarra Shire Council DEECA (for media release approvals only) EPA NCCMA GMW	Coliban Staff Infrastructure Team Concept Development Team Customer Support Team
How we want them to feel	I am aware of Coliban Water's plans to upgrade the lagoons at Cohuna Water Reclamation Plant. I have spoken to them directly (if a neighbour) or heard from them indirectly (if a customer in Cohuna) and I know who to approach with questions and concerns.	We are aware Coliban Water has engaged with those in Cohuna and has this project in hand. These essential works are important for the long-term sustainability of the Cohuna Water Reclamation Plant. It is a well-considered project which considers compliance and risk.	As a staff member of Coliban Water, I may or may not be aware of this project, but I know how to find information about it. As a member of the Infrastructure Team, Concept Development Team or Customer Support Team, I am aware of this project and know how to find key messages and information online.

Key messages for general community – September 2024

We're planning important lagoon upgrades at our Cohuna Water Reclamation Plant, to increase capacity and keep pace with future population growth.

Everything you flush down the toilet or drain ends up at our plant, and these works are essential to provide sustainable and reliable wastewater services to the community.

A new lagoon is planned for construction south of our plant, near Chuggs Road.

We have recently purchased a piece of land in preparation for this and hope to begin construction in spring 2025.

Our plans also involve maintenance relining works in two of our four existing lagoons and building a new pump station and pipework, to improve environmental sustainability and our day-to-day operations.

A new power supply will be needed to pump wastewater from the existing lagoons through to the new one.

What does this mean for me?

We don't expect you'll notice any significant changes as a result of these works.

Your wastewater services will continue as normal.

If you have any questions, please contact our Project Manage [redacted] on [redacted] during business hours.

Information is also online at connect.coliban.com.au/cohuna-water-reclamation-plant

Why are these works required?

The inflows to our plant includes wastewater from those in Cohuna, as well as wash-water from Cohuna Water Treatment Plant, stormwater and groundwater.

We know that by 2053, our plant is expected to receive inflows of up to 300 ML per year. Currently, an average of 225 ML per year is treated at the plant. We need additional capacity to provide for winter storage in higher rainfall years. We also know that the current surface area of the lagoons is not large enough to provide adequate evaporation for the future increased inflows.

That's why these [redacted] upgrades are essential to improve the plant's resilience and long-term sustainability for the next 25 years.

Will there be odour from the new lagoon?

There is a possibility of odour, as with all lagoons at water reclamation plants, however the new lagoon will store the highest quality water within the plant. This means it will have the least potential for odour production. We encourage you to call us on 1300 363 200 to report any odour your experience.

How high are the banks of the new lagoon?

The lagoon banks will be approximately 1.5 to 2 metres high, similar to the existing lagoons.

Why can't the new lagoon be built on existing Coliban Water land?

Unfortunately there is not enough space for a new lagoon on existing land. There are also land-use restrictions within the aerodrome precinct which we must abide by. This restricts us from building a lagoon near the current ones.

Why does Cohuna have a lagoon-based wastewater treatment system?

The highly saline, shallow water table in the Cohuna area infiltrates into the gravity sewer network, meaning that the wastewater transferred to the Cohuna Water Reclamation Plant has a high salt content. This limits our options for wastewater reuse, such as irrigation or discharge to waterways. Treatment options to remove the salt and allow for reuse or disposal are cost-prohibitive, meaning that a lagoon-based, wastewater treatment and evaporation disposal system is the most feasible option for Cohuna.

Other projects connected to this one

- Cohuna WTP washwater upgrades

Completed comms collateral

Social Media

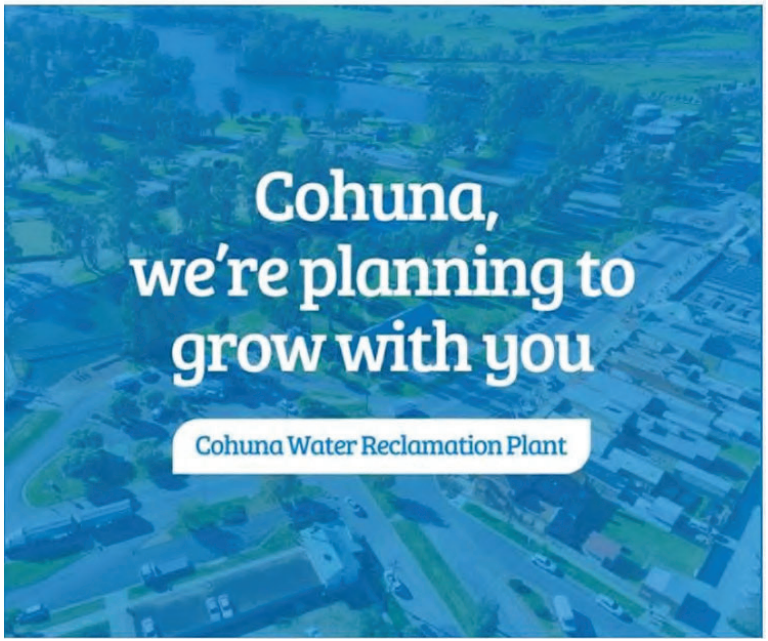
Facebook post Friday 26 July 2024:

The Cohuna Water Reclamation Plant is getting an upgrade!

Everything you flush down the toilet or drain ends up at our plant. So, we're increasing the plant's capacity so that it can keep pace with future population growth.

We're planning to construct a new 15-hectare lagoon south of our plant, near Chuggs Road. The plans also involve relining two of our four existing lagoons and building a new pump station and pipework. This will improve environmental sustainability and our day-to-day operations.

We'll begin construction on this early next year, but in the meantime you can find out more here https://brnw.ch/21wLv6J



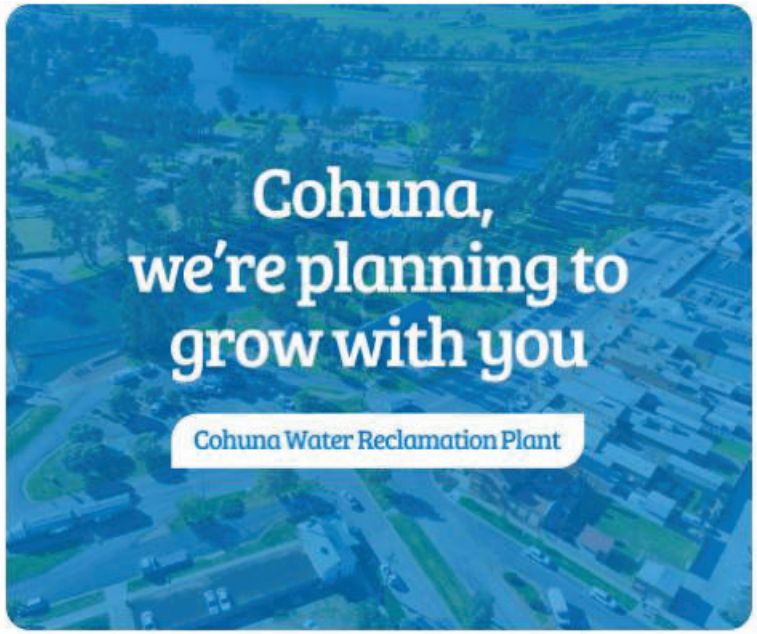
Twitter post Friday 26 July 2024:

Coliban Water @ColibanWater · 26 Jul 2024 9:00

The Cohuna Water Reclamation Plant is getting an upgrade!

Everything you flush down the toilet or drain ends up at our plant. So, we're increasing the plant's capacity so that it can keep pace with future population growth.

More here brnw.ch/21wLv6E



Appendix C

Geotechnical reports

GEOTECHNICAL TESTING SERVICES SOUTHERN

COHUNA WATER RECLAMATION PLANT
CHUGGS ROAD, COHUNA

GEOTECHNICAL INVESTIGATION

FOR

COLIBAN REGION WATER CORPORATION

GTS Report Number 16C 0144
March 2016

[redacted]

• Geotechnical Investigations • Contract Drilling • Land Capability Assessments • Contamination Assessments • Compaction Control Testing • On-site Wastewater Management • Site Classifications • Residential and Industrial • Soil, Concrete and Aggregate Testing Laboratories • Site Laboratory • Construction Material Testing Services • www.geotestsouthern.com.au

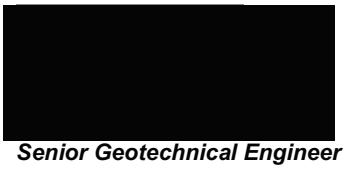
DISCLAIMER

This investigation has been carried out in goodwill and under the instructions of the Coliban Region Water Corporation (Coliban Water). The investigation has been undertaken with the care and skill of competent personnel as defined within Geotechnical Testing Services quality system. It is not a comprehensive investigation but a guide to the conditions throughout the designated area.

The results from this investigation relate to the specified sites labelled throughout this document, and hence the information obtained may need to be extrapolated to the rest of the designated area. While care has been taken throughout this investigation, soil conditions can vary between each individual test site and at depths greater than that drilled during this investigation. Hence, if variations from this report are found during excavations/construction then Geotechnical Testing Services should be notified so it can be assessed and appropriate advice provided.

This document has been prepared for Coliban Water, and hence no responsibility or liability is being accepted to any third party, where any part of the report is used in either isolation or without consideration of the whole document. This document is not appropriate where there has been a significant change in the project or either for the specific needs of the reader.

Please, don't hesitate to contact the undersigned, if you require any further information or assistance.



Senior Geotechnical Engineer

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2	FIELD INVESTIGATION	4
3	LABORATORY TESTING	5
4	DISCUSSION	7
5	IMPORTANT NOTES ABOUT THIS REPORT	8

APPENDIX

Borehole Locations
Borehole Logs
Laboratory Test Reports

1 INTRODUCTION

Coliban Water commissioned Geotechnical Testing Services (GTS) to undertake a geotechnical investigation of the base of Lagoon 4 at the Cohuna Water Reclamation Plant off of Chuggs Road, Cohuna.

The investigation was undertaken to determine the quality of the material currently located in the base and embankments of the existing storage lagoons.

2 FIELD INVESTIGATION

The field investigation was conducted over the period of the 24th to 26th February 2016 and involved the following program as advised by Coliban:

- drilling of 21 boreholes in the floor of lagoon 4 to depths of 3 metres
- obtaining undisturbed tube and disturbed bulk samples for further laboratory testing

The borehole logs are included in the Appendix with their locations shown on the site plan. The subsurface profile generally indicated that the subsurface profile is relatively uniform across the site and may be summarised as follows:

(Sandy) Silty CLAY, low to medium plasticity, dark grey, black, dry, stiff to very stiff
To depths of between 100 and 300mm
Overlying
Silty CLAY, medium to high plasticity, grey, pale brown, moist, firm to stiff
To termination depths

It is noted that the entire floor area of lagoon 4 could not be investigated due to the northeast section being under water.

The Department of Primary Industries online Geovic map shows the site to be underlain by Quaternary aged sedimentary deposits of the Shepparton formation with this generally confirmed by the field data.

3 LABORATORY TESTING

Samples of the soil from the investigation were submitted to GTS laboratory in Bendigo for atterberg limits, emerson class number and particle size distributions. In addition, subsamples were submitted to ALS for cation exchange capacity with permeability tests sent to Groundscience and Civil Geotechnical Services. It is noted that permeability tests were conducted on undisturbed tube samples with either distilled water or saline water. Previous testing of the groundwater at the site indicated Total Dissolved Solids of around 4600mg/L, hence a saline solution 5000mg/L was used. A summary of the test results is included below with the NATA accredited reports for all tests included in the Appendix.

Sample	BH1 0.2-0.6m	BH2 0.2-0.6m	BH3 0.3-0.9m	BH4 0.2-0.7m	BH5 0.3-0.8m	BH6 0.2-0.6m
Liquid Limit (%)	46	42	36	40	47	42
Plastic Limit (%)	17	16	16	16	16	16
Plasticity Index (%)	29	26	20	24	31	26
Linear Shrinkage (%)	15.0	13.0	10.5	12.5	15.0	12.5
% Passing 0.075mm	93	94	96	93	88	90
Emerson Class	4	4	4	4	4	4
Moisture Content (%)	20.2	16.7	18.9	17.5	19.0	17.0
Cation Exchange Capacity (meq/100g)	18	17	11	15	16	14

Sample	BH7 0.3-0.7m	BH8 0.3-0.7m	BH9 0.3-0.7m	BH10 0.3-0.7m	BH11 0.3-0.8m	BH12 0.3-0.8m
Liquid Limit (%)	39	47	46	55	47	47
Plastic Limit (%)	13	16	16	17	17	16
Plasticity Index (%)	26	31	30	38	30	30
Linear Shrinkage (%)	12.0	14.5	14.0	16.5	14.5	14.5
% Passing 0.075mm	83	95	97	94	96	95
Emerson Class	4	4	4	4	4	4
Moisture Content (%)	18.9	20.6	21.0	20.6	20.0	18.5
Cation Exchange Capacity (meq/100g)	16	19	18	23	23	20

Sample	BH13 0.3-0.8m	BH14 0.2-0.6m	BH15 0.2-0.5m	BH16 0.2-0.6m	BH17 0.2-0.6m	BH18 0.2-0.6m
Liquid Limit (%)	49	51	46	48	49	54
Plastic Limit (%)	18	18	16	18	17	19
Plasticity Index (%)	32	33	30	30	32	35
Linear Shrinkage (%)	14.5	17.0	15.0	15.0	15.5	17.0
% Passing 0.075mm	94	93	94	94	92	95
Emerson Class	4	4	4	4	4	4
Moisture Content (%)	20.9	19.9	19.6	20.3	21.8	20.7
Cation Exchange Capacity (meq/100g)	21	21	17	22	22	23

Sample	BH19 0.4-0.8m	BH20 0.2-0.6m	BH21 0.2-0.6m
Liquid Limit (%)	51	58	51
Plastic Limit (%)	19	20	19
Plasticity Index (%)	32	38	32
Linear Shrinkage (%)	16.5	17.0	16.0
% Passing 0.075mm	97	94	93
Emerson Class	4	4	4
Moisture Content (%)	21.5	21.0	21.6
Cation Exchange Capacity (meq/100g)	23	25	20

The results of the permeability tests conducted on undisturbed tube samples are as follows:

Sample	BH1 0.6m	BH2 0.75m	BH3 0.6m	BH4 0.75m	BH5 0.6m	BH6 0.75m
Water	filtered	filtered	filtered	filtered	filtered	filtered
Permeability (m/s)	1.0E-10	6.0E-11	9.0E-11	2.0E-11	2.0E-11	8.0E-11
Water	saline	saline	saline	saline	saline	saline
Permeability (m/s)	1.0E-10	6.0E-11	9.0E-11	4.0E-11	3.0E-11	2.0E-11

Sample	BH7 0.6m	BH8 0.8m	BH9 0.7m	BH10 0.7m	BH11 0.7m	BH12 0.8m
Water	filtered	filtered	filtered	filtered	filtered	filtered
Permeability (m/s)	1.0E-10	3.0E-11	3.0E-11	3.0E-11	1.0E-10	6.0E-11
Water	saline	saline	saline	saline	saline	saline
Permeability (m/s)	3.0E-10	9.0E-11	5.0E-11	2.0E-10	6.0E-11	5.0E-11

Sample	BH13 1.0m	BH14 0.5m	BH15 0.5m	BH16 0.5m	BH17 0.8m	BH18 0.6m
Water	filtered	filtered	filtered	filtered	filtered	filtered
Permeability (m/s)	4.0E-11	2.0E-11	5.0E-11	2.0E-11	3.0E-11	2.0E-11
Water	saline	saline	saline	saline	saline	saline
Permeability (m/s)	2.0E-11	2.0E-11	4.0E-11	2.0E-11	2.0E-11	2.0E-11

Sample	BH19 1.0m	BH20 0.5m	BH21 0.7m
Water	filtered	filtered	filtered
Permeability (m/s)	3.0E-11	3.0E-11	3.0E-11
Water	saline	saline	saline
Permeability (m/s)	3.0E-11	3.0E-11	4.0E-11

4 DISCUSSION

Based on the results of this investigation, the Silty Clay material below the surface deposits (depth of 100 to 300mm) appears suitable as the base for a waste water storage lagoon. The emerson class number for all tests was 4 indicating that it was no dispersive and has a carbonate content. In addition, all permeability tests were conducted on undisturbed tube samples with both fresh/filtered water and saline water resulted in permeability rates of less than 1 x 10^{-9}m/s which is a requirement for storage lagoons. As such, these tests indicate that the material is suitable for the base of a water storage lagoon.

The laboratory tests were conducted over the top 1 metre of this material, however, this material appears consistent to a depth of 3 metres. Whilst it is not possible to say that the base has an engineered clay liner, it can be said that the insitu material below 100 to 300mm is suitable for the base of the water storage lagoon.

To confirm the integrity of the base, the following procedure may be adopted:

- Strip the low to medium plasticity dark grey, black Silty Clay material (depth of 100 to 300mm) to expose the pale brown, grey, high plasticity Silty Clay
- Rip/tyne the Silty Clay a minimum depth of 300mm and moisture condition to -1, +3% of Optimum Moisture Content
- Compact the base to a minimum density ratio of 98% Standard (AS1289 5.1.1, 5.4.1, or 5.7.1).

This will remove and seepage lines that may exist and expose any areas of unsuitable material (e.g. pockets of lower strength or unsuitable material) that may be located in between the test borehole locations.

5 IMPORTANT NOTES ABOUT THIS REPORT

Although this investigation indicates that the subsurface profile is relatively uniform across the site, variations may occur in areas not directly investigated. Material types and quality in areas away from the test locations are inferred only and may vary from those encountered during the investigation.

The soil colours provided in the borehole logs attached may vary with soil moisture content and individual interpretation, therefore colour alone should not be used to identify these soils.

Senior Geotechnical Engineer

APPENDIX

GTS GEOTECHNICAL TESTING SERVICES	**GEOTECHNICAL INVESTIGATION**	**CLIENT:** COLIBAN WATER **PROJECT:** COHUNA WRP CHUGGS ROAD, COHUNA	
	APPROXIMATE LOCATIONS: NOT TO SCALE	GTS REF: 16C 0144	DATE: 26 FEBRUARY 2016

GTS GEOTECHNICAL TESTING SERVICES

ENGINEERING BOREHOLE LOG

Borehole no. 1
Sheet no. 1 of 1
Job no. 16C 0144

Client :	Coliban Water			Date:	24/02/2016
Project :	Cohuna WRP Lagoon			Logged by:	ML
Location :	Chuggs Road, Cohuna				
Drill model :	Gemco HS7	Slope	90 deg	RL surface:	*Not measured*
Hole diameter :	100mm	Bearing	- deg	Datum :	-

Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density index	Structure, additional observations	Notes Samples Tests	Method	Support
Silty CLAY (CI), medium plasticity, dark grey				D	St				
Silty CLAY (CH), high plasticity, pale brown, trace of fine to medium gravel				M	St				
	0.50								
	1.00								
	1.50								
	2.00								
Silty CLAY (CH), high plasticity, pale brown, orange, grey				M	F to St				
	2.50								
	3.00								
BH1 - Terminated at 3.0 metres									
	3.50								
	4.00								

GTS GEOTECHNICAL TESTING SERVICES

ENGINEERING BOREHOLE LOG

Borehole no. 2
Sheet no. 1 of 1
Job no. 16C 0144

[redacted]

Client :	Coliban Water			Date:	24/02/2016
Project :	Cohuna WRP Lagoon			Logged by:	ML
Location :	Chuggs Road, Cohuna				
Drill model :	Gemco HS7	Slope	90 deg	RL surface:	*Not measured*
Hole diameter :	100mm	Bearing	- deg	Datum :	-

Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density index	Structure, additional observations	Notes Samples Tests	Method	Support
Sandy Silty CLAY (CI), medium plasticity, dark grey				D	St				
Silty CLAY (CH), high plasticity, pale brown	0.50			M	S				
	1.00								
	1.50								
Silty CLAY (CH), high plasticity, pale brown, grey	2.00			M	F to St				
	2.50								
	3.00								
BH3 - Terminated at 3.0 metres	3.50								
	4.00								

GTS GEOTECHNICAL TESTING SERVICES

ENGINEERING BOREHOLE LOG

Borehole no. 3
Sheet no. 1 of 1
Job no. 16C 0144

[redacted]

Client :	Coliban Water	Date:	24/02/2016
Project :	Cohuna WRP Lagoon	Logged by:	ML
Location :	Chuggs Road, Cohuna		
Drill model :	Gemco HS7	Slope 90 deg	RL surface: *Not measured*
Hole diameter :	100mm	Bearing - deg	Datum : -

Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density index	Structure, additional observations	Notes Samples Tests	Method	Support
Sandy Silty CLAY (CI), medium plasticity, dark grey				D	St				
Silty CLAY (CI), medium plasticity, orange, brown	0.50			M	St				
Silty CLAY (CH), high plasticity, orange, grey	1.00			M	St to F				
	1.50								
	2.00								
Silty CLAY (CH), high plasticity, grey, pale brown	2.50			M	St to F				
	3.00								
BH3 - Terminated at 3.0 metres									
	3.50								
	4.00								

GTS GEOTECHNICAL TESTING SERVICES

ENGINEERING BOREHOLE LOG

Borehole no. 4
Sheet no. 1 of 1
Job no. 16C 0144

[redacted]

Client :	Coliban Water	Date:	24/02/2016
Project :	Cohuna WRP Lagoon	Logged by:	ML
Location :	Chuggs Road, Cohuna		
Drill model :	Gemco HS7	Slope 90 deg	RL surface: *Not measured*
Hole diameter :	100mm	Bearing - deg	Datum : -

Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density index	Structure, additional observations	Notes Samples Tests	Method	Support
Sandy Silty CLAY (CL), low plasticity, dark grey				D	S				
Silty CLAY (CI), medium plasticity, pale brown				M	St				
	0.50								
Silty CLAY (CH), high plasticity, pale brown, grey	1.00			M	St to F				
	1.50								
	2.00								
Silty CLAY (CH), high plasticity, grey, pale brown	2.50			M	St				
	3.00								
BH4 - Terminated at 3.0 metres									
	3.50								
	4.00								

GTS GEOTECHNICAL TESTING SERVICES

ENGINEERING BOREHOLE LOG

Borehole no. 5
Sheet no. 1 of 1
Job no. 16C 0144

[redacted]

Client :	Coliban Water	Date:	24/02/2016
Project :	Cohuna WRP Lagoon	Logged by:	ML
Location :	Chuggs Road, Cohuna		
Drill model :	Gemco HS7	Slope 90 deg	RL surface: *Not measured*
Hole diameter :	100mm	Bearing - deg	Datum : -

Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density index	Structure, additional observations	Notes Samples Tests	Method	Support
Sandy Silty CLAY (Cl), medium plasticity, black, dark grey				D	S				
Silty CLAY (Cl), medium plasticity, pale brown, orange	0.50			M	St				
Silty CLAY (CH), high plasticity, orange, grey	1.00			M	St				
	1.50								
	2.00								
Silty CLAY (CH), high plasticity, grey, orange				M	St				
	2.50								
	3.00								
BH5 - Terminated at 3.0 metres									
	3.50								
	4.00								

GTS GEOTECHNICAL TESTING SERVICES

ENGINEERING BOREHOLE LOG

Borehole no. 6
Sheet no. 1 of 1
Job no. 16C 0144

Client :	Coliban Water			Date:	24/02/2016
Project :	Cohuna WRP Lagoon			Logged by:	ML
Location :	Chuggs Road, Cohuna				
Drill model :	Gemco HS7	Slope	90 deg	RL surface:	*Not measured*
Hole diameter :	100mm	Bearing	- deg	Datum :	-

Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density index	Structure, additional observations	Notes Samples Tests	Method	Support
Sandy Silty CLAY (CL), low plasticity, black				D	S				
Silty CLAY (CI), medium plasticity, pale brown				M	St				
	0.50								
Silty CLAY (CH), high plasticity, pale brown				M	St				
	1.00								
	1.50								
Silty CLAY (CH), high plasticity, grey, pale brown				M	St				
	2.00								
	2.50								
	3.00								
BH6 - Terminated at 3.0 metres									
	3.50								
	4.00								

GTS GEOTECHNICAL TESTING SERVICES

ENGINEERING BOREHOLE LOG

Borehole no. 7
Sheet no. 1 of 1
Job no. 16C 0144

[redacted]

Client :	Coliban Water	Date:	24/02/2016
Project :	Cohuna WRP Lagoon	Logged by:	ML
Location :	Chuggs Road, Cohuna		
Drill model :	Gemco HS7	Slope 90 deg	RL surface: *Not measured*
Hole diameter :	100mm	Bearing - deg	Datum : -

Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density index	Structure, additional observations	Notes Samples Tests	Method	Support
Sandy Silty CLAY (CL), low plasticity, black				D	S				
Silty CLAY (CI), medium plasticity, pale brown				M	St				
	0.50								
Silty CLAY (CH), high plasticity, pale brown				M	St				
	1.00								
	1.50								
Silty CLAY (CH), high plasticity, grey, pale brown				M	St				
	2.00								
	2.50								
	3.00								
BH7 - Terminated at 3.0 metres									
	3.50								
	4.00								

GTS GEOTECHNICAL TESTING SERVICES

ENGINEERING BOREHOLE LOG

Borehole no. 8
Sheet no. 1 of 1
Job no. 16C 0144

Client :	Coliban Water		Date: 24/02/2016
Project :	Cohuna WRP Lagoon		Logged by: ML
Location :	Chuggs Road, Cohuna		
Drill model :	Gemco HS7	Slope 90 deg	RL surface: *Not measured*
Hole diameter :	100mm	Bearing - deg	Datum : -

Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density index	Structure, additional observations	Notes Samples Tests	Method	Support
Sandy Silty CLAY (CI), low to medium plasticity, black				D	VSt				
Silty CLAY (CI), medium plasticity, pale brown	0.50			M	St				
	1.00								
	1.50								
Silty CLAY (CH), high plasticity, pale brown, grey	2.00			M	F to St				
Silty CLAY (CH), high plasticity, grey, pale brown	2.50			M	F to St				
	3.00								
BH8 - Terminated at 3.0 metres	3.50								
	4.00								

GTS GEOTECHNICAL TESTING SERVICES

ENGINEERING BOREHOLE LOG

Borehole no. 9
Sheet no. 1 of 1
Job no. 16C 0144

Client :	Coliban Water	Date:	24/02/2016
Project :	Cohuna WRP Lagoon	Logged by:	ML
Location :	Chuggs Road, Cohuna		
Drill model :	Gemco HS7	Slope 90 deg	RL surface: *Not measured*
Hole diameter :	100mm	Bearing - deg	Datum : -

Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density index	Structure, additional observations	Notes Samples Tests	Method	Support
Sandy Silty CLAY (CI), low to medium plasticity, black				D	VSt				
Silty CLAY (CI), medium plasticity, pale brown	0.50			M	St				
	1.00								
	1.50								
Silty CLAY (CH), high plasticity, pale brown, grey	2.00			M	F to St				
Silty CLAY (CH), high plasticity, grey, pale brown	2.50			M	F to St				
	3.00								
BH9 - Terminated at 3.0 metres	3.50								
	4.00								

GTS GEOTECHNICAL TESTING SERVICES

ENGINEERING BOREHOLE LOG

Borehole no. 10
Sheet no. 1 of 1
Job no. 16C 0144

[redacted]

Client :	Coliban Water		Date: 24/02/2016
Project :	Cohuna WRP Lagoon		Logged by: ML
Location :	Chuggs Road, Cohuna		
Drill model :	Gemco HS7	Slope 90 deg	RL surface: *Not measured*
Hole diameter :	100mm	Bearing - deg	Datum : -

Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density index	Structure, additional observations	Notes Samples Tests	Method	Support
Sandy Silty CLAY (CI), low to medium plasticity, black				D	VSt				
Silty CLAY (CI), medium palsticity, pale brown	0.50			M	St				
	1.00								
	1.50								
Silty CLAY (CH), high plasticity, grey, pale brown	2.00			M	F to St				
	2.50								
	3.00								
BH10 - Terminated at 3.0 metres	3.50								
	4.00								

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ENGINEERING BOREHOLE LOG

Borehole no. 11
Sheet no. 1 of 1
Job no. 16C 0144

[redacted]

Client :	Coliban Water			Date:	25/02/2016
Project :	Cohuna WRP Lagoon			Logged by:	ML
Location :	Chuggs Road, Cohuna				
Drill model :	Gemco HS7	Slope	90 deg	RL surface:	*t measured*
Hole diameter :	100mm	Bearing	- deg	Datum :	-

Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density index	Structure, additional observations	Notes Samples Tests	Method	Support
Sandy Silty CLAY (CI), medium plasticity, black				D	VSt				
Silty CLAY (CI), medium plasticity, brown				M	St				
	0.50								
	1.00								
Silty CLAY (CH), high plasticity, pale brown, orange				M	St				
	1.50								
	2.00								
Silty CLAY (CH), high plasticity, grey, orange				M	St				
	2.50								
	3.00								
BH11 - Terminated at 3.0 metres									
	3.50								
	4.00								

GTS GEOTECHNICAL TESTING SERVICES

ENGINEERING BOREHOLE LOG

Borehole no. 12
Sheet no. 1 of 1
Job no. 16C 0144

Client :	Coliban Water			Date:	25/02/2016
Project :	Cohuna WRP Lagoon			Logged by:	ML
Location :	Chuggs Road, Cohuna				
Drill model :	Gemco HS7	Slope	90 deg	RL surface:	*t measured*
Hole diameter :	100mm	Bearing	- deg	Datum :	-

Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density index	Structure, additional observations	Notes Samples Tests	Method	Support
Sandy Silty CLAY (CI), medium plasticity, black				D	VSt				
Silty CLAY (CI), medium plasticity, brown				M	St				
	0.50								
	1.00								
Silty CLAY (CH), high plasticity, pale brown, orange				M	St				
	1.50								
	2.00								
Silty CLAY (CH), high plasticity, grey, orange				M	St				
	2.50								
	3.00								
BH11 - Terminated at 3.0 metres									
	3.50								
	4.00								

GTS GEOTECHNICAL TESTING SERVICES

ENGINEERING BOREHOLE LOG

Borehole no. 13
Sheet no. 1 of 1
Job no. 16C 0144

Client :	Coliban Water	Date:	25/02/2016
Project :	Cohuna WRP Lagoon	Logged by:	ML
Location :	Chuggs Road, Cohuna		
Drill model :	Gemco HS7	Slope 90 deg	RL surface: *Not measured*
Hole diameter :	100mm	Bearing - deg	Datum : -

Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density index	Structure, additional observations	Notes Samples Tests	Method	Support
Sandy Silty CLAY (Cl), medium plasticity, dark brown, black				D to M	VSt				
Silty CLAY (CH-Cl), high to medium plasticity, pale brown,	0.50			M	St				
	1.00								
	1.50								
Silty CLAY (CH), high plasticity, grey, brown				M	St				
	2.00								
	2.50								
	3.00								
BH13 - Terminated at 3.0 metres									
	3.50								
	4.00								

GTS GEOTECHNICAL TESTING SERVICES

ENGINEERING BOREHOLE LOG

Borehole no. 14
Sheet no. 1 of 1
Job no. 16C 0144

[redacted]

Client :	Coliban Water			Date:	23/02/2016
Project :	Cohuna WRP Lagoon			Logged by:	ML
Location :	Chuggs Road, Cohuna				
Drill model :	Gemco HS7	Slope	90 deg	RL surface:	*Not measured*
Hole diameter :	100mm	Bearing	- deg	Datum :	-

Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density index	Structure, additional observations	Notes Samples Tests	Method	Support
Silty CLAY (CI), medium plasticity, black				D	VSt				
Silty CLAY (CI), medium plasticity, pale brown trace of fine to medium gravel	0.50			M	St				
	1.00								
	1.50								
Silty CLAY (CH), high plasticity, grey, pale brown				M	St				
	2.00								
	2.50								
	3.00								
BH14 - Terminated at 3.0 metres									
	3.50								
	4.00								

GTS GEOTECHNICAL TESTING SERVICES

ENGINEERING BOREHOLE LOG

Borehole no. 15
Sheet no. 1 of 1
Job no. 16C 0144

[redacted]

Client :	Coliban Water		Date: 26/02/2016
Project :	Cohuna WRP Lagoon		Logged by: ML
Location :	Chuggs Road, Cohuna		
Drill model :	Gemco HS7	Slope 90 deg	RL surface: *Not measured*
Hole diameter :	100mm	Bearing - deg	Datum : -

Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density index	Structure, additional observations	Notes Samples Tests	Method	Support
Silty CLAY (CI), medium plasticity, black				D	VSt				
Silty CLAY (CI), medium plasticity, pale brown				M	VSt				
	0.50								
Silty CLAY (CH), high plasticity, pale brown	1.00			M	St				
	1.50								
Silty CLAY (CH), high plasticity, grey, pale brown				M	St				
	2.00								
	2.50								
	3.00								
BH15 - Terminated at 3.0 metres									
	3.50								
	4.00								

GTS GEOTECHNICAL TESTING SERVICES

ENGINEERING BOREHOLE LOG

Borehole no. 16
Sheet no. 1 of 1
Job no. 16C 0144

Client :	Coliban Water			Date:	26/02/2016
Project :	Cohuna WRP Lagoon			Logged by:	ML
Location :	Chuggs Road, Cohuna				
Drill model :	Gemco HS7	Slope	90 deg	RL surface:	*Not measured*
Hole diameter :	100mm	Bearing	- deg	Datum :	-

Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density index	Structure, additional observations	Notes Samples Tests	Method	Support
Silty CLAY (CI), medium plasticity, black				D	VSt				
Silty CLAY (CI), medium plasticity, pale brown trace of fine to medium gravel	0.50			M	St				
	1.00								
	1.50								
Silty CLAY (CH), high plasticity, pale brown, grey	2.00			M	St				
	2.50								
	3.00								
BH16 - Terminated at 3.0 metres	3.50								
	4.00								

GTS GEOTECHNICAL TESTING SERVICES

ENGINEERING BOREHOLE LOG

Borehole no. 17
Sheet no. 1 of 1
Job no. 16C 0144

[redacted]

Client :	Coliban Water	Date:	26/02/2016
Project :	Cohuna WRP Lagoon	Logged by:	ML
Location :	Chuggs Road, Cohuna		
Drill model :	Gemco HS7	Slope 90 deg	RL surface: *Not measured*
Hole diameter :	100mm	Bearing - deg	Datum : -

Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density index	Structure, additional observations	Notes Samples Tests	Method	Support
Silty CLAY (CI), medium plasticity, dark brown				D to M	VSt				
Silty CLAY (CI), medium plasticity, pale brown grey	0.50			M	St				
Silty CLAY (CH), high plasticity, pale brown, trace of fine to medium gravel	1.00			M	St				
	1.50								
Silty CLAY (CH), high plasticity, grey, pale brown	2.00			M	St				
	2.50								
	3.00								
BH17 - Terminated at 3.0 metres									
	3.50								
	4.00								

GTS GEOTECHNICAL TESTING SERVICES

ENGINEERING BOREHOLE LOG

Borehole no. 18
Sheet no. 1 of 1
Job no. 16C 0144

Client :	Coliban Water	Date:	26/02/2016
Project :	Cohuna WRP Lagoon	Logged by:	ML
Location :	Chuggs Road, Cohuna		
Drill model :	Gemco HS7	Slope 90 deg	RL surface: *Not measured*
Hole diameter :	100mm	Bearing - deg	Datum : -

Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density index	Structure, additional observations	Notes Samples Tests	Method	Support
Silty CLAY (CI), medium plasticity, black				D	VSt				
Silty CLAY (CI), medium plasticity, pale brown trace of gravel				M	St				
	0.50								
	1.00								
Silty CLAY (CH), high plasticity, brown, grey				M	St				
	1.50								
	2.00								
Silty CLAY (CH), high plasticity, grey, brown				M	St				
	2.50								
	3.00								
BH18 - Terminated at 3.0 metres									
	3.50								
	4.00								

GTS GEOTECHNICAL TESTING SERVICES

ENGINEERING BOREHOLE LOG

Borehole no. 19
Sheet no. 1 of 1
Job no. 16C 0144

Client :	Coliban Water			Date:	26/02/2016
Project :	Cohuna WRP Lagoon			Logged by:	ML
Location :	Chuggs Road, Cohuna				
Drill model :	Gemco HS7	Slope	90 deg	RL surface:	*Not measured*
Hole diameter :	100mm	Bearing	- deg	Datum :	-

Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density index	Structure, additional observations	Notes Samples Tests	Method	Support
Silty CLAY (CI), medium plasticity, dark brown, black				D	VSt				
Silty CLAY (CI), medium plasticity, pale brown				M	St				
	0.50								
	1.00								
	1.50								
	2.00								
Silty CLAY (CH), high plasticity, grey, pale brown				M	St				
	2.50								
	3.00								
BH19 - Terminated at 3.0 metres									
	3.50								
	4.00								

GTS GEOTECHNICAL TESTING SERVICES

ENGINEERING BOREHOLE LOG

Borehole no. 20
Sheet no. 1 of 1
Job no. 16C 0144

Client :	Coliban Water			Date:	26/02/2016
Project :	Cohuna WRP Lagoon			Logged by:	ML
Location :	Chuggs Road, Cohuna				
Drill model :	Gemco HS7	Slope	90 deg	RL surface:	*Not measured*
Hole diameter :	100mm	Bearing	- deg	Datum :	-

Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density index	Structure, additional observations	Notes Samples Tests	Method	Support
Silty CLAY (CI), medium plasticity, black, dark brown				D	VSt				
Silty CLAY (CI), medium plasticity, pale brown trace of fine to medium gravel				M	St				
	0.50								
	1.00								
Silty CLAY (CH), high plasticity, pale brown, grey				M	St				
	1.50								
	2.00								
	2.50								
Silty CLAY (CH), high plasticity, grey, pale brown				M	St				
	3.00								
BH20 - Terminated at 3.0 metres									
	3.50								
	4.00								

GTS GEOTECHNICAL TESTING SERVICES

ENGINEERING BOREHOLE LOG

Borehole no. 21
Sheet no. 1 of 1
Job no. 16C 0144

Client :	Coliban Water			Date:	26/02/2016
Project :	Cohuna WRP Lagoon			Logged by:	ML
Location :	Chuggs Road, Cohuna				
Drill model :	Gemco HS7	Slope	90 deg	RL surface:	*t measured*
Hole diameter :	100mm	Bearing	- deg	Datum :	-

Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density index	Structure, additional observations	Notes Samples Tests	Method	Support
Sandy Silty CLAY (CI), medium plasticity, black, dark brown				D	VSt				
Silty CLAY (CI), medium plasticity, brown				M	St				
	0.50								
Silty CLAY (CH), high plasticity, pale brown				M	St				
	1.00								
	1.50								
					St				
	2.00								
	2.50								
Silty CLAY (CH), high plasticity, grey, pale brown				M	St				
	3.00								
BH21 - Terminated at 3.0 metres									
	3.50								
	4.00								

GTS GEOTECHNICAL TESTING SERVICES SOUTHERN

ENGINEERING BOREHOLE LOG

Borehole no. 2
Sheet no. 1 of 1
Job no.

[redacted]

Client :				Date:	
Project :				Logged by:	
Location :					
Drill model :	Gemco HS7	Slope	90 deg	RL surface:	*t measured*
Hole diameter :	100mm	Bearing	- deg	Datum :	-

Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density index	Structure, additional observations	Notes Samples Tests	Method	Support
	0.50								
	1.00								
	1.50								
	2.00								
	2.50								
	3.00								
	3.50								
	4.00								

GEOTECHNICAL TESTING SERVICES SOUTHERN

ENGINEERING BOREHOLE LOG

Borehole no. 3
Sheet no. 1 of 1
Job no.

Client :				Date:	
Project :				Logged by:	
Location :					
Drill model :	Gemco HS7	Slope	90 deg	RL surface:	*t measured*
Hole diameter :	100mm	Bearing	- deg	Datum :	-

Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density index	Structure, additional observations	Notes Samples Tests	Method	Support
	0.50								
	1.00								
	1.50								
	2.00								
	2.50								
	3.00								
	3.50								
	4.00								

GTS GEOTECHNICAL TESTING SERVICES SOUTHERN

[redacted]

ENGINEERING BOREHOLE LOG

Borehole no. 4
Sheet no. 1 of 1
Job no.

Client :				Date:	
Project :				Logged by:	
Location :					
Drill model :	Gemco HS7	Slope	90 deg	RL surface:	*t measured*
Hole diameter :	100mm	Bearing	- deg	Datum :	-

Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density index	Structure, additional observations	Notes Samples Tests	Method	Support
	0.50								
	1.00								
	1.50								
	2.00								
	2.50								
	3.00								
	3.50								
	4.00								

GTS GEOTECHNICAL TESTING SERVICES SOUTHERN

ENGINEERING BOREHOLE LOG

Borehole no. 5
Sheet no. 1 of 1
Job no.

[redacted]

Client :				Date:	
Project :				Logged by:	
Location :					
Drill model :	Gemco HS7	Slope	90 deg	RL surface:	*t measured*
Hole diameter :	100mm	Bearing	- deg	Datum :	-

Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density index	Structure, additional observations	Notes Samples Tests	Method	Support
	0.50								
	1.00								
	1.50								
	2.00								
	2.50								
	3.00								
	3.50								
	4.00								

GEOTECHNICAL TESTING SERVICES SOUTHERN

ENGINEERING BOREHOLE LOG

Borehole no. 6
Sheet no. 1 of 1
Job no.

[redacted]

Client :			Date:
Project :			Logged by:
Location :			
Drill model :	Gemco HS7	Slope 90 deg	RL surface: *Not measured*
Hole diameter :	100mm	Bearing - deg	Datum : -

Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density index	Structure, additional observations	Notes Samples Tests	Method	Support
	0.50								
	1.00								
	1.50								
	2.00								
	2.50								
	3.00								
	3.50								
	4.00								

GTS GEOTECHNICAL TESTING SERVICES SOUTHERN

ENGINEERING BOREHOLE LOG

Borehole no. 7
Sheet no. 1 of 1
Job no.

Client :				Date:	
Project :				Logged by:	
Location :					
Drill model :	Gemco HS7	Slope	90 deg	RL surface:	*t measured*
Hole diameter :	100mm	Bearing	- deg	Datum :	-

Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density index	Structure, additional observations	Notes Samples Tests	Method	Support
	0.50								
	1.00								
	1.50								
	2.00								
	2.50								
	3.00								
	3.50								
	4.00								

GTS GEOTECHNICAL TESTING SERVICES SOUTHERN

[redacted]

ENGINEERING BOREHOLE LOG

Borehole no. 8
Sheet no. 1 of 1
Job no.

Client :				Date:	
Project :				Logged by:	
Location :					
Drill model :	Gemco HS7	Slope	90 deg	RL surface:	*t measured*
Hole diameter :	100mm	Bearing	- deg	Datum :	-

Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density index	Structure, additional observations	Notes Samples Tests	Method	Support
	0.50								
	1.00								
	1.50								
	2.00								
	2.50								
	3.00								
	3.50								
	4.00								

GTS GEOTECHNICAL TESTING SERVICES SOUTHERN

ENGINEERING BOREHOLE LOG

Borehole no. 9
Sheet no. 1 of 1
Job no.

[redacted]

Client :				Date:	
Project :				Logged by:	
Location :					
Drill model :	Gemco HS7	Slope	90 deg	RL surface:	*t measured*
Hole diameter :	100mm	Bearing	- deg	Datum :	-

Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density index	Structure, additional observations	Notes Samples Tests	Method	Support
	0.50								
	1.00								
	1.50								
	2.00								
	2.50								
	3.00								
	3.50								
	4.00								

GTS GEOTECHNICAL TESTING SERVICES SOUTHERN

ENGINEERING BOREHOLE LOG

Borehole no. 10
Sheet no. 1 of 1
Job no.

[redacted]

Client :			Date:
Project :			Logged by:
Location :			
Drill model :	Gemco HS7	Slope 90 deg	RL surface: *t measured*
Hole diameter :	100mm	Bearing - deg	Datum : -

Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density index	Structure, additional observations	Notes Samples Tests	Method	Support
	0.50								
	1.00								
	1.50								
	2.00								
	2.50								
	3.00								
	3.50								
	4.00								

GTS GEOTECHNICAL TESTING SERVICES SOUTHERN

Soil Analysis Report - Atterberg, Emerson, Grading, Moisture Content

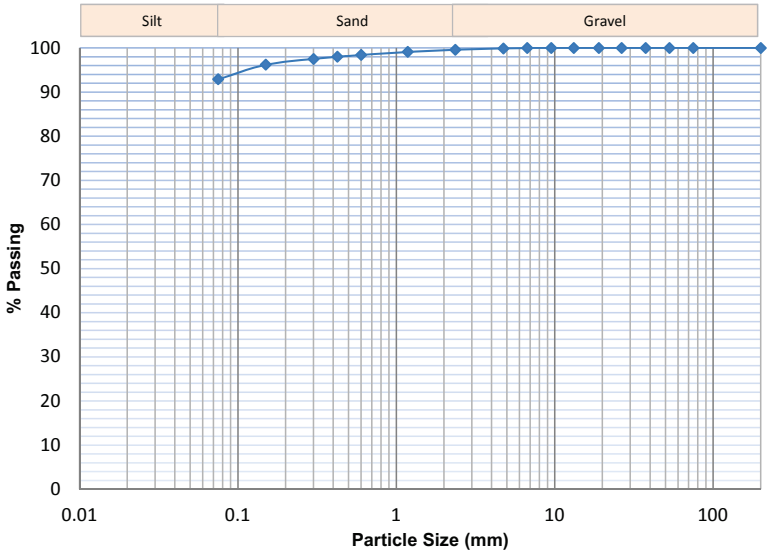
Report For: Coliban Water
P.O Box 2770
BENDIGO
VIC 3554

Report No.	16E 0574
Revision No.	0
Sheet:	1 of 21
Date of Report:	22/04/2016
GTSS Sample No.	16E 0574A

Project: Material Investigation
Sample Location Cohuna Water Treatment Plant
Client Identification[2]: Bore Hole 1
Date Sampled: 25/02/2016 **Sample supplied by :** Laboratory
Material Description: Silty Clay, Brown, Trace of Sand

PARTICLE SIZE DISTRIBUTION

Sieve Size mm	Sample % Passing
200	100
75.0	100
53.0	100
37.5	100
26.5	100
19.0	100
13.2	100
9.5	100
6.7	100
4.75	100
2.36	100
1.18	99
0.600	98
0.425	98
0.300	98
0.150	96
0.075	93



ATTERBERG LIMITS

Liquid Limit %	46
Plastic Limit %	17
Plasticity Index %	29
Linear Shrinkage %	15.0
Curling	No
Crumbling	Yes
Cracking	No
Mould Length (mm):	254

MOISTURE CONTENT

Moisture Content %	20.2

EMERSON CLASS NUMBER

Water Type	channel
Water Temperature (°C)	25
Emerson Class Number	4

MATERIAL PROPERTIES

Gravel Content %	0
Sand Content %	7
Silt/Clay Content %	93

Notes: * Represents test not preformed
1. Test Methods: AS 1289: 2.1.1 / 3.1.2 / 3.3.1 / 3.4.1 / 3.4.1 / 3.6.1 / 3.8.1
2. This laboratory is not be responsible for the correctness or accuracy of information provided by the client.

Approved Signatory: [redacted] **Date:** April 22, 2016

Geotechnical Testing Services, Southern
Geotechnical Investigations, Soil Concrete and Aggregate Testing Laboratories (on/off site), Contract Drilling, Compaction Control Testing, Site Classifications, Land Capability Assessments, Contamination Assessments

[redacted]

Laboratory accreditation number 19506
Accredited for compliance with ISO/IEC 17025
The results of the test included in this document are traceable to Australian / National Standards.

NATA WORLD RECOGNISED ACCREDITATION

GTS GEOTECHNICAL TESTING SERVICES SOUTHERN

Soil Analysis Report - Atterberg, Emerson, Grading, Moisture Content

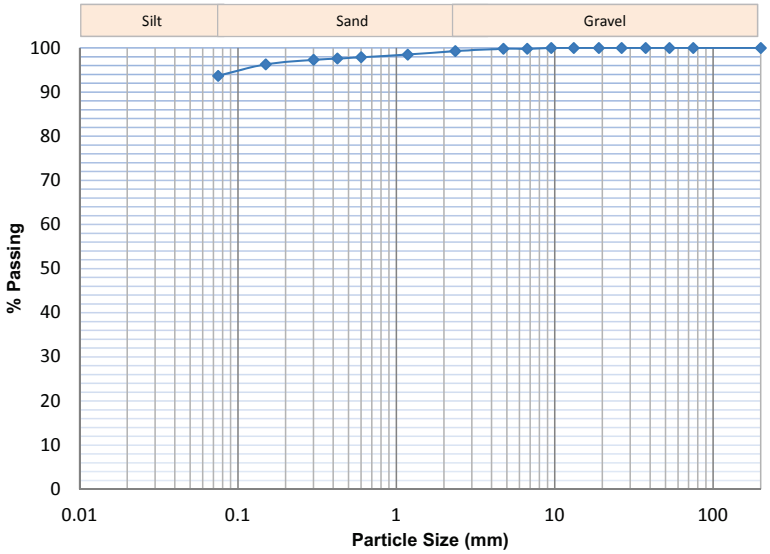
Report For: Coliban Water
P.O Box 2770
BENDIGO
VIC 3554

Report No.	16E 0574
Revision No.	0
Sheet:	2 of 21
Date of Report:	22/04/2016
GTSS Sample No.	16E 0574B

Project: Material Investigation
Sample Location Cohuna Water Treatment Plant
Client Identification[2]: Bore Hole 2
Date Sampled: 25/02/2016 **Sample supplied by :** Laboratory
Material Description: Silty Clay, Brown, Trace of Gravel & Sand

PARTICLE SIZE DISTRIBUTION

Sieve Size mm	Sample % Passing
200	100
75.0	100
53.0	100
37.5	100
26.5	100
19.0	100
13.2	100
9.5	100
6.7	100
4.75	100
2.36	99
1.18	99
0.600	98
0.425	98
0.300	97
0.150	96
0.075	94



ATTERBERG LIMITS

Liquid Limit %	42
Plastic Limit %	16
Plasticity Index %	26
Linear Shrinkage %	13.0
Curling	No
Crumbling	Yes
Cracking	No
Mould Length (mm):	254

MOISTURE CONTENT

Moisture Content %	16.7

EMERSON CLASS NUMBER

Water Type	channel
Water Temperature (°C)	25
Emerson Class Number	4

MATERIAL PROPERTIES

Gravel Content %	1
Sand Content %	6
Silt/Clay Content %	94

Notes: * Represents test not preformed
1. Test Methods: AS 1289: 2.1.1 / 3.1.2 / 3.3.1 / 3.4.1 / 3.4.1 / 3.6.1 / 3.8.1
2. This laboratory is not be responsible for the correctness or accuracy of information provided by the client.

Approved Signatory: [redacted] **Date:** April 22, 2016

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GTS GEOTECHNICAL TESTING SERVICES SOUTHERN

Soil Analysis Report - Atterberg, Emerson, Grading, Moisture Content

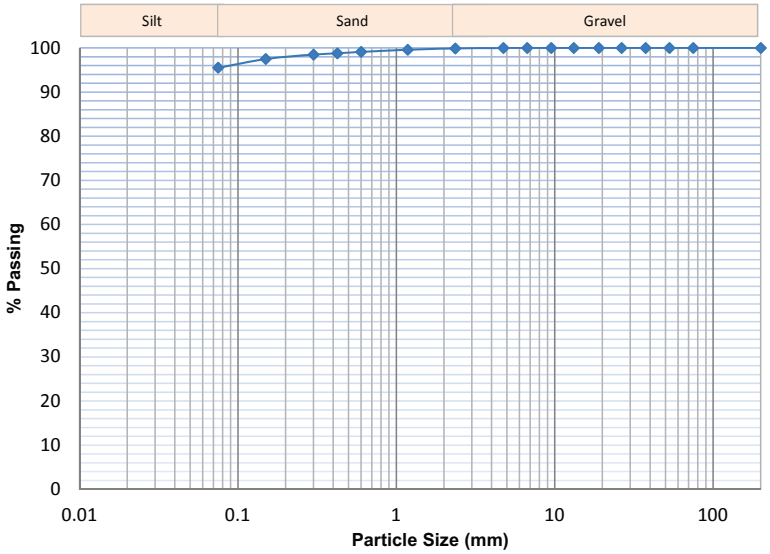
Report For: Coliban Water
P.O Box 2770
BENDIGO
VIC 3554

Report No.	16E 0574
Revision No.	0
Sheet:	3 of 21
Date of Report:	22/04/2016
GTSS Sample No.	16E 0574C

Project: Material Investigation
Sample Location Cohuna Water Treatment Plant
Client Identification[2]: Bore Hole 3
Date Sampled: 25/02/2016 **Sample supplied by :** Laboratory
Material Description: Silty Clay, Brown, Trace of Sand

PARTICLE SIZE DISTRIBUTION

Sieve Size mm	Sample % Passing
200	100
75.0	100
53.0	100
37.5	100
26.5	100
19.0	100
13.2	100
9.5	100
6.7	100
4.75	100
2.36	100
1.18	100
0.600	99
0.425	99
0.300	99
0.150	98
0.075	96



ATTERBERG LIMITS

Liquid Limit %	36
Plastic Limit %	16
Plasticity Index %	20
Linear Shrinkage %	10.5
Curling	No
Crumbling	No
Cracking	No
Mould Length (mm):	254

MOISTURE CONTENT

Moisture Content %	18.9

EMERSON CLASS NUMBER

Water Type	channel
Water Temperature (°C)	25.3
Emerson Class Number	4

MATERIAL PROPERTIES

Gravel Content %	0
Sand Content %	4
Silt/Clay Content %	96

Notes: * Represents test not preformed
1. Test Methods: AS 1289: 2.1.1 / 3.1.2 / 3.3.1 / 3.4.1 / 3.4.1 / 3.6.1 / 3.8.1
2. This laboratory is not be responsible for the correctness or accuracy of information provided by the client.

Approved Signatory: [redacted] **ate:** April 22, 2016

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GTS GEOTECHNICAL TESTING SERVICES SOUTHERN

Soil Analysis Report - Atterberg, Emerson, Grading, Moisture Content

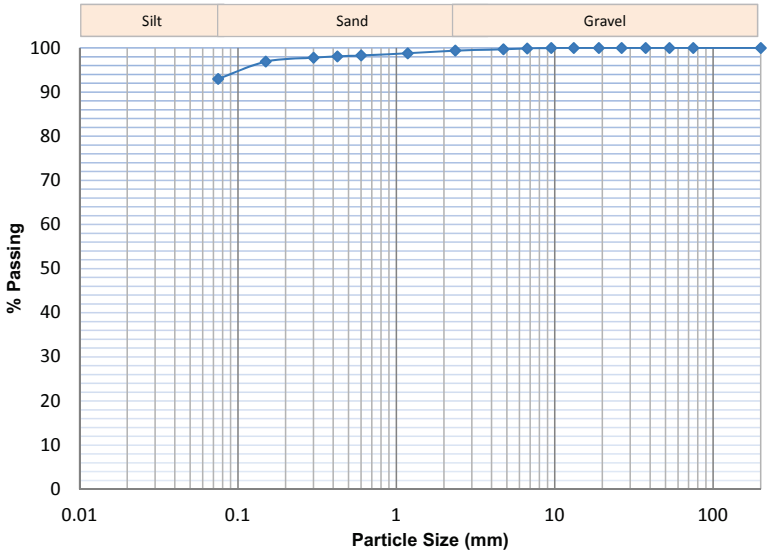
Report For: Coliban Water
P.O Box 2770
BENDIGO
VIC 3554

Report No.	16E 0574
Revision No.	0
Sheet:	4 of 21
Date of Report:	22/04/2016
GTSS Sample No.	16E 0574D

Project: Material Investigation
Sample Location Cohuna Water Treatment Plant
Client Identification[2]: Bore Hole 4
Date Sampled: 25/02/2016 **Sample supplied by :** Laboratory
Material Description: Silty Clay, Brown, Trace of Gravel & Sand

PARTICLE SIZE DISTRIBUTION

Sieve Size mm	Sample % Passing
200	100
75.0	100
53.0	100
37.5	100
26.5	100
19.0	100
13.2	100
9.5	100
6.7	100
4.75	100
2.36	99
1.18	99
0.600	98
0.425	98
0.300	98
0.150	97
0.075	93



ATTERBERG LIMITS

Liquid Limit %	40
Plastic Limit %	16
Plasticity Index %	24
Linear Shrinkage %	12.5
Curling	No
Crumbling	No
Cracking	No
Mould Length (mm):	254

MOISTURE CONTENT

Moisture Content %	17.5

EMERSON CLASS NUMBER

Water Type	channel
Water Temperature (°C)	25.3
Emerson Class Number	4

MATERIAL PROPERTIES

Gravel Content %	1
Sand Content %	6
Silt/Clay Content %	93

Notes: * Represents test not preformed
1. Test Methods: AS 1289: 2.1.1 / 3.1.2 / 3.3.1 / 3.4.1 / 3.4.1 / 3.6.1 / 3.8.1
2. This laboratory is not be responsible for the correctness or accuracy of information provided by the client.

Approved Signatory: [redacted] **Date:** April 22, 2016

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Soil Analysis Report - Atterberg, Emerson, Grading, Moisture Content

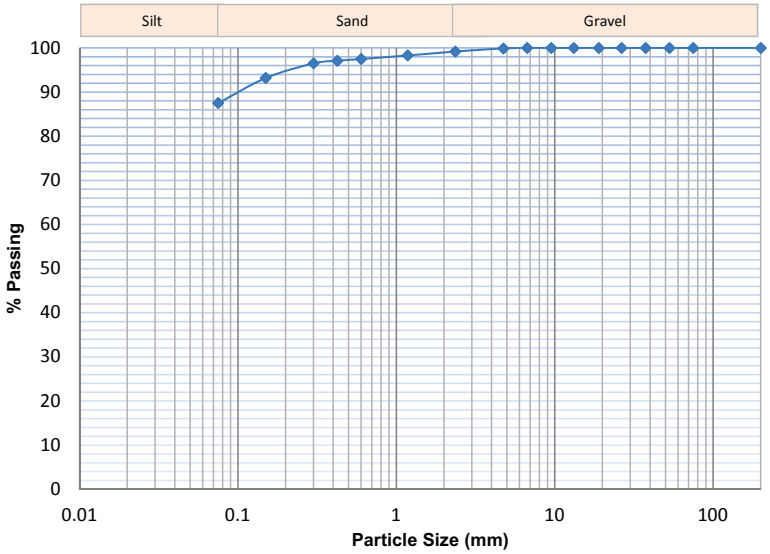
Report For: Coliban Water
P.O Box 2770
BENDIGO
VIC 3554

Report No.	16E 0574
Revision No.	0
Sheet:	5 of 21
Date of Report:	22/04/2016
GTSS Sample No.	16E 0574E

Project: Material Investigation
Sample Location Cohuna Water Treatment Plant
Client Identification[2]: Bore Hole 5
Date Sampled: 25/02/2016 **Sample supplied by :** Laboratory
Material Description: Silty Clay, Brown, Some Sand, Trace of Gravel

PARTICLE SIZE DISTRIBUTION

Sieve Size mm	Sample % Passing
200	100
75.0	100
53.0	100
37.5	100
26.5	100
19.0	100
13.2	100
9.5	100
6.7	100
4.75	100
2.36	99
1.18	98
0.600	98
0.425	97
0.300	97
0.150	93
0.075	88



ATTERBERG LIMITS

Liquid Limit %	47
Plastic Limit %	16
Plasticity Index %	31
Linear Shrinkage %	15.0
Curling	No
Crumbling	No
Cracking	No
Mould Length (mm):	254

MOISTURE CONTENT

Moisture Content %	19.0

EMERSON CLASS NUMBER

Water Type	channel
Water Temperature (°C)	25
Emerson Class Number	4

MATERIAL PROPERTIES

Gravel Content %	1
Sand Content %	12
Silt/Clay Content %	88

Notes: * Represents test not preformed
1. Test Methods: AS 1289: 2.1.1 / 3.1.2 / 3.3.1 / 3.4.1 / 3.4.1 / 3.6.1 / 3.8.1
2. This laboratory is not be responsible for the correctness or accuracy of information provided by the client.

Approved Signatory: [redacted] **Date:** April 22, 2016

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GTS GEOTECHNICAL TESTING SERVICES SOUTHERN

Soil Analysis Report - Atterberg, Emerson, Grading, Moisture Content

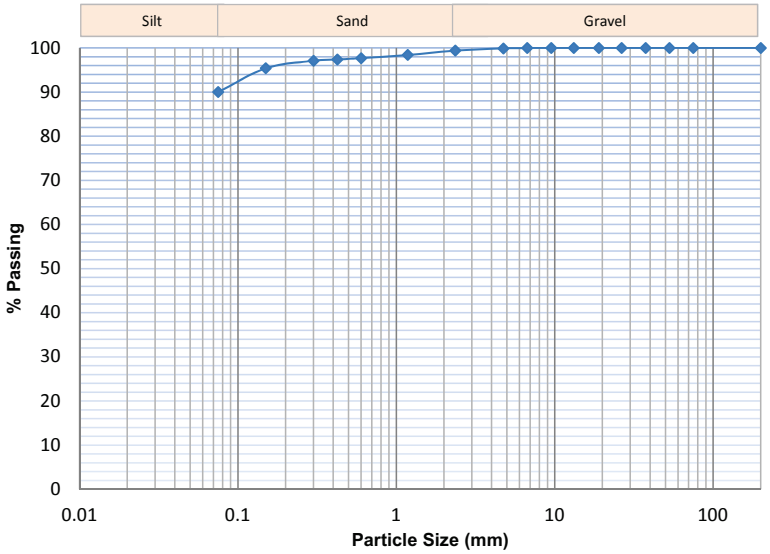
Report For: Coliban Water
P.O Box 2770
BENDIGO
VIC 3554

Report No.	16E 0574
Revision No.	0
Sheet:	6 of 21
Date of Report:	22/03/2016
GTSS Sample No.	16E 0574F

Project: Material Investigation
Sample Location Cohuna Water Treatment Plant
Client Identification[2]: Bore Hole 6
Date Sampled: 25/02/2016 **Sample supplied by :** Laboratory
Material Description: Silty Clay, Brown, Trace of Sand & Gravel

PARTICLE SIZE DISTRIBUTION

Sieve Size mm	Sample % Passing
200	100
75.0	100
53.0	100
37.5	100
26.5	100
19.0	100
13.2	100
9.5	100
6.7	100
4.75	100
2.36	99
1.18	98
0.600	98
0.425	97
0.300	97
0.150	95
0.075	90



ATTERBERG LIMITS

Liquid Limit %	42
Plastic Limit %	16
Plasticity Index %	26
Linear Shrinkage %	12.5
Curling	No
Crumbling	No
Cracking	No
Mould Length (mm):	254

MOISTURE CONTENT

Moisture Content %	17.0

EMERSON CLASS NUMBER

Water Type	channel
Water Temperature (°C)	25.3
Emerson Class Number	4

MATERIAL PROPERTIES

Gravel Content %	1
Sand Content %	9
Silt/Clay Content %	90

Notes: * Represents test not preformed
1. Test Methods: AS 1289: 2.1.1 / 3.1.2 / 3.3.1 / 3.4.1 / 3.4.1 / 3.6.1 / 3.8.1
2. This laboratory is not be responsible for the correctness or accuracy of information provided by the client.

Approved Signatory: [redacted] **Date:** March 22, 2016

Geotechnical Testing Services, Southern
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Soil Analysis Report - Atterberg, Emerson, Grading, Moisture Content

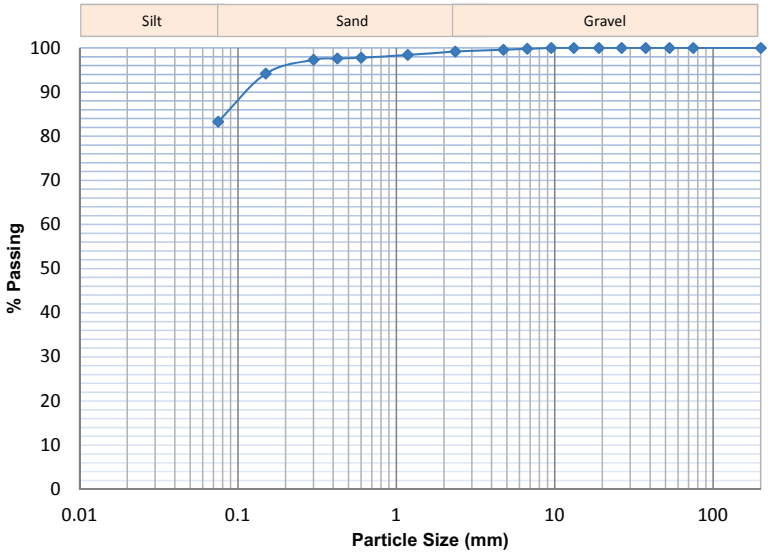
Report For: Coliban Water
P.O Box 2770
BENDIGO
VIC 3554

Report No.	16E0574
Revision No.	0
Sheet:	7 of 21
Date of Report:	22/04/2016
GTSS Sample No.	16E0574G

Project: Material Investigation
Sample Location Cohuna Water Treatment Plant
Client Identification[2]: Bore Hole 7
Date Sampled: 25/02/2016 **Sample supplied by :** Laboratory
Material Description: Silty Clay, Brown, Some Sand, Trace of Gravel

PARTICLE SIZE DISTRIBUTION

Sieve Size mm	Sample % Passing
200	100
75.0	100
53.0	100
37.5	100
26.5	100
19.0	100
13.2	100
9.5	100
6.7	100
4.75	100
2.36	99
1.18	98
0.600	98
0.425	98
0.300	97
0.150	94
0.075	83



ATTERBERG LIMITS

Liquid Limit %	39
Plastic Limit %	13
Plasticity Index %	26
Linear Shrinkage %	12.0
Curling	No
Crumbling	No
Cracking	No
Mould Length (mm):	254

MOISTURE CONTENT

Moisture Content %	18.9

EMERSON CLASS NUMBER

Water Type	channel
Water Temperature (°C)	25
Emerson Class Number	4

MATERIAL PROPERTIES

Gravel Content %	1
Sand Content %	16
Silt/Clay Content %	83

Notes: * Represents test not preformed
1. Test Methods: AS 1289: 2.1.1 / 3.1.2 / 3.3.1 / 3.4.1 / 3.4.1 / 3.6.1 / 3.8.1
2. This laboratory is not be responsible for the correctness or accuracy of information provided by the client.

Approved Signatory: [redacted] **Date:** April 22, 2016

Geotechnical Testing Services, Southern
Geotechnical Investigations, Soil Concrete and Aggregate Testing Laboratories (on/off site), Contract Drilling, Compaction Control Testing, Site Classifications, Land Capability Assessments, Contamination Assessments

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GTS GEOTECHNICAL TESTING SERVICES SOUTHERN

Soil Analysis Report - Atterberg, Emerson, Grading, Moisture Content

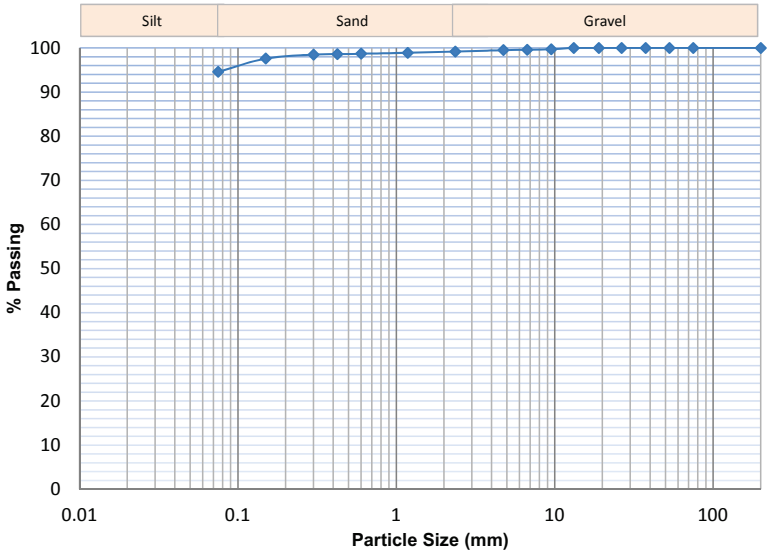
Report For: Coliban Water
P.O Box 2770
BENDIGO
VIC 3554

Report No.	16E 0574
Revision No.	0
Sheet:	8 of 21
Date of Report:	22/04/2016
GTSS Sample No.	16E 0574H

Project: Material Investigation
Sample Location Cohuna Water Treatment Plant
Client Identification[2]: Bore Hole 8
Date Sampled: 25/02/2016 **Sample supplied by :** Laboratory
Material Description: Silty Clay, Brown, Trace of Sand

PARTICLE SIZE DISTRIBUTION

Sieve Size mm	Sample % Passing
200	100
75.0	100
53.0	100
37.5	100
26.5	100
19.0	100
13.2	100
9.5	100
6.7	100
4.75	100
2.36	99
1.18	99
0.600	99
0.425	99
0.300	99
0.150	98
0.075	95



ATTERBERG LIMITS

Liquid Limit %	47
Plastic Limit %	16
Plasticity Index %	31
Linear Shrinkage %	14.5
Curling	No
Crumbling	No
Cracking	No
Mould Length (mm):	254

MOISTURE CONTENT

Moisture Content %	20.6

EMERSON CLASS NUMBER

Water Type	channel
Water Temperature (°C)	25.3
Emerson Class Number	4

MATERIAL PROPERTIES

Gravel Content %	1
Sand Content %	5
Silt/Clay Content %	95

Notes: * Represents test not preformed
1. Test Methods: AS 1289: 2.1.1 / 3.1.2 / 3.3.1 / 3.4.1 / 3.4.1 / 3.6.1 / 3.8.1
2. This laboratory is not be responsible for the correctness or accuracy of information provided by the client.

Approved Signatory: [redacted] **Date:** April 22, 2016

Geotechnical Testing Services, Southern
Geotechnical Investigations, Soil Concrete and Aggregate Testing Laboratories (on/off site), Contract Drilling, Compaction Control Testing, Site Classifications, Land Capability Assessments, Contamination Assessments

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Soil Analysis Report - Atterberg, Emerson, Grading, Moisture Content

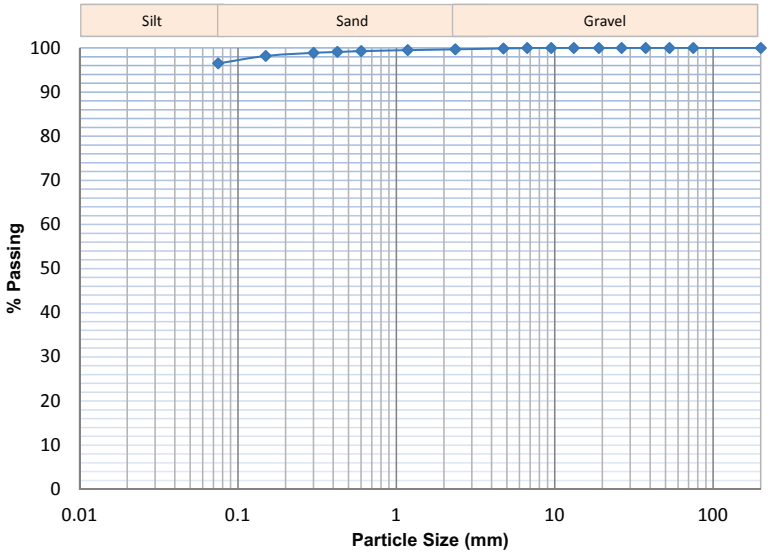
Report For: Coliban Water
P.O Box 2770
BENDIGO
VIC 3554

Report No.	16E 0574
Revision No.	0
Sheet:	9 of 21
Date of Report:	22/04/2016
GTSS Sample No.	16E 0574I

Project: Material Investigation
Sample Location Cohuna Water Treatment Plant
Client Identification[2]: Bore Hole 9
Date Sampled: 25/02/2016 **Sample supplied by :** Laboratory
Material Description: Silty Clay, Brown, Trace of Sand

PARTICLE SIZE DISTRIBUTION

Sieve Size mm	Sample % Passing
200	100
75.0	100
53.0	100
37.5	100
26.5	100
19.0	100
13.2	100
9.5	100
6.7	100
4.75	100
2.36	100
1.18	100
0.600	99
0.425	99
0.300	99
0.150	98
0.075	97



ATTERBERG LIMITS

Liquid Limit %	46
Plastic Limit %	16
Plasticity Index %	30
Linear Shrinkage %	14.0
Curling	No
Crumbling	No
Cracking	No
Mould Length (mm):	254

MOISTURE CONTENT

Moisture Content %	21.0

EMERSON CLASS NUMBER

Water Type	channel
Water Temperature (°C)	25.3
Emerson Class Number	4

MATERIAL PROPERTIES

Gravel Content %	0
Sand Content %	3
Silt/Clay Content %	97

Notes: * Represents test not preformed
1. Test Methods: AS 1289: 2.1.1 / 3.1.2 / 3.3.1 / 3.4.1 / 3.4.1 / 3.6.1 / 3.8.1
2. This laboratory is not be responsible for the correctness or accuracy of information provided by the client.

Approved Signatory: [redacted] **Date:** April 22, 2016

Geotechnical Testing Services, Southern
Geotechnical Investigations, Soil Concrete and Aggregate Testing Laboratories (on/off site), Contract Drilling, Compaction Control Testing, Site Classifications, Land Capability Assessments, Contamination Assessments

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NATA WORLD RECOGNISED ACCREDITATION

GTS GEOTECHNICAL TESTING SERVICES SOUTHERN

Soil Analysis Report - Atterberg, Emerson, Grading, Moisture Content

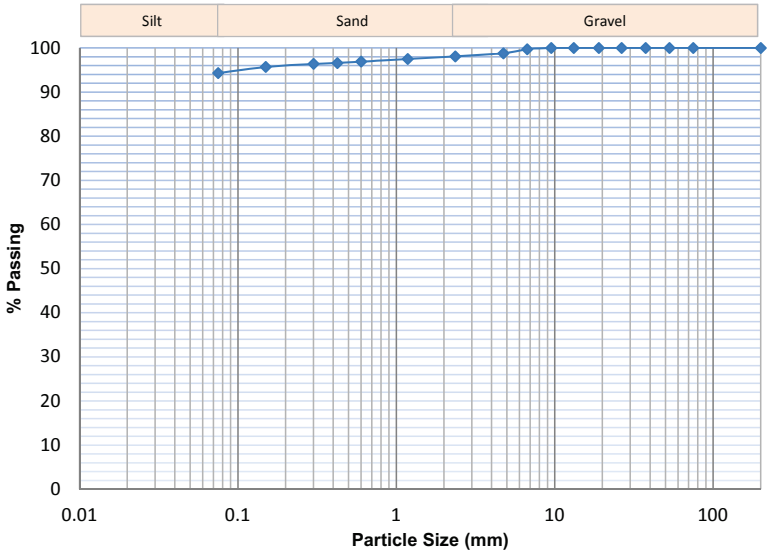
Report For: Coliban Water
P.O Box 2770
BENDIGO
VIC 3554

Report No.	16E 0574
Revision No.	0
Sheet:	10 of 21
Date of Report:	22/04/2016
GTSS Sample No.	16E 0574J

Project: Material Investigation
Sample Location Cohuna Water Treatment Plant
Client Identification[2]: Bore Hole 10
Date Sampled: 25/02/2016 **Sample supplied by :** Laboratory
Material Description: Silty Clay, Brown, Trace of Sand & Gravel

PARTICLE SIZE DISTRIBUTION

Sieve Size mm	Sample % Passing
200	100
75.0	100
53.0	100
37.5	100
26.5	100
19.0	100
13.2	100
9.5	100
6.7	100
4.75	99
2.36	98
1.18	98
0.600	97
0.425	97
0.300	96
0.150	96
0.075	94



ATTERBERG LIMITS

Liquid Limit %	55
Plastic Limit %	17
Plasticity Index %	38
Linear Shrinkage %	16.5
Curling	No
Crumbling	Yes
Cracking	No
Mould Length (mm):	254

MOISTURE CONTENT

Moisture Content %	20.6

EMERSON CLASS NUMBER

Water Type	channel
Water Temperature (°C)	25.3
Emerson Class Number	4

MATERIAL PROPERTIES

Gravel Content %	2
Sand Content %	4
Silt/Clay Content %	94

Notes: * Represents test not preformed
1. Test Methods: AS 1289: 2.1.1 / 3.1.2 / 3.3.1 / 3.4.1 / 3.4.1 / 3.6.1 / 3.8.1
2. This laboratory is not be responsible for the correctness or accuracy of information provided by the client.

Approved Signatory: [redacted] **Date:** April 22, 2016

Geotechnical Testing Services, Southern
Geotechnical Investigations, Soil Concrete and Aggregate Testing Laboratories (on/off site), Contract Drilling, Compaction Control Testing, Site Classifications, Land Capability Assessments, Contamination Assessments

Laboratory accreditation number 19506
Accredited for compliance with ISO/IEC 17025
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NATA WORLD RECOGNISED ACCREDITATION

GTS GEOTECHNICAL TESTING SERVICES SOUTHERN

Soil Analysis Report - Atterberg, Emerson, Grading, Moisture Content

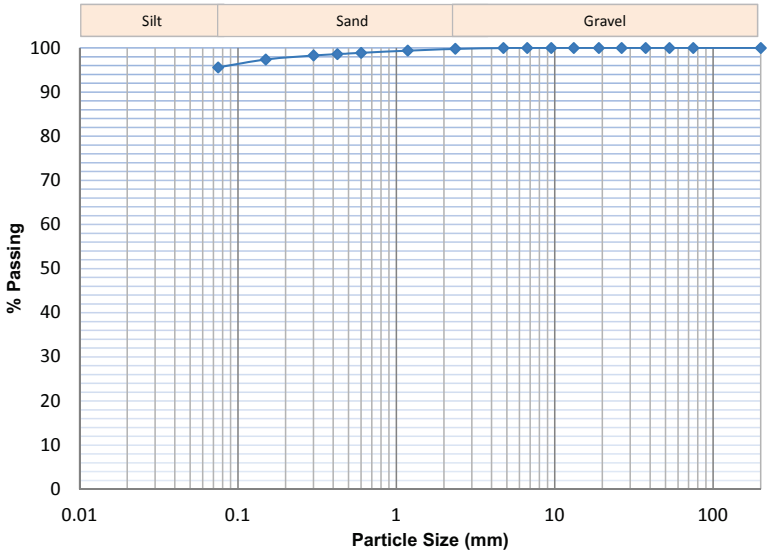
Report For: Coliban Water
P.O Box 2770
BENDIGO
VIC 3554

Report No.	16E 0574
Revision No.	0
Sheet:	11 of 21
Date of Report:	22/04/2016
GTSS Sample No.	16E 0574K

Project: Material Investigation
Sample Location Cohuna Water Treatment Plant
Client Identification[2]: Bore Hole 11
Date Sampled: 25/02/2016 **Sample supplied by :** Laboratory
Material Description: Silty Clay, Brown, Trace of Sand

PARTICLE SIZE DISTRIBUTION

Sieve Size mm	Sample % Passing
200	100
75.0	100
53.0	100
37.5	100
26.5	100
19.0	100
13.2	100
9.5	100
6.7	100
4.75	100
2.36	100
1.18	99
0.600	99
0.425	99
0.300	98
0.150	97
0.075	96



ATTERBERG LIMITS

Liquid Limit %	47
Plastic Limit %	17
Plasticity Index %	30
Linear Shrinkage %	14.5
Curling	No
Crumbling	No
Cracking	Yes
Mould Length (mm):	254

MOISTURE CONTENT

Moisture Content %	20.0

EMERSON CLASS NUMBER

Water Type	channel
Water Temperature (°C)	25.3
Emerson Class Number	4

MATERIAL PROPERTIES

Gravel Content %	0
Sand Content %	4
Silt/Clay Content %	96

Notes: * Represents test not preformed
1. Test Methods: AS 1289: 2.1.1 / 3.1.2 / 3.3.1 / 3.4.1 / 3.4.1 / 3.6.1 / 3.8.1
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Approved Signatory: [redacted] **Date:** April 22, 2016

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GTS GEOTECHNICAL TESTING SERVICES SOUTHERN

Soil Analysis Report - Atterberg, Emerson, Grading, Moisture Content

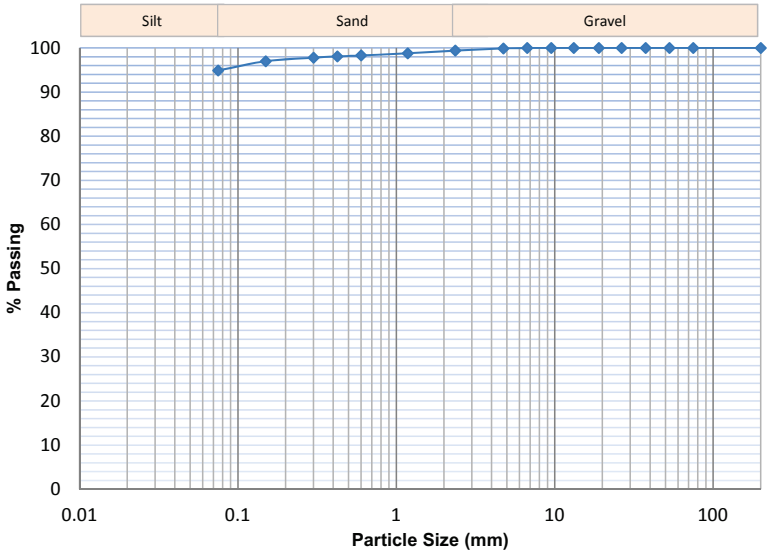
Report For: Coliban Water
P.O Box 2770
BENDIGO
VIC 3554

Report No.	16E 0574
Revision No.	0
Sheet:	12 of 21
Date of Report:	22/04/2016
GTSS Sample No.	16E 0574L

Project: Material Investigation
Sample Location Cohuna Water Treatment Plant
Client Identification[2]: Bore Hole 12
Date Sampled: 25/02/2016 **Sample supplied by :** ML
Material Description: Brown Silty Clay

PARTICLE SIZE DISTRIBUTION

Sieve Size mm	Sample % Passing
200	100
75.0	100
53.0	100
37.5	100
26.5	100
19.0	100
13.2	100
9.5	100
6.7	100
4.75	100
2.36	99
1.18	99
0.600	98
0.425	98
0.300	98
0.150	97
0.075	95



ATTERBERG LIMITS

Liquid Limit %	47
Plastic Limit %	16
Plasticity Index %	30
Linear Shrinkage %	14.5
Curling	No
Crumbling	Yes
Cracking	No
Mould Length (mm):	254

MOISTURE CONTENT

Moisture Content %	18.5

EMERSON CLASS NUMBER

Water Type	channel
Water Temperature (°C)	25.3
Emerson Class Number	4

MATERIAL PROPERTIES

Gravel Content %	1
Sand Content %	4
Silt/Clay Content %	95

Notes: * Represents test not preformed
1. Test Methods: AS 1289: 2.1.1 / 3.1.2 / 3.3.1 / 3.4.1 / 3.4.1 / 3.6.1 / 3.8.1
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GTS GEOTECHNICAL TESTING SERVICES SOUTHERN

Soil Analysis Report - Atterberg, Emerson, Grading, Moisture Content

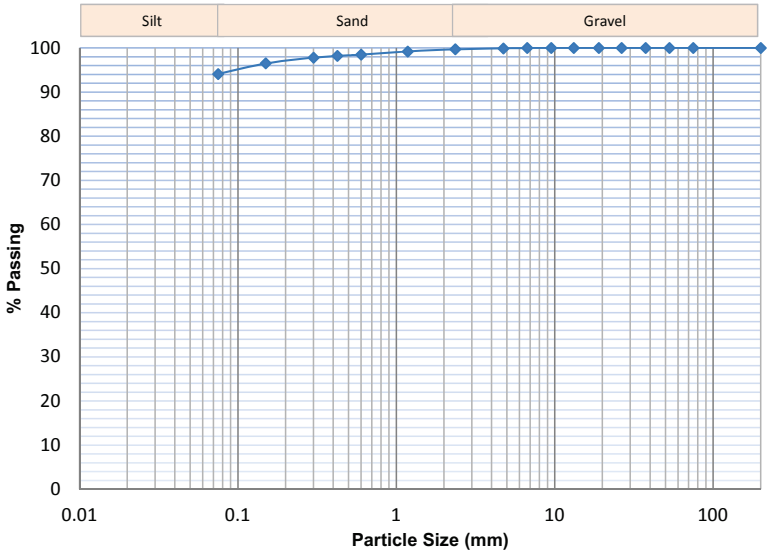
Report For: Coliban Water
P.O Box 2770
BENDIGO
VIC 3554

Report No.	16E 0574
Revision No.	0
Sheet:	13 of 21
Date of Report:	22/04/2016
GTSS Sample No.	16E 0574M

Project: Material Investigation
Sample Location Cohuna Water Treatment Plant
Client Identification[2]: Bore Hole 13
Date Sampled: 25/02/2016 **Sample supplied by :** Laboratory
Material Description: Brown Silty Clay

PARTICLE SIZE DISTRIBUTION

Sieve Size mm	Sample % Passing
200	100
75.0	100
53.0	100
37.5	100
26.5	100
19.0	100
13.2	100
9.5	100
6.7	100
4.75	100
2.36	100
1.18	99
0.600	99
0.425	98
0.300	98
0.150	97
0.075	94



ATTERBERG LIMITS

Liquid Limit %	49
Plastic Limit %	18
Plasticity Index %	32
Linear Shrinkage %	14.5
Curling	No
Crumbling	No
Cracking	No
Mould Length (mm):	253

MOISTURE CONTENT

Moisture Content %	20.9

EMERSON CLASS NUMBER

Water Type	channel
Water Temperature (°C)	25.3
Emerson Class Number	4

MATERIAL PROPERTIES

Gravel Content %	0
Sand Content %	6
Silt/Clay Content %	94

Notes: * Represents test not preformed
1. Test Methods: AS 1289: 2.1.1 / 3.1.2 / 3.3.1 / 3.4.1 / 3.4.1 / 3.6.1 / 3.8.1
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Approved Signatory: [redacted] **Date:** April 22, 2016

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GTS GEOTECHNICAL TESTING SERVICES SOUTHERN

Soil Analysis Report - Atterberg, Emerson, Grading, Moisture Content

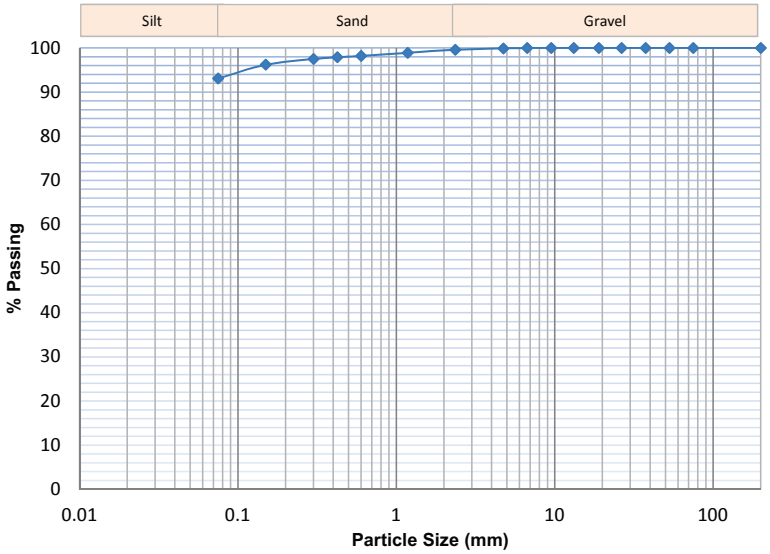
Report For: Coliban Water
P.O Box 2770
BENDIGO
VIC 3554

Report No.	16E 0574
Revision No.	0
Sheet:	14 of 21
Date of Report:	22/04/2016
GTSS Sample No.	16E 0574N

Project: Material Investigation
Sample Location Cohuna Water Treatment Plant
Client Identification[2]: Bore Hole 14
Date Sampled: 25/02/2016 **Sample supplied by :** Laboratory
Material Description: Brown Silty Clay

PARTICLE SIZE DISTRIBUTION

Sieve Size mm	Sample % Passing
200	100
75.0	100
53.0	100
37.5	100
26.5	100
19.0	100
13.2	100
9.5	100
6.7	100
4.75	100
2.36	100
1.18	99
0.600	98
0.425	98
0.300	98
0.150	96
0.075	93



ATTERBERG LIMITS

Liquid Limit %	51
Plastic Limit %	18
Plasticity Index %	33
Linear Shrinkage %	17.0
Curling	No
Crumbling	No
Cracking	No
Mould Length (mm):	255

MOISTURE CONTENT

Moisture Content %	19.9

EMERSON CLASS NUMBER

Water Type	channel
Water Temperature (°C)	25.3
Emerson Class Number	4

MATERIAL PROPERTIES

Gravel Content %	0
Sand Content %	7
Silt/Clay Content %	93

Notes: * Represents test not preformed
1. Test Methods: AS 1289: 2.1.1 / 3.1.2 / 3.3.1 / 3.4.1 / 3.4.1 / 3.6.1 / 3.8.1
2. This laboratory is not be responsible for the correctness or accuracy of information provided by the client.

Approved Signatory: [redacted] **Date:** April 22, 2016

Geotechnical Testing Services, Southern
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Soil Analysis Report - Atterberg, Emerson, Grading, Moisture Content

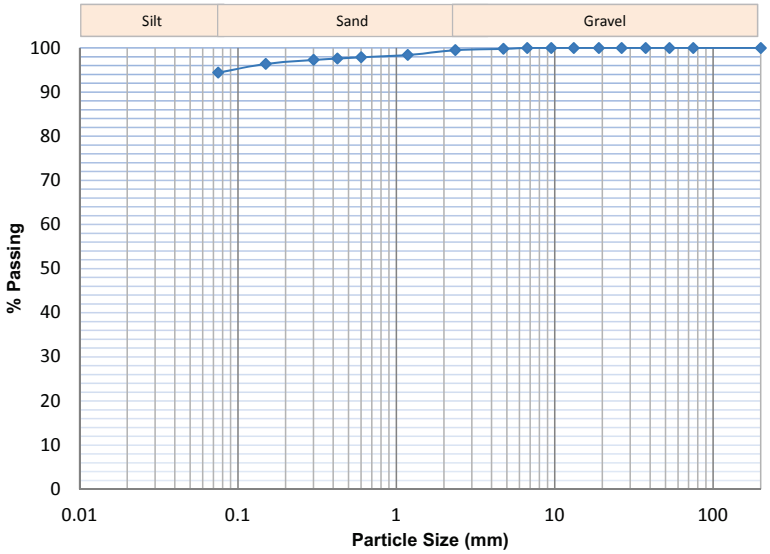
Report For: Coliban Water
P.O Box 2770
BENDIGO
VIC 3554

Report No.	16E 0574
Revision No.	0
Sheet:	15 of 21
Date of Report:	22/04/2016
GTSS Sample No.	16E 0574O

Project: Material Investigation
Sample Location Cohuna Water Treatment Plant
Client Identification[2]: Bore Hole 15
Date Sampled: 25/02/2016 **Sample supplied by :** Laboratory
Material Description: Brown Silty Clay

PARTICLE SIZE DISTRIBUTION

Sieve Size mm	Sample % Passing
200	100
75.0	100
53.0	100
37.5	100
26.5	100
19.0	100
13.2	100
9.5	100
6.7	100
4.75	100
2.36	100
1.18	98
0.600	98
0.425	98
0.300	97
0.150	96
0.075	94



ATTERBERG LIMITS

Liquid Limit %	46
Plastic Limit %	16
Plasticity Index %	30
Linear Shrinkage %	15.0
Curling	No
Crumbling	No
Cracking	No
Mould Length (mm):	254

MOISTURE CONTENT

Moisture Content %	19.6

EMERSON CLASS NUMBER

Water Type	channel
Water Temperature (°C)	25.3
Emerson Class Number	4

MATERIAL PROPERTIES

Gravel Content %	1
Sand Content %	5
Silt/Clay Content %	94

Notes: * Represents test not preformed
1. Test Methods: AS 1289: 2.1.1 / 3.1.2 / 3.3.1 / 3.4.1 / 3.4.1 / 3.6.1 / 3.8.1
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Approved Signatory: [redacted] **Date:** April 22, 2016

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GTS GEOTECHNICAL TESTING SERVICES SOUTHERN

Soil Analysis Report - Atterberg, Emerson, Grading, Moisture Content

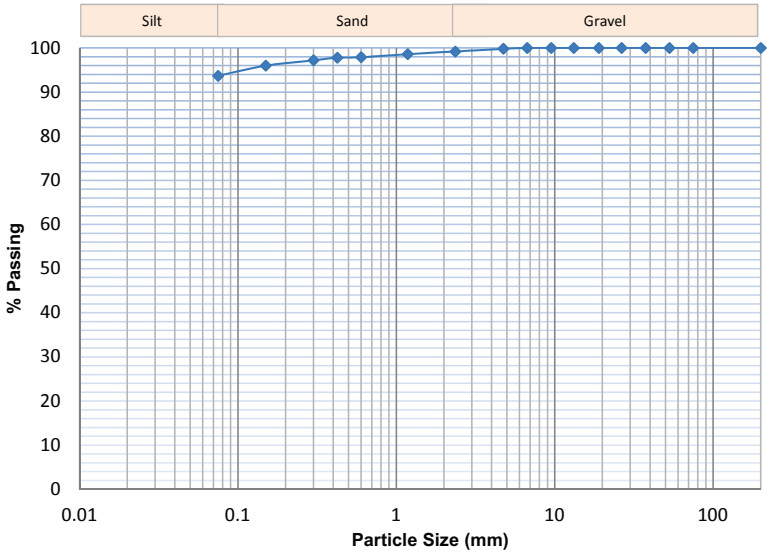
Report For: Coliban Water
P.O Box 2770
BENDIGO
VIC 3554

Report No.	16e/0574
Revision No.	0
Sheet:	16 of 21
Date of Report:	22/03/2016
GTSS Sample No.	16e/0574p

Project: Material Investigation
Sample Location Cohuna Water Treatment Plant
Client Identification[2]: Bore Hole 16
Date Sampled: 25/02/2016 **Sample supplied by :** Laboratory
Material Description: Brown Silty Clay

PARTICLE SIZE DISTRIBUTION

Sieve Size mm	Sample % Passing
200	100
75.0	100
53.0	100
37.5	100
26.5	100
19.0	100
13.2	100
9.5	100
6.7	100
4.75	100
2.36	99
1.18	99
0.600	98
0.425	98
0.300	97
0.150	96
0.075	94



ATTERBERG LIMITS

Liquid Limit %	48
Plastic Limit %	17
Plasticity Index %	30
Linear Shrinkage %	15.0
Curling	No
Crumbling	No
Cracking	No
Mould Length (mm):	254

MOISTURE CONTENT

Moisture Content %	20.3

EMERSON CLASS NUMBER

Water Type	channel
Water Temperature (°C)	25.3
Emerson Class Number	4

MATERIAL PROPERTIES

Gravel Content %	1
Sand Content %	5
Silt/Clay Content %	94

Notes: * Represents test not preformed
1. Test Methods: AS 1289: 2.1.1 / 3.1.2 / 3.3.1 / 3.4.1 / 3.4.1 / 3.6.1 / 3.8.1
2. This laboratory is not be responsible for the correctness or accuracy of information provided by the client.

Approved Signatory: [redacted] **Date:** March 22, 2016

Geotechnical Testing Services, Southern
Geotechnical Investigations, Soil Concrete and Aggregate Testing Laboratories (on/off site), Contract Drilling, Compaction Control Testing, Site Classifications, Land Capability Assessments, Contamination Assessments

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Soil Analysis Report - Atterberg, Emerson, Grading, Moisture Content

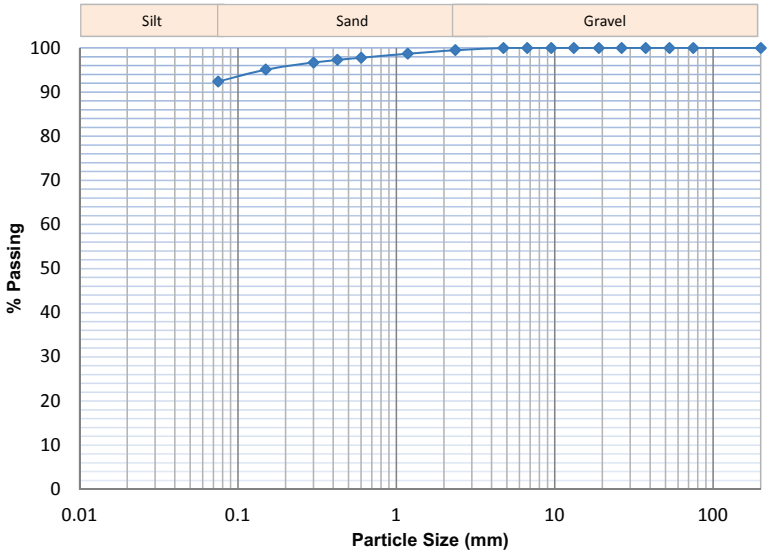
Report For: Coliban Water
P.O Box 2770
BENDIGO
VIC 3554

Report No.	16E 0574
Revision No.	0
Sheet:	17 of 21
Date of Report:	22/04/2016
GTSS Sample No.	16E 0574Q

Project: Material Investigation
Sample Location Cohuna Water Treatment Plant
Client Identification[2]: Bore Hole 17
Date Sampled: 25/02/2016 **Sample supplied by :** Laboratory
Material Description: Brown Silty Clay

PARTICLE SIZE DISTRIBUTION

Sieve Size mm	Sample % Passing
200	100
75.0	100
53.0	100
37.5	100
26.5	100
19.0	100
13.2	100
9.5	100
6.7	100
4.75	100
2.36	100
1.18	99
0.600	98
0.425	97
0.300	97
0.150	95
0.075	92



ATTERBERG LIMITS

Liquid Limit %	49
Plastic Limit %	17
Plasticity Index %	32
Linear Shrinkage %	15.5
Curling	No
Crumbling	No
Cracking	Yes
Mould Length (mm):	254

MOISTURE CONTENT

Moisture Content %	21.8

EMERSON CLASS NUMBER

Water Type	channel
Water Temperature (°C)	25.3
Emerson Class Number	4

MATERIAL PROPERTIES

Gravel Content %	1
Sand Content %	7
Silt/Clay Content %	92

Notes: * Represents test not preformed
1. Test Methods: AS 1289: 2.1.1 / 3.1.2 / 3.3.1 / 3.4.1 / 3.4.1 / 3.6.1 / 3.8.1
2. This laboratory is not be responsible for the correctness or accuracy of information provided by the client.

Approved Signatory: [redacted] **Date:** April 22, 2016

Geotechnical Testing Services, Southern
Geotechnical Investigations, Soil Concrete and Aggregate Testing Laboratories (on/off site), Contract Drilling, Compaction Control Testing, Site Classifications, Land Capability Assessments, Contamination Assessments

Laboratory accreditation number 19506
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GTS GEOTECHNICAL TESTING SERVICES SOUTHERN

Soil Analysis Report - Atterberg, Emerson, Grading, Moisture Content

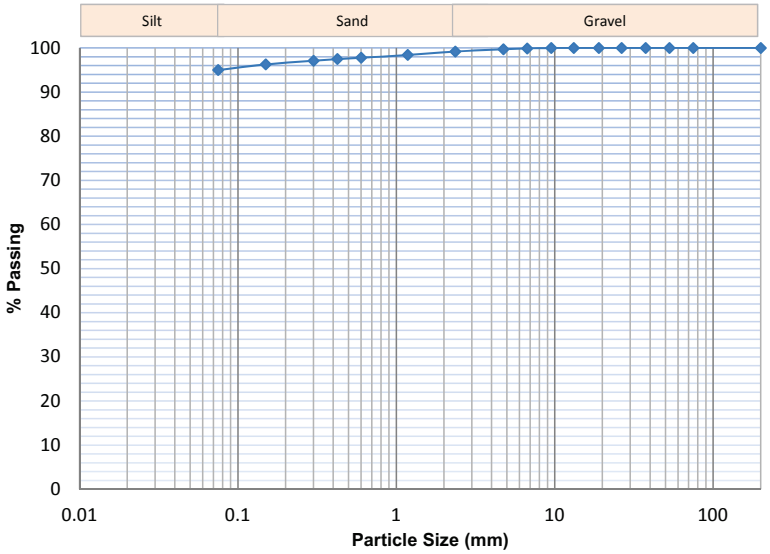
Report For: Coliban Water
P.O Box 2770
BENDIGO
VIC 3554

Report No.	16E 0574
Revision No.	0
Sheet:	18 of 21
Date of Report:	22/04/2016
GTSS Sample No.	16E 0574R

Project: Material Investigation
Sample Location Cohuna Water Treatment Plant
Client Identification[2]: Bore Hole 18
Date Sampled: 25/02/2016 **Sample supplied by :** Laboratory
Material Description: Brown Silty Clay

PARTICLE SIZE DISTRIBUTION

Sieve Size mm	Sample % Passing
200	100
75.0	100
53.0	100
37.5	100
26.5	100
19.0	100
13.2	100
9.5	100
6.7	100
4.75	100
2.36	99
1.18	98
0.600	98
0.425	98
0.300	97
0.150	96
0.075	95



ATTERBERG LIMITS

Liquid Limit %	54
Plastic Limit %	19
Plasticity Index %	35
Linear Shrinkage %	17.0
Curling	No
Crumbling	No
Cracking	No
Mould Length (mm):	254

MOISTURE CONTENT

Moisture Content %	20.7

EMERSON CLASS NUMBER

Water Type	channel
Water Temperature (°C)	25.3
Emerson Class Number	4

MATERIAL PROPERTIES

Gravel Content %	1
Sand Content %	4
Silt/Clay Content %	95

Notes: * Represents test not preformed
1. Test Methods: AS 1289: 2.1.1 / 3.1.2 / 3.3.1 / 3.4.1 / 3.4.1 / 3.6.1 / 3.8.1
2. This laboratory is not be responsible for the correctness or accuracy of information provided by the client.

Approved Signatory: [redacted] **Date:** April 22, 2016

Geotechnical Testing Services, Southern
Geotechnical Investigations, Soil Concrete and Aggregate Testing Laboratories (on/off site), Contract Drilling, Compaction Control Testing, Site Classifications, Land Capability Assessments, Contamination Assessments

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GTS GEOTECHNICAL TESTING SERVICES SOUTHERN

Soil Analysis Report - Atterberg, Emerson, Grading, Moisture Content

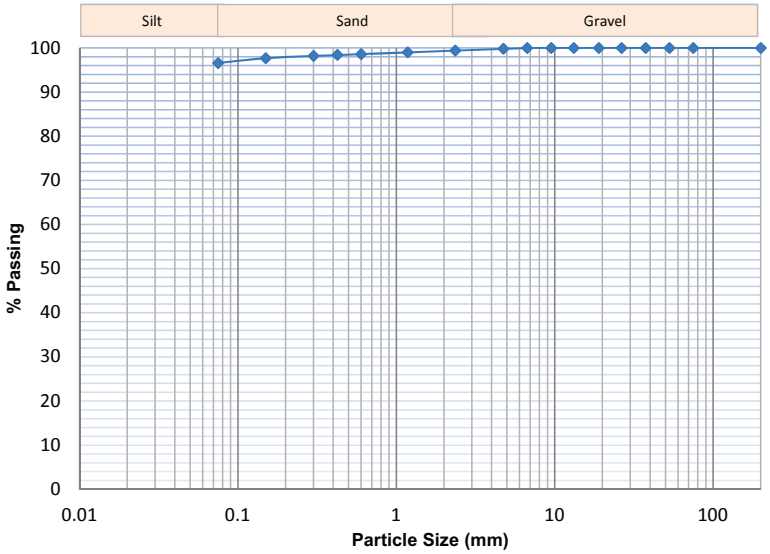
Report For: Coliban Water
P.O Box 2770
BENDIGO
VIC 3554

Report No.	16E 0574
Revision No.	0
Sheet:	19 of 21
Date of Report:	22/03/2016
GTSS Sample No.	16E 0574S

Project: Material Investigation
Sample Location Cohuna Water Treatment Plant
Client Identification[2]: Bore Hole 19
Date Sampled: 25/02/2016 **Sample supplied by :** Laboratory
Material Description: Brown Silty Clay

PARTICLE SIZE DISTRIBUTION

Sieve Size mm	Sample % Passing
200	100
75.0	100
53.0	100
37.5	100
26.5	100
19.0	100
13.2	100
9.5	100
6.7	100
4.75	100
2.36	99
1.18	99
0.600	99
0.425	98
0.300	98
0.150	98
0.075	97



ATTERBERG LIMITS

Liquid Limit %	51
Plastic Limit %	19
Plasticity Index %	32
Linear Shrinkage %	16.5
Curling	No
Crumbling	No
Cracking	No
Mould Length (mm):	254

MOISTURE CONTENT

Moisture Content %	21.5

EMERSON CLASS NUMBER

Water Type	channel
Water Temperature (°C)	25.3
Emerson Class Number	4

MATERIAL PROPERTIES

Gravel Content %	1
Sand Content %	3
Silt/Clay Content %	97

Notes: * Represents test not preformed
1. Test Methods: AS 1289: 2.1.1 / 3.1.2 / 3.3.1 / 3.4.1 / 3.4.1 / 3.6.1 / 3.8.1
2. This laboratory is not be responsible for the correctness or accuracy of information provided by the client.

Approved Signatory: [redacted] **Date:** March 22, 2016

Geotechnical Testing Services, Southern
Geotechnical Investigations, Soil Concrete and Aggregate Testing Laboratories (on/off site), Contract Drilling, Compaction Control Testing, Site Classifications, Land Capability Assessments, Contamination Assessments

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NATA WORLD RECOGNISED ACCREDITATION

GTS GEOTECHNICAL TESTING SERVICES SOUTHERN

Soil Analysis Report - Atterberg, Emerson, Grading, Moisture Content

Report For: Coliban Water
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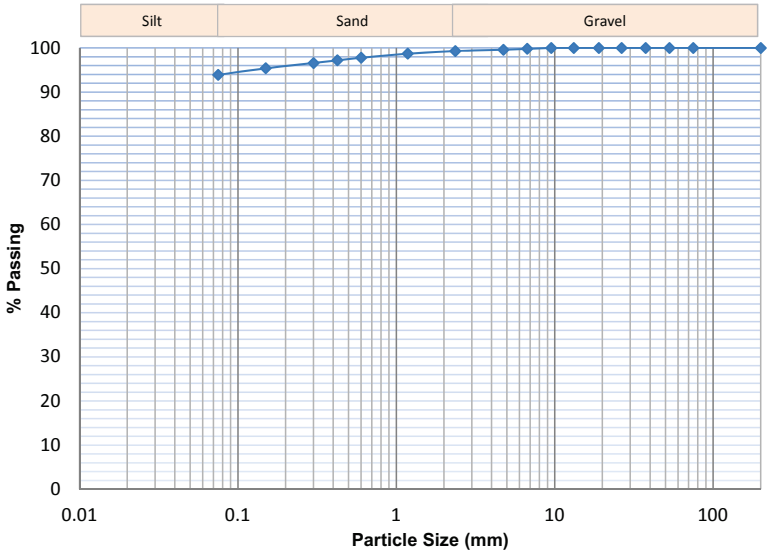
Report No.	16E 0574
Revision No.	0
Sheet:	20 of 21
Date of Report:	22/04/2016
GTSS Sample No.	16E 0574T

Project: Material Investigation
Sample Location Cohuna Water Treatment Plant
Client Identification[2]: Bore Hole 20
Date Sampled: 25/02/2016 **Sample supplied by :** Laboratory
Material Description: Brown Silty Clay

PARTICLE SIZE DISTRIBUTION

Sieve Size mm	Sample % Passing
200	100
75.0	100
53.0	100
37.5	100
26.5	100
19.0	100
13.2	100
9.5	100
6.7	100
4.75	100
2.36	99
1.18	99
0.600	98
0.425	97
0.300	97
0.150	95
0.075	94



ATTERBERG LIMITS

Liquid Limit %	58
Plastic Limit %	20
Plasticity Index %	38
Linear Shrinkage %	17.0
Curling	No
Crumbling	Yes
Cracking	No
Mould Length (mm):	254

MOISTURE CONTENT

Moisture Content %	21.0

EMERSON CLASS NUMBER

Water Type	channel
Water Temperature (°C)	25.3
Emerson Class Number	4

MATERIAL PROPERTIES

Gravel Content %	1
Sand Content %	5
Silt/Clay Content %	94

Notes: * Represents test not preformed
1. Test Methods: AS 1289: 2.1.1 / 3.1.2 / 3.3.1 / 3.4.1 / 3.4.1 / 3.6.1 / 3.8.1
2. This laboratory is not be responsible for the correctness or accuracy of information provided by the client.

Approved Signatory: [redacted] **Date:** April 22, 2016

Geotechnical Testing Services, Southern
Geotechnical Investigations, Soil Concrete and Aggregate Testing Laboratories (on/off site), Contract Drilling, Compaction Control Testing, Site Classifications, Land Capability Assessments, Contamination Assessments

Laboratory accreditation number 19506
Accredited for compliance with ISO/IEC 17025
The results of the test included in this document are traceable to Australian / National Standards.

NATA WORLD RECOGNISED ACCREDITATION

GTS GEOTECHNICAL TESTING SERVICES SOUTHERN

Soil Analysis Report - Atterberg, Emerson, Grading, Moisture Content

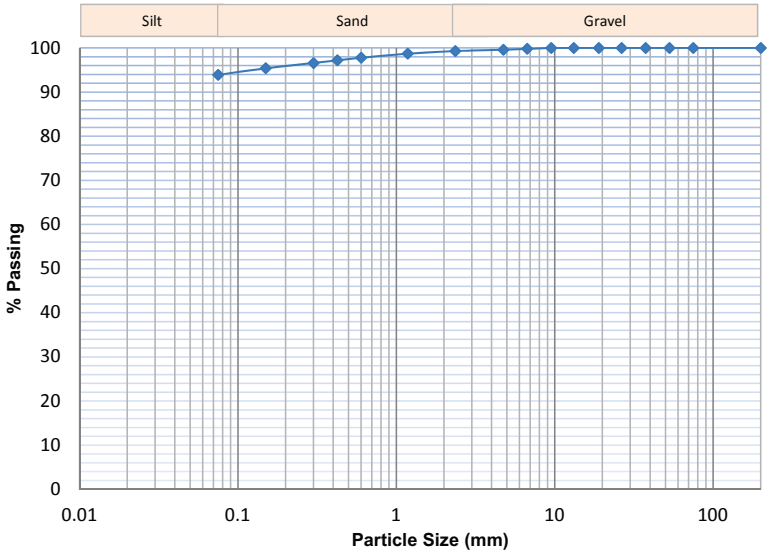
Report For: Coliban Water
P.O Box 2770
BENDIGO
VIC 3554

Report No.	16E0574
Revision No.	0
Sheet:	21 of 21
Date of Report:	22/04/2016
GTSS Sample No.	16E0574U

Project: Material Investigation
Sample Location Cohuna Water Treatment Plant
Client Identification[2]: Bore Hole 21
Date Sampled: 25/02/2016 **Sample supplied by :** Laboratory
Material Description: Brown Silty Clay

PARTICLE SIZE DISTRIBUTION

Sieve Size mm	Sample % Passing
200	100
75.0	100
53.0	100
37.5	100
26.5	100
19.0	100
13.2	100
9.5	100
6.7	100
4.75	100
2.36	99
1.18	99
0.600	98
0.425	97
0.300	97
0.150	95
0.075	94



ATTERBERG LIMITS

Liquid Limit %	58
Plastic Limit %	20
Plasticity Index %	38
Linear Shrinkage %	17.0
Curling	No
Crumbling	Yes
Cracking	No
Mould Length (mm):	254

MOISTURE CONTENT

Moisture Content %	21.0

EMERSON CLASS NUMBER

Water Type	channel
Water Temperature (°C)	25.3
Emerson Class Number	4

MATERIAL PROPERTIES

Gravel Content %	1
Sand Content %	5
Silt/Clay Content %	94

Notes: * Represents test not preformed
1. Test Methods: AS 1289: 2.1.1 / 3.1.2 / 3.3.1 / 3.4.1 / 3.4.1 / 3.6.1 / 3.8.1
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Approved Signatory: [redacted] **Date:** April 22, 2016

Geotechnical Testing Services, Southern
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NATA WORLD RECOGNISED ACCREDITATION

GroundScience

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PERMEABILITY - CONSTANT HEAD (Triaxial method) AS1289 6.7.3

client :	GEOTECHNICAL TESTING SERVICES PTY LTD (BENDIGO)	job No.	GS3485/1
project:	COHUNA WASTE WATER TREATMENT LAGOONS	report No.	CT
location:	COHUNA	test date:	29/4/2016

Sample identification		# 72 (De-aired)
Borehole / test pit		BH1
Depth m		0.6 m
sample diameter	mm	51.00
sample height	mm	50.96
specimen wet density	t/m3	2.099
specimen dry density	t/m3	1.74
moisture content	%	20.8
cell pressure	kPa	320
inlet pressure	kPa	300
outlet pressure	kPa	250
mean effective stress	kPa	45
hydraulic head	kPa	50
saturation	%	96
PERMEABILITY	**m/sec**	**1.E-10**
water type		de-aired - filtered
specimen description		silty CLAY, high plasticity, mottled grey brown
Notes:		undisturbed sample

Comments: sample provided by client, tested "as received"

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Date of issue
4/05/2016

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PERMEABILITY - CONSTANT HEAD (Triaxial method) AS1289 6.7.3

client :	GEOTECHNICAL TESTING SERVICES PTY LTD (BENDIGO)	job No.	GS3485/1
project:	COHUNA WASTE WATER TREATMENT LAGOONS	report No.	CU
location:	COHUNA	test date:	29/4/2016

Sample identification		# 72 (NaCl)
Borehole / test pit		BH1
Depth m		0.6m
sample diameter	mm	50.82
sample height	mm	50.92
specimen wet density	t/m3	2.131
specimen dry density	t/m3	1.77
moisture content	%	20.5
cell pressure	kPa	320
inlet pressure	kPa	300
outlet pressure	kPa	250
mean effective stress	kPa	45
hydraulic head	kPa	50
saturation	%	98
PERMEABILITY	**m/sec**	**1.E-10**
water type		5,000ppm NaCl Solution
specimen description		silty CLAY, high plasticity, mottled grey brown
Notes:		undisturbed sample
Comments		sample provided by client, tested "as received"

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[redacted]

PERMEABILITY - CONSTANT HEAD (Triaxial method) AS1289 6.7.3

client :	GEOTECHNICAL TESTING SERVICES PTY LTD (BENDIGO)	job No.	GS3485/1
project:	COHUNA WASTE WATER TREATMENT LAGOONS	report No.	CV
location:	COHUNA	test date:	2/5/2016

Sample identification		# 73 (De-aired)
Borehole / test pit		BH2
Depth m		0.75 m
sample diameter	mm	50.92
sample height	mm	51.00
specimen wet density	t/m3	2.090
specimen dry density	t/m3	1.74
moisture content	%	20.3
cell pressure	kPa	320
inlet pressure	kPa	300
outlet pressure	kPa	250
mean effective stress	kPa	45
hydraulic head	kPa	50
saturation	%	95
PERMEABILITY	**m/sec**	**6.E-11**
water type		de-aired - filtered
specimen description		silty CLAY, high plasticity, mottled grey brown
Notes:		undisturbed sample

Comments: sample provided by client, tested "as received"

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PERMEABILITY - CONSTANT HEAD (Triaxial method) AS1289 6.7.3

client :	GEOTECHNICAL TESTING SERVICES PTY LTD (BENDIGO)	job No.	GS3485/1
project:	COHUNA WASTE WATER TREATMENT LAGOONS	report No.	CW
location:	COHUNA	test date:	2/5/2016

Sample identification		# 73 (De-aired)
Borehole / test pit		BH2
Depth m		0.75 m
sample diameter	mm	50.92
sample height	mm	51.00
specimen wet density	t/m3	2.090
specimen dry density	t/m3	1.74
moisture content	%	20.3
cell pressure	kPa	320
inlet pressure	kPa	300
outlet pressure	kPa	250
mean effective stress	kPa	45
hydraulic head	kPa	50
saturation	%	95
PERMEABILITY	**m/sec**	**6.E-11**
water type		de-aired - filtered
specimen description		silty CLAY, high plasticity, mottled grey brown
Notes:		undisturbed sample

Comments: sample provided by client, tested "as received"

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[redacted]

PERMEABILITY - CONSTANT HEAD (Triaxial method) AS1289 6.7.3

client :	GEOTECHNICAL TESTING SERVICES PTY LTD (BENDIGO)	job No.	GS3485/1
project:	COHUNA WASTE WATER TREATMENT LAGOONS	report No.	CX
location:	COHUNA	test date:	3/5/2016

Sample identification		# 74 (De-aired)
Borehole / test pit		BH3
Depth m		0.6 m
sample diameter	mm	50.98
sample height	mm	51.18
specimen wet density	t/m3	2.065
specimen dry density	t/m3	1.72
moisture content	%	19.8
cell pressure	kPa	320
inlet pressure	kPa	300
outlet pressure	kPa	250
mean effective stress	kPa	45
hydraulic head	kPa	50
saturation	%	95
PERMEABILITY	**m/sec**	**9.E-11**
water type		de-aired - filtered
specimen description		silty CLAY, medium to high plasticity, mottled grey brown
Notes:		undisturbed sample

Comments: sample provided by client, tested "as received"

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PERMEABILITY - CONSTANT HEAD (Triaxial method) AS1289 6.7.3

client :	GEOTECHNICAL TESTING SERVICES PTY LTD (BENDIGO)	job No.	GS3485/1
project:	COHUNA WASTE WATER TREATMENT LAGOONS	report No.	CY
location:	COHUNA	test date:	3/5/2016

Sample identification		# 74 (NaCl)
Borehole / test pit		BH3
Depth m		0.6 m
sample diameter	mm	51.28
sample height	mm	51.30
specimen wet density	t/m3	2.043
specimen dry density	t/m3	1.68
moisture content	%	21.5
cell pressure	kPa	320
inlet pressure	kPa	300
outlet pressure	kPa	250
mean effective stress	kPa	45
hydraulic head	kPa	50
saturation	%	96
PERMEABILITY	**m/sec**	**3.E-11**
water type		5,000ppm NaCl Solution
specimen description		silty CLAY, medium to high plasticity, mottled grey brown
Notes:		undisturbed sample
Comments		sample provided by client, tested "as received"

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PERMEABILITY - CONSTANT HEAD (Triaxial method) AS1289 6.7.3

client :	GEOTECHNICAL TESTING SERVICES PTY LTD (BENDIGO)	job No.	GS3485/1
project:	COHUNA WASTE WATER TREATMENT LAGOONS	report No.	CZ
location:	COHUNA	test date:	4/5/2016

Sample identification		# 75 (De-aired)
Borehole / test pit		BH4
Depth m		0.75 m
sample diameter	mm	51.00
sample height	mm	51.08
specimen wet density	t/m3	2.059
specimen dry density	t/m3	1.70
moisture content	%	20.8
cell pressure	kPa	320
inlet pressure	kPa	300
outlet pressure	kPa	250
mean effective stress	kPa	45
hydraulic head	kPa	50
saturation	%	96
PERMEABILITY	**m/sec**	**2.E-11**
water type		de-aired - filtered
specimen description		silty CLAY, medium to high plasticity, mottled grey brown
Notes:		undisturbed sample

Comments: sample provided by client, tested "as received"

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[redacted]

PERMEABILITY - CONSTANT HEAD (Triaxial method) AS1289 6.7.3

client :	GEOTECHNICAL TESTING SERVICES PTY LTD (BENDIGO)	job No.	GS3485/1
project:	COHUNA WASTE WATER TREATMENT LAGOONS	report No.	DA
location:	COHUNA	test date:	4/5/2016

Sample identification		# 75 (NaCl)
Borehole / test pit		BH4
Depth m		0.75 m
sample diameter	mm	50.92
sample height	mm	51.00
specimen wet density	t/m3	2.092
specimen dry density	t/m3	1.76
moisture content	%	19.1
cell pressure	kPa	320
inlet pressure	kPa	300
outlet pressure	kPa	250
mean effective stress	kPa	45
hydraulic head	kPa	50
saturation	%	95
PERMEABILITY	**m/sec**	**4.E-11**
water type		5,000ppm NaCl Solution
specimen description		silty CLAY, medium to high plasticity, mottled grey brown
Notes:		undisturbed sample
Comments		sample provided by client, tested "as received"

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PERMEABILITY - CONSTANT HEAD (Triaxial method) AS1289 6.7.3

client :	GEOTECHNICAL TESTING SERVICES PTY LTD (BENDIGO)	job No.	GS3485/1
project:	COHUNA WASTE WATER TREATMENT LAGOONS	report No.	DB
location:	COHUNA	test date:	9/5/2016

Sample identification		# 76 (De-airedl)
Borehole / test pit		BH5
Depth m		0.6 m
sample diameter	mm	50.48
sample height	mm	50.42
specimen wet density	t/m3	2.103
specimen dry density	t/m3	1.78
moisture content	%	17.8
cell pressure	kPa	320
inlet pressure	kPa	300
outlet pressure	kPa	250
mean effective stress	kPa	45
hydraulic head	kPa	50
saturation	%	96
PERMEABILITY	**m/sec**	**2.E-11**
water type		de-aired - filtered
specimen description		silty CLAY, medium to high plasticity, brown
Notes:		undisturbed sample

Comments: sample provided by client, tested "as received"

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PERMEABILITY - CONSTANT HEAD (Triaxial method) AS1289 6.7.3

client :	GEOTECHNICAL TESTING SERVICES PTY LTD (BENDIGO)	job No.	GS3485/1
project:	COHUNA WASTE WATER TREATMENT LAGOONS	report No.	DC
location:	COHUNA	test date:	9/5/2016

Sample identification		# 76 (NaCl)
Borehole / test pit		BH5
Depth m		0.6 m
sample diameter	mm	50.50
sample height	mm	50.48
specimen wet density	t/m3	2.124
specimen dry density	t/m3	1.80
moisture content	%	17.8
cell pressure	kPa	320
inlet pressure	kPa	300
outlet pressure	kPa	250
mean effective stress	kPa	45
hydraulic head	kPa	50
saturation	%	96
PERMEABILITY	**m/sec**	**3.E-11**
water type		5,000ppm NaCl Solution
specimen description		silty CLAY, medium to high plasticity, brown
Notes:		undisturbed sample
Comments		sample provided by client, tested "as received"

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13/05/2016

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[redacted]

PERMEABILITY - CONSTANT HEAD (Triaxial method) AS1289 6.7.3

client :	GEOTECHNICAL TESTING SERVICES PTY LTD (BENDIGO)	job No.	GS3485/1
project:	COHUNA WASTE WATER TREATMENT LAGOONS	report No.	DD
location:	COHUNA	test date:	19/5/2016

Sample identification		# 77 (De-aired)
Borehole / test pit		BH6
Depth m		0.75m
sample diameter	mm	50.98
sample height	mm	51.00
specimen wet density	t/m3	2.072
specimen dry density	t/m3	1.77
moisture content	%	17.4
cell pressure	kPa	320
inlet pressure	kPa	300
outlet pressure	kPa	250
mean effective stress	kPa	45
hydraulic head	kPa	50
saturation	%	98
PERMEABILITY	**m/sec**	**8.E-11**
water type		de-aired - filtered
specimen description		silty CLAY, medium to high plasticity, mottled grey brown
Notes:		undisturbed sample

Comments: sample provided by client, tested "as received"

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PERMEABILITY - CONSTANT HEAD (Triaxial method) AS1289 6.7.3

client :	GEOTECHNICAL TESTING SERVICES PTY LTD (BENDIGO)	job No.	GS3485/1
project:	COHUNA WASTE WATER TREATMENT LAGOONS	report No.	DE
location:	COHUNA	test date:	19/5/2016

Sample identification		# 77 (NaCl)
Borehole / test pit		BH6
Depth m		0.75m
sample diameter	mm	50.88
sample height	mm	51.00
specimen wet density	t/m3	2.115
specimen dry density	t/m3	1.80
moisture content	%	17.4
cell pressure	kPa	320
inlet pressure	kPa	300
outlet pressure	kPa	250
mean effective stress	kPa	45
hydraulic head	kPa	50
saturation	%	96
PERMEABILITY	**m/sec**	**2.E-11**
water type		5,000ppm NaCl Solution
specimen description		silty CLAY, medium to high plasticity, mottled grey brown
Notes:		undisturbed sample
Comments		sample provided by client, tested "as received"

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PERMEABILITY - CONSTANT HEAD (Triaxial method) AS1289 6.7.3

client :	GEOTECHNICAL TESTING SERVICES PTY LTD (BENDIGO)	job No.	GS3485/1
project:	COHUNA WASTE WATER TREATMENT LAGOONS	report No.	DF
location:	COHUNA	test date:	20/5/2016

Sample identification		# 78 (Deaired)
Borehole / test pit		BH7
Depth m		0.6m
sample diameter	mm	50.80
sample height	mm	50.76
specimen wet density	t/m3	2.054
specimen dry density	t/m3	1.69
moisture content	%	21.3
cell pressure	kPa	320
inlet pressure	kPa	300
outlet pressure	kPa	250
mean effective stress	kPa	45
hydraulic head	kPa	50
saturation	%	98
PERMEABILITY	**m/sec**	**1.E-10**
water type		de-aired - filtered
specimen description		silty CLAY, high plasticity, mottled grey brown
Notes:		undisturbed sample

Comments: sample provided by client, tested "as received"

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PERMEABILITY - CONSTANT HEAD (Triaxial method) AS1289 6.7.3

client :	GEOTECHNICAL TESTING SERVICES PTY LTD (BENDIGO)	job No.	GS3485/1
project:	COHUNA WASTE WATER TREATMENT LAGOONS	report No.	DG
location:	COHUNA	test date:	20/5/2016

Sample identification		# 78 (NaCl)
Borehole / test pit		BH7
Depth m		0.6m
sample diameter	mm	50.80
sample height	mm	50.48
specimen wet density	t/m3	2.045
specimen dry density	t/m3	1.69
moisture content	%	21.3
cell pressure	kPa	320
inlet pressure	kPa	300
outlet pressure	kPa	250
mean effective stress	kPa	45
hydraulic head	kPa	50
saturation	%	95
PERMEABILITY	**m/sec**	**3.E-10**
water type		5,000ppm NaCl Solution
specimen description		silty CLAY, high plasticity, mottled grey brown
Notes:		undisturbed sample
Comments		sample provided by client, tested "as received"

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24/05/2016

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PERMEABILITY - CONSTANT HEAD (Triaxial method) AS1289 6.7.3

client :	GEOTECHNICAL TESTING SERVICES PTY LTD (BENDIGO)	job No.	GS3485/1
project:	COHUNA WASTE WATER TREATMENT LAGOONS	report No.	DH
location:	COHUNA	test date:	23/5/2016

Sample identification		# 79 (Deaired)
Borehole / test pit		BH8
Depth m		0.8m
sample diameter	mm	50.80
sample height	mm	50.88
specimen wet density	t/m3	2.019
specimen dry density	t/m3	1.64
moisture content	%	23.4
cell pressure	kPa	320
inlet pressure	kPa	300
outlet pressure	kPa	250
mean effective stress	kPa	45
hydraulic head	kPa	50
saturation	%	98
PERMEABILITY	**m/sec**	**3.E-11**
water type		de-aired - filtered
specimen description		CLAY, high plasticity, mottled grey brown
Notes:		undisturbed sample

Comments: sample provided by client, tested "as received"

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Date of issue
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[redacted]

PERMEABILITY - CONSTANT HEAD (Triaxial method) AS1289 6.7.3

client :	GEOTECHNICAL TESTING SERVICES PTY LTD (BENDIGO)	job No.	GS3485/1
project:	COHUNA WASTE WATER TREATMENT LAGOONS	report No.	DI
location:	COHUNA	test date:	23/5/2016

Sample identification		# 79 (NaCl)
Borehole / test pit		BH8
Depth m		0.8m
sample diameter	mm	50.88
sample height	mm	51.00
specimen wet density	t/m3	2.049
specimen dry density	t/m3	1.66
moisture content	%	23.4
cell pressure	kPa	320
inlet pressure	kPa	300
outlet pressure	kPa	250
mean effective stress	kPa	45
hydraulic head	kPa	50
saturation	%	96
PERMEABILITY	**m/sec**	**9.E-11**
water type		5,000ppm NaCl Solution
specimen description		CLAY, high plasticity, mottled grey brown
Notes:		undisturbed sample

Comments: sample provided by client, tested "as received"

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26/05/2016

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PERMEABILITY - CONSTANT HEAD (Triaxial method) AS1289 6.7.3

client :	GEOTECHNICAL TESTING SERVICES PTY LTD (BENDIGO)	job No.	GS3485/1
project:	COHUNA WASTE WATER TREATMENT LAGOONS	report No.	DJ
location:	COHUNA	test date:	23/5/2016

Sample identification		# 80 (Deaired)
Borehole / test pit		BH9
Depth m		0.7m
sample diameter	mm	50.90
sample height	mm	50.98
specimen wet density	t/m3	2.028
specimen dry density	t/m3	1.65
moisture content	%	22.9
cell pressure	kPa	320
inlet pressure	kPa	300
outlet pressure	kPa	250
mean effective stress	kPa	45
hydraulic head	kPa	50
saturation	%	98
PERMEABILITY	**m/sec**	**3.E-11**
water type		de-aired - filtered
specimen description		CLAY, high plasticity, mottled grey brown
Notes:		undisturbed sample

Comments: sample provided by client, tested "as received"

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PERMEABILITY - CONSTANT HEAD (Triaxial method) AS1289 6.7.3

client :	GEOTECHNICAL TESTING SERVICES PTY LTD (BENDIGO)	job No.	GS3485/1
project:	COHUNA WASTE WATER TREATMENT LAGOONS	report No.	DK
location:	COHUNA	test date:	23/5/2016

Sample identification		# 80 (NaCl)
Borehole / test pit		BH9
Depth m		0.7m
sample diameter	mm	50.90
sample height	mm	51.00
specimen wet density	t/m3	2.024
specimen dry density	t/m3	1.65
moisture content	%	22.9
cell pressure	kPa	320
inlet pressure	kPa	300
outlet pressure	kPa	250
mean effective stress	kPa	45
hydraulic head	kPa	50
saturation	%	95
PERMEABILITY	**m/sec**	**5.E-11**
water type		5,000ppm NaCl Solution
specimen description		CLAY, high plasticity, mottled grey brown
Notes:		undisturbed sample
Comments		sample provided by client, tested "as received"

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PERMEABILITY - CONSTANT HEAD (Triaxial method) AS1289 6.7.3

client :	GEOTECHNICAL TESTING SERVICES PTY LTD (BENDIGO)	job No.	GS3485/1
project:	COHUNA WASTE WATER TREATMENT LAGOONS	report No.	DL
location:	COHUNA	test date:	26/5/2016

Sample identification		# 81 (Deaired)
Borehole / test pit		BH10
Depth m		0.7 m
sample diameter	mm	51.00
sample height	mm	50.98
specimen wet density	t/m3	2.007
specimen dry density	t/m3	1.60
moisture content	%	25.4
cell pressure	kPa	320
inlet pressure	kPa	300
outlet pressure	kPa	250
mean effective stress	kPa	45
hydraulic head	kPa	50
saturation	%	96
PERMEABILITY	**m/sec**	**3.E-11**
water type		de-aired - filtered
specimen description		CLAY, high plasticity, mottled grey brown
Notes:		undisturbed sample

Comments: sample provided by client, tested "as received"

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PERMEABILITY - CONSTANT HEAD (Triaxial method) AS1289 6.7.3

client :	GEOTECHNICAL TESTING SERVICES PTY LTD (BENDIGO)	job No.	GS3485/1
project:	COHUNA WASTE WATER TREATMENT LAGOONS	report No.	DM
location:	COHUNA	test date:	26/5/2016

Sample identification		# 81 (NaCl)
Borehole / test pit		BH10
Depth m		0.7 m
sample diameter	mm	50.90
sample height	mm	50.98
specimen wet density	t/m3	2.013
specimen dry density	t/m3	1.61
moisture content	%	25.4
cell pressure	kPa	320
inlet pressure	kPa	300
outlet pressure	kPa	250
mean effective stress	kPa	45
hydraulic head	kPa	50
saturation	%	98
PERMEABILITY	**m/sec**	**2.E-10**
water type		5,000ppm NaCl Solution
specimen description		CLAY, high plasticity, mottled grey brown
Notes:		undisturbed sample

Comments: sample provided by client, tested "as received"

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CONSTANT HEAD PERMEABILITY TEST

AS 1289.6.7.3

[redacted]

		Job No	16089
		Report No	16089/R019
		Date of Issue	23/06/16
Client	GEOTECHNICAL TESTING SERVICES P/L (BENDIGO)	*Tested by*	ANR
Project	COHUNA WASTE WATER TREATMENT LAGOONS	*Date tested*	10-14/06/16
Location	VIA BENDIGO	*Checked by*	ANR

Sample No		16089019
Sample identification		BH11 0.7m
Date sampled		25/02/16
Sampled by		Client
Sampling method		By Client
Sample type		U50
Specimen details before test		
Length of specimen	*mm*	51.8
Diameter of specimen	*mm*	50.4
Length to diameter ratio		1: 1.0
Dry density	*t/m³*	1.70
Moisture content	*%*	22.9
Specimen details after test		
Moisture content	*%*	25.4
Mean effective stress	*kPa*	100
Permeant used		Distilled water
PERMEABILITY (k)	*m/sec*	1 x 10^{-10}
Sample description		CLAY, medium to high plasticity, grey-brown.

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CONSTANT HEAD PERMEABILITY TEST

AS 1289.6.7.3

[redacted]

		Job No	16089
		Report No	16089/R020
		Date of Issue	23/06/16
Client	GEOTECHNICAL TESTING SERVICES P/L (BENDIGO)	*Tested by*	ANR
Project	COHUNA WASTE WATER TREATMENT LAGOONS	*Date tested*	10-14/06/16
Location	VIA BENDIGO	*Checked by*	ANR

Sample No		16089020
Sample identification		BH12 0.8m
Date sampled		25/02/16
Sampled by		Client
Sampling method		By Client
Sample type		U50

Specimen details before test

Length of specimen	*mm*	51.5
Diameter of specimen	*mm*	50.4
Length to diameter ratio		1: 1.0
Dry density	*t/m³*	1.68
Moisture content	*%*	24.1

Specimen details after test

Moisture content	*%*	25.5
Mean effective stress	*kPa*	100
Permeant used		Distilled water
PERMEABILITY (k)	*m/sec*	6×10^{-11}
Sample description		CLAY, high plasticity, pale brown-grey.

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[redacted]

		Job No	16089
		Report No	16089/R021
		Date of Issue	23/06/16
Client	GEOTECHNICAL TESTING SERVICES P/L (BENDIGO)	*Tested by*	ANR
Project	COHUNA WASTE WATER TREATMENT LAGOONS	*Date tested*	10-14/06/16
Location	VIA BENDIGO	*Checked by*	ANR

Sample No		16089021
Sample identification		BH13 1.0m
Date sampled		25/02/16
Sampled by		Client
Sampling method		By Client
Sample type		U50

Specimen details before test

Length of specimen	*mm*	51.2
Diameter of specimen	*mm*	50.3
Length to diameter ratio		1: 1.0
Dry density	*t/m³*	1.67
Moisture content	*%*	24.4

Specimen details after test

Moisture content	*%*	26.5
Mean effective stress	*kPa*	100
Permeant used		Distilled water
PERMEABILITY (k)	*m/sec*	4×10^{-11}
Sample description		CLAY, high plasticity, brown and grey.

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CIVIL GEOTECHNICAL SERVICES [redacted]

		Job No	16089
		Report No	16089/R022
		Date of Issue	28/06/16
Client	GEOTECHNICAL TESTING SERVICES P/L (BENDIGO)	*Tested by*	ANR
Project	COHUNA WASTE WATER TREATMENT LAGOONS	*Date tested*	20-24/06/16
Location	VIA BENDIGO	*Checked by*	ANR

Sample No		16089022
Sample identification		BH14 0.5m
Date sampled		2016
Sampled by		Client
Sampling method		By Client
Sample type		U50

Specimen details before test

Length of specimen	*mm*	51.8
Diameter of specimen	*mm*	50.6
Length to diameter ratio		1: 1.0
Dry density	*t/m³*	1.76
Moisture content	*%*	20.3

Specimen details after test

Moisture content	*%*	21.8
Mean effective stress	*kPa*	100
Permeant used		Distilled water
PERMEABILITY (k)	*m/sec*	2×10^{-11}

Sample description	CLAY, high plasticity, brown, trace of fine to coarse sand, trace of fine gravel.

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CIVIL GEOTECHNICAL SERVICES

[redacted]

Job No	16089		
Report No	16089/R023		
Date of Issue	28/06/16		
Client	GEOTECHNICAL TESTING SERVICES P/L (BENDIGO)	*Tested by*	ANR
Project	COHUNA WASTE WATER TREATMENT LAGOONS	*Date tested*	20-24/06/16
Location	VIA BENDIGO	*Checked by*	ANR

Sample No		16089023
Sample identification		BH15 0.5m
Date sampled		2016
Sampled by		Client
Sampling method		By Client
Sample type		U50
Specimen details before test		
Length of specimen	*mm*	51.5
Diameter of specimen	*mm*	50.6
Length to diameter ratio		1: 1.0
Dry density	*t/m³*	1.74
Moisture content	*%*	21.2
Specimen details after test		
Moisture content	*%*	22.5
Mean effective stress	*kPa*	100
Permeant used		Distilled water
PERMEABILITY (k)	*m/sec*	5 x 10 $^{-11}$
Sample description		CLAY, high plasticity, brown.

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CONSTANT HEAD PERMEABILITY TEST

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CIVIL GEOTECHNICAL SERVICES

[redacted]

Job No	16089		
Report No	16089/R024		
Date of Issue	28/06/16		
Client	GEOTECHNICAL TESTING SERVICES P/L (BENDIGO)	*Tested by*	ANR
Project	COHUNA WASTE WATER TREATMENT LAGOONS	*Date tested*	20-24/06/16
Location	VIA BENDIGO	*Checked by*	ANR

Sample No		16089024
Sample identification		BH16 0.5m
Date sampled		2016
Sampled by		Client
Sampling method		By Client
Sample type		U50
Specimen details before test		
Length of specimen	*mm*	51.8
Diameter of specimen	*mm*	50.8
Length to diameter ratio		1: 1.0
Dry density	*t/m³*	1.69
Moisture content	*%*	22.2
Specimen details after test		
Moisture content	*%*	23.6
Mean effective stress	*kPa*	100
Permeant used		Distilled water
PERMEABILITY (k)	*m/sec*	2×10^{-11}
Sample description		CLAY, high plasticity, grey.

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[redacted]

		Job No	16089
		Report No	16089/R025
		Date of Issue	12/07/16
Client	GEOTECHNICAL TESTING SERVICES P/L (BENDIGO)	*Tested by*	ANR
Project	COHUNA WASTE WATER TREATMENT LAGOONS	*Date tested*	27/06/16
Location	VIA BENDIGO	*Checked by*	PJF

Sample No		16089025
Sample identification		BH17 0.8m
Date sampled		2016
Sampled by		Client
Sampling method		By Client
Sample type		U50
Specimen details before test		
Length of specimen	*mm*	51.9
Diameter of specimen	*mm*	50.6
Length to diameter ratio		1: 1.0
Dry density	*t/m³*	1.69
Moisture content	*%*	22.7
Specimen details after test		
Moisture content	*%*	24.6
Mean effective stress	*kPa*	100
Permeant used		Distilled water
PERMEABILITY (k)	*m/sec*	3E-11
Sample description		CLAY, high plasticity, brown and dark grey.

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CONSTANT HEAD PERMEABILITY TEST

AS 1289.6.7.3

[redacted]

		Job No	16089
		Report No	16089/R026
		Date of Issue	12/07/16
Client	GEOTECHNICAL TESTING SERVICES P/L (BENDIGO)	*Tested by*	ANR
Project	COHUNA WASTE WATER TREATMENT LAGOONS	*Date tested*	27/06/16
Location	VIA BENDIGO	*Checked by*	PJF

Sample No		16089026
Sample identification		BH18 0.6m
Date sampled		2016
Sampled by		Client
Sampling method		By Client
Sample type		U50

Specimen details before test

Length of specimen	*mm*	51.8
Diameter of specimen	*mm*	50.6
Length to diameter ratio		1: 1.0
Dry density	*t/m³*	1.64
Moisture content	*%*	24.2

Specimen details after test

Moisture content	*%*	26.4
Mean effective stress	*kPa*	100
Permeant used		Distilled water
PERMEABILITY (k)	*m/sec*	2E-11
Sample description		CLAY, high plasticity, brown and dark grey.

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CONSTANT HEAD PERMEABILITY TEST

AS 1289.6.7.3

CIVIL GEOTECHNICAL SERVICES

[redacted]

		Job No	16089
		Report No	16089/R027
		Date of Issue	12/07/16
Client	GEOTECHNICAL TESTING SERVICES P/L (BENDIGO)	*Tested by*	ANR
Project	COHUNA WASTE WATER TREATMENT LAGOONS	*Date tested*	27/06/16
Location	VIA BENDIGO	*Checked by*	PJF

Sample No		16089027
Sample identification		BH19 1.0m
Date sampled		2016
Sampled by		Client
Sampling method		By Client
Sample type		U50

Specimen details before test

Length of specimen	*mm*	51.8
Diameter of specimen	*mm*	50.9
Length to diameter ratio		1: 1.0
Dry density	*t/m³*	1.67
Moisture content	*%*	23.0

Specimen details after test

Moisture content	*%*	25.3
Mean effective stress	*kPa*	100
Permeant used		Distilled water
PERMEABILITY (k)	*m/sec*	3E-11

Sample description	CLAY, high plasticity, brown and grey.

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CONSTANT HEAD PERMEABILITY TEST

AS 1289.6.7.3

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		Job No	16089
		Report No	16089/R028
		Date of Issue	12/07/16
Client	GEOTECHNICAL TESTING SERVICES P/L (BENDIGO)	*Tested by*	ANR
Project	COHUNA WASTE WATER TREATMENT LAGOONS	*Date tested*	04/07/16
Location	VIA BENDIGO	*Checked by*	PJF

Sample No		16089028
Sample identification		BH20 0.5m
Date sampled		2016
Sampled by		Client
Sampling method		By Client
Sample type		U50

Specimen details before test

Length of specimen	*mm*	51.8
Diameter of specimen	*mm*	50.8
Length to diameter ratio		1: 1.0
Dry density	*t/m³*	2.04
Moisture content	*%*	23.2

Specimen details after test

Moisture content	*%*	25.7
Mean effective stress	*kPa*	100
Permeant used		Distilled water
PERMEABILITY (k)	*m/sec*	3E-11

Sample description	CLAY, high plasticity, grey-brown.

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CIVIL GEOTECHNICAL SERVICES

[redacted]

		Job No	16089
		Report No	16089/R029
		Date of Issue	12/07/16
Client	GEOTECHNICAL TESTING SERVICES P/L (BENDIGO)	*Tested by*	ANR
Project	COHUNA WASTE WATER TREATMENT LAGOONS	*Date tested*	04/07/16
Location	VIA BENDIGO	*Checked by*	PJF

Sample No		16089029
Sample identification		BH21 0.7m
Date sampled		2016
Sampled by		Client
Sampling method		By Client
Sample type		U50

Specimen details before test

Length of specimen	*mm*	51.8
Diameter of specimen	*mm*	50.6
Length to diameter ratio		1: 1.0
Dry density	*t/m³*	1.66
Moisture content	*%*	23.5

Specimen details after test

Moisture content	*%*	25.9
Mean effective stress	*kPa*	100
Permeant used		Distilled water
PERMEABILITY (k)	*m/sec*	3E-11

Sample description	CLAY, high plasticity, grey-brown.

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CONSTANT HEAD PERMEABILITY TEST

AS 1289.6.7.3

[redacted]

		Job No	16089
CIVIL GEOTECHNICAL SERVICES		*Report No*	16089/R030
		Date of Issue	23/06/16
Client	GEOTECHNICAL TESTING SERVICES P/L (BENDIGO)	*Tested by*	ANR
Project	COHUNA WWTP	*Date tested*	16-20/06/16
Location	VIA BENDIGO	*Checked by*	ANR

Sample No		16089030
Sample identification		BH11 0.7m
Date sampled		2016
Sampled by		Client
Sampling method		By Client
Sample type		U50

Specimen details before test

Length of specimen	*mm*	51.8
Diameter of specimen	*mm*	50.4
Length to diameter ratio		1: 1.0
Dry density	*t/m³*	1.70
Moisture content	*%*	22.9

Specimen details after test

Moisture content	*%*	27.6
Mean effective stress	*kPa*	100
Permeant used		50,000ppm NaCl
PERMEABILITY (k)	*m/sec*	6 x 10^{-11}

Sample description	CLAY, medium to high plasticity, grey-brown.

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CONSTANT HEAD PERMEABILITY TEST

AS 1289.6.7.3

CIVIL GEOTECHNICAL SERVICES

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Job No	16089		
Report No	16089/R031		
Date of Issue	23/06/16		
Client	GEOTECHNICAL TESTING SERVICES P/L (BENDIGO)	*Tested by*	ANR
Project	COHUNA WWTP	*Date tested*	16-20/06/16
Location	VIA BENDIGO	*Checked by*	ANR

Sample No		16089031
Sample identification		BH12 0.8m
Date sampled		2016
Sampled by		Client
Sampling method		By Client
Sample type		U50

Specimen details before test

Length of specimen	*mm*	51.5
Diameter of specimen	*mm*	50.4
Length to diameter ratio		1: 1.0
Dry density	*t/m³*	1.68
Moisture content	*%*	24.3

Specimen details after test

Moisture content	*%*	25.3
Mean effective stress	*kPa*	100
Permeant used		50,000ppm NaCl
PERMEABILITY (k)	*m/sec*	5×10^{-11}
Sample description		CLAY, high plasticity, pale brown-grey.

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AS 1289.6.7.3

CIVIL GEOTECHNICAL SERVICES

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Job No	16089		
Report No	16089/R032		
Date of Issue	23/06/16		
Client	GEOTECHNICAL TESTING SERVICES P/L (BENDIGO)	*Tested by*	ANR
Project	COHUNA WWTP	*Date tested*	16-20/06/16
Location	VIA BENDIGO	*Checked by*	ANR

Sample No		16089032
Sample identification		BH13 1.0m
Date sampled		2016
Sampled by		Client
Sampling method		By Client
Sample type		U50
Specimen details before test		
Length of specimen	*mm*	51.2
Diameter of specimen	*mm*	50.3
Length to diameter ratio		1: 1.0
Dry density	*t/m³*	1.67
Moisture content	*%*	24.6
Specimen details after test		
Moisture content	*%*	26.1
Mean effective stress	*kPa*	100
Permeant used		50,000ppm NaCl
PERMEABILITY (k)	*m/sec*	2 x 10^{-11}
Sample description		CLAY, high plasticity, brown and grey.

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[redacted]

A673U2 V1.3 OCT 09

CONSTANT HEAD PERMEABILITY TEST

AS 1289.6.7.3

[redacted]

		Job No	16089
		Report No	16089/R033
		Date of Issue	28/06/16
Client	GEOTECHNICAL TESTING SERVICES P/L (BENDIGO)	*Tested by*	ANR
Project	COHUNA WWTP	*Date tested*	24-27/06/16
Location	VIA BENDIGO	*Checked by*	ANR

Sample No		16089033
Sample identification		BH14 0.5m
Date sampled		2016
Sampled by		Client
Sampling method		By Client
Sample type		U50

Specimen details before test

Length of specimen	*mm*	51.9
Diameter of specimen	*mm*	50.7
Length to diameter ratio		1: 1.0
Dry density	*t/m³*	1.75
Moisture content	*%*	20.3

Specimen details after test

Moisture content	*%*	21.9
Mean effective stress	*kPa*	100
Permeant used		50,000ppm NaCl
PERMEABILITY (k)	*m/sec*	2 x 10^{-11}

Sample description	CLAY, high plasticity, brown, trace of fine to coarse sand, trace of fine gravel.

A673U2 V1.3 OCT 09

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[redacted]

CONSTANT HEAD PERMEABILITY TEST

AS 1289.6.7.3

CIVIL GEOTECHNICAL SERVICES
[redacted]

Job No	16089		
Report No	16089/R034		
Date of Issue	28/06/16		
Client	GEOTECHNICAL TESTING SERVICES P/L (BENDIGO)	*Tested by*	ANR
Project	COHUNA WWTP	*Date tested*	24-27/06/16
Location	VIA BENDIGO	*Checked by*	ANR

Sample No		16089034
Sample identification		BH15 0.5m
Date sampled		2016
Sampled by		Client
Sampling method		By Client
Sample type		U50
Specimen details before test		
Length of specimen	*mm*	51.7
Diameter of specimen	*mm*	50.8
Length to diameter ratio		1: 1.0
Dry density	*t/m³*	1.74
Moisture content	*%*	20.8
Specimen details after test		
Moisture content	*%*	22.5
Mean effective stress	*kPa*	100
Permeant used		50,000ppm NaCl
PERMEABILITY (k)	*m/sec*	4 x 10^{-11}
Sample description		CLAY, high plasticity, brown.

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[redacted]

A673U2 V1.3 OCT 09

CONSTANT HEAD PERMEABILITY TEST

AS 1289.6.7.3

CIVIL GEOTECHNICAL SERVICES

[redacted]

Job No	16089		
Report No	16089/R035		
Date of Issue	28/06/16		
Client	GEOTECHNICAL TESTING SERVICES P/L (BENDIGO)	*Tested by*	ANR
Project	COHUNA WWTP	*Date tested*	24-27/06/16
Location	VIA BENDIGO	*Checked by*	ANR

Sample No		16089035
Sample identification		BH16 0.5m
Date sampled		2016
Sampled by		Client
Sampling method		By Client
Sample type		U50

Specimen details before test

Length of specimen	*mm*	52.0
Diameter of specimen	*mm*	50.8
Length to diameter ratio		1: 1.0
Dry density	*t/m³*	1.69
Moisture content	*%*	22.3

Specimen details after test

Moisture content	*%*	23.6
Mean effective stress	*kPa*	100
Permeant used		50,000ppm NaCl
PERMEABILITY (k)	*m/sec*	2×10^{-11}
Sample description		CLAY, high plasticity, grey.

A673U2 V1.3 OCT 09

NATA ACCREDITED FOR TECHNICAL COMPETENCE

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[redacted]

CONSTANT HEAD PERMEABILITY TEST

AS 1289.6.7.3

[redacted]

		Job No	16089
CIVIL GEOTECHNICAL SERVICES		*Report No*	16089/R036
		Date of Issue	12/07/16
Client	GEOTECHNICAL TESTING SERVICES P/L (BENDIGO)	*Tested by*	ANR
Project	COHUNA WWTP	*Date tested*	01/07/16
Location	VIA BENDIGO	*Checked by*	PJF

Sample No		16089036
Sample identification		BH17 0.8m
Date sampled		2016
Sampled by		Client
Sampling method		By Client
Sample type		U50
Specimen details before test		
Length of specimen	*mm*	51.9
Diameter of specimen	*mm*	50.6
Length to diameter ratio		1: 1.0
Dry density	*t/m³*	1.69
Moisture content	*%*	22.7
Specimen details after test		
Moisture content	*%*	24.6
Mean effective stress	*kPa*	100
Permeant used		50,000ppm NaCl
PERMEABILITY (k)	*m/sec*	2E-11
Sample description		CLAY, high plasticity, grey and brown.

[redacted]

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A673U2 V1.4 MAR 13

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AS 1289.6.7.3

[redacted]

		Job No	16089
CIVIL GEOTECHNICAL SERVICES		*Report No*	16089/R037
		Date of Issue	12/07/16
Client	GEOTECHNICAL TESTING SERVICES P/L (BENDIGO)	*Tested by*	ANR
Project	COHUNA WWTP	*Date tested*	01/07/16
Location	VIA BENDIGO	*Checked by*	PJF

Sample No		16089037
Sample identification		BH18 0.6m
Date sampled		2016
Sampled by		Client
Sampling method		By Client
Sample type		U50
Specimen details before test		
Length of specimen	*mm*	51.8
Diameter of specimen	*mm*	50.6
Length to diameter ratio		1: 1.0
Dry density	*t/m³*	1.64
Moisture content	*%*	24.2
Specimen details after test		
Moisture content	*%*	26.4
Mean effective stress	*kPa*	100
Permeant used		50,000ppm NaCl
PERMEABILITY (k)	*m/sec*	2E-11
Sample description		CLAY, high plasticity, brown and dark grey.

[redacted]

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A673U2 V1.4 MAR 13

CONSTANT HEAD PERMEABILITY TEST

AS 1289.6.7.3

[redacted]

		Job No	16089
		Report No	16089/R038
		Date of Issue	12/07/16
Client	GEOTECHNICAL TESTING SERVICES P/L (BENDIGO)	*Tested by*	ANR
Project	COHUNA WWTP	*Date tested*	01/07/16
Location	VIA BENDIGO	*Checked by*	PJF

Sample No		16089038
Sample identification		BH19 1.0m
Date sampled		2016
Sampled by		Client
Sampling method		By Client
Sample type		U50

Specimen details before test

Length of specimen	*mm*	51.8
Diameter of specimen	*mm*	50.9
Length to diameter ratio		1: 1.0
Dry density	*t/m³*	1.67
Moisture content	*%*	23.0

Specimen details after test

Moisture content	*%*	25.3
Mean effective stress	*kPa*	100
Permeant used		50,000ppm NaCl
PERMEABILITY (k)	*m/sec*	3E-11

Sample description	CLAY, high plasticity, brown and grey.

[redacted]

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A673U2 V1.4 MAR 13

CONSTANT HEAD PERMEABILITY TEST

AS 1289.6.7.3

[redacted]

CIVIL GEOTECHNICAL SERVICES

		Job No	16089
		Report No	16089/R039
		Date of Issue	12/07/16
Client	GEOTECHNICAL TESTING SERVICES P/L (BENDIGO)	*Tested by*	ANR
Project	COHUNA WWTP	*Date tested*	08/07/16
Location	VIA BENDIGO	*Checked by*	PJF

Sample No		16089039
Sample identification		BH20 0.5m
Date sampled		2016
Sampled by		Client
Sampling method		By Client
Sample type		U50

Specimen details before test

Length of specimen	*mm*	51.8
Diameter of specimen	*mm*	50.8
Length to diameter ratio		1: 1.0
Dry density	*t/m³*	1.66
Moisture content	*%*	23.2

Specimen details after test

Moisture content	*%*	25.7
Mean effective stress	*kPa*	100
Permeant used		50,000ppm NaCl
PERMEABILITY (k)	*m/sec*	3E-11

Sample description	CLAY, high plasticity, grey-brown.

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[redacted]

CONSTANT HEAD PERMEABILITY TEST

AS 1289.6.7.3

CIVIL GEOTECHNICAL SERVICES

		Job No	16089
		Report No	16089/R040
		Date of Issue	2/07/16
Client	GEOTECHNICAL TESTING SERVICES P/L (BENDIGO)	*Tested by*	ANR
Project	COHUNA WWTP	*Date tested*	08/07/16
Location	VIA BENDIGO	*Checked by*	PJF

Sample No		16089040
Sample identification		BH21 0.7m
Date sampled		2016
Sampled by		Client
Sampling method		By Client
Sample type		U50

Specimen details before test

Length of specimen	*mm*	51.8
Diameter of specimen	*mm*	50.6
Length to diameter ratio		1: 1.0
Dry density	*t/m³*	1.66
Moisture content	*%*	23.5

Specimen details after test

Moisture content	*%*	25.9
Mean effective stress	*kPa*	100
Permeant used		50,000ppm NaCl
PERMEABILITY (k)	*m/sec*	4E-11

Sample description	CLAY, high plasticity, grey-brown.

[redacted]

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A673U2 V1.4 MAR 13

ALS Water

NATA Accredited Laboratory No. 992 Accredited for compliance with ISO/IEC 17025

CERTIFICATE OF ANALYSIS

Batch No:	**16-13745**	*Page*	Page 1 of 3
Final Report	549266	*Laboratory*	Bendigo Laboratory
		Address	[redacted]
Client:	**Sandhurst Geotech Pty Ltd**	*Phone*	
Contact:	**Brad Bishop**	*Fax*	
Address:	t/a Geotechnical Testing Services - Southern [redacted]	Contact:	Bendigo Laboratory Manager [redacted]
Client Program Ref:	**15E 0574 - Cohuna WTP**	Date Sampled:	25-Feb-2016
ALS Program Ref:	**SANDHURSTGEO**	Date Samples Received:	15-Mar-2016
PO No:	**SG 0384**	*Date Issued:*	**24-Mar-2016**

The sample(s) referred to in this report were analysed by the following method(s) under NATA Accreditation No. 992. The hash (#) below indicates methods not covered by NATA accreditation in the performance of this service.

Analysis	*Method*	*Laboratory*	*Analysis*	*Method*	*Laboratory*	*Analysis*	*Method*	*Laboratory*
CEC	CM072	Scoresby						

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

NATA Accredited Laboratory No. 992 Accredited for compliance with ISO/IEC 17025

Signatories

These results have been electronically signed by the authorised signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11

Name	*Title*	*Name*	*Title*
Chatura Perera	**Team Leader Nutrients**		

Page:	**Page 2 of 3**
Batch No:	**16-13745**
Report Number:	**549266**
Client:	**Sandhurst Geotech Pty Ltd**
Client Program Ref:	**15E 0574 - Cohuna WTP**

Soil Analysis

Sample	*Sampled Date*	*Your Ref*	*Analysis:*	CEC
			Component:	CEC
			Units:	meq/100g
			Sample Type	
4696226	25-02-16	16E 0574A	SOIL	18
4696227	25-02-16	16E 0574B	SOIL	17
4696228	25-02-16	16E 0574C	SOIL	11
4696229	25-02-16	16E 0574D	SOIL	15
4696230	25-02-16	16E 0574E	SOIL	16
4696231	25-02-16	16E 0574F	SOIL	14
4696232	25-02-16	16E 0574G	SOIL	16
4696233	25-02-16	16E 0574H	SOIL	19
4696234	25-02-16	16E 0574I	SOIL	18
4696235	25-02-16	16E 0574J	SOIL	23
4696236	25-02-16	16E 0574K	SOIL	23
4696237	25-02-16	16E 0574L	SOIL	20
4696238	25-02-16	16E 0574M	SOIL	21
4696239	25-02-16	16E 0574N	SOIL	21
4696240	25-02-16	16E 0574O	SOIL	17
4696241	25-02-16	16E 0574P	SOIL	22
4696242	25-02-16	16E 0574Q	SOIL	22
4696243	25-02-16	16E 0574R	SOIL	23
4696244	25-02-16	16E 0574S	SOIL	23
4696245	25-02-16	16E 0574T	SOIL	25
4696246	25-02-16	16E 0574U	SOIL	20

Samples not collected by ALS and are tested as received.

A blank space indicates no test performed. Soil results expressed in mg/kg dry weight unless specified otherwise. Microbiological testing was commenced on the day of receival and within 24 hours of sampling unless otherwise stated. MM524: Plate count results <10 per mL and >300 per mL are deemed as approximate. VIC-MM526: Plate count results <2,500 per mL and >250,000 per mL are deemed as approximate. Calculated results

Page:	**Page 3 of 3**
Batch No:	**16-13745**
Report Number:	**549266**
Client:	**Sandhurst Geotech Pty Ltd**
Client Program Ref:	**15E 0574 - Cohuna WTP**

Quality Control

Soil Analysis	CEC
	CEC
4696247 DUPLICATE Sample Value	18
4696247 DUPLICATE Duplicate Value	19
4696247 DUPLICATE % RPD	**3.9**

Samples not collected by ALS and are tested as received.

A blank space indicates no test performed. Soil results expressed in mg/kg dry weight unless specified otherwise. Microbiological testing was commenced on the day of receival and within 24 hours of sampling unless otherwise stated. MM524: Plate count results <10 per mL and >300 per mL are deemed as approximate. VIC-MM526: Plate count results <2,500 per mL and >250,000 per mL are deemed as approximate. Calculated results

DESCRIPTIVE TERMS
BOREHOLE/EXCAVATION LOG

Classification Symbol & Soil Name

Classification of material and its description is based on the Unified Classification System as referenced in AS1726 – 1993 Geotechnical Site Investigations, Appendix A. A summary of the more common terms is included within.

Particle Size Descriptive Terms

Name	Subdivision	Size
Boulders		>200mm
Cobbles		63 – 200mm
Gravel	Coarse	20 – 63mm
	Medium	6 – 20mm
	Fine	2.36 – 6mm
Sand	Coarse	0.6 – 2.36mm
	Medium	200 – 600 micron
	Fine	75 – 200 micron
Silt		2 – 75 micron
Clay		< 2 micron

Consistency of Cohesive Soils

Term	Undrained shear strength, s_u (kPa)	Field Guide
Very Soft (VS)	<12	A finger can be pushed well into the soil with little effort
Soft (S)	12 – 25	A finger can be pushed into the soil to about 25mm depth
Firm (F)	25 – 50	The soil can be indented about 5mm with the thumb
Stiff (St)	50 – 100	The surface of the soil can be indented with the thumb
Very Stiff (VSt)	100 – 200	The surface of the soil can be indented by thumb nail
Hard (H)	>200	The surface of the soil can be marked only with the thumbnail
Friable (F)	-	Crumbles or powders when scraped by thumbnail

Density of Granular Soils

Term	Density Index (%)
Very Loose (VL)	< 15
Loose (L)	15 – 35
Medium Dense (MD)	35 – 65
Dense (D)	65 – 85
Very Dense (VD)	> 85

Minor Components

Term	Field Guide	Proportion of Minor Component In:
Trace of	Presence just detectable by feel or eye	Coarse grained soils: <5% Fine grained soils: <15%
Some	Presence easily detectable by feel or eye	Coarse grained soils: 5-12% Fine grained soils: 15-30%

Moisture Condition

Dry (D) Looks & feels dry. Cohesive soils are usually hard, powdery or friable. Granular soils run freely through the hand.

Moist (M) Soil feels cool and darkened in colour. Cohesive soils can be moulded. Granular soils tend to cohere. Free water does not form.

Wet (W) As for moist, but with free water forming on hands when remoulded.

Method

S Auger Screwing
D Auger Drilling
R Roller/tricone
W Washboring
N Natural Exposure
E Existing Excavation
B Blade/bucket
C Coring
H Hammer Drill

Support

***** Nil
C Casing
M Mud/polymer

Water

* Not observed
Observed water level (date shown)
Observed water inflow
Observed water outflow
R Refer to report for details

Notes, Samples, Tests

U63 Undisturbed sample, 63mm diameter
D Disturbed sample
N* Standard Penetration Test, (*) Sample Figure = results

Structures, Additional Observations

PP Pocket Penetrometer test (kPa)
DCP Dynamic Cone Penetrometer test (blows/100mm)

Surface

_____ Known boundary
- - - - - - - - - - Probably boundary
-?-?-?-?-?-?- Possible boundary

Cohuna Water Reclamation Plant
Chuggs Road, Cohuna

Geotechnical Investigation
for
Coliban Region Water Corporation

Report 24C 0548-1
March 2025

GTS
GEOTECHNICAL TESTING SERVICES

Cohuna Water Reclamation Plant, Chuggs Road, Cohuna

Geotechnical Investigation

for

Coliban Region Water Corporation

Revision

Revision	Date	Authorised
24C 0548-1	21/03/2025	[redacted]

Distribution (this revision only)

Recipient	Format	Date
GTS	On file	21/03/2025
Coliban Region Water Corporation Attn: [redacted]	Email PDF [redacted]	21/03/2025

[redacted]

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APPENDIX

Borehole Locations
Engineering Logs
Laboratory Test Reports
Descriptive Terms

1 INTRODUCTION

Coliban Region Water Corporation commissioned Geotechnical Testing Services (GTS) to undertake a geotechnical investigation for the proposed development at the Cohuna Water Reclamation Plant off Chuggs Road, Cohuna.

The purpose of the investigation was to assess general subsurface conditions at the site with a view to providing comments and design parameters for the proposed development.

It shall be noted that this report covers Lagoon 3, north of Chuggs Road. GTS has undertaken a previous investigation (24C 0548) for the development south of Chuggs Road.

2 SITE AND GEOLOGY

2.1 SITE LOCATION AND GENERAL CONDITIONS

The site is located at Lagoon 3, on the north side of Chuggs Road, Cohuna.

The site is relatively flat and currently consists existing lagoons with raised emabnkments. There are no trees across the site. At the time of the investigation, the surface of the site varied from dry to moist with areas with a sparse coverage of natural grass to areas that lacked grass cover. There was visual evidence of surface cracking. There was no visual evidence of natural surface rock.

2.2 GEOLOGY

The Victorian Government's online "Geovic" map shows the site to be underlain by Quaternary aged sedimentary deposits of the Shepparton Formation, with this generally confirmed by the field data.

3 FIELDWORK

The geotechnical investigation was conducted on the 28th to 30th of January 2025 and involved the drilling of 18 boreholes (BH) by Gemco HS7 drilling rig to termination depths of between 4.0 to 8.0 metres. In-situ strength tests including Dynamic Cone Penetrometer (DCP), Pocket Penetrometer (PP) and Standard Penetration Test (SPT) were conducted within the boreholes with the results included on the engineering logs. In addition, samples of material were obtained for further laboratory analysis.

The field investigation was conducted by a technician under the direction of a Geotechnical Engineer, who logged the subsurface profile. The engineering logs are included in the Appendix with

their locations shown on the enclosed site plan. Boreholes 1 to 11 and 13 to 18 were located within the lagoon with BH12 outside the lagoon for the pump station.

4 RESULTS

4.1 FIELD RESULTS – SOIL PROFILES

The field investigation indicated that the soil profile is relatively uniform and may be summarised as follows:

LAGOON LINER: Silty CLAY, medium/high plasticity, red/brown, dark brown, very soft to soft
To a depth of between 0.2 to 1.3 metres
Overlying
Sandy SILT/Sandy Silty CLAY, low plasticity, brown, orange/brown, grey, fine to coarse sand, very soft to soft.
To a depth of between 0.8 to 1.3 metres
Overlying
Silty CLAY, medium/high plasticity, orange/brown, pale brown, grey, brown, trace fine to coarse sand, stiff to very stiff.
Layered With
Sandy Silty CLAY, low/low to medium plasticity, brown, pale brown, grey, fine to coarse sand, trace fine to coarse gravel, firm to stiff.
To termination depths.

There are some variations to the above including the presence of Clayey Sand material in BHs 1 and 12. Therefore, reference should be made to the appended engineering logs for a full description of subsurface conditions at each location.

Groundwater inflow was encountered at various depths and locations across the site and are tabulated below:

Table 1: SWL

Location	BH1	BH3	BH6	BH8	BH12
SWL (m)	1.6	2.4	1.6	3.4	2.3

4.2 LABORATORY TEST RESULTS

Samples retained from the investigation were submitted to the GTS Bendigo and an external laboratory at the completion of the field investigation. The testing consisted of Atterberg Limit, Particle Size Distribution, Emerson Class, Permeability and Pinhole Dispersion with the results summarised in the following table with full NATA accredited reports in the Appendix.

Table 2: Material Properties

Test Location	BH1 1.6-2.0m	BH2 3.5-4.0m	BH3 2.5-3.0m	BH4 0.5-1.0m	BH5 2.4-2.8m	BH6 0.5-1.0m
% Passing 19mm Sieve	100	100	100	100	100	100
% Passing 2.36mm Sieve	99	100	99	99	100	99
% Passing 0.075mm Sieve	87	71	49	93	83	40
Liquid Limit (%)	57	32	34	48	58	20
Plastic Limit (%)	24	15	16	17	19	18
Plasticity Index (%)	33	17	18	31	39	2
Linear Shrinkage (%)	15.0	9.5	10.5	14.0	15.0	1.5
Emerson Class	4	5	5	4	5	4
Moisture Content (%)	25.5	19.7	18.6	20.7	21.0	17.5

Table 2 Continued: Material Properties

Test Location	BH7 0.3-1.3m	BH8 1.0-1.5m	BH9 1.5-2.0m	BH10 0.5-1.2m	BH11 0.4-1.2m	BH11 3.0-3.5m
% Passing 19mm Sieve	100	100	100	100	100	100
% Passing 2.36mm Sieve	97	100	100	99	100	99
% Passing 0.075mm Sieve	77	92	88	92	93	87
Liquid Limit (%)	27	46	58	39	31	51
Plastic Limit (%)	17	18	21	17	17	20
Plasticity Index (%)	10	28	37	22	14	31
Linear Shrinkage (%)	4.0	14.0	15.0	9.0	9.5	14.5
Emerson Class	4	5	4	4	4	4
Moisture Content (%)	-	21.2	22.2	-	-	18.2

Table 2 Continued: Material Properties

Test Location	BH12 3.0m	BH12 6.0m	BH12 7.5m	BH13 0.3-1.0m	BH13 3.5-4.0m	BH14 1.5-2.0m
% Passing 19mm Sieve	100	100	100	100	100	100
% Passing 2.36mm Sieve	100	97	96	99	100	100
% Passing 0.075mm Sieve	91	60	26	80	60	82
Liquid Limit (%)	63	27	5	28	46	52
Plastic Limit (%)	20	16	-	15	18	21
Plasticity Index (%)	43	11	-	13	28	31
Linear Shrinkage (%)	10.0	6.5	-	5.5	10.5	16.0
Emerson Class	5	5	5	4	5	5
Moisture Content (%)	19.0	15.4	21.0	-	19.2	23.7

Table 2 Continued: Material Properties

Test Location	BH17 0.8-1.3m	BH18 1.5-2.0m
% Passing 19mm Sieve	100	100
% Passing 2.36mm Sieve	100	100
% Passing 0.075mm Sieve	90	82
Liquid Limit (%)	38	55
Plastic Limit (%)	18	22
Plasticity Index (%)	20	33
Linear Shrinkage (%)	11.5	16.0
Emerson Class	6	4
Moisture Content (%)	-	21.5

Table 3: Permeability

Test Location	BH7 0.3-1.3m	BH10 0.5-1.2m	BH11 0.4-1.0m	BH13 0.3-1.0m	BH17 0.8-1.3m
Permeability (m/s)	$3x10^{-9}$	$6x10^{-10}$	$6x10^{-10}$	$2x10^{-9}$	$2x10^{-10}$

Table 4: Pinhole Dispersion Classification

Test Location	BH7 0.3-1.3m	BH10 0.5-1.2m	BH11 0.4-1.0m	BH13 0.3-1.0m	BH17 0.8-1.3m
Dispersion Classification	ND2	ND2	ND2	ND2	ND1

- D1 – Highly Dispersive
- D2 – Dispersive
- ND1 – Non-Dispersive
- ND2 – Erosion Resistant

5 ENGINEERING RECOMMENDATIONS

5.1 PUMP STATION (BH12)

5.1.1 FOUNDATIONS

Based on the results of this investigation, it is recommended that the founding material and minimum depth below existing surface level for footings should be as follows:

- **Silty CLAY,** medium to high plasticity, brown, trace fine sand, trace medium gravel, stiff.
  At depths below 0.1 metres
  Or
- **Clayey SAND,** fine to coarse, pale brown mottled grey, low plasticity fines, medium dense.
  At depths below 6.3 metres

For edge beams, strips and pad footings founded in the natural Silty Clay material as above there is an allowable bearing pressure of 100kPa, increasing to 125kPa below 1.0 metres and 150kPa below 2.0 metres. For footings founded in the Clayey Sand as above there is an allowable bearing pressure of 300kPa.

All foundations should extend a minimum of 100mm into the above founding mediums. Blinding concrete (minimum 15MPa strength) may be used to bring excavations up to design levels.

5.1.2 RETAINING STRUCTURE

The underground infrastructure, including the wet well will need to be capable of resisting the lateral earth pressure of the surrounding material.

Soil parameters and pressure coefficients (triangular distribution) are provided for the design of retaining walls and estimated in the table below. The values of K_a and K_p allow for friction between the wall structure and the soil. These values should be modified for backfill slopes and surcharges that may apply post construction (e.g. vehicle loadings etc). Lightweight compaction equipment should only be used directly behind the retaining walls.

A drainage system comprising granular backfill and a suitable system of drainage pipes leading water away from the structure should be provided behind the walls. However, due to the proposed excavation depths it may be practical to line the walls of the excavations with an impermeable membrane to reduce the potential for moisture ingress. Even with a drainage system or impermeable membrane, it is recommended that hydrostatic pressures should be included in the design of the wall as a future safeguard.

Based on the subsurface profile the material to be retained will typically be a Silty Clay overlying Clayey Sand, with the design parameters outlined below.

Soil Parameters / Coefficients	Silty CLAY (Below 0.1m)	Clayey SAND (Below 6.3m)
Active earth pressure coefficient, K_a	0.5	0.33
Passive earth pressure coefficient, K_p	2	3
At rest earth pressure coefficient, K_0	0.95	0.5
Unit Weight, γ	18kN/m^3	20kN/m^3
Cohesion, c	50 kPa	0 kPa
Friction Angle, ϕ	0^o	30^o

The friction angle for the clay material assumes it is saturated (zero air voids) and is a conservative assumption.

It is noted that any imported backfill material for the retaining structure may need to be assessed to determine the appropriate design parameters.

5.1.3 EARTHWORKS

It is expected that excavation at the site will be readily achieved using conventional heavy earthmoving machinery in the Silty Clay and Clayey Sand profile.

Temporary excavations in the Silty CLAY material should remain stable in the short term at near vertical, however, it is recommended that it be battered back at an angle of 70^o to the horizontal if unsupported. For any long-term batters if required in the clay material it is recommended that they be no steeper than 3:1 (H:V) and on completion be topsoiled and vegetated to ensure there is stability against erosion.

Excavations below the water table and through the Clayey Sand material may collapse and provisions for shoring/casing shall be made. Furthermore, provisions for dewatering shall be made

below the water table and pending the time of year may be shallower than recorded at the time of the investigation.

It is recommended that heavy machinery should maintain a distance of 1.5 metres from the edge of any excavations to minimise the risk of applying a surcharge to the excavation face which increased the risk of instability and collapse of excavations.

For backfilling of the wet well, it is recommended that granular material be used which will be easier to compact satisfactorily in confined areas. The Silty Clay natural and Clayey Sand material appears suitable for re-use as engineered fill. However, moisture conditioning (wetting up or drying back) may be required to achieve satisfactory compaction.

For backfilling at the base of the wet well considerations should be given to a cement sand slurry as this is self-compacting and will cure to a satisfactory strength. It is recommended that the cement sand slurry have a minimum of 7% cement and sufficient water so that it can flow when poured. This removes the need for compaction in tight spaces and at depth.

5.2 LAGOON

It is understood that the performance of the existing lagoon is inadequate and is expected to require a new clay liner to reduce seepage.

The existing clay liner is generally 400mm across the base, however, there are areas where this is greater or lesser. In particular BHs 6, 7, 13, and 14 had a clay liner of 100 to 200mm thick. The material directly below the liner ranged from high plasticity clays to low plasticity clay and silts. Concern is raised in the low plasticity clays and silts which are of moderate to high permeability, enabling loss of water through the subsurface. This water loss appearts present across the lagoon floor with moist to wet, soft material up to 1.0 metres below floor level.

With the variable liner depth, presence of low plastic clays and silts and evidence of water seepage up to 1.0 metres below the lagoon floor, it is recommended to remediate the lagoon base and walls. EPA requires a permeability rate of less than or equal to $1x10^{-9}$ m/s in the top 300 to 600mm of the lagoon base and walls. To achieve this, a liner will be required or deepening of the existing lagoon to a suitable material.

Based on the results of the investigation and laboratory testing, the material at the site is variable with low plasticity clays and silts present below the existing clay liner which transition to medium and high plastic clays. In addition, there are layers of low/medium plastic sandy clays present between the medium and high plastic clay layers.

Remoulded permeability testing was conducted on a range of samples across the site in the upper profile and returned results of between $3x10^{-9}$m/s to $2x10^{-10}$m/s. The medium and high plastic clays across the site meet the required permeability rate of $1x10^{-9}$m/s, whilst the low plastic clays/silts do not meet this required permeability rate. This is further corroborated by the previous investigation south of Chuggs Road (GTS Report 24C 0548), which returned permeability results less than $1x10^{-9}$ m/s in the medium and high plastic clays present at depth.

Further to the permeability of the materials across the site, the dispersiveness was tested. From the Emerson Class testing, the low, medium and high plastic clays were generally non-dispersive with Emerson Class values of 4 or greater. In addition, pinhole dispersion testing was conducted which indicates the low and medium plastic clays are non-dispersive/erosion resistance (ND1 and ND2).

Dispersion testing of the medium and high plastic clays, south of Chuggs road returned results of Dispersive (D2) to Highly Dispersive (D1).

As such, it is recommended the medium and high plastic clays be stabilised to ensure protection against erosion, especially, on the exposed banks. The following may be incorporated to stabilise the medium and high plastic clays:

- Chemically stabilise the material with lime or gypsum.
- Vegetate slopes with topsoil or geosynthetic matting to control runoff.
- Increase batter slopes to reduce runoff speed.

Based on the Permeability, Emerson Class and Pinhole dispersion testing, the medium and high plastic clays present across the site are suitable for relining the lagoon. This material is generally below 1.0 metres of the lagoon base. Alternatively, the material excavated from the south side of Chuggs Road may be utilised.

For remediation of the lagoon liner, it is recommended the following earthworks procedure shall be undertaken:

- Excavate any topsoil/silt material in the vegetative zone (approximately 100mm in depth) and stockpiled separately.
- Excavate the existing liner and underlying soft material to either allow a minimum clay liner of 400mm or to a suitable medium or high plastic clay. All medium and high plastic clay shall be stockpiled separately to the low plastic silts and clays.
- All batters should not exceed a 3:1 (H:V) slope.
- For the walls and base in the medium and high plastic clays, they should be ripped a depth of 300mm, moisture conditioned to within 2% of optimum moisture content (OMC) and

compacted to achieve a minimum density ratio of 98% standard (AS1289 5.1.1, 5.4.1 or 5.7.1)

- For the walls and base in the proximity of the low plastic clays/silts, a clay liner is required. Prior to placing the clay liner, the exposed base/walls shall be compacted with a pad foot roller to create a rough surface to bind the liner material. Suitable site won material (medium and high plastic clays) may then be placed in loose layers no greater than 200mm, moisture conditioned to within 2% OMC and compacted with a vibrating pad foot roller to achieve a minimum density ratio of 98% standard.
- The compacted thickness of each layer shall not exceed 150mm and also be appropriate to the size of the compaction equipment in order for satisfactory compaction to be achieved. In between layers, the surface should be finished with a pad foot roller or tyned a depth of 50mm so that the subsequent layer may bind.
- Once a minimum thickness of 400mm has been achieved, the finished surface shall be finished with a smooth drum roller or grader to achieve finished surface levels and satisfactory drainage of the site.

On completion of the construction, the topsoil material may be spread over the banks to aid in re-vegetation and prevent erosion. For internal storage areas subject to wave motion of filling points, it is recommended that beaching rock or concrete apron be placed to prevent erosion of the soil from the movement of water. In addition, due to the potentially dispersive nature of the material, stabilisation of the base and internal walls through gypsum, geofabrics or other methods may be required.

Additional permeability testing may be required in the base of the constructed clay liner to ensure a permeability rate of $1x10^{-9}$ has been achieved during construction to meet EPA requirements.

It is expected that excavation at the site will be readily achieved using conventional heavy earthmoving machinery to the required design levels in the sandy/silty clay profile.

It is noted that some boreholes encountered shallow/perched groundwater. As such, provisions/methods for dealing with the groundwater during construction will be required. In addition to the dewatering, there is low strength material that will be difficult to traffic with heavy machinery likely to get bogged. As such, additional excavation, moisture conditioning and recompacting of the base or bridging rock may be required so that a suitable clay liner can be constructed.

If the Silty Clay material is exposed during construction, should it become wet, it will be slippery and difficult to traffic. As such, crushed rock will be required in trafficked areas to ensure access remains available. Alternatively, during dry weathered, this material will dust up on the surface under traffic, therefore, dust controls measures such as water truck or crushed rock surfacing will be required.

6 IMPORTANT NOTES ABOUT THIS REPORT

The results from this investigation relate to the specified sites labelled throughout this document, and hence the information obtained may need to be extrapolated to the rest of the designated area. While care has been taken throughout this investigation, soil conditions can vary between each individual test site and at depths greater than that drilled during this investigation. Hence, if variations from this report are found during excavations/construction then Geotechnical Testing Services should be notified so it can be assessed and appropriate advice provided.

The soil colours provided in the borelogs attached may vary with soil moisture content and individual interpretation, therefore colour alone should not be used to identify these soils.

Strength characteristics of soils often exhibit a large variation between wet and dry conditions. Soil characteristics of a soil profile are given on the soil conditions at the time of the investigation.

7 DISCLAIMER

This investigation has been carried out in goodwill and under the instructions of Coliban Region Water Corporation. The investigation has been undertaken with the care and skill of competent personnel as defined within Geotechnical Testing Services quality system. It is not a comprehensive investigation but a guide to the conditions throughout the designated area.

This document has been prepared for Coliban Region Water Corporation and hence no responsibility or liability is being accepted to any third party, where any part of the report is used in either isolation or without consideration of the whole document. This document is not appropriate where there has been a significant change in the project or either for the specific needs of the reader.

Please, don't hesitate to contact the undersigned, if you require any further information or assistance.

Prepared by

[redacted]

Graduate Geotechnical Engineer

Reviewed by

[redacted]

Principal Geotechnical Engineer

APPENDIX

N
BH1
BH2
BH3
BH4
BH5
BH6
BH7
BH8
BH9
BH10
BH11
BH12
BH13
BH14
BH15
BH16
BH17
BH18
CHUGGS ROAD
GEOTECHNICAL INVESTIGATION
APPROXIMATE LOCATIONS
NOT TO SCALE
CLIENT: COLIBAN REGION WATER CORPORATION
PROJECT: CHUGGS ROAD, COHUNA, VIC
GTS REF: 24C 0548-1
CLIENT REF:
DRAWN BY: [redacted]
DATE: 03 FEBRUARY 2025

GTS - Bendigo [redacted]

Geotechnical Log - Borehole

BH 1

UTM	:	Drill Rig	: Drillman GT10 - Landcruiser Mount	Job Number	: 24C 0548-1
Easting (m)	: 0.00	Driller Supplier	: Geotechnical Testing Services	Client	: Coliban Region Water Corporation
Northing (m)	: 0.00	Logged By	: VC & CC	Project	: Geotechnical Investigation
Ground Elevation	: Not Surveyed	Reviewed By	:	Location	: Chuggs Road, Cohuna VIC
Total Depth	: 4 m BGL	Date	: 28/01/2025	Loc Comment	:

Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Weathering	Consistency	Testing: DCP (blows/100mm)	Testing: PP (kPa)	Testing: SPT (N)	Remarks
		Fill		CH	Silty CLAY (CH): high plasticity, red/brown, dark brown, very soft to soft, trace fine to coarse grained sand, moist.	M		VS-S				
	0.4								0			
		Natural		CH	Silty CLAY (CH): very soft to soft, high plasticity, red/brown, dark brown, trace fine to coarse grained sand, moist.	M		VS-S	1			
									0			
									1			
									0			
									1			
	1								1			
									1			
									2			
	1.3								2			
		Natural		CH	Silty CLAY (CH): stiff, high plasticity, orange/brown, pale brown, grey, trace fine grained sand, moist.	M		St	4			
	1.6											
SWL - @1.6m		Natural		CH	As above, but very stiff.	M		VSt				
	2											
	2.5											
		Natural		CL-CI	Sandy to silty CLAY (CL-CI): firm to stiff, low to medium plasticity, brown, pale brown, grey, fine to coarse grained sand, trace fine to coarse sized gravel, moist.	M		F-St				
										100kPa		
	3											
		Natural		CH	Silty CLAY (CH): stiff, high plasticity, orange/brown, pale brown, grey, trace fine to coarse grained sand, moist.	M		St				
					BH 1 Terminated at 4m							

GTS - Bendigo [redacted]

Geotechnical Log - Borehole

BH 2

UTM	:	Drill Rig	: Drillman GT10 - Landcruiser Mount
Easting (m)	: 0.00	Driller Supplier	: Geotechnical Testing Services
Northing (m)	: 0.00	Logged By	: VC & CC
Ground Elevation	: Not Surveyed	Reviewed By	:
Total Depth	: 4 m BGL	Date	: 28/01/2025

Job Number	: 24C 0548-1		
Client	: Coliban Region Water Corporation		
Project	: Geotechnical Investigation		
Location	: Chuggs Road, Cohuna VIC		
Loc Comment	:		

Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Weathering	Consistency	Testing: DCP (blows/100mm)	Testing: PP (kPa)	Testing: SPT (N)	Remarks
		Fill		CH	Silty CLAY (CH): high plasticity, red/brown, dark brown, soft, trace fine to coarse grained sand, moist.	M		S				
	0.4								2			
		Natural		ML	Sandy SILT (ML): very soft to soft, low plasticity, orange/brown, brown, fine to coarse grained sand, moist.	M		VS-S	1			
									1			
									2			
	0.8								1			
		Natural		CH	Silty CLAY (CH): very soft to soft, high plasticity, brown, dark brown, grey, trace fine to coarse grained sand, moist.	M		VS-S	0			
	1								1			
									1			
	1.2								2			
		Natural		CH	As above, but stiff.	M		St	3	150kPa		
	2											
										155kPa		
	3											
	3.1											
		Natural		CL	Sandy to silty CLAY (CL): firm, low plasticity, orange/brown, brown, fine to medium grained sand, moist.	M		F				
										80kPa		
					BH 2 Terminated at 4m							

GTS - Bendigo [redacted]

Geotechnical Log - Borehole

BH 3

UTM	:	Drill Rig	: Drillman GT10 - Landcruiser Mount
Easting (m)	: 0.00	Driller Supplier	: Geotechnical Testing Services
Northing (m)	: 0.00	Logged By	: VC & CC
Ground Elevation	: Not Surveyed	Reviewed By	:
Total Depth	: 4 m BGL	Date	: 28/01/2025

Job Number	: 24C 0548-1		
Client	: Coliban Region Water Corporation		
Project	: Geotechnical Investigation		
Location	: Chuggs Road, Cohuna VIC		
Loc Comment	:		

Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Weathering	Consistency	Testing: DCP (blows/100mm)	Testing: PP (kPa)	Testing: SPT (N)	Remarks
		Fill		CI-CH	Sandy to silty CLAY (CI-CH): medium to high plasticity, brown, dark brown, very soft to soft, fine to coarse grained sand, moist.	M		VS-S	1			
									0			
									1			
									1			
									1			
	0.9								1			
	1	Fill		CI-CH	As above, but firm to stiff.	M		F-St	2			
									2			
									3			
	1.3								3			
		Natural		CH	Silty CLAY (CH): very stiff, high plasticity, brown, grey, dark brown, trace fine to coarse grained sand, moist.	M		VSt				
	2									300kPa		
▽	2.5											
SWL - @2.4m		Natural		CL-CI	Sandy to silty CLAY (CL-CI): firm to stiff, low to medium plasticity, brown, orange/brown, fine to coarse grained sand, moist.	M		F-St		100kPa		
	3											
	3.2	Natural		CH	Sandy to silty CLAY (CH): stiff, high plasticity, brown, orange/brown, grey, fine to coarse grained sand, moist.	M		St				
										120kPa		
					BH 3 Terminated at 4m							

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GTS - Bendigo [redacted]

Geotechnical Log - Borehole

BH 4

UTM	:	Drill Rig	: Drillman GT10 - Landcruiser Mount	Job Number	: 24C 0548-1
Easting (m)	: 0.00	Driller Supplier	: Geotechnical Testing Services	Client	: Coliban Region Water Corporation
Northing (m)	: 0.00	Logged By	: VC & CC	Project	: Geotechnical Investigation
Ground Elevation	: Not Surveyed	Reviewed By	:	Location	: Chuggs Road, Cohuna VIC
Total Depth	: 4 m BGL	Date	: 28/01/2025	Loc Comment	:

Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Weathering	Consistency	Testing: DCP (blows/100mm)	Testing: PP (kPa)	Testing: SPT (N)	Remarks
		Fill		Cl	Silty CLAY (Cl): medium plasticity, dark brown, orange/brown, firm to stiff, trace fine to medium grained sand, moist.	M		F-St				
									2			
									2			
									2			
									3			
									4			
									4			
	1								5			
	1.1								6			
		Natural		CH	Sandy to silty CLAY (CH): stiff, high plasticity, pale brown, orange/brown, grey, fine to coarse grained sand, moist.	M		St	6			
									5			
	2											
	3				BH 4 Terminated at 4m							

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GTS - Bendigo [redacted]

Geotechnical Log - Borehole

BH 5

UTM	:	Drill Rig	: Drillman GT10 - Landcruiser Mount	Job Number	: 24C 0548-1
Easting (m)	: 0.00	Driller Supplier	: Geotechnical Testing Services	Client	: Coliban Region Water Corporation
Northing (m)	: 0.00	Logged By	: VC & CC	Project	: Geotechnical Investigation
Ground Elevation	: Not Surveyed	Reviewed By	:	Location	: Chuggs Road, Cohuna VIC
Total Depth	: 4 m BGL	Date	: 28/01/2025	Loc Comment	:

Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Weathering	Consistency	Testing: DCP (blows/100mm)	Testing: PP (kPa)	Testing: SPT (N)	Remarks
		Fill		CH	Silty CLAY (CH): high plasticity, brown, dark brown, firm to stiff, trace fine to coarse grained sand, moist.	M		F-St				
									2			
									2			
									2			
									2			
	0.8								3			
		Natural		CH	Silty CLAY (CH): stiff, high plasticity, pale brown, orange/brown, with fine to medium grained sand, moist.	M		St	4			
	1								4			
									5			
									6			
	2											
	2.4											
		Natural		CH	As above, but very stiff.	M		VSt				
										310kPa		
	3											
					BH 5 Terminated at 4m							

GTS - Bendigo [redacted]

Geotechnical Log - Borehole

BH 6

UTM	:	Drill Rig	: Drillman GT10 - Landcruiser Mount	Job Number	: 24C 0548-1
Easting (m)	: 0.00	Driller Supplier	: Geotechnical Testing Services	Client	: Coliban Region Water Corporation
Northing (m)	: 0.00	Logged By	: PR	Project	: Geotechnical Investigation
Ground Elevation	: Not Surveyed	Reviewed By	:	Location	: Chuggs Road, Cohuna VIC
Total Depth	: 4 m BGL	Date	: 29/01/2025	Loc Comment	:

Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Weathering	Consistency	Testing: DCP (blows/100mm)	Testing: PP (kPa)	Testing: SPT (N)	Remarks
	0.1	Fill		CH	Silty CLAY (CH): high plasticity, pale brown,	M		F				
		Natural		CI	firm, trace fine to coarse grained sand, moist.	M		St				
					Sandy to silty CLAY (CI): stiff, medium plasticity, pale brown, mottled orange/brown,							
	0.4				fine to coarse grained sand, moist.				5			
		Natural		ML	Sandy SILT (ML): soft to firm, low plasticity, brown, fine to coarse grained sand, wet to moist.	W-M		S-F	5			
									7			
									3			
									2			
	1								1			
									1			
									1			
	1.2								3			
		Natural		CI	Silty CLAY (CI): stiff, medium plasticity, pale brown, orange/brown, grey, trace fine to medium grained sand, moist.	M		St				
	1.6											
SWL - @1.6m		Natural		CH	Silty CLAY (CH): very stiff, high plasticity, grey, trace fine grained sand, moist.	M		VSt				
	2									350kPa		
	2.7											
		Natural		CI	Silty CLAY (CI): very stiff, medium plasticity, brown, mottled grey, orange/brown, trace fine to medium sized gravel, trace fine to coarse grained sand, moist, (limestoen).	M		VSt				
	3									300kPa		
					BH 6 Terminated at 4m							

GTS - Bendigo [redacted]

Geotechnical Log - Borehole

BH 7

UTM	:	Drill Rig	: Drillman GT10 - Landcruiser Mount	Job Number	: 24C 0548-1
Easting (m)	: 0.00	Driller Supplier	: Geotechnical Testing Services	Client	: Coliban Region Water Corporation
Northing (m)	: 0.00	Logged By	: PR	Project	: Geotechnical Investigation
Ground Elevation	: Not Surveyed	Reviewed By	:	Location	: Chuggs Road, Cohuna VIC
Total Depth	: 4 m BGL	Date	: 29/01/2025	Loc Comment	:

Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Weathering	Consistency	Testing: DCP (blows/100mm)	Testing: PP (kPa)	Testing: SPT (N)	Remarks
	0	Fill		CH	Silty CLAY (CH): high plasticity, pale brown, firm, trace fine to coarse grained sand, moist.	M		F				
	0.15	Natural		CL	Silty CLAY (CL): soft to firm, low plasticity, pale brown, mottled orange/brown, with fine to coarse grained sand, moist.	M		S-F	2			
									1			
									1			
									0			
									2			
									2			
	1								3			
									3			
	1.3	Natural		CH	Silty CLAY (CH): stiff, high plasticity, pale brown, mottled grey, trace fine grained sand, moist.	M		St				
	1.6	Natural		CH	As above, but stiff to very stiff, trace fine to medium sized gravel, (limestone).	M		St-VSt		350kPa		
	2											
	3											
	3.7	Natural		CL-CI	Sandy CLAY (CL-CI): stiff, low to medium plasticity, pale brown, mottled grey, fine to coarse grained sand, wet to moist.	W-M		St				
	4				BH 7 Terminated at 4m							

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GTS - Bendigo

[redacted]

Geotechnical Log - Borehole

BH 8

UTM	:	Drill Rig	: Drillman GT10 - Landcruiser Mount	Job Number	: 24C 0548-1
Easting (m)	: 0.00	Driller Supplier	: Geotechnical Testing Services	Client	: Coliban Region Water Corporation
Northing (m)	: 0.00	Logged By	: PR	Project	: Geotechnical Investigation
Ground Elevation	: Not Surveyed	Reviewed By	:	Location	: Chuggs Road, Cohuna VIC
Total Depth	: 4 m BGL	Date	: 29/01/2025	Loc Comment	:

Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Weathering	Consistency	Testing: DCP (blows/100mm)	Testing: PP (kPa)	Testing: SPT (N)	Remarks
		Fill		CI-CH	Silty CLAY (CI-CH): medium to high plasticity, brown, firm, trace fine to coarse grained sand, dry.	D		F				
	0.2	Fill		CI-CH	As above, but moist.	M		F	2			
									3			
	0.6								3			
		Natural		CI	Silty CLAY (CI): stiff, medium plasticity, brown, mottled black/grey, trace fine to medium grained sand, moist.	M		St	2			
									3			
									5			
	1								4			
	2	Natural		CI	As above, but very stiff.	M		VSt		320kPa		
	3											
SWL - @3.4m					BH 8 Terminated at 4m							

GTS - Bendigo

[redacted]

Geotechnical Log - Borehole

BH 9

UTM	:	Drill Rig	: Drillman GT10 - Landcruiser Mount	Job Number	: 24C 0548-1
Easting (m)	: 0.00	Driller Supplier	: Geotechnical Testing Services	Client	: Coliban Region Water Corporation
Northing (m)	: 0.00	Logged By	: PR	Project	: Geotechnical Investigation
Ground Elevation	: Not Surveyed	Reviewed By	:	Location	: Chuggs Road, Cohuna VIC
Total Depth	: 4 m BGL	Date	: 02/02/2025	Loc Comment	:

Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Weathering	Consistency	Testing: DCP (blows/100mm)	Testing: PP (kPa)	Testing: SPT (N)	Remarks
		Fill		Cl	Sandy to silty CLAY (Cl): medium plasticity, brown, very soft to soft, fine to coarse grained sand, moist.	M		VS-S				
									1			
									1			
									0			
									1			
									0			
	0.9								1			
	1	Natural		CI-CH	Silty CLAY (CI-CH): soft to firm, medium to high plasticity, red/brown, mottled black, trace fine sized gravel, trace fine to coarse grained sand, moist.	M		S-F	1			
									1			
	1.2								3			
		Natural		CH	Silty CLAY (CH): stiff, high plasticity, brown, orange/brown, trace fine grained sand, moist.	M		St	3			
	2											
	2	Natural		CH	As above, but very stiff.	M		VSt		350kPa		
	2.3											
		Natural		CH	Silty CLAY (CH): stiff to very stiff, high plasticity, pale brown, grey, trace fine to medium sized gravel, trace fine to coarse grained sand, moist.	M		St-VSt				
	3											
					BH 9 Terminated at 4m							

GTS - Bendigo

[redacted]

Geotechnical Log - Borehole

BH 10

UTM	:	Drill Rig	: Drillman GT10 - Landcruiser Mount	Job Number	: 24C 0548-1
Easting (m)	: 0.00	Driller Supplier	: Geotechnical Testing Services	Client	: Coliban Region Water Corporation
Northing (m)	: 0.00	Logged By	: PR	Project	: Geotechnical Investigation
Ground Elevation	: Not Surveyed	Reviewed By	:	Location	: Chuggs Road, Cohuna VIC
Total Depth	: 4 m BGL	Date	: 29/01/2025	Loc Comment	:

Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Weathering	Consistency	Testing: DCP (blows/100mm)	Testing: PP (kPa)	Testing: SPT (N)	Remarks
		Fill		CI-CH	Silty CLAY (CI-CH): medium to high plasticity, brown, firm, with fine to coarse grained sand, moist to dry.	M-D		F				
									2			
	0.5								2			
		Natural		CI	Silty CLAY (CI): soft to firm, medium plasticity, pale brown, mottled grey, trace fine grained sand, moist.	M		S-F	1			
									1			
									2			
									1			
	1								3			
									3			
	1.2											
		Natural		CH	Silty CLAY (CH): stiff, high plasticity, brown, orange/brown, trace fine grained sand, moist.	M		St				
	2											
		Natural		CH	As above, but very stiff, pale brown, grey.	M		VSt		320kPa		
	3				BH 10 Terminated at 4m							

GTS - Bendigo

[redacted]

Geotechnical Log - Borehole

BH 11

UTM	:	Drill Rig	: Drillman GT10 - Landcruiser Mount	Job Number	: 24C 0548-1
Easting (m)	: 0.00	Driller Supplier	: Geotechnical Testing Services	Client	: Coliban Region Water Corporation
Northing (m)	: 0.00	Logged By	: PR	Project	: Geotechnical Investigation
Ground Elevation	: Not Surveyed	Reviewed By	:	Location	: Chuggs Road, Cohuna VIC
Total Depth	: 4 m BGL	Date	: 29/01/2025	Loc Comment	:

Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Weathering	Consistency	Testing: DCP (blows/100mm)	Testing: PP (kPa)	Testing: SPT (N)	Remarks
		Fill		CI-CH	Silty CLAY (CI-CH): medium to high plasticity, brown, firm, trace fine to coarse grained sand, moist to dry.	M-D		F	2, 3, 3			
	0.6	Natural		CL	Silty CLAY (CL): stiff to very stiff, low plasticity, brown, grey, trace fine grained sand, moist.	M		St-VSt	3, 4, 5, 7			
	1.7	Natural		CH	Silty CLAY (CH): stiff to very stiff, high plasticity, brown and grey, trace fine to medium grained sand.			St-VSt		400kPa		
					BH 11 Terminated at 4m							

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GTS - Bendigo [redacted]

Geotechnical Log - Borehole

BH 12

UTM	:	Drill Rig	: Drillman GT10 - Landcruiser Mount	Job Number	: 24C 0548-1
Easting (m)	: 0.00	Driller Supplier	: Geotechnical Testing Services	Client	: Coliban Region Water Corporation
Northing (m)	: 0.00	Logged By	: PR & GF	Project	: Geotechnical Investigation
Ground Elevation	: Not Surveyed	Reviewed By	:	Location	: Chuggs Road, Cohuna VIC
Total Depth	: 8 m BGL	Date	: 30/01/2025	Loc Comment	:

Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Weathering	Consistency	Testing: DCP (blows/100mm)	Testing: PP (kPa)	Testing: SPT (N)	Remarks
	0.1	TOPSOIL		ML	Clayey SILT (ML): stiff, low plasticity, pale brown, trace fine to medium grained sand, dry.	D		St				
		Natural		CI-CH	Silty CLAY (CI-CH): stiff, medium to high plasticity, brown, trace medium sized gravel, trace fine grained sand, moist.	M		St	4			
									4			
									3			
									2			
									3			
									3			
	1								4			
	1.1	Natural		CI-CH	Silty CLAY (CI-CH): stiff, medium to high plasticity, pale brown, trace fine grained sand, moist.	M		St				
											2, 4, 4, (N = 8)	
	2											
	2.2	Natural		CH	Silty CLAY (CH): stiff, high plasticity, brown, mottled orange/brown, black, trace fine grained sand, moist.	M		St				
SWL - @2.3m	2.6	Natural		CH	Silty CLAY (CH): stiff to very stiff, high plasticity, pale brown, mottled grey, trace fine grained sand, moist.	M		St-VSt				
	3										2, 4, 6, (N = 10)	

GTS - Bendigo [redacted]

Geotechnical Log - Borehole

BH 12

UTM	:	Drill Rig	: Drillman GT10 - Landcruiser Mount	Job Number	: 24C 0548-1
Easting (m)	: 0.00	Driller Supplier	: Geotechnical Testing Services	Client	: Coliban Region Water Corporation
Northing (m)	: 0.00	Logged By	: PR & GF	Project	: Geotechnical Investigation
Ground Elevation	: Not Surveyed	Reviewed By	:	Location	: Chuggs Road, Cohuna VIC
Total Depth	: 8 m BGL	Date	: 30/01/2025	Loc Comment	:

Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Weathering	Consistency	Testing: DCP (blows/100mm)	Testing: PP (kPa)	Testing: SPT (N)	Remarks
		Natural		CH	Silty CLAY (CH): stiff to very stiff, high plasticity, pale brown, mottled grey, trace fine grained sand, moist.	M		St-VSt				
											7, 7, 8, (N = 15)	
	5											
	5.1	Natural		CL-CI	Silty to sandy CLAY (CL-CI): stiff, low to medium plasticity, pale brown, mottled grey, fine grained sand, wet to moist.	W-M		St				
	6											
	6.3	Natural		SC	Clayey SAND (SC): medium dense, low plasticity clay, pale brown, mottled grey, fine grained, wet to moist.	W-M		MD			5, 5, 7, (N = 12)	
	7											
											3, 5, 9, (N = 14)	
					BH 12 Terminated at 8m							

GTS - Bendigo

[redacted]

Geotechnical Log - Borehole

BH 13

UTM	:	Drill Rig	: Drillman GT10 - Landcruiser Mount	Job Number	: 24C 0548-1
Easting (m)	: 0.00	Driller Supplier	: Geotechnical Testing Services	Client	: Coliban Region Water Corporation
Northing (m)	: 0.00	Logged By	: PR & GF	Project	: Geotechnical Investigation
Ground Elevation	: Not Surveyed	Reviewed By	:	Location	: Chuggs Road, Cohuna VIC
Total Depth	: 4 m BGL	Date	: 30/01/2025	Loc Comment	:

Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Weathering	Consistency	Testing: DCP (blows/100mm)	Testing: PP (kPa)	Testing: SPT (N)	Remarks
	0.05	TOPSOIL		ML	Sandy SILT (ML): stiff, low plasticity, pale brown, fine to medium grained sand, dry.	D M		St				
		Natural		CL	Silty CLAY (CL): firm to stiff, low plasticity, brown, mottled orange/brown, with fine grained sand, moist.			F-St	1			
									2			
									2			
									2			
									2			
									2			
									2			
	1								3			
	1.2								3			
		Natural		CH	Silty CLAY (CH): very stiff, high plasticity, brown, moist.	M		VSt				
	1.8											
		Natural		CH	Silty CLAY (CH): very stiff, high plasticity, grey, mottled orange/brown, moist.	M		VSt				
	2											
	2.6											
		Natural		CI	Sandy to silty CLAY (CI): very stiff, medium plasticity, grey, mottled brown, fine to medium grained sand, moist.	M		VSt				
	3											
					BH 13 Terminated at 4m							

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GTS - Bendigo [redacted]

Geotechnical Log - Borehole

BH 14

UTM	:	Drill Rig	: Drillman GT10 - Landcruiser Mount	Job Number	: 24C 0548-1
Easting (m)	: 0.00	Driller Supplier	: Geotechnical Testing Services	Client	: Coliban Region Water Corporation
Northing (m)	: 0.00	Logged By	: PR & GF	Project	: Geotechnical Investigation
Ground Elevation	: Not Surveyed	Reviewed By	:	Location	: Chuggs Road, Cohuna VIC
Total Depth	: 4 m BGL	Date	: 30/01/2025	Loc Comment	:

Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Weathering	Consistency	Testing: DCP (blows/100mm)	Testing: PP (kPa)	Testing: SPT (N)	Remarks
	0.2	Fill		CH	Silty CLAY (CH): high plasticity, brown, very soft, trace fine to medium grained sand, moist.	M		VS				
	0.8	Natural		CL-CI	Sandy CLAY (CL-CI): very soft, low to medium plasticity, orange/brown, fine grained sand, moist.	M		VS	0 0 0 0 0			
	1.2	Natural		CI-CH	Silty CLAY (CI-CH): soft to firm, medium to high plasticity, brown, grey, trace fine grained sand, moist.	M		S-F	1 0 1 3			
	1.5	Natural		CI-CH	As above, but stiff.	M		St	3			
	1.7	Natural		CH	Silty CLAY (CH): very stiff, high plasticity, brown, trace fine to coarse grained sand, moist, (sand bands).	M		VSt				
	2.6	Natural		CH	Silty CLAY (CH): very stiff, high plasticity, brown, mottled grey, with fine to medium grained sand, moist.	M		VSt				
	3.5	Natural		CH	Sandy CLAY (CH): very stiff, high plasticity, brown, mottled grey, fine to coarse grained sand, moist.	M		VSt				
		Natural		CH	Silty CLAY (CH): very stiff, high plasticity, grey, mottled brown, trace fine grained sand, moist.	M		VSt				

BH 14 Terminated at 4m

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GTS - Bendigo [redacted]

Geotechnical Log - Borehole

BH 15

UTM	:	Drill Rig	: Drillman GT10 - Landcruiser Mount	Job Number	: 24C 0548-1
Easting (m)	: 0.00	Driller Supplier	: Geotechnical Testing Services	Client	: Coliban Region Water Corporation
Northing (m)	: 0.00	Logged By	: PR & GF	Project	: Geotechnical Investigation
Ground Elevation	: Not Surveyed	Reviewed By	:	Location	: Chuggs Road, Cohuna VIC
Total Depth	: 4 m BGL	Date	: 30/01/2025	Loc Comment	:

Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Weathering	Consistency	Testing: DCP (blows/100mm)	Testing: PP (kPa)	Testing: SPT (N)	Remarks
		Fill		SC	Clayey SAND (SC): low to medium plasticity clay, brown, very loose, fine to coarse grained, moist.	M		VL	0 1 0			
	0.6	Natural		CL-CI	Sandy CLAY (CL-CI): very soft to soft, low to medium plasticity, brown, fine to coarse grained sand, moist.	M		VS-S	0 2 1			
	0.9 1	Natural		CI	Silty CLAY (CI): firm to stiff, medium plasticity, brown, grey, trace fine grained sand, moist.	M		F-St	2 3 3			
	2											
	2.6	Natural		CH	Silty CLAY (CH): very stiff, high plasticity, grey, mottled brown, with fine to coarse grained sand, moist.	M		VSt				
	3				BH 15 Terminated at 4m							

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GTS - Bendi_o [redacted]

Geotechnical Log - Borehole

BH 16

UTM	:	Drill Rig	: Drillman GT10 - Landcruiser Mount	Job Number	: 24C 0548-1
Easting (m)	: 0.00	Driller Supplier	: Geotechnical Testing Services	Client	: Coliban Region Water Corporation
Northing (m)	: 0.00	Logged By	: PR & GF	Project	: Geotechnical Investigation
Ground Elevation	: Not Surveyed	Reviewed By	:	Location	: Chuggs Road, Cohuna VIC
Total Depth	: 4 m BGL	Date	: 30/01/2025	Loc Comment	:

Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Weathering	Consistency	Testing: DCP (blows/100mm)	Testing: PP (kPa)	Testing: SPT (N)	Remarks
		Fill		CI	Silty CLAY (CI): medium plasticity, brown, soft, with fine to medium grained sand, moist.	M		S				
	0.4								0			
		Natural		CL-CI	Silty CLAY (CL-CI): soft to firm, low to medium plasticity, brown, orange/brown, trace fine to medium grained sand, moist.	M		S-F	0			
									1			
									1			
	1								1			
									2			
									2			
									2			
	1.2								2			
		Natural		CH	Silty CLAY (CH): stiff, high plasticity, brown, grey, trace fine to medium grained sand, moist.	M		St	3			
	1.7											
		Natural		CH	As above, but trace fine to medium sized gravel, trace fine to coarse grained sand.	M		St				
	2											
	2.6											
		Natural		CL-CI	Sandy CLAY (CL-CI): very stiff, low to medium plasticity, brown, mottled orange/brown, fine to coarse grained sand, moist.	M		VSt				
	3											
	3.4											
		Natural		CH	Silty CLAY (CH): stiff, high plasticity, pale brown, mottled grey, wet to moist.	W-M		St				
					BH 16 Terminated at 4m							

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GTS - Bendigo

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Geotechnical Log - Borehole

BH 17

UTM	:	Drill Rig	: Drillman GT10 - Landcruiser Mount	Job Number	: 24C 0548-1
Easting (m)	: 0.00	Driller Supplier	: Geotechnical Testing Services	Client	: Coliban Region Water Corporation
Northing (m)	: 0.00	Logged By	: PR & GF	Project	: Geotechnical Investigation
Ground Elevation	: Not Surveyed	Reviewed By	:	Location	: Chuggs Road, Cohuna VIC
Total Depth	: 4 m BGL	Date	: 30/01/2025	Loc Comment	:

Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Weathering	Consistency	Testing: DCP (blows/100mm)	Testing: PP (kPa)	Testing: SPT (N)	Remarks
		Fill		CI	Silty CLAY (CI): medium plasticity, brown, very soft, with fine to medium grained sand, moist.	M		VS				
									1			
									0			
									0			
									1			
	0.8								0			
		Natural		CI	Silty CLAY (CI): soft to firm, medium plasticity, brown, mottled grey, orange/brown, trace fine to medium grained sand, moist.	M		S-F	1			
	1								0			
									2			
									2			
									1			
	1.4								2			
		Natural		CI	As above, but stiff.	M		St				
	2											
	2.2											
		Natural		CH	Silty CLAY (CH): very stiff, high plasticity, pale brown, mottled grey, trace fine to medium sized gravel, trace fine to coarse grained sand, moist.	M		VSt				
	3				BH 17 Terminated at 4m							

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GTS - Bendigo

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Geotechnical Log - Borehole

BH 18

UTM	:	Drill Rig	: Drillman GT10 - Landcruiser Mount	Job Number	: 24C 0548-1
Easting (m)	: 0.00	Driller Supplier	: Geotechnical Testing Services	Client	: Coliban Region Water Corporation
Northing (m)	: 0.00	Logged By	: PR & GF	Project	: Geotechnical Investigation
Ground Elevation	: Not Surveyed	Reviewed By	:	Location	: Chuggs Road, Cohuna VIC
Total Depth	: 4 m BGL	Date	: 30/01/2025	Loc Comment	:

Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Weathering	Consistency	Testing: DCP (blows/100mm)	Testing: PP (kPa)	Testing: SPT (N)	Remarks
		Fill		CI	Silty CLAY (CI): medium plasticity, brown, very soft, with fine to medium grained sand, moist.	M		VS	0			
									0			
									0			
									1			
	0.8								0			
		Natural		CI-CH	Silty CLAY (CI-CH): firm to stiff, medium to high plasticity, brown, mottled grey, orange/brown, trace fine to medium grained sand, moist.	M		F-St	1			
	1								2			
									3			
									3			
	1.5											
		Natural		CI-CH	As above, but very stiff.	M		VSt				
	2											
	2.5											
		Natural		CI-CH	As above, but trace fine to medium sized gravel.	M		VSt				
	3											
	3.1											
		Natural		CI	Silty CLAY (CI): very stiff, medium plasticity, pale brown, with fine to coarse grained sand, trace fine to medium sized gravel, moist.	M		VSt				
					BH 18 Terminated at 4m							

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Material Test Report

Report Number: **P252992-1**
Issue Number: 2 - *This version supersedes all previous issues*
Reissue Reason: *Updated Report Format*
Date Issued: 12/03/2025
Client: GTS Consultancy Department
[redacted]
Contact: [redacted]
Project Number: P252992
Project Name: Cohuna WTP
Project Location: Site 1 - Chuggs Rd (2/PS428326)
Client Reference: 24C 0548-1
Work Request: 17212
Sample Number: B25-17212A
Date Sampled: 12/07/2024
Dates Tested: 07/02/2025 - 25/02/2025
Sampling Method: Sampled by Client
The results apply to the sample as received
Sample Location: **BH1 , Depth: 1.6-2.0m**
Material: Refer to Borehole Logs

Geotechnical Testing Services (Southern)
Bendigo Soil and Concrete Testing Laboratory
[redacted]

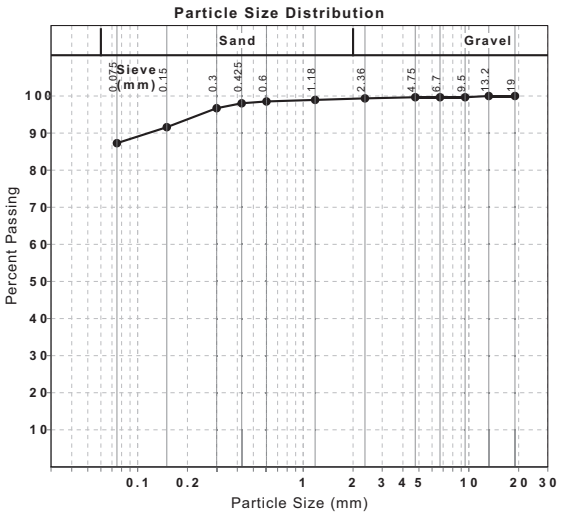
Accredited for compliance with ISO/IEC 17025 - Testing
[redacted]
Approved Signatory: [redacted]
CMT Laboratory Supervisor
NATA Accredited Laboratory Number: 19506

Particle Size Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
19 mm	**100**			0		
13.2 mm	**100**			0		
9.5 mm	**100**			0		
6.7 mm	**100**			0		
4.75 mm	**100**			0		
2.36 mm	**99**			0		
1.18 mm	**99**			0		
0.6 mm	**99**			0		
0.425 mm	**98**			0		
0.3 mm	**97**			1		
0.15 mm	**92**			5		
0.075 mm	**87**			4		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	57		
Plastic Limit (%)	24		
Plasticity Index (%)	**33**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**15.0**		
Cracking Crumbling Curling	Cracking & Curling		

Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	**4 ***		
Soil Description	Refer to Borehole Logs		
Nature of Water	Potable		
Temperature of Water (°C)	20.6		
* Mineral Present	Carbonate		



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Results relate only to the items tested/sampled.

Material Test Report

Report Number: **P252992-1**
Issue Number: 2 - *This version supersedes all previous issues*
Reissue Reason: *Updated Report Format*
Date Issued: 12/03/2025
Client: GTS Consultancy Department
Contact: [redacted]
Project Number: P252992
Project Name: Cohuna WTP
Project Location: Site 1 - Chuggs Rd (2/PS428326)
Client Reference: 24C 0548-1
Work Request: 17212
Sample Number: B25-17212B
Date Sampled: 12/07/2024
Dates Tested: 07/02/2025 - 17/02/2025
Sampling Method: Sampled by Client
The results apply to the sample as received
Sample Location: **BH2 , Depth: 3.5-4.0m**
Material: Refer to Borehole Logs

Geotechnical Testing Services (Southern)
Bendigo Soil and Concrete Testing Laboratory
[redacted]

Accredited for compliance with ISO/IEC 17025 - Testing

[redacted]

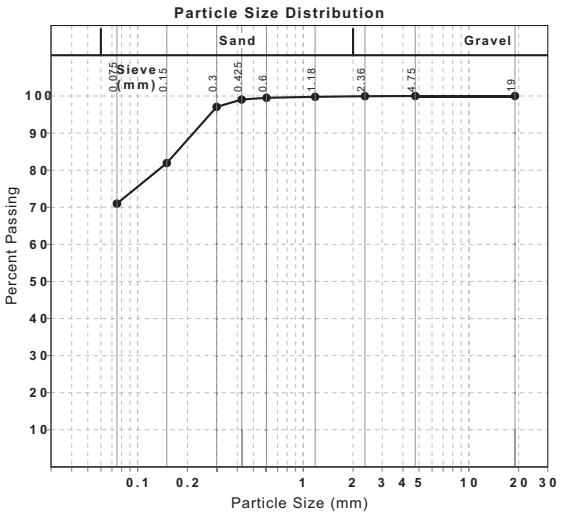
Approved Signatory: [redacted]
CMT Laboratory Supervisor
NATA Accredited Laboratory Number: 19506

Particle Size Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
19 mm	**100**			0		
4.75 mm	**100**			0		
2.36 mm	**100**			0		
1.18 mm	**100**			0		
0.6 mm	**100**			0		
0.425 mm	**99**			0		
0.3 mm	**97**			2		
0.15 mm	**82**			15		
0.075 mm	**71**			11		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	32		
Plastic Limit (%)	15		
Plasticity Index (%)	**17**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**9.5**		
Cracking Crumbling Curling	Curling		

Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	**5**		
Soil Description	Refer to Borehole Logs		
Nature of Water	Potable		
Temperature of Water (°C)	20.6		



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Material Test Report

Report Number: **P252992-1**
Issue Number: 2 - *This version supersedes all previous issues*
Reissue Reason: *Updated Report Format*
Date Issued: 12/03/2025
Client: GTS Consultancy Department
Contact: [redacted]
Project Number: P252992
Project Name: Cohuna WTP
Project Location: Site 1 - Chuggs Rd (2/PS428326)
Client Reference: 24C 0548-1
Work Request: 17212
Sample Number: B25-17212C
Date Sampled: 12/07/2024
Dates Tested: 07/02/2025 - 26/02/2025
Sampling Method: Sampled by Client
The results apply to the sample as received
Sample Location: **BH3 , Depth: 2.5-3.0m**
Material: Refer to Borehole Logs

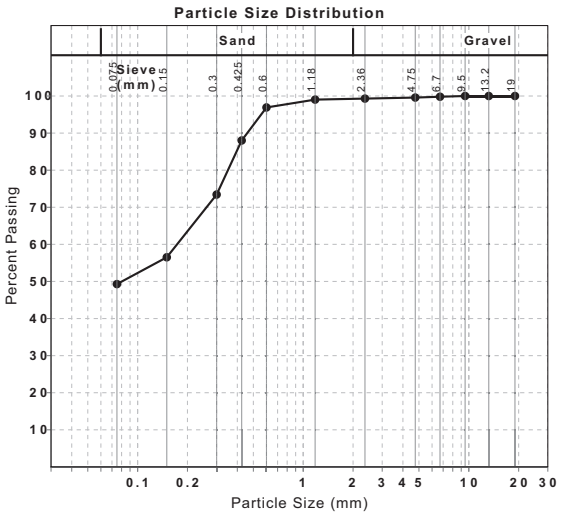
Geotechnical Testing Services (Southern)
Bendigo Soil and Concrete Testing Laboratory
[redacted]
Accredited for compliance with ISO/IEC 17025 - Testing
[redacted]
Approved Signatory: [redacted]
CMT Laboratory Supervisor
NATA Accredited Laboratory Number: 19506

Particle Size Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
19 mm	**100**			0		
13.2 mm	**100**			0		
9.5 mm	**100**			0		
6.7 mm	**100**			0		
4.75 mm	**100**			0		
2.36 mm	**99**			0		
1.18 mm	**99**			0		
0.6 mm	**97**			2		
0.425 mm	**88**			9		
0.3 mm	**73**			15		
0.15 mm	**57**			17		
0.075 mm	**49**			7		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	34		
Plastic Limit (%)	16		
Plasticity Index (%)	**18**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**10.5**		
Cracking Crumbling Curling	Cracking & Curling		

Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	**5**		
Soil Description	Refer to Borehole Logs		
Nature of Water	Potable		
Temperature of Water (°C)	20.6		



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Material Test Report

Report Number: **P252992-1**
Issue Number: 2 - *This version supersedes all previous issues*
Reissue Reason: *Updated Report Format*
Date Issued: 12/03/2025
Client: GTS Consultancy Department
[redacted]
Project Number: P252992
Project Name: Cohuna WTP
Project Location: Site 1 - Chuggs Rd (2/PS428326)
Client Reference: 24C 0548-1
Work Request: 17212
Sample Number: B25-17212D
Date Sampled: 12/07/2024
Dates Tested: 07/02/2025 - 25/02/2025
Sampling Method: Sampled by Client
The results apply to the sample as received
Sample Location: **BH4 , Depth: 0.5-1.0m**
Material: Refer to Borehole Logs

Geotechnical Testing Services (Southern)
Bendigo Soil and Concrete Testing Laboratory
1[redacted]

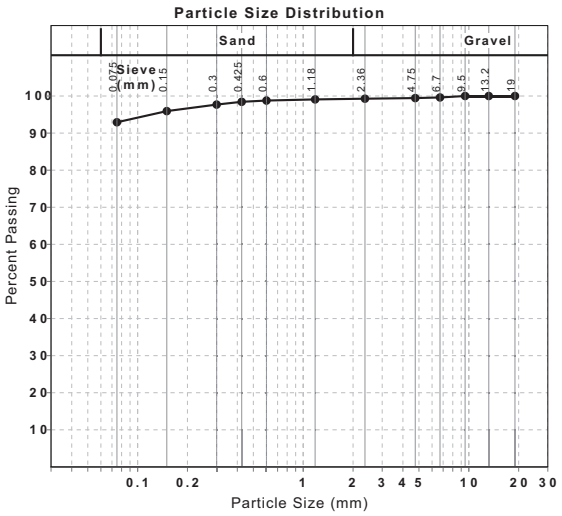
Accredited for compliance with ISO/IEC 17025 - Testing
[redacted]
Approved Signatory: [redacted]
CMT Laboratory Supervisor
NATA Accredited Laboratory Number: 19506

Particle Size Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
19 mm	**100**			0		
13.2 mm	**100**			0		
9.5 mm	**100**			0		
6.7 mm	**100**			0		
4.75 mm	**99**			0		
2.36 mm	**99**			0		
1.18 mm	**99**			0		
0.6 mm	**99**			0		
0.425 mm	**98**			0		
0.3 mm	**98**			1		
0.15 mm	**96**			2		
0.075 mm	**93**			3		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	48		
Plastic Limit (%)	17		
Plasticity Index (%)	**31**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**14.0**		
Cracking Crumbling Curling	Curling		

Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	**4 ***		
Soil Description	Refer to Borehole Logs		
Nature of Water	Potable		
Temperature of Water (°C)	20.6		
* Mineral Present	Carbonate		



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Material Test Report

Report Number: **P252992-1**
Issue Number: 2 - *This version supersedes all previous issues*
Reissue Reason: *Updated Report Format*
Date Issued: 12/03/2025
Client: GTS Consultancy Department
[redacted]
Contact: [redacted]
Project Number: P252992
Project Name: Cohuna WTP
Project Location: Site 1 - Chuggs Rd (2/PS428326)
Client Reference: 24C 0548-1
Work Request: 17212
Sample Number: B25-17212E
Date Sampled: 12/07/2024
Dates Tested: 07/02/2025 - 17/02/2025
Sampling Method: Sampled by Client
The results apply to the sample as received
Sample Location: **BH5 , Depth: 2.4-2.8m**
Material: Refer to Borehole Logs

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Bendigo Soil and Concrete Testing Laboratory
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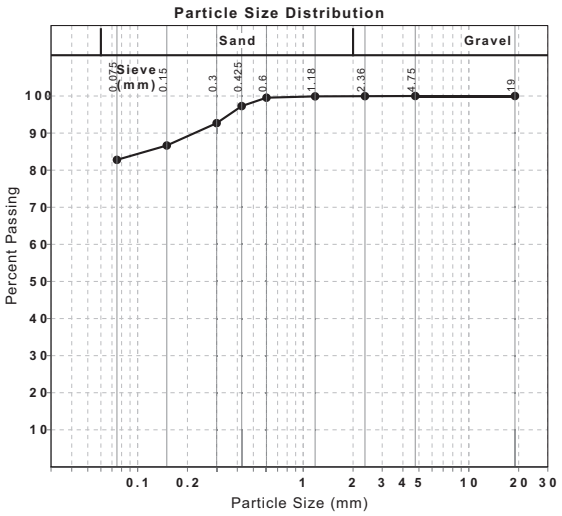
Approved Signatory: [redacted]
CMT Laboratory Supervisor
NATA Accredited Laboratory Number: 19506

Particle Size Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
19 mm	**100**			0		
4.75 mm	**100**			0		
2.36 mm	**100**			0		
1.18 mm	**100**			0		
0.6 mm	**100**			0		
0.425 mm	**97**			2		
0.3 mm	**93**			5		
0.15 mm	**87**			6		
0.075 mm	**83**			4		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	58		
Plastic Limit (%)	19		
Plasticity Index (%)	**39**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**15.0**		
Cracking Crumbling Curling	Cracking & Curling		

Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	**5**		
Soil Description	Refer to Borehole Logs		
Nature of Water	Potable		
Temperature of Water (°C)	20.6		



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Material Test Report

Report Number: **P252992-1**
Issue Number: 2 - *This version supersedes all previous issues*
Reissue Reason: *Updated Report Format*
Date Issued: 12/03/2025
Client: GTS Consultancy Department
[redacted]
Contact: [redacted]
Project Number: P252992
Project Name: Cohuna WTP
Project Location: Site 1 - Chuggs Rd (2/PS428326)
Client Reference: 24C 0548-1
Work Request: 17212
Sample Number: B25-17212F
Date Sampled: 12/07/2024
Dates Tested: 07/02/2025 - 17/02/2025
Sampling Method: Sampled by Client
The results apply to the sample as received
Sample Location: **BH6 , Depth: 0.5-1.0m**
Material: Refer to Borehole Logs

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Bendigo Soil and Concrete Testing Laboratory
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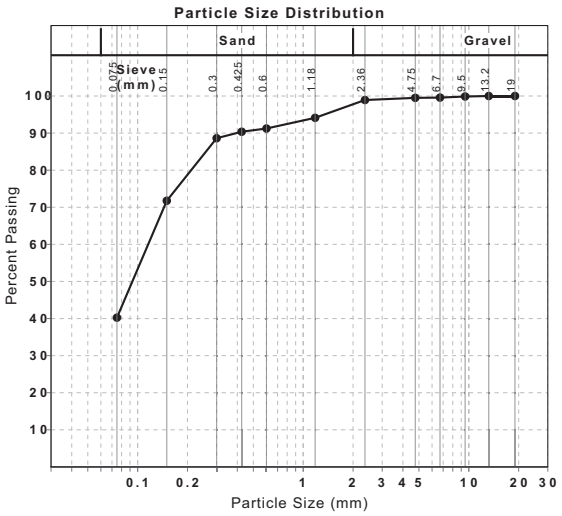
Approved Signatory: [redacted]
CMT Laboratory Supervisor
NATA Accredited Laboratory Number: 19506

Particle Size Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
19 mm	**100**			0		
13.2 mm	**100**			0		
9.5 mm	**100**			0		
6.7 mm	**100**			0		
4.75 mm	**99**			0		
2.36 mm	**99**			1		
1.18 mm	**94**			5		
0.6 mm	**91**			3		
0.425 mm	**90**			1		
0.3 mm	**89**			2		
0.15 mm	**72**			17		
0.075 mm	**40**			32		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	20		
Plastic Limit (%)	18		
Plasticity Index (%)	**2**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**1.5**		
Cracking Crumbling Curling	Cracking		

Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	**4 ***		
Soil Description	Refer to Borehole Logs		
Nature of Water	Potable		
Temperature of Water (°C)	20.6		
* Mineral Present	Carbonate		



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Material Test Report

Report Number: **P252992-1**
Issue Number: 2 - *This version supersedes all previous issues*
Reissue Reason: *Updated Report Format*
Date Issued: 12/03/2025
Client: GTS Consultancy Department
[redacted]
Contact: [redacted]
Project Number: P252992
Project Name: Cohuna WTP
Project Location: Site 1 - Chuggs Rd (2/PS428326)
Client Reference: 24C 0548-1
Work Request: 17212
Sample Number: B25-17212G
Date Sampled: 12/07/2024
Dates Tested: 07/02/2025 - 26/02/2025
Sampling Method: Sampled by Client
The results apply to the sample as received
Sample Location: **BH8 , Depth: 1.0-1.5m**
Material: Refer to Borehole Logs

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Bendigo Soil and Concrete Testing Laboratory
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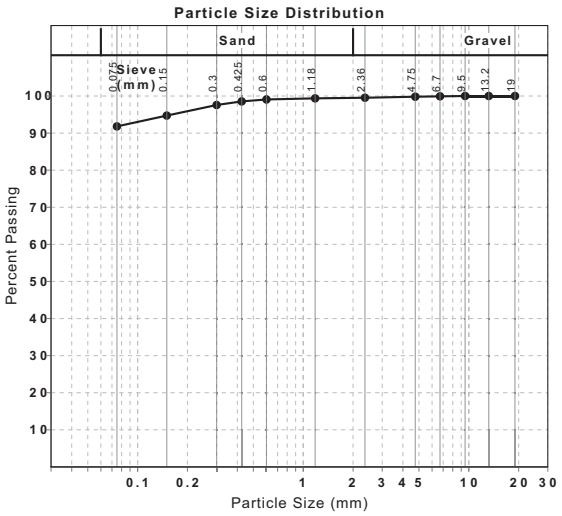
Approved Signatory: [redacted]
CMT Laboratory Supervisor
NATA Accredited Laboratory Number: 19506

Particle Size Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
19 mm	**100**			0		
13.2 mm	**100**			0		
9.5 mm	**100**			0		
6.7 mm	**100**			0		
4.75 mm	**100**			0		
2.36 mm	**100**			0		
1.18 mm	**99**			0		
0.6 mm	**99**			0		
0.425 mm	**99**			1		
0.3 mm	**98**			1		
0.15 mm	**95**			3		
0.075 mm	**92**			3		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	46		
Plastic Limit (%)	18		
Plasticity Index (%)	**28**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**14.0**		
Cracking Crumbling Curling	Cracking & Curling		

Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	**5**		
Soil Description	Refer to Borehole Logs		
Nature of Water	Potable		
Temperature of Water (^{o}C)	20.6		



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Material Test Report

Report Number: **P252992-1**
Issue Number: 2 - *This version supersedes all previous issues*
Reissue Reason: *Updated Report Format*
Date Issued: 12/03/2025
Client: GTS Consultancy Department
[redacted]
Contact: [redacted]
Project Number: P252992
Project Name: Cohuna WTP
Project Location: Site 1 - Chuggs Rd (2/PS428326)
Client Reference: 24C 0548-1
Work Request: 17212
Sample Number: B25-17212H
Date Sampled: 12/07/2024
Dates Tested: 07/02/2025 - 20/02/2025
Sampling Method: Sampled by Client
The results apply to the sample as received
Sample Location: **BH12 , Depth: 3.0m**
Material: Refer to Borehole Logs

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Bendigo Soil and Concrete Testing Laboratory
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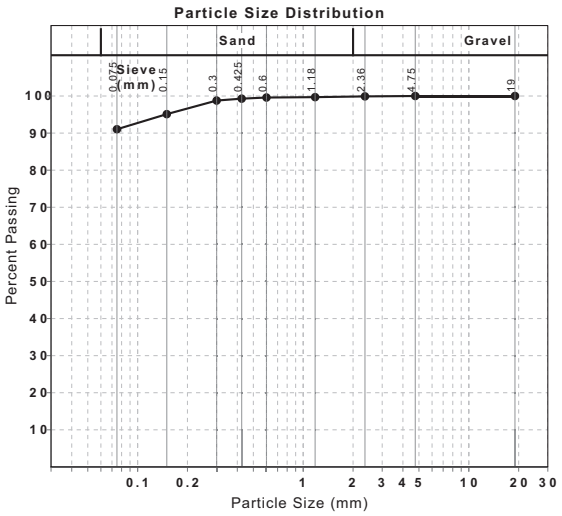
Approved Signatory: [redacted]
CMT Laboratory Supervisor
NATA Accredited Laboratory Number: 19506

Particle Size Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
19 mm	**100**			0		
4.75 mm	**100**			0		
2.36 mm	**100**			0		
1.18 mm	**100**			0		
0.6 mm	**100**			0		
0.425 mm	**99**			0		
0.3 mm	**99**			1		
0.15 mm	**95**			4		
0.075 mm	**91**			4		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	63		
Plastic Limit (%)	20		
Plasticity Index (%)	**43**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**10.0**		
Cracking Crumbling Curling	Curling		

Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	**5**		
Soil Description	Refer to Borehole logs		
Nature of Water	Potable		
Temperature of Water (°C)	20.6		



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Material Test Report

Report Number: **P252992-1**
Issue Number: 2 - *This version supersedes all previous issues*
Reissue Reason: *Updated Report Format*
Date Issued: 12/03/2025
Client: GTS Consultancy Department
Contact: [redacted]
Project Number: P252992
Project Name: Cohuna WTP
Project Location: Site 1 - Chuggs Rd (2/PS428326)
Client Reference: 24C 0548-1
Work Request: 17212
Sample Number: B25-17212I
Date Sampled: 12/07/2024
Dates Tested: 07/02/2025 - 25/02/2025
Sampling Method: Sampled by Client
The results apply to the sample as received
Sample Location: **BH12 , Depth: 6.0m**
Material: Refer to Borehole Logs

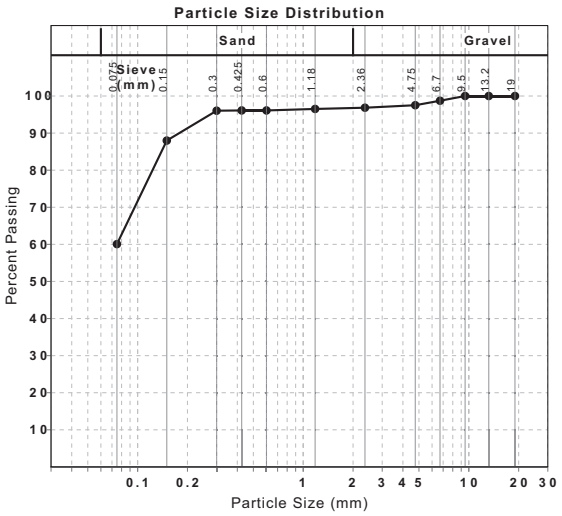
GTS GEOTECHNICAL TESTING SERVICES
Geotechnical Testing Services (Southern)
Bendigo Soil and Concrete Testing Laboratory
[redacted]
Accredited for compliance with ISO/IEC 17025 - Testing
NATA WORLD RECOGNISED ACCREDITATION
[redacted]
Approved Signatory: [redacted]
CMT Laboratory Supervisor
NATA Accredited Laboratory Number: 19506

Particle Size Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
19 mm	**100**			0		
13.2 mm	**100**			0		
9.5 mm	**100**			0		
6.7 mm	**99**			1		
4.75 mm	**98**			1		
2.36 mm	**97**			1		
1.18 mm	**97**			0		
0.6 mm	**96**			0		
0.425 mm	**96**			0		
0.3 mm	**96**			0		
0.15 mm	**88**			8		
0.075 mm	**60**			28		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	27		
Plastic Limit (%)	16		
Plasticity Index (%)	**11**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**6.5**		
Cracking Crumbling Curling	Curling		

Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	**5**		
Soil Description	Refer to Borehole Logs		
Nature of Water	Potable		
Temperature of Water (°C)	20.6		



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Material Test Report

Report Number: **P252992-1**
Issue Number: 2 - *This version supersedes all previous issues*
Reissue Reason: *Updated Report Format*
Date Issued: 12/03/2025
Client: GTS Consultancy Department
[redacted]
Contact: [redacted]
Project Number: P252992
Project Name: Cohuna WTP
Project Location: Site 1 - Chuggs Rd (2/PS428326)
Client Reference: 24C 0548-1
Work Request: 17212
Sample Number: B25-17212J
Date Sampled: 12/07/2024
Dates Tested: 07/02/2025 - 26/02/2025
Sampling Method: Sampled by Client
The results apply to the sample as received
Sample Location: **BH12 , Depth: 7.5m**
Material: Refer to Borehole Logs

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Bendigo Soil and Concrete Testing Laboratory
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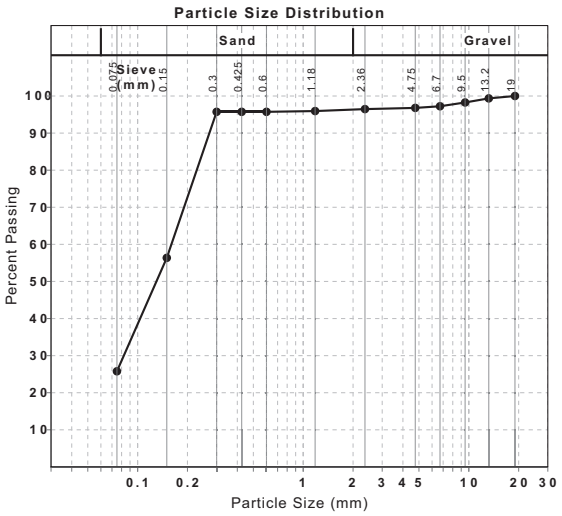
[redacted]

Approved Signatory: [redacted]
CMT Laboratory Supervisor
NATA Accredited Laboratory Number: 19506

Particle Size Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
19 mm	**100**			0		
13.2 mm	**99**			1		
9.5 mm	**98**			1		
6.7 mm	**97**			1		
4.75 mm	**97**			0		
2.36 mm	**96**			0		
1.18 mm	**96**			1		
0.6 mm	**96**			0		
0.425 mm	**96**			0		
0.3 mm	**96**			0		
0.15 mm	**56**			39		
0.075 mm	**26**			31		

Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	**5**		
Soil Description	Refer to Borehole Logs		
Nature of Water	Potable		
Temperature of Water (°C)	20.6		



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Report Number: **P252992-1**
Issue Number: 2 - *This version supersedes all previous issues*
Reissue Reason: *Updated Report Format*
Date Issued: 12/03/2025
Client: GTS Consultancy Department
[redacted]
Contact: [redacted]
Project Number: P252992
Project Name: Cohuna WTP
Project Location: Site 1 - Chuggs Rd (2/PS428326)
Client Reference: 24C 0548-1
Work Request: 17212
Sample Number: B25-17212K
Date Sampled: 12/07/2024
Dates Tested: 07/02/2025 - 26/02/2025
Sampling Method: Sampled by Client
The results apply to the sample as received
Sample Location: **BH9 , Depth: 1.5-2.0m**
Material: Refer to Borehole Logs

Geotechnical Testing Services (Southern)
Bendigo Soil and Concrete Testing Laboratory
[redacted]

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[redacted]

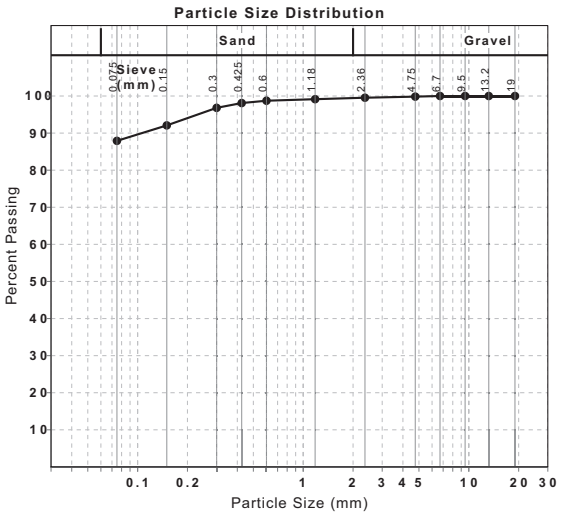
Approved Signatory: [redacted]
CMT Laboratory Supervisor
NATA Accredited Laboratory Number: 19506

Particle Size Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
19 mm	**100**			0		
13.2 mm	**100**			0		
9.5 mm	**100**			0		
6.7 mm	**100**			0		
4.75 mm	**100**			0		
2.36 mm	**100**			0		
1.18 mm	**99**			0		
0.6 mm	**99**			0		
0.425 mm	**98**			1		
0.3 mm	**97**			1		
0.15 mm	**92**			5		
0.075 mm	**88**			4		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	58		
Plastic Limit (%)	21		
Plasticity Index (%)	**37**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**15.0**		
Cracking Crumbling Curling	Curling		

Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	**4 ***		
Soil Description	Refer to Borehole Logs		
Nature of Water	Potable		
Temperature of Water (°C)	20.6		
* Mineral Present	Carbonate		



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Material Test Report

Report Number: **P252992-1**
Issue Number: 2 - *This version supersedes all previous issues*
Reissue Reason: *Updated Report Format*
Date Issued: 12/03/2025
Client: GTS Consultancy Department
[redacted]
Contact: [redacted]
Project Number: P252992
Project Name: Cohuna WTP
Project Location: Site 1 - Chuggs Rd (2/PS428326)
Client Reference: 24C 0548-1
Work Request: 17212
Sample Number: B25-17212L
Date Sampled: 12/07/2024
Dates Tested: 07/02/2025 - 25/02/2025
Sampling Method: Sampled by Client
The results apply to the sample as received
Sample Location: **BH11 , Depth: 3.0-3.5m**
Material: Refer to Borehole Logs

Geotechnical Testing Services (Southern)
Bendigo Soil and Concrete Testing Laboratory
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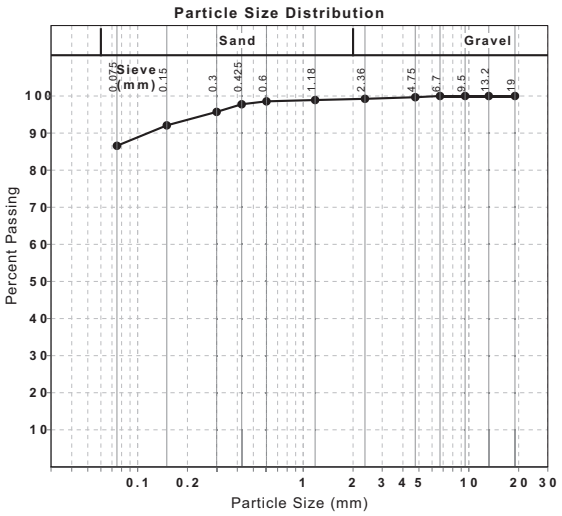
[redacted]
Approved Signatory: [redacted]
CMT Laboratory Supervisor
NATA Accredited Laboratory Number: 19506

Particle Size Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
19 mm	**100**			0		
13.2 mm	**100**			0		
9.5 mm	**100**			0		
6.7 mm	**100**			0		
4.75 mm	**100**			0		
2.36 mm	**99**			0		
1.18 mm	**99**			0		
0.6 mm	**99**			0		
0.425 mm	**98**			1		
0.3 mm	**96**			2		
0.15 mm	**92**			4		
0.075 mm	**87**			6		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	51		
Plastic Limit (%)	20		
Plasticity Index (%)	**31**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**14.5**		
Cracking Crumbling Curling	Curling		

Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	**4 ***		
Soil Description	Refer to Borehole Logs		
Nature of Water	Potable		
Temperature of Water (°C)	20.6		
* Mineral Present	Carbonate		



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Material Test Report

Report Number: **P252992-1**
Issue Number: 2 - *This version supersedes all previous issues*
Reissue Reason: *Updated Report Format*
Date Issued: 12/03/2025
Client: GTS Consultancy Department
[redacted]
Contact: [redacted]
Project Number: P252992
Project Name: Cohuna WTP
Project Location: Site 1 - Chuggs Rd (2/PS428326)
Client Reference: 24C 0548-1
Work Request: 17212
Sample Number: B25-17212M
Date Sampled: 12/07/2024
Dates Tested: 07/02/2025 - 25/02/2025
Sampling Method: Sampled by Client
The results apply to the sample as received
Sample Location: **BH13 , Depth: 3.5-4.0m**
Material: Refer to Borehole Logs

Geotechnical Testing Services (Southern)
Bendigo Soil and Concrete Testing Laboratory
[redacted]

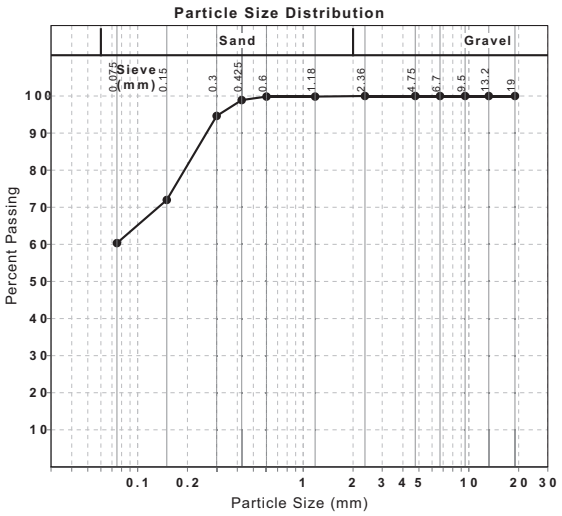
Accredited for compliance with ISO/IEC 17025 - Testing
[redacted]
Approved Signatory: [redacted]
CMT Laboratory Supervisor
NATA Accredited Laboratory Number: 19506

Particle Size Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
19 mm	**100**			0		
13.2 mm	**100**			0		
9.5 mm	**100**			0		
6.7 mm	**100**			0		
4.75 mm	**100**			0		
2.36 mm	**100**			0		
1.18 mm	**100**			0		
0.6 mm	**100**			0		
0.425 mm	**99**			1		
0.3 mm	**95**			4		
0.15 mm	**72**			23		
0.075 mm	**60**			12		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	46		
Plastic Limit (%)	18		
Plasticity Index (%)	**28**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**10.5**		
Cracking Crumbling Curling	Curling		

Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	**5**		
Soil Description	Refer to Borehole Logs		
Nature of Water	Potable		
Temperature of Water (^{o}C)	20.6		



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Material Test Report

Report Number: **P252992-1**
Issue Number: 2 - *This version supersedes all previous issues*
Reissue Reason: *Updated Report Format*
Date Issued: 12/03/2025
Client: GTS Consultancy Department
[redacted]
Contact: S[redacted]
Project Number: P252992
Project Name: Cohuna WTP
Project Location: Site 1 - Chuggs Rd (2/PS428326)
Client Reference: 24C 0548-1
Work Request: 17212
Sample Number: B25-17212N
Date Sampled: 12/07/2024
Dates Tested: 07/02/2025 - 26/02/2025
Sampling Method: Sampled by Client
The results apply to the sample as received
Sample Location: **BH14 , Depth: 1.5-2.0m**
Material: Refer to Borehole Logs

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Geotechnical Testing Services (Southern)
Bendigo Soil and Concrete Testing Laboratory
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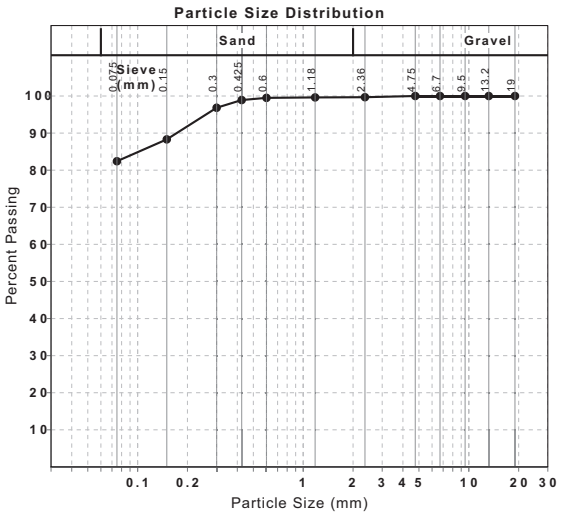
Approved Signatory: [redacted]
CMT Laboratory Supervisor
NATA Accredited Laboratory Number: 19506

Particle Size Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
19 mm	**100**			0		
13.2 mm	**100**			0		
9.5 mm	**100**			0		
6.7 mm	**100**			0		
4.75 mm	**100**			0		
2.36 mm	**100**			0		
1.18 mm	**100**			0		
0.6 mm	**100**			0		
0.425 mm	**99**			1		
0.3 mm	**97**			2		
0.15 mm	**88**			9		
0.075 mm	**82**			6		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	52		
Plastic Limit (%)	21		
Plasticity Index (%)	**31**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**16.0**		
Cracking Crumbling Curling	Cracking & Curling		

Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	**5**		
Soil Description	Refer to Borehole Logs		
Nature of Water	Potable		
Temperature of Water (^{o}C)	20.6		



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Material Test Report

Report Number: **P252992-1**
Issue Number: 2 - *This version supersedes all previous issues*
Reissue Reason: *Updated Report Format*
Date Issued: 12/03/2025
Client: GTS Consultancy Department
[redacted]
Contact: [redacted]
Project Number: P252992
Project Name: Cohuna WTP
Project Location: Site 1 - Chuggs Rd (2/PS428326)
Client Reference: 24C 0548-1
Work Request: 17212
Sample Number: B25-17212O
Date Sampled: 12/07/2024
Dates Tested: 07/02/2025 - 25/02/2025
Sampling Method: Sampled by Client
The results apply to the sample as received
Sample Location: **BH18 , Depth: 1.5-2.0m**
Material: Refer to Borehole Logs

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Bendigo Soil and Concrete Testing Laboratory
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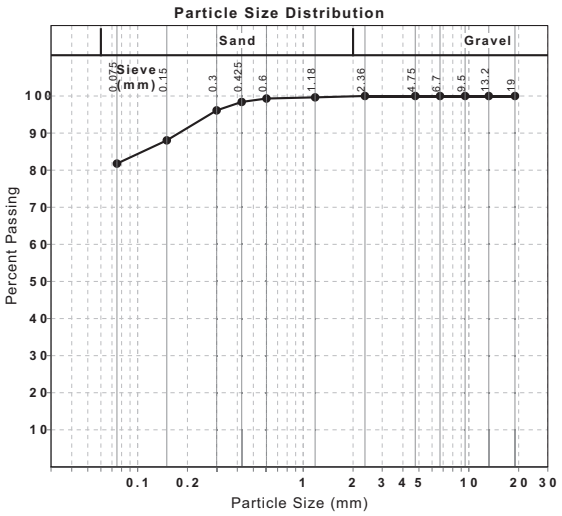
Approved Signatory: [redacted]
CMT Laboratory Supervisor
NATA Accredited Laboratory Number: 19506

Particle Size Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
19 mm	**100**			0		
13.2 mm	**100**			0		
9.5 mm	**100**			0		
6.7 mm	**100**			0		
4.75 mm	**100**			0		
2.36 mm	**100**			0		
1.18 mm	**100**			0		
0.6 mm	**99**			0		
0.425 mm	**98**			1		
0.3 mm	**96**			2		
0.15 mm	**88**			8		
0.075 mm	**82**			6		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	55		
Plastic Limit (%)	22		
Plasticity Index (%)	**33**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**16.0**		
Cracking Crumbling Curling	Cracking & Curling		

Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	**4 ***		
Soil Description	Refer to Borehole Logs		
Nature of Water	Potable		
Temperature of Water (°C)	20.6		
* Mineral Present	Carbonate		



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Material Test Report

Report Number: **P252992-1**
Issue Number: 2 - *This version supersedes all previous issues*
Reissue Reason: *Updated Report Format*
Date Issued: 12/03/2025
Client: GTS Consultancy Department
[redacted]
Contact: [redacted]
Project Number: P252992
Project Name: Cohuna WTP
Project Location: Site 1 - Chuggs Rd (2/PS428326)
Client Reference: 24C 0548-1
Work Request: 17212
Sample Number: B25-17212P
Date Sampled: 12/07/2024
Dates Tested: 07/02/2025 - 25/02/2025
Sampling Method: Sampled by Client
The results apply to the sample as received
Sample Location: **BH7 (0.3-1.3m)**
Material: Refer to Borehole Logs

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Bendigo Soil and Concrete Testing Laboratory
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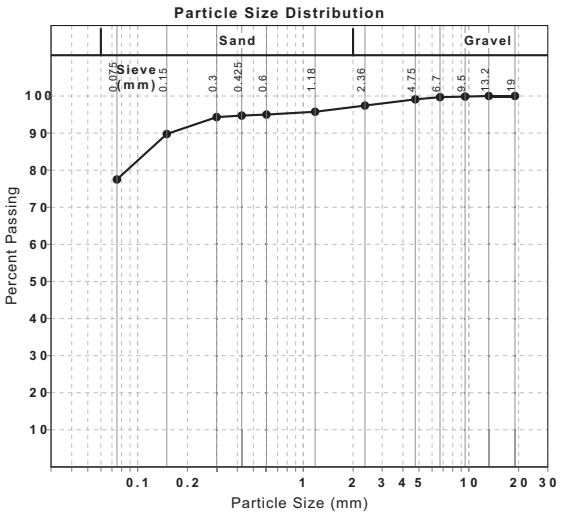
[redacted]
Approved Signatory: [redacted]
CMT Laboratory Supervisor
NATA Accredited Laboratory Number: 19506

Particle Size Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
19 mm	**100**			0		
13.2 mm	**100**			0		
9.5 mm	**100**			0		
6.7 mm	**100**			0		
4.75 mm	**99**			1		
2.36 mm	**97**			2		
1.18 mm	**96**			2		
0.6 mm	**95**			1		
0.425 mm	**95**			0		
0.3 mm	**94**			0		
0.15 mm	**90**			5		
0.075 mm	**77**			12		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	27		
Plastic Limit (%)	17		
Plasticity Index (%)	**10**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**4.0**		
Cracking Crumbling Curling	Cracking		

Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	**4**		
Soil Description	Refer to Borehole Logs		
Nature of Water	Potable		
Temperature of Water (°C)	22.1		



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Material Test Report

Report Number: **P252992-1**
Issue Number: 2 - *This version supersedes all previous issues*
Reissue Reason: *Updated Report Format*
Date Issued: 12/03/2025
Client: GTS Consultancy Department
[redacted]
Contact: [redacted]
Project Number: P252992
Project Name: Cohuna WTP
Project Location: Site 1 - Chuggs Rd (2/PS428326)
Client Reference: 24C 0548-1
Work Request: 17212
Sample Number: B25-17212Q
Date Sampled: 12/07/2024
Dates Tested: 07/02/2025 - 26/02/2025
Sampling Method: Sampled by Client
The results apply to the sample as received
Sample Location: **BH10 (0.5-1.2m)**
Material: Refer to Borehole Logs

Geotechnical Testing Services (Southern)
Bendigo Soil and Concrete Testing Laboratory
[redacted]

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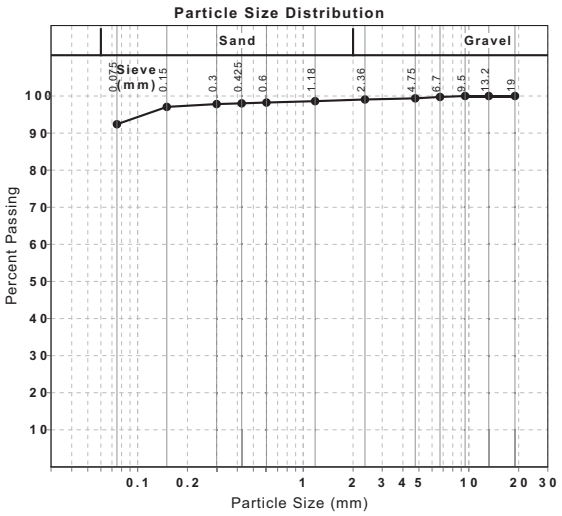
[redacted]
Approved Signatory: [redacted]
CMT Laboratory Supervisor
NATA Accredited Laboratory Number: 19506

Particle Size Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
19 mm	**100**			0		
13.2 mm	**100**			0		
9.5 mm	**100**			0		
6.7 mm	**100**			0		
4.75 mm	**99**			0		
2.36 mm	**99**			0		
1.18 mm	**99**			0		
0.6 mm	**98**			0		
0.425 mm	**98**			0		
0.3 mm	**98**			0		
0.15 mm	**97**			1		
0.075 mm	**92**			5		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	39		
Plastic Limit (%)	17		
Plasticity Index (%)	**22**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**9.0**		
Cracking Crumbling Curling	Cracking		

Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	**4 ***		
Soil Description	Refer to Borehole Logs		
Nature of Water	Potable		
Temperature of Water (°C)	22.1		
* Mineral Present	Carbonate		



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Material Test Report

Report Number: **P252992-1**
Issue Number: 2 - *This version supersedes all previous issues*
Reissue Reason: *Updated Report Format*
Date Issued: 12/03/2025
Client: GTS Consultancy Department
[redacted]
Contact: [redacted]
Project Number: P252992
Project Name: Cohuna WTP
Project Location: Site 1 - Chuggs Rd (2/PS428326)
Client Reference: 24C 0548-1
Work Request: 17212
Sample Number: B25-17212R
Date Sampled: 12/07/2024
Dates Tested: 07/02/2025 - 25/02/2025
Sampling Method: Sampled by Client
The results apply to the sample as received
Sample Location: **BH11 (0.4-1.0m)**
Material: Refer to Borehole Logs

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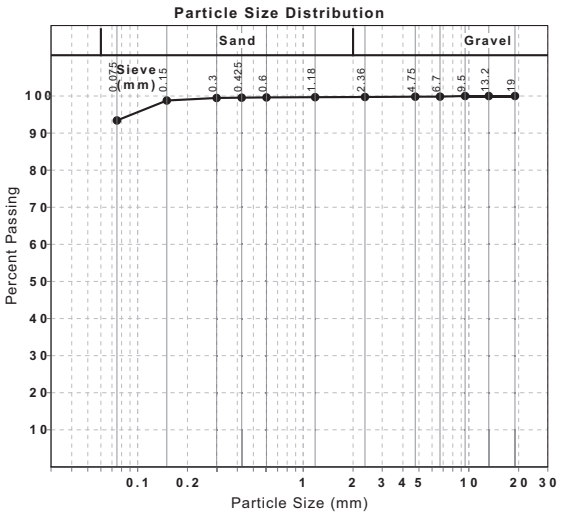
Geotechnical Testing Services (Southern)
Bendigo Soil and Concrete Testing Laboratory
[redacted]
Accredited for compliance with ISO/IEC 17025 - Testing
NATA WORLD RECOGNISED ACCREDITATION
[redacted]
Approved Signatory: [redacted]
CMT Laboratory Supervisor
NATA Accredited Laboratory Number: 19506

Particle Size Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
19 mm	**100**			0		
13.2 mm	**100**			0		
9.5 mm	**100**			0		
6.7 mm	**100**			0		
4.75 mm	**100**			0		
2.36 mm	**100**			0		
1.18 mm	**100**			0		
0.6 mm	**100**			0		
0.425 mm	**100**			0		
0.3 mm	**99**			0		
0.15 mm	**99**			1		
0.075 mm	**93**			5		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	31		
Plastic Limit (%)	17		
Plasticity Index (%)	**14**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**9.5**		
Cracking Crumbling Curling	Cracking		

Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	**4 ***		
Soil Description	Refer to Borehole Logs		
Nature of Water	Potable		
Temperature of Water (°C)	22.1		
* Mineral Present	Carbonate		



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Material Test Report

Report Number: **P252992-1**
Issue Number: 2 - *This version supersedes all previous issues*
Reissue Reason: *Updated Report Format*
Date Issued: 12/03/2025
Client: GTS Consultancy Department
[redacted]
Contact: [redacted]
Project Number: P252992
Project Name: Cohuna WTP
Project Location: Site 1 - Chuggs Rd (2/PS428326)
Client Reference: 24C 0548-1
Work Request: 17212
Sample Number: B25-17212S
Date Sampled: 07/02/2025
Dates Tested: 07/02/2025 - 24/02/2025
Sampling Method: Sampled by Client
The results apply to the sample as received
Sample Location: **BH13 (0.3-1.0m)**
Material: Refer to Borehole Logs

Geotechnical Testing Services (Southern)
Bendigo Soil and Concrete Testing Laboratory
[redacted]

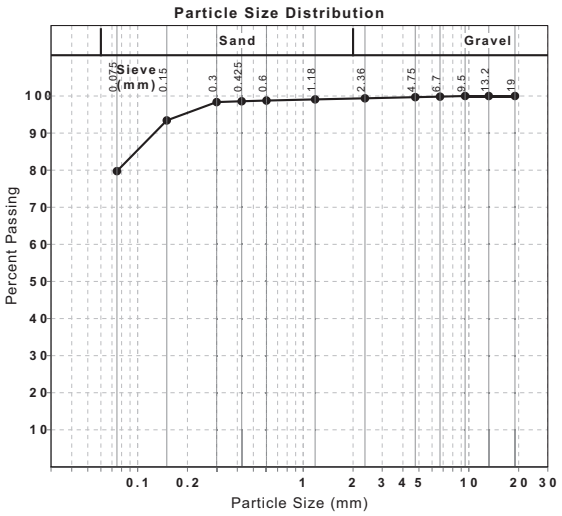
Accredited for compliance with ISO/IEC 17025 - Testing
[redacted]
Approved Signatory: [redacted]
CMT Laboratory Supervisor
NATA Accredited Laboratory Number: 19506

Particle Size Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
19 mm	**100**			0		
13.2 mm	**100**			0		
9.5 mm	**100**			0		
6.7 mm	**100**			0		
4.75 mm	**100**			0		
2.36 mm	**99**			0		
1.18 mm	**99**			0		
0.6 mm	**99**			0		
0.425 mm	**99**			0		
0.3 mm	**98**			0		
0.15 mm	**93**			5		
0.075 mm	**80**			14		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	28		
Plastic Limit (%)	15		
Plasticity Index (%)	**13**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**5.5**		
Cracking Crumbling Curling	Cracking		

Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	**4 ***		
Soil Description	Refer to Borehole Logs		
Nature of Water	Potable		
Temperature of Water (°C)	22.1		
* Mineral Present	Carbonate		



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Material Test Report

Report Number: **P252992-1**
Issue Number: 2 - *This version supersedes all previous issues*
Reissue Reason: *Updated Report Format*
Date Issued: 12/03/2025
Client: GTS Consultancy Department
[redacted]
Contact: [redacted]
Project Number: P252992
Project Name: Cohuna WTP
Project Location: Site 1 - Chuggs Rd (2/PS428326)
Client Reference: 24C 0548-1
Work Request: 17212
Sample Number: B25-17212T
Date Sampled: 07/02/2025
Dates Tested: 07/02/2025 - 26/02/2025
Sampling Method: Sampled by Client
The results apply to the sample as received
Sample Location: **BH17 (0.8-1.3m)**
Material: Refer to Borehole Logs

Geotechnical Testing Services (Southern)
Bendigo Soil and Concrete Testing Laboratory
[redacted]

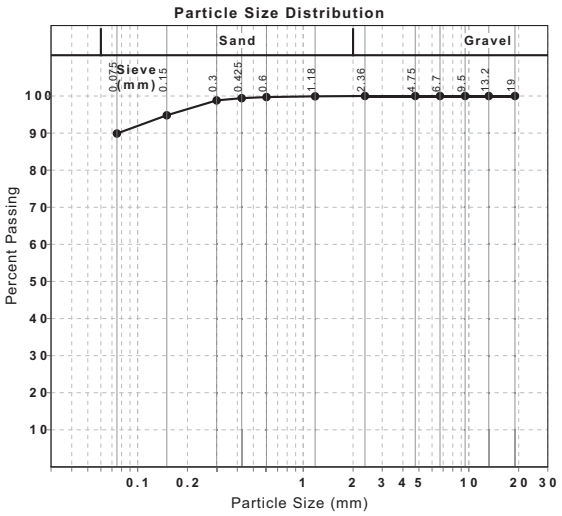
Accredited for compliance with ISO/IEC 17025 - Testing
[redacted]
Approved Signatory: [redacted]
CMT Laboratory Supervisor
NATA Accredited Laboratory Number: 19506

Particle Size Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
19 mm	**100**			0		
13.2 mm	**100**			0		
9.5 mm	**100**			0		
6.7 mm	**100**			0		
4.75 mm	**100**			0		
2.36 mm	**100**			0		
1.18 mm	**100**			0		
0.6 mm	**100**			0		
0.425 mm	**99**			0		
0.3 mm	**99**			1		
0.15 mm	**95**			4		
0.075 mm	**90**			5		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	38		
Plastic Limit (%)	18		
Plasticity Index (%)	**20**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**11.5**		
Cracking Crumbling Curling	Curling		

Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	**6**		
Soil Description	Refer to Borehole Logs		
Nature of Water	Potable		
Temperature of Water (°C)	22.1		



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Material Test Report

Report Number: P252992-1
Issue Number: 2 - *This version supersedes all previous issues*
Reissue Reason: *Updated Report Format*
Date Issued: 12/03/2025
Client: GTS Consultancy Department
Contact: [redacted]
Project Number: P252992
Project Name: Cohuna WTP
Project Location: Site 1 - Chuggs Rd (2/PS428326)
Client Reference: 24C 0548-1
Work Request: 17212
Dates Tested: 07/02/2025 - 13/02/2025
Location: Material Investigation - Site 1 - Chuggs Rd (2/PS428326) - 24C 0548-1

Geotechnical Testing Services (Southern)
Bendigo Soil and Concrete Testing Laboratory
[redacted]

Accredited for compliance with ISO/IEC 17025 - Testing

[redacted]

Approved Signatory: [redacted]
CMT Laboratory Supervisor
NATA Accredited Laboratory Number: 19506

Moisture Content AS 1289 2.1.1					
Sample Number	Sample Location	Moisture Content (%)	Min	Max	Material
B25-17212A	BH1 , Depth: 1.6-2.0m	25.5 %	**	**	Refer to Borehole Logs
B25-17212B	BH2 , Depth: 3.5-4.0m	19.7 %	**	**	Refer to Borehole Logs
B25-17212C	BH3 , Depth: 2.5-3.0m	18.6 %	**	**	Refer to Borehole Logs
B25-17212D	BH4 , Depth: 0.5-1.0m	20.7 %	**	**	Refer to Borehole Logs
B25-17212E	BH5 , Depth: 2.4-2.8m	21.0 %	**	**	Refer to Borehole Logs
B25-17212F	BH6 , Depth: 0.5-1.0m	17.5 %	**	**	Refer to Borehole Logs
B25-17212G	BH8 , Depth: 1.0-1.5m	21.2 %	**	**	Refer to Borehole Logs
B25-17212H	BH12 , Depth: 3.0m	19.0 %	**	**	Refer to Borehole Logs
B25-17212I	BH12 , Depth: 6.0m	15.4 %	**	**	Refer to Borehole Logs
B25-17212J	BH12 , Depth: 7.5m	21.0 %	**	**	Refer to Borehole Logs
B25-17212K	BH9 , Depth: 1.5-2.0m	22.2 %	**	**	Refer to Borehole Logs
B25-17212L	BH11 , Depth: 3.0-3.5m	18.2 %	**	**	Refer to Borehole Logs
B25-17212M	BH13 , Depth: 3.5-4.0m	19.2 %	**	**	Refer to Borehole Logs
B25-17212N	BH14 , Depth: 1.5-2.0m	23.7 %	**	**	Refer to Borehole Logs
B25-17212O	BH18 , Depth: 1.5-2.0m	21.5 %	**	**	Refer to Borehole Logs

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Material Test Report

Report Number: **P252134-1**
Issue Number: 1
Date Issued: 11/03/2025
Client: Geotechnical Testing Services
[redacted]

Project Number: P252134
Project Name: P252992
Project Location: Bendigo
Work Request: 17155
Date Sampled: 12/07/2024
Dates Tested: 20/02/2025 - 28/02/2025
Sampling Method: Sampled by Client
The results apply to the sample as received
Location: WR#17212

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Pakenham Laboratory
[redacted]

Accredited for compliance with ISO/IEC 17025 - Testing
[redacted]
Approved Signatory: [redacted]
NATA Accredited Laboratory Number: 15357

Determination of pinhole dispersion classification of a soil (AS 1289.3.8.3)				
Sample Number	P25-17155A	P25-17155B	P25-17155C	P25-17155D
Date Sampled	12/07/2024	12/07/2024	12/07/2024	12/07/2024
Sample Location	B25-17212P	B25-17212Q	B25-17212R	B25-17212S
Sample Depth	**	**	**	**
Material	**	**	**	**
Pinhole Dispersion Classification	ND2 Erosion resistant	ND2 Erosion resistant	ND2 Erosion resistant	ND2 Erosion resistant
Rate of Flow on completion (ml/s)	2.12	1.94	1.83	2.24
Natural Moisture Content (%)	15.9	19.2	24.7	16.8
Moisture Content Before Testing (%)	16.3	18.2	17.1	15.2
Standard Maximum Dry Density (t/m^3)	1.74	1.72	1.85	1.84
Time Matured in Cylinder (hh:mm)	46:34	48:13	24:40	48:40
Method of Moisture Determination for Remoulding	OMC	OMC	OMC	OMC
Source of Water Used	MELBOURNE TAP W	MELB tap water	Melbourne tap W	Melbourne tap w
Was Hole Reformed at 50mm Head	N	N	N	N

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Material Test Report

Report Number: **P252134-1**
Issue Number: 1
Date Issued: 11/03/2025
Client: Geotechnical Testing Services
[redacted]
Project Number: P252134
Project Name: P252992
Project Location: Bendigo
Work Request: 17155
Date Sampled: 12/07/2024
Dates Tested: 20/02/2025 - 28/02/2025
Sampling Method: Sampled by Client
The results apply to the sample as received
Location: WR#17212

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[redacted]

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[redacted]
NATA Accredited Laboratory Number: 15357

Determination of pinhole dispersion classification of a soil (AS 1289.3.8.3)				
Sample Number	P25-17155E			
Date Sampled	12/07/2024			
Sample Location	B25-17212T			
Sample Depth	**			
Material	**			
Pinhole Dispersion Classification	ND1 Non-dispersive			
Rate of Flow on completion (ml/s)	2.56			
Natural Moisture Content (%)	14.9			
Moisture Content Before Testing (%)	17.8			
Standard Maximum Dry Density (t/m^3)	1.65			
Time Matured in Cylinder (hh:mm)	24			
Method of Moisture Determination for Remoulding	OMC			
Source of Water Used	Melbourne tap w			
Was Hole Reformed at 50mm Head	N			

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Triaxial Permeability Test Report

Report Number: **11600-18**
Date Issued: 13/03/2025
Client: Geotechnical Testing Services Pty Ltd
[redacted]
Contact: [redacted]
Project Number: 11600
Project Name: Triaxial Permeability Testing
Project Location: Bendigo VIC
Date Sampled: 12/07/2024
Dates Tested: 19/02-12/03/2025
Sampling Method: Sampled by client
Specification: <1.E-9m/s
Sample Identification: P25-17155A
Sample Number: **B25-17212P**
Location: **B25-17212P**
Material Description: silty CLAY,brown

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Pakenham Laboratory
47 National Avenue Pakenham VIC 381[redacted]
[redacted]

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Approved Signatory: [redacted]
NATA Accredited Laboratory Number: 15357

Triaxial Permeability AS 1289 6.7.3-2016	
Permeant Used	De-aired Water
Confining Pressure(kPa)	600
Head Pressure(kPa)	590
Bottom Pressure(kPa)	570
Mean Pressure(kPa)	20
Specimen Height(mm)	70
Specimen Diameter(mm)	63
Length to Height Ratio	1.11
Laboratory Density Ratio(%)	98
Laboratory Moisture Ratio(%)	103
Compactive Effort	Standard
Material Retained on the 37.5mm sieve (%)	0
Final Moisture Content (%)	20.8
Permeability(m/s)	**3.E-09**

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Triaxial Permeability Test Report

Report Number: **11600-19**
Date Issued: 12-Mar-2025
Client: Geotechnical Testing Services Pty Ltd
[redacted]
Project Number: 11600
Project Name: Triaxial Permeability Testing
Project Location: Bendigo VIC
Date Sampled: 12/07/2024
Dates Tested: 21/02-05/03/2025
Sampling Method: Sampled by client
Specification: <1.E-9m/s
Sample Identification: P25-17155B
Sample Number: **B25-17212Q**
Location: **B25-17212Q**
Material Description: silty CLAY trace gravel,brown

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Approved Signatory: [redacted]

NATA Accredited Laboratory Number: 15357

Triaxial Permeability AS 1289 6.7.3-2016	
Permeant Used	De-aired Water
Confining Pressure(kPa)	600
Head Pressure(kPa)	590
Bottom Pressure(kPa)	570
Mean Pressure(kPa)	20
Specimen Height(mm)	70
Specimen Diameter(mm)	63
Length to Height Ratio	1.11
Laboratory Density Ratio(%)	98
Laboratory Moisture Ratio(%)	101
Compactive Effort	Standard
Material Retained on the 37.5mm sieve (%)	0
Final Moisture Content (%)	20.6
Permeability(m/s)	**6.E-10**

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Triaxial Permeability Test Report

Report Number: **11600-20**
Date Issued: 13/03/2025
Client: Geotechnical Testing Services Pty Ltd
[redacted]
Contact: [redacted]
Project Number: 11600
Project Name: Triaxial Permeability Testing
Project Location: Bendigo VIC
Date Sampled: 12/07/2024
Dates Tested: 21/02-05/03/2025
Sampling Method: Sampled by client
Specification: <1.E-9m/s
Sample Identification: P25-17155C
Sample Number: **B25-17212R**
Location: **B25-17212R**
Material Description: silty CLAY trace gravel,brown

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Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: [redacted]

NATA Accredited Laboratory Number: 15357

Triaxial Permeability AS 1289 6.7.3-2016	
Permeant Used	De-aired Water
Confining Pressure(kPa)	600
Head Pressure(kPa)	590
Bottom Pressure(kPa)	570
Mean Pressure(kPa)	20
Specimen Height(mm)	70
Specimen Diameter(mm)	63
Length to Height Ratio	1.11
Laboratory Density Ratio(%)	98
Laboratory Moisture Ratio(%)	103
Compactive Effort	Standard
Material Retained on the 37.5mm sieve (%)	0
Final Moisture Content (%)	20.4
Permeability(m/s)	**6.E-10**

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Triaxial Permeability Test Report

Report Number: **11600-21**
Date Issued: 12-Mar-2025
Client: Geotechnical Testing Services Pty Ltd
1[redacted]
Contact: [redacted]
Project Number: 11600
Project Name: Triaxial Permeability Testing
Project Location: Bendigo VIC
Date Sampled: 12/07/2024
Dates Tested: 19/02-05/03/2025
Sampling Method: Sampled by client
Specification: <1.E-9m/s
Sample Identification: P25-17155D
Sample Number: **B25-17212S**
Location: **B25-17212S**
Material Description: silty CLAY trace gravel,brown

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Pakenham Laboratory
[redacted]

NATA WORLD RECOGNISED ACCREDITATION

Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: [redacted]

NATA Accredited Laboratory Number: 15357

Triaxial Permeability AS 1289 6.7.3-2016	
Permeant Used	De-aired Water
Confining Pressure(kPa)	600
Head Pressure(kPa)	590
Bottom Pressure(kPa)	570
Mean Pressure(kPa)	20
Specimen Height(mm)	70
Specimen Diameter(mm)	63
Length to Height Ratio	1.11
Laboratory Density Ratio(%)	98
Laboratory Moisture Ratio(%)	102
Compactive Effort	Standard
Material Retained on the 37.5mm sieve (%)	0
Final Moisture Content (%)	17.9
Permeability(m/s)	**2.E-09**

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Results relate only to the items tested/sampled.

Triaxial Permeability Test Report

Report Number: **11600-22**
Date Issued: 14/03/2025
Client: Geotechnical Testing Services Pty Ltd
[redacted]
Contact: [redacted]
Project Number: 11600
Project Name: Triaxial Permeability Testing
Project Location: Bendigo VIC
Date Sampled: 12/07/2024
Dates Tested: 20/02-13/03/2025
Sampling Method: Sampled by client
Specification: <1.E-9m/s
Sample Identification: P25-17155E
Sample Number: **B25-17212T**
Location: **B25-17212T**
Material Description: silty CLAY,brown

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Pakenham Laboratory
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NATA WORLD RECOGNISED ACCREDITATION

Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: [redacted]

NATA Accredited Laboratory Number: 15357

Triaxial Permeability AS 1289 6.7.3-2016	
Permeant Used	De-aired Water
Confining Pressure(kPa)	600
Head Pressure(kPa)	590
Bottom Pressure(kPa)	570
Mean Pressure(kPa)	20
Specimen Height(mm)	70
Specimen Diameter(mm)	63
Length to Height Ratio	1.11
Laboratory Density Ratio(%)	98
Laboratory Moisture Ratio(%)	98
Compactive Effort	Standard
Material Retained on the 37.5mm sieve (%)	0
Final Moisture Content (%)	22.5
Permeability(m/s)	**2.E-10**

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Material Test Report

Report Number: **P252134-1**
Issue Number: 1
Date Issued: 11/03/2025
Client: Geotechnical Testing Services
[redacted]
Project Number: P252134
Project Name: P252992
Project Location: Bendigo
Work Request: 17155
Date Sampled: 12/07/2024
Dates Tested: 20/02/2025 - 28/02/2025
Sampling Method: Sampled by Client
The results apply to the sample as received
Location: WR#17212

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[redacted]

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Accredited for compliance with ISO/IEC 17025 - Testing
[redacted]
Approved Signatory: [redacted]
NATA Accredited Laboratory Number: 15357

Determination of pinhole dispersion classification of a soil (AS 1289.3.8.3)				
Sample Number	P25-17155A	P25-17155B	P25-17155C	P25-17155D
Date Sampled	12/07/2024	12/07/2024	12/07/2024	12/07/2024
Sample Location	B25-17212P	B25-17212Q	B25-17212R	B25-17212S
Sample Depth	**	**	**	**
Material	**	**	**	**
Pinhole Dispersion Classification	ND2 Erosion resistant	ND2 Erosion resistant	ND2 Erosion resistant	ND2 Erosion resistant
Rate of Flow on completion (ml/s)	2.12	1.94	1.83	2.24
Natural Moisture Content (%)	15.9	19.2	24.7	16.8
Moisture Content Before Testing (%)	16.3	18.2	17.1	15.2
Standard Maximum Dry Density (t/m^3)	1.74	1.72	1.85	1.84
Time Matured in Cylinder (hh:mm)	46:34	48:13	24:40	48:40
Method of Moisture Determination for Remoulding	OMC	OMC	OMC	OMC
Source of Water Used	MELBOURNE TAP W	MELB tap water	Melbourne tap W	Melbourne tap w
Was Hole Reformed at 50mm Head	N	N	N	N

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Results relate only to the items tested/sampled.

Material Test Report

Report Number: **P252134-1**
Issue Number: 1
Date Issued: 11/03/2025
Client: Geotechnical Testing Services
[redacted]
Project Number: P252134
Project Name: P252992
Project Location: Bendigo
Work Request: 17155
Date Sampled: 12/07/2024
Dates Tested: 20/02/2025 - 28/02/2025
Sampling Method: Sampled by Client
The results apply to the sample as received
Location: WR#17212

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Pakenham Laboratory
[redacted]
Accredited for compliance with ISO/IEC 17025 - Testing
[redacted]
Approved Signatory: [redacted]
NATA Accredited Laboratory Number: 15357

Determination of pinhole dispersion classification of a soil (AS 1289.3.8.3)				
Sample Number	P25-17155E			
Date Sampled	12/07/2024			
Sample Location	B25-17212T			
Sample Depth	**			
Material	**			
Pinhole Dispersion Classification	ND1 Non-dispersive			
Rate of Flow on completion (ml/s)	2.56			
Natural Moisture Content (%)	14.9			
Moisture Content Before Testing (%)	17.8			
Standard Maximum Dry Density (t/m^3)	1.65			
Time Matured in Cylinder (hh:mm)	24			
Method of Moisture Determination for Remoulding	OMC			
Source of Water Used	Melbourne tap w			
Was Hole Reformed at 50mm Head	N			

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DESCRIPTIVE TERMS
BOREHOLE/EXCAVATION LOG

Classification Symbol & Soil Name

Classification of material and its description is based on the Unified Classification System as referenced in AS1726 – 1993 Geotechnical Site Investigations, Appendix A. A summary of the more common terms is included within.

Particle Size Descriptive Terms

Name	Subdivision	Size
Boulders		>200mm
Cobbles		63 – 200mm
Gravel	Coarse	20 – 63mm
	Medium	6 – 20mm
	Fine	2.36 – 6mm
Sand	Coarse	0.6 – 2.36mm
	Medium	200 – 600 micron
	Fine	75 – 200 micron
Silt		2 – 75 micron
Clay		< 2 micron

Consistency of Cohesive Soils

Term	Undrained shear strength, s_u (kPa)	Field Guide
Very Soft (VS)	<12	A finger can be pushed well into the soil with little effort
Soft (S)	12 – 25	A finger can be pushed into the soil to about 25mm depth
Firm (F)	25 – 50	The soil can be indented about 5mm with the thumb
Stiff (St)	50 – 100	The surface of the soil can be indented with the thumb
Very Stiff (VSt)	100 – 200	The surface of the soil can be indented by thumb nail
Hard (H)	>200	The surface of the soil can be marked only with the thumbnail
Friable (F)	-	Crumbles or powders when scraped by thumbnail

Density of Granular Soils

Term	Density Index (%)
Very Loose (VL)	< 15
Loose (L)	15 – 35
Medium Dense (MD)	35 – 65
Dense (D)	65 – 85
Very Dense (VD)	> 85

Minor Components

Term	Field Guide	Proportion of Minor Component In:
Trace of	Presence just detectable by feel or eye	Coarse grained soils: <5% Fine grained soils: <15%
Some	Presence easily detectable by feel or eye	Coarse grained soils: 5-12% Fine grained soils: 15-30%

Moisture Condition

Dry (D) Looks & feels dry. Cohesive soils are usually hard, powdery or friable. Granular soils run freely through the hand.

Moist (M) Soil feels cool and darkened in colour. Cohesive soils can be moulded. Granular soils tend to cohere. Free water does not form.

Wet (W) As for moist, but with free water forming on hands when remoulded.

Method

S Auger Screwing
D Auger Drilling
R Roller/tricone
W Washboring
N Natural Exposure
E Existing Excavation
B Blade/bucket
C Coring
H Hammer Drill

Support

***** Nil
C Casing
M Mud/polymer

Water

* Not observed
Observed water level (date shown)
Observed water inflow
Observed water outflow
R Refer to report for details

Notes, Samples, Tests

U63 Undisturbed sample, 63mm diameter
D Disturbed sample
N* Standard Penetration Test, (*) Sample Figure = results

Structures, Additional Observations

PP Pocket Penetrometer test (kPa)
DCP Dynamic Cone Penetrometer test (blows/100mm)

Surface

Known boundary
Probably boundary
Possible boundary

Cohuna Water Reclamation Plant
Chuggs Road, Cohuna

Geotechnical Investigation
for
Coliban Region Water Corporation

Report 24C 0548
September 2024

GTS
GEOTECHNICAL TESTING SERVICES

Cohuna Water Reclamation Plant, Chuggs Road, Cohuna

Geotechnical Investigation

for

Coliban Region Water Corporation

Revision

Revision	Date	Authorised
24C 0548	6/09/2024	[redacted]

Distribution (this revision only)

Recipient	Format	Date
GTS	On file	6/09/2024
Coliban Region Water Corporation Attn: [redacted]	Email PDF [redacted]	6/09/2024

GEOTECHNICAL | ENVIRONMENTAL | CONSTRUCTION MATERIALS TESTING

[redacted]

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3 FIELDWORK 4
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4.2 LABORATORY TEST RESULTS 6
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6 IMPORTANT NOTES ABOUT THIS REPORT 10
7 DISCLAIMER 10

APPENDIX

Borehole Locations
Engineering Logs
Laboratory Test Reports
Descriptive Terms

1 INTRODUCTION

Coliban Region Water Corporation commissioned Geotechnical Testing Services (GTS) to undertake a geotechnical investigation for the proposed development at the Cohuna Water Reclamation Plant off Chuggs Road, Cohuna.

The purpose of the investigation was to assess general subsurface conditions at the site with a view to providing comments and design parameters for the proposed development.

It shall be noted that this report covers the proposed development at Lot 2/PS428326, south of Chuggs Road. Lagoon 3 was flooded at the time of the investigation and is not included in this report.

2 SITE AND GEOLOGY

2.1 SITE LOCATION AND GENERAL CONDITIONS

The site is located at Lot 2/PS428326, on the south side of Chuggs Road, Cohuna.

The site is relatively flat and currently consists of vacant paddocks. There are few small to large sized trees across the site. At the time of the investigation, the surface of the site was moist with a moderate coverage of seeded grass. There was no visual evidence of surface cracking or natural surface rock.

2.2 GEOLOGY

The Victorian Government's online "Geovic" map shows the site to be underlain by Quaternary aged sedimentary deposits of the Shepparton Formation, with this generally confirmed by the field data.

3 FIELDWORK

The geotechnical investigation was conducted on the 1st to the 3rd of July 2024 and involved the drilling of 30 boreholes (BH) by Gemco HS7 drilling rig to termination depths of 4.0 metres. In-situ strength tests including Dynamic Cone Penetrometer (DCP) and Pocket Penetrometer (PP) tests were conducted within each of the boreholes with the results included on the engineering logs. In addition, samples of material were obtained for further laboratory analysis.

The field investigation was conducted by a technician under the direction of a Geotechnical Engineer, who logged the subsurface profile. The engineering logs are included in the Appendix with their locations shown on the enclosed site plan.

4 RESULTS

4.1 FIELD RESULTS – SOIL PROFILES

The field investigation indicated that the soil profile is relatively uniform across the site below the existing fill and may be summarised as follows:

TOPSOIL: Sandy SILT, low plasticity, brown, fine sand, stiff.
To a depth of between 0.1 to 0.15 metres
Overlying
(Sandy) Silty CLAY, low/low to medium plasticity, brown, pale brown, fine to coarse sand when present, trace fine to medium gravel when present, soft to stiff
To a depth of between 0.6 to 1.7 metres
Overlying
Silty CLAY, medium/high plasticity, pale brown, pale grey, grey, trace fine to coarse sand when present, stiff to very stiff.
To termination depths.

There are some variations to the above including the presence of Clayey Silt material in BHs 1 and 2. Therefore, reference should be made to the appended engineering logs for a full description of subsurface conditions at each location.

Groundwater inflow was encountered at various depths and locations across the site and are tabulated below:

Table 1: SWL

Location	BH3	BH7	BH14	BH19	BH20	BH21	BH23
SWL (m)	2.3	2.1	1.9	1.4	1.6	3.6	3.9

Table 1 Continued: SWL

Location	BH25	BH26	BH27	BH28	BH29	BH30
SWL (m)	3.6	3.4	3.7	3.5	1.5	3.5

4.2 LABORATORY TEST RESULTS

Samples retained from the investigation were submitted to the GTS Bendigo laboratory at the completion of the field investigation. The testing consisted of soaked CBR, Atterberg Limit and Particle Size Distribution with the results summarised in the following table with full NATA accredited reports in the Appendix.

Table 2: Material Properties

Test Location	BH1 0.5-1.0m	BH1 1.5-2.0m	BH1 2.3-3.0m	BH4 0.2-0.7m	BH4 2.5-3.0m	BH4 3.5-4.0m
% Passing 19mm Sieve	100	100	100	100	100	100
% Passing 2.36mm Sieve	99	100	98	98	100	100
% Passing 0.075mm Sieve	80	93	90	91	99	99
Liquid Limit (%)	26	45	63	48	59	44
Plastic Limit (%)	20	18	22	18	22	17
Plasticity Index (%)	6	27	41	30	37	27
Linear Shrinkage (%)	4.0	10.5	18.0	14.5	16.5	12.0
Emerson Class	4	6	4	4	6	6
Moisture Content (%)	20.7	30.1	29.4	24.1	24.4	20.6

Table 2 Continued: Material Properties

Test Location	BH7 3.5-4.0m	BH9 0.6-0.9m	BH11 0.7-1.2m	BH12 0.4-1.3m	BH14 0.1-0.9m	BH15 0.2-0.9m
% Passing 19mm Sieve	100	100	100	100	100	100
% Passing 2.36mm Sieve	100	98	100	98	99	99
% Passing 0.075mm Sieve	73	91	72	82	95	95
Liquid Limit (%)	41	42	26	31	64	44
Plastic Limit (%)	15	16	17	14	21	16
Plasticity Index (%)	26	26	9	17	43	28
Linear Shrinkage (%)	12.0	9.0	5.0	9.0	17.5	12.0
Emerson Class	5	4	4	4	4	4
Moisture Content (%)	23.9	14.3	19.2	18.4	27.3	20.3

Table 2 Continued: Material Properties

Test Location	BH18 0.1-1.0m	BH19 0.8-1.5m	BH25 0.1-0.6m	BH28 0.1-0.5m	BH29 0.5-1.2m	BH30 0.1-0.7m
% Passing 19mm Sieve	100	100	100	100	100	100
% Passing 2.36mm Sieve	98	99	99	99	100	98
% Passing 0.075mm Sieve	81	72	90	91	90	79
Liquid Limit (%)	30	25	54	40	27	31
Plastic Limit (%)	15	17	16	13	18	15
Plasticity Index (%)	15	8	38	27	9	16
Linear Shrinkage (%)	8.0	4.5	13.5	13.5	4.0	7.0
Emerson Class	4	4	4	4	6	4
Moisture Content (%)	18.5	25.5	23.0	19.4	23.7	18.6

Table 3: Permeability

Test Location	BH9 0.6-0.9m	BH12 0.4-1.3m	BH14 0.1-0.9m	BH15 0.2-0.9m	BH18 0.1-1.0m	BH25 0.1-0.6m	BH28 0.1-0.5m	BH30 0.1-0.7m
Permeability (m/s)	$5x10^{-11}$	$4x10^{-11}$	$2x10^{-10}$	$6x10^{-11}$	$2x10^{-10}$	$6x10^{-10}$	$3x10^{-10}$	$8x10^{-9}$

Table 4: Pinhole Dispersion Classification

Test Location	BH9 0.6-0.9m	BH12 0.4-1.3m	BH14 0.1-0.9m	BH15 0.2-0.9m	BH18 0.1-1.0m	BH25 0.1-0.6m	BH28 0.1-0.5m	BH30 0.1-0.7m
Dispersion Classification	D1	ND2	D1	D1	ND2	D1	D2	ND2

- D1 – Highly Dispersive
- D2 - Dispersive
- ND2 – Erosion Resistant

5 ENGINEERING RECOMMENDATIONS

It is understood that the proposed development is the construction of new wastewater storage lagoons. The site is to be used for the new lagoons and as a borrow site for relining of existing lagoons. The exact dimensions of the proposed lagoons are unknown to GTS but are expected to be excavated to depths up to 3.0 metres and additional filling for embankments. As per EPA requirements a permeability rate of less than or equal to $1x10^{-9}$ m/s in the top 300 to 600mm of the lagoon base and walls is required.

Based on the results of the investigation and laboratory testing, the material at the site is slightly variable with low plasticity clays and silts in the upper profile to depths around 1.5m in most locations overlying medium to high plasticity clays. In some areas, medium to high plasticity clay were encountered at depths just below the topsoil.

Remoulded permeability testing was conducted on a range of samples across the site and returned results of between $8x10^{-9}$m/s to $6x10^{-11}$m/s. The medium and high plastic clays across the site meet the required permeability rate of $1x10^{-9}$m/s, whilst the low plastic clays/silts do not meet the required permeability rate.

Further to the permeability of the materials across the site, the dispersiveness was tested. From the Emerson Class testing, the low, medium and high plastic clays were generally non-dispersive with Emerson Class values of 4 or greater. In addition, pinhole dispersion testing was conducted which indicated that the low plasticity clays are Erosion Resistant (ND2), with the medium plastic clays Dispersive (D2) and the high plastic clays Highly Dispersive (D1).

The medium and high plastic clays will require stabilisation to ensure protection against erosion, especially, on the exposed banks. The following may be incorporated to stabilise the medium and high plastic clays:

- Chemically stabilise the material with lime or gypsum.
- Vegetate slopes with topsoil or geosynthetic matting to control runoff.
- Increase batter slopes to reduce runoff speed.

Based on the Permeability, Emerson Class and Pinhole dispersion testing the medium and high plastic clays present across the site are suitable for the embankments and base of wastewater lagoons. This material is generally below the topsoil (0.1 to 0.2 metres) along the south and east sides of the Lot and below 1.5 to 2.0 metres along the north and west sides of the Lot (BHs 1 to 3, 11, 12, 18 to 22 and 27 to 30).

For construction of the wastewater lagoons, it is expected to be excavated a minimum of 3 metres below existing surface level. Therefore, the following earthworks procedure shall be undertaken to achieve a clay lined lagoon:

- Excavate any topsoil/silt material in the vegetative zone (approximately 100mm in depth) and stockpiled separately.
- The lagoon should be excavated to design levels, accounting for a minimum clay liner thickness of 300mm over the base and pond walls. Pending the location of the lagoons, the clay liner will be required in the upper 2.0 metres (see above). The medium and high plasticity Silty Clay shall be stockpile separately to the low plasticity clays.

- All batters should not exceed a 3:1 (H:V) slope.
- For the walls and base in the medium and high plastic clays, they should be ripped a depth of 300mm, moisture conditioned to within 2% of optimum moisture content (OMC) and compacted to achieve a minimum density ratio of 98% standard (AS1289 5.1.1, 5.4.1 or 5.7.1)
- For the walls above 2.0 metres in the proximity of the low plastic clays (see above), a clay liner is required. Prior to placing the clay liner, the exposed base/walls shall be compacted with a pad foot roller to create a rough surface to bind the liner material. Suitable site won material (medium and high plastic clays) may then be placed in loose layers no greater than 200mm, moisture conditioned to within 2% OMC and compacted with a vibrating pad foot roller to achieve a minimum density ratio of 98% standard.
- The compacted thickness of each layer shall not exceed 150mm and also be appropriate to the size of the compaction equipment in order for satisfactory compaction to be achieved. In between layers, the surface should be finished with a pad foot roller or tyned a depth of 50mm so that the subsequent layer may bind.
- Once a minimum thickness of 300mm has been achieved, the finished surface shall be finished with a smooth drum roller or grader to achieve finished surface levels and satisfactory drainage of the site.

On completion of the construction, the topsoil material may be spread over the banks to aid in re-vegetation and prevent erosion. For internal storage areas subject to wave motion of filling points, it is recommended that beaching rock or concrete apron be placed to prevent erosion of the soil from the movement of water. In addition, due to the potentially dispersive nature of the material, stabilisation of the base and internal walls through gypsum, geofabrics or other methods may be required.

Additional permeability testing may be required in the base of the constructed clay liner to ensure a permeability rate of $1x10^{-9}$ has been achieved during construction to meet EPA requirements.

It is expected that excavation at the site will be readily achieved using conventional heavy earthmoving machinery to the required design levels in the sandy/silty clay profile.

It is noted that some boreholes encountered shallow/perched groundwater. As such, provisions/methods for dealing with the groundwater during construction will be required.

If the Silty Clay material is exposed during construction, should it become wet, it will be slippery and difficult to traffic. As such, crushed rock will be required in trafficked areas to ensure access remains available. Alternatively, during dry weathered, this material will dust up on the surface under traffic, therefore, dust controls measures such as water truck or crushed rock surfacing will be required.

6 IMPORTANT NOTES ABOUT THIS REPORT

The results from this investigation relate to the specified sites labelled throughout this document, and hence the information obtained may need to be extrapolated to the rest of the designated area. While care has been taken throughout this investigation, soil conditions can vary between each individual test site and at depths greater than that drilled during this investigation. Hence, if variations from this report are found during excavations/construction then Geotechnical Testing Services should be notified so it can be assessed and appropriate advice provided.

The soil colours provided in the borelogs attached may vary with soil moisture content and individual interpretation, therefore colour alone should not be used to identify these soils.

Strength characteristics of soils often exhibit a large variation between wet and dry conditions. Soil characteristics of a soil profile are given on the soil conditions at the time of the investigation.

7 DISCLAIMER

This investigation has been carried out in goodwill and under the instructions of Coliban Region Water Corporation. The investigation has been undertaken with the care and skill of competent personnel as defined within Geotechnical Testing Services quality system. It is not a comprehensive investigation but a guide to the conditions throughout the designated area.

This document has been prepared for Coliban Region Water Corporation and hence no responsibility or liability is being accepted to any third party, where any part of the report is used in either isolation or without consideration of the whole document. This document is not appropriate where there has been a significant change in the project or either for the specific needs of the reader.

Please, don't hesitate to contact the undersigned, if you require any further information or assistance.

Prepared by

[redacted]

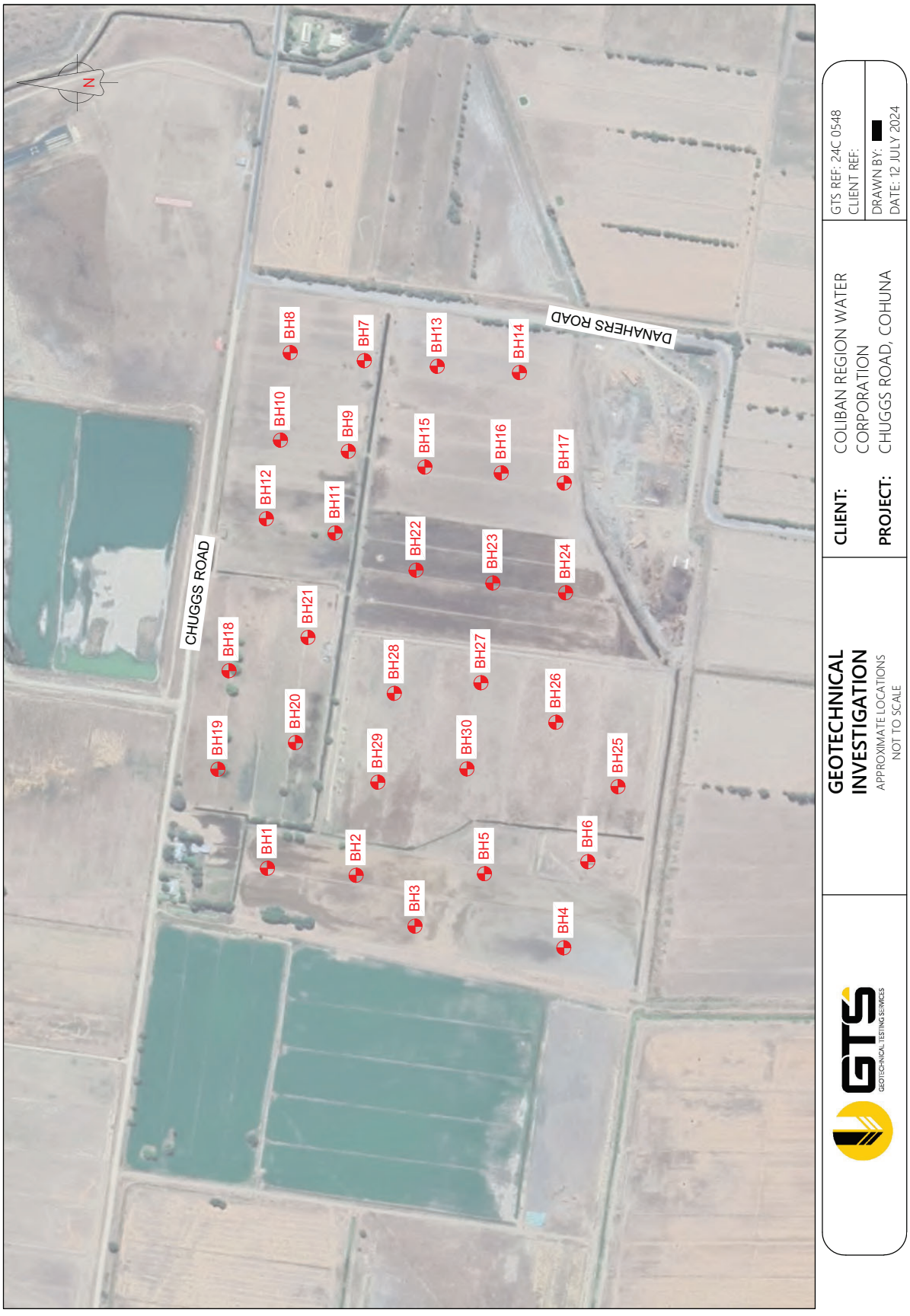
Graduate Geotechnical Engineer

Reviewed by

[redacted]

Principal Geotechnical Engineer

APPENDIX


N
CHUGGS ROAD
DANAHERS ROAD
BH1
BH2
BH3
BH4
BH5
BH6
BH7
BH8
BH9
BH10
BH11
BH12
BH13
BH14
BH15
BH16
BH17
BH18
BH19
BH20
BH21
BH22
BH23
BH24
BH25
BH26
BH27
BH28
BH29
BH30
GEOTECHNICAL INVESTIGATION
APPROXIMATE LOCATIONS
NOT TO SCALE
GTS
GEOTECHNICAL TESTING SERVICES
CLIENT: COLIBAN REGION WATER CORPORATION
PROJECT: CHUGGS ROAD, COHUNA
GTS REF: 24C 0548
CLIENT REF:
DRAWN BY: [redacted]
DATE: 12 JULY 2024

GTS - Bendigo

[redacted]

Geotechnical Log - Borehole

1

UTM	:	**Drill Rig**	: Gemco HS7 - Trailer Mount
Easting (m)	: 0.00	**Driller Supplier**	:
Northing (m)	: 0.00	**Logged By**	: PR
Ground Elevation	: Not Surveyed	**Reviewed By**	:
Total Depth	: 4 m BGL	**Date**	: 01/07/2024
Job Number	: 24C 0548		
Client	: Coliban Region Water Corporation		
Project	: Geotechnical Investigation - Cohuna WTP		
Location	: Chuggs Road, Cohuna VIC		
Loc Comment	:		

Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Weathering	Consistency	Testing: DCP	Testing: PP (kPa)	Testing: SPT	Remarks
	0.1	TOPSOIL		SM	Sandy SILT SM: stiff, low plasticity, brown, fine grained sand, moist.	M		St				
		Natural		Cl	Silty CLAY Cl: soft to firm, medium plasticity, brown, trace fine grained sand, moist.	M		S-F	2			
	0.5								2			
		Natural		ML	Clayey SILT ML: soft to firm, low plasticity, pale grey, with fine grained sand, wet to moist.	W-M		S-F	2			
									1			
									1			
									2			
									1			
									0			
									1			
									3			
	1.4	Natural		Cl	Silty CLAY Cl: soft to firm, medium plasticity, pale brown mottled grey, trace fine to coarse grained sand, moist.	M		S-F				
	2.3	Natural		CH	Silty CLAY CH: stiff to very stiff, high plasticity, pale brown mottled grey, trace fine to coarse grained sand, moist.	M		St-VSt				
					1 Terminated at 4m							

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GTS - Bendigo

[redacted]

Geotechnical Log - Borehole

2

UTM	:	**Drill Rig**	: Gemco HS7 - Trailer Mount	**Job Number**	: 24C 0548
Easting (m)	: 0.00	**Driller Supplier**	:	**Client**	: Coliban Region Water Corporation
Northing (m)	: 0.00	**Logged By**	: PR	**Project**	: Geotechnical Investigation - Cohuna WTP
Ground Elevation	: Not Surveyed	**Reviewed By**	:	**Location**	: Chuggs Road, Cohuna VIC
Total Depth	: 4 m BGL	**Date**	: 01/07/2024	**Loc Comment**	:

Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Weathering	Consistency	Testing: DCP	Testing: PP (kPa)	Testing: SPT	Remarks
	0.1	TOPSOIL		SM	Sandy SILT SM: stiff, low plasticity, brown, fine grained sand, moist.	M		St				
		Natural		Cl	Silty CLAY Cl: soft, medium plasticity, brown, trace fine grained sand, moist.	M		S	1			
	0.5								2			
		Natural		ML	Clayey SILT ML: soft, low plasticity, pale brown, with fine grained sand, wet to moist.	W-M		S	2			
									2			
									1			
									1			
									1			
									2			
									3			
	1.3											
		Natural		CH	Silty CLAY CH: stiff to very stiff, high plasticity, pale brown mottled grey, trace fine grained sand, moist.	M		St-VSt				
					2 Terminated at 4m							

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GTS - Bendigo

[redacted]

Geotechnical Log - Borehole

3

UTM	:	**Drill Rig**	: Gemco HS7 - Trailer Mount	**Job Number**	: 24C 0548
Easting (m)	: 0.00	**Driller Supplier**	:	**Client**	: Coliban Region Water Corporation
Northing (m)	: 0.00	**Logged By**	: PR	**Project**	: Geotechnical Investigation - Cohuna WTP
Ground Elevation	: Not Surveyed	**Reviewed By**	:	**Location**	: Chuggs Road, Cohuna VIC
Total Depth	: 4 m BGL	**Date**	: 01/07/2024	**Loc Comment**	:

Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Weathering	Consistency	Testing: DCP	Testing: PP (kPa)	Testing: SPT	Remarks
	0.1	TOPSOIL		SM	Sandy SILT SM: stiff, low plasticity, brown, fine grained sand, moist.	M		St				
		Natural		Cl	Silty CLAY Cl: firm, medium plasticity, brown, trace fine grained sand, moist.	M		F				
	0.4								2			
		Natural		CL	Silty to sandy CLAY CL: firm to stiff, low plasticity, pale brown, fine to coarse grained sand, moist.	M		F-St	2			
									3			
									2			
									3			
									3			
									4			
	1.6	Natural		CH	Silty CLAY CH: stiff to very stiff, high plasticity, pale brown mottled grey, trace fine to medium sized gravel, trace fine to coarse grained sand, moist.	M		St-VSt				
SWL												
	3.4	Natural		CH	As above, but wet.	W		St-VSt				
					3 Terminated at 4m							

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GTS - Bendigo

[redacted]

Geotechnical Log - Borehole

4

UTM	:	**Drill Rig**	: Gemco HS7 - Trailer Mount
Easting (m)	: 0.00	**Driller Supplier**	:
Northing (m)	: 0.00	**Logged By**	: PR
Ground Elevation	: Not Surveyed	**Reviewed By**	:
Total Depth	: 4 m BGL	**Date**	: 01/07/2024

Job Number	: 24C 0548
Client	: Coliban Region Water Corporation
Project	: Geotechnical Investigation - Cohuna WTP
Location	: Chuggs Road, Cohuna VIC
Loc Comment	:

Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Weathering	Consistency	Testing: DCP	Testing: PP (kPa)	Testing: SPT	Remarks
	0.1	TOPSOIL		SM	Sandy SILT SM: stiff, low plasticity, brown, fine grained sand, moist.	M		St				
		Natural		CI-CH	Silty CLAY CI-CH: stiff to very stiff, medium to high plasticity, grey, trace fine to coarse grained sand, moist.	M		St-VSt	1			
									2			
									3			
									3			
									6			
									6			
									6			
	1.3	Natural		CH	Silty CLAY CH: very stiff, high plasticity, pale brown mottled grey, moist.	M		VSt				
	3.2	Natural		CI	Silty CLAY CI: stiff, medium plasticity, pale grey mottled pale brown, moist.	M		St				
					4 Terminated at 4m							

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GTS - Bendigo [redacted]

Geotechnical Log - Borehole

5

UTM	:	Drill Rig	: Gemco HS7 - Trailer Mount	Job Number	: 24C 0548
Easting (m)	: 0.00	Driller Supplier	:	Client	: Coliban Region Water Corporation
Northing (m)	: 0.00	Logged By	: PR	Project	: Geotechnical Investigation - Cohuna WTP
Ground Elevation	: Not Surveyed	Reviewed By	:	Location	: Chuggs Road, Cohuna VIC
Total Depth	: 4 m BGL	Date	: 01/07/2024	Loc Comment	:

Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Weathering	Consistency	Testing: DCP	Testing: PP (kPa)	Testing: SPT	Remarks
	0.1	TOPSOIL		SM	Sandy SILT SM: stiff, low plasticity, brown, fine grained sand, moist.	M		St				
		Natural		CH	Silty CLAY CH: firm to stiff, high plasticity, grey, trace fine grained sand, moist.	M		F-St	3			
									3			
									3			
	0.7								4			
		Natural		CI-CH	Silty CLAY CI-CH: stiff, medium to high plasticity, pale brown, trace fine grained sand, moist.	M		St	4			
									3			
									5			
	2.3	Natural		CH	Silty CLAY CH: very stiff, high plasticity, pale brown mottled grey, trace fine grained sand, moist.	M		VSt				
	2.8	Natural		CI	Silty to sandy CLAY CI: stiff to very stiff, medium plasticity, pale grey mottled pale brown, fine grained sand, moist.	M		St-VSt				
					5 Terminated at 4m							

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GTS - Bendigo

[redacted]

Geotechnical Log - Borehole

6

UTM	:	Drill Rig	: Gemco HS7 - Trailer Mount	Job Number	: 24C 0548
Easting (m)	: 0.00	Driller Supplier	:	Client	: Coliban Region Water Corporation
Northing (m)	: 0.00	Logged By	: PR	Project	: Geotechnical Investigation - Cohuna WTP
Ground Elevation	: Not Surveyed	Reviewed By	:	Location	: Chuggs Road, Cohuna VIC
Total Depth	: 4 m BGL	Date	: 01/07/2024	Loc Comment	:

Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Weathering	Consistency	Testing: DCP	Testing: PP (kPa)	Testing: SPT	Remarks
	0.1	TOPSOIL		SM	Sandy SILT SM: stiff, low plasticity, brown, fine grained sand, moist.	M		St				
		Natural		CH	Silty CLAY CH: stiff, high plasticity, pale brown, trace fine grained sand, moist.	M		St	3			
									3			
									4			
									5			
									6			
									5			
									6			
	1.7	Natural		CH	Silty CLAY CH: very stiff, high plasticity, pale brown mottled grey, trace fine grained sand, moist.	M		VSt				
	3.2	Natural		CI-CH	Silty to sandy CLAY CI-CH: very stiff, medium to high plasticity, pale grey mottled pale brown, moist.	M		VSt				
					6 Terminated at 4m							

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GTS - Bendigo

[redacted]

Geotechnical Log - Borehole

7

UTM	:	**Drill Rig**	: Gemco HS7 - Trailer Mount	**Job Number**	: 24C 0548
Easting (m)	: 0.00	**Driller Supplier**	:	**Client**	: Coliban Region Water Corporation
Northing (m)	: 0.00	**Logged By**	: PR	**Project**	: Geotechnical Investigation - Cohuna WTP
Ground Elevation	: Not Surveyed	**Reviewed By**	:	**Location**	: Chuggs Road, Cohuna VIC
Total Depth	: 4 m BGL	**Date**	: 01/07/2024	**Loc Comment**	:

Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Weathering	Consistency	Testing: DCP	Testing: PP (kPa)	Testing: SPT	Remarks
	0.1	TOPSOIL		SM	Sandy SILT SM: stiff, low plasticity, brown, fine grained sand, moist.	M		St				
		Natural		CH	Silty CLAY CH: stiff, high plasticity, grey, trace fine grained sand, moist.	M		St	3			
									3			
	0.6								3			
		Natural		CI-CH	Silty CLAY CI-CH: stiff, medium to high plasticity, pale brown, trace fine grained sand, moist.	M		St	2			
									3			
									3			
SWL									5			
	2.8	Natural		CI	Silty CLAY CI: very stiff, medium plasticity, pale brown mottled grey, with fine to coarse grained sand, moist.	M		VSt		300		
	3.5	Natural		CI	As above, but wet.	W		VSt		375		
					7 Terminated at 4m							

GTS - Bendigo

[redacted]

Geotechnical Log - Borehole

8

UTM	:	**Drill Rig**	: Gemco HS7 - Trailer Mount	**Job Number**	: 24C 0548
Easting (m)	: 0.00	**Driller Supplier**	:	**Client**	: Coliban Region Water Corporation
Northing (m)	: 0.00	**Logged By**	: PR	**Project**	: Geotechnical Investigation - Cohuna WTP
Ground Elevation	: Not Surveyed	**Reviewed By**	:	**Location**	: Chuggs Road, Cohuna VIC
Total Depth	: 4 m BGL	**Date**	: 01/07/2024	**Loc Comment**	:

Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Weathering	Consistency	Testing: DCP	Testing: PP (kPa)	Testing: SPT	Remarks
		TOPSOIL		SM	Sandy SILT SM: stiff, low plasticity, brown, fine to coarse grained sand, moist.	M		St				
	0.1	Natural		CH	Silty CLAY CH: firm to stiff, high plasticity, grey, trace fine grained sand, moist.	M		F-St	1			
									1			
									2			
									3			
	0.8								3			
		Natural		CI-CH	Silty CLAY CI-CH: stiff, medium to high plasticity, pale brown, trace fine grained sand, moist.	M		St	7			
									8			
	2.7	Natural		CI-CH	Silty to sandy CLAY CI-CH: very stiff, medium to high plasticity, pale brown mottled grey, fine to medium grained sand, moist.	M		VSt		350		
					8 Terminated at 4m					400		

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GTS - Bendigo

[redacted]

Geotechnical Log - Borehole

9

UTM	:	**Drill Rig**	: Gemco HS7 - Trailer Mount	**Job Number**	: 24C 0548
Easting (m)	: 0.00	**Driller Supplier**	:	**Client**	: Coliban Region Water Corporation
Northing (m)	: 0.00	**Logged By**	: PR	**Project**	: Geotechnical Investigation - Cohuna WTP
Ground Elevation	: Not Surveyed	**Reviewed By**	:	**Location**	: Chuggs Road, Cohuna VIC
Total Depth	: 4 m BGL	**Date**	: 01/07/2024	**Loc Comment**	:

Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Weathering	Consistency	Testing: DCP	Testing: PP (kPa)	Testing: SPT	Remarks
	0.15	TOPSOIL		SM	Sandy SILT SM: stiff, low plasticity, brown, fine grained sand, moist.	M		St				
		Natural		CH	Silty CLAY CH: stiff to very stiff, high plasticity, grey, trace fine grained sand, moist.	M		St-VSt	3			
									5			
	0.6								9			
		Natural		CI	Silty CLAY CI: very stiff, medium plasticity, pale brown, trace fine to coarse grained sand, moist.	M		VSt	17			
									20+			
	1.6	Natural		CH	Silty CLAY CH: stiff, high plasticity, pale brown mottled grey, trace fine grained sand, moist.	M		St		350		
					9 Terminated at 4m					450		

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GTS - Bendigo

[redacted]

Geotechnical Log - Borehole

10

UTM	:	**Drill Rig**	: Gemco HS7 - Trailer Mount	**Job Number**	: 24C 0548
Easting (m)	: 0.00	**Driller Supplier**	:	**Client**	: Coliban Region Water Corporation
Northing (m)	: 0.00	**Logged By**	: PR	**Project**	: Geotechnical Investigation - Cohuna WTP
Ground Elevation	: Not Surveyed	**Reviewed By**	:	**Location**	: Chuggs Road, Cohuna VIC
Total Depth	: 4 m BGL	**Date**	: 02/07/2024	**Loc Comment**	:

Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Weathering	Consistency	Testing: DCP	Testing: PP (kPa)	Testing: SPT	Remarks
	0.1	TOPSOIL		SM	Sandy SILT SM: stiff, low plasticity, brown, fine grained sand, moist.	M		St				
		Natural		CI-CH	Silty CLAY CI-CH: stiff, medium to high plasticity, grey, trace fine grained sand, moist.	M		St	1 2 2			
	0.6	Natural		CH	Silty CLAY CH: stiff to very stiff, high plasticity, pale brown, trace fine sized gravel, trace fine to coarse grained sand, moist.	M		St-VSt	4 8 8 5			
	1.8	Natural		CH	Silty CLAY CH: stiff to very stiff, high plasticity, pale brown mottled grey, trace fine grained sand, moist.	M		St-VSt		250 280		

10 Terminated at 4m

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[redacted]

Geotechnical Log - Borehole

11

UTM	:	**Drill Rig**	: Gemco HS7 - Trailer Mount	**Job Number**	: 24C 0548
Easting (m)	: 0.00	**Driller Supplier**	:	**Client**	: Coliban Region Water Corporation
Northing (m)	: 0.00	**Logged By**	: PR	**Project**	: Geotechnical Investigation - Cohuna WTP
Ground Elevation	: Not Surveyed	**Reviewed By**	:	**Location**	: Chuggs Road, Cohuna VIC
Total Depth	: 4 m BGL	**Date**	: 02/07/2024	**Loc Comment**	:

Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Weathering	Consistency	Testing: DCP	Testing: PP (kPa)	Testing: SPT	Remarks
	0	TOPSOIL		SM	Sandy SILT SM: stiff, low plasticity, brown, fine grained sand, moist.	M		St				
	0.15	Natural		CL-CI	Silty CLAY CL-CI: firm to stiff, low to medium plasticity, brown, with fine grained sand, moist.	M		F-St	2			
	0.4	Natural		CL	Silty CLAY CL: firm to stiff, low plasticity, pale brown, with fine to coarse grained sand, moist.	M		F-St	4 4 2 3 2 3			
	1.3	Natural		CH	Silty CLAY CH: firm to stiff, high plasticity, pale brown mottled grey, trace fine grained sand, moist.	M		F-St		280		
					11 Terminated at 4m					280		

GTS - Bendigo [redacted]

Geotechnical Log - Borehole

12

UTM	:	Drill Rig	: Gemco HS7 - Trailer Mount	Job Number	: 24C 0548
Easting (m)	: 0.00	Driller Supplier	:	Client	: Coliban Region Water Corporation
Northing (m)	: 0.00	Logged By	: PR	Project	: Geotechnical Investigation - Cohuna WTP
Ground Elevation	: Not Surveyed	Reviewed By	:	Location	: Chuggs Road, Cohuna VIC
Total Depth	: 4 m BGL	Date	: 02/07/2024	Loc Comment	:

Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Weathering	Consistency	Testing: DCP	Testing: PP (kPa)	Testing: SPT	Remarks
	0.1	TOPSOIL		SM	Sandy SILT SM: stiff, low plasticity, brown, fine grained sand, moist.	M		St				
		Natural		CL	Silty CLAY CL: firm, low plasticity, brown, with fine grained sand, moist.	M		F				
	0.4								2			
		Natural		CL	Silty CLAY CL: stiff, low plasticity, pale brown, with fine grained sand, moist.	M		St	2			
									3			
									2			
									3			
									4			
									3			
	1.3											
		Natural		CH	Silty CLAY CH: stiff, high plasticity, pale brown mottled grey, trace fine grained sand, moist.	M		St				
										200		
										245		
					12 Terminated at 4m							

GTS - Bendigo [redacted]

Geotechnical Log - Borehole

13

UTM	:	**Drill Rig**	: Gemco HS7 - Trailer Mount	**Job Number**	: 24C 0548
Easting (m)	: 0.00	**Driller Supplier**	:	**Client**	: Coliban Region Water Corporation
Northing (m)	: 0.00	**Logged By**	: PR	**Project**	: Geotechnical Investigation - Cohuna WTP
Ground Elevation	: Not Surveyed	**Reviewed By**	:	**Location**	: Chuggs Road, Cohuna VIC
Total Depth	: 4 m BGL	**Date**	: 02/07/2024	**Loc Comment**	:

Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Weathering	Consistency	Testing: DCP	Testing: PP (kPa)	Testing: SPT	Remarks
	0.1	TOPSOIL		SM	Sandy SILT SM: stiff, low plasticity, brown, fine grained sand, moist.	M		St				
		Natural		CH	Silty CLAY CH: soft to firm, high plasticity, grey, trace fine grained sand, moist.	M		S-F	2			
									1			
	0.6								1			
		Natural		CH	Silty CLAY CH: stiff, high plasticity, pale brown, trace fine to medium grained sand, moist.	M		St	3			
									5			
									6			
									7			
	1.8	Natural		CH	Silty CLAY CH: stiff to very stiff, high plasticity, pale brown mottled grey, trace fine grained sand, moist.	M		St-VSt				
										275		
	3.5	Natural		CI	Sandy CLAY CI: stiff to very stiff, medium plasticity, pale brown mottled grey, fine to coarse grained sand, moist.	M		St-VSt				
										250		

13 Terminated at 4m

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Geotechnical Log - Borehole

14

UTM	:	**Drill Rig**	: Gemco HS7 - Trailer Mount	**Job Number**	: 24C 0548
Easting (m)	: 0.00	**Driller Supplier**	:	**Client**	: Coliban Region Water Corporation
Northing (m)	: 0.00	**Logged By**	: PR	**Project**	: Geotechnical Investigation - Cohuna WTP
Ground Elevation	: Not Surveyed	**Reviewed By**	:	**Location**	: Chuggs Road, Cohuna VIC
Total Depth	: 4 m BGL	**Date**	: 02/07/2024	**Loc Comment**	:

Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Weathering	Consistency	Testing: DCP	Testing: PP (kPa)	Testing: SPT	Remarks
	0.1	TOPSOIL		SM	Sandy SILT SM: stiff, low plasticity, brown, coarse grained sand, moist.	M		St				
		Natural		CH	Silty CLAY CH: firm to stiff, high plasticity, grey, moist.	M		F-St	2			
									2			
									2			
									2			
									3			
	0.9								3			
SWL		Natural		CH	Silty CLAY CH: stiff, high plasticity, pale brown, trace fine to coarse grained sand, moist.	M		St	3			
	2.3	Natural		CH	Silty CLAY CH: very stiff, high plasticity, pale brown mottled grey, trace fine grained sand, moist.	M		VSt		250		
	3.2	Natural		CH	As above, but wet.	W		VSt				
					14 Terminated at 4m					420		

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Geotechnical Log - Borehole

15

UTM	:	**Drill Rig**	: Gemco HS7 - Trailer Mount
Easting (m)	: 0.00	**Driller Supplier**	:
Northing (m)	: 0.00	**Logged By**	: PR
Ground Elevation	: Not Surveyed	**Reviewed By**	:
Total Depth	: 4 m BGL	**Date**	: 02/07/2024

Job Number	: 24C 0548
Client	: Coliban Region Water Corporation
Project	: Geotechnical Investigation - Cohuna WTP
Location	: Chuggs Road, Cohuna VIC
Loc Comment	:

Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Weathering	Consistency	Testing: DCP	Testing: PP (kPa)	Testing: SPT	Remarks
	0.1	TOPSOIL		SM	Sandy SILT SM: stiff, low plasticity, brown, fine grained sand, moist.	M		St				
		Natural		Cl	Silty CLAY Cl: stiff to very stiff, medium plasticity, brown, moist.	M		St-VSt	2			
									3			
									4			
									5			
									7			
									4			
									5			
	2.3	Natural		CH	Silty CLAY CH: very stiff, high plasticity, pale brown mottled grey, trace fine grained sand, moist.	M		VSt		220		
					15 Terminated at 4m					230		

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Geotechnical Log - Borehole

16

UTM	:	**Drill Rig**	: Gemco HS7 - Trailer Mount	**Job Number**	: 24C 0548
Easting (m)	: 0.00	**Driller Supplier**	:	**Client**	: Coliban Region Water Corporation
Northing (m)	: 0.00	**Logged By**	: PR	**Project**	: Geotechnical Investigation - Cohuna WTP
Ground Elevation	: Not Surveyed	**Reviewed By**	:	**Location**	: Chuggs Road, Cohuna VIC
Total Depth	: 4 m BGL	**Date**	: 02/07/2024	**Loc Comment**	:

Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Weathering	Consistency	Testing: DCP	Testing: PP (kPa)	Testing: SPT	Remarks
	0.1	TOPSOIL		SM	Sandy SILT SM: stiff, low plasticity, brown, fine grained sand, moist.	M		St				
		Natural		CH	Silty CLAY CH: stiff, high plasticity, brown, trace fine grained sand, moist.	M		St	3			
									2			
	0.6								5			
		Natural		CH	Silty CLAY CH: stiff, high plasticity, pale brown, trace fine to medium sized gravel, trace fine grained sand, moist.	M		St	3			
									4			
									4			
									5			
	1.7	Natural		CH	Silty CLAY CH: stiff, high plasticity, pale brown mottled grey, trace fine grained sand, moist.	M		St		250		
					16 Terminated at 4m					330		

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Geotechnical Log - Borehole

17

UTM	:	Drill Rig	: Gemco HS7 - Trailer Mount	Job Number	: 24C 0548
Easting (m)	: 0.00	Driller Supplier	:	Client	: Coliban Region Water Corporation
Northing (m)	: 0.00	Logged By	: PR	Project	: Geotechnical Investigation - Cohuna WTP
Ground Elevation	: Not Surveyed	Reviewed By	:	Location	: Chuggs Road, Cohuna VIC
Total Depth	: 4 m BGL	Date	: 02/07/2024	Loc Comment	:

Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Weathering	Consistency	Testing: DCP	Testing: PP (kPa)	Testing: SPT	Remarks
	0.1	TOPSOIL		SM	Sandy SILT SM: stiff, low plasticity, brown, fine grained sand, moist.	M		St				
		Natural		CH	Silty CLAY CH: stiff, high plasticity, brown, trace fine grained sand, moist.	M		St	5			
									5			
	0.6								7			
		Natural		CH	Silty CLAY CH: stiff, high plasticity, pale brown, trace fine grained sand, moist.	M		St	4			
									2			
									3			
	1.2								4			
		Natural		CH	Silty CLAY CH: stiff, high plasticity, pale brown mottled grey, trace fine grained sand, moist.	M		St				
										300		
					17 Terminated at 4m					375		

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Geotechnical Log - Borehole

18

UTM	:	**Drill Rig**	: Gemco HS7 - Trailer Mount	**Job Number**	: 24C 0548
Easting (m)	: 0.00	**Driller Supplier**	:	**Client**	: Coliban Region Water Corporation
Northing (m)	: 0.00	**Logged By**	: PR	**Project**	: Geotechnical Investigation - Cohuna WTP
Ground Elevation	: Not Surveyed	**Reviewed By**	:	**Location**	: Chuggs Road, Cohuna VIC
Total Depth	: 4 m BGL	**Date**	: 02/07/2024	**Loc Comment**	:

Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Weathering	Consistency	Testing: DCP	Testing: PP (kPa)	Testing: SPT	Remarks
	0.1	TOPSOIL		SM	Sandy SILT SM: stiff, low plasticity, brown, fine grained sand, moist.	M		St				
		Natural		CL	Silty CLAY CL: firm to stiff, low plasticity, pale brown, with fine to coarse grained sand, moist.	M		F-St	2 1 2 1 2 2 3 4			
	1.1	Natural		CH	Silty CLAY CH: stiff to very stiff, high plasticity, pale brown mottled grey, trace fine grained sand, moist.	M		St-VSt		250 350		
					18 Terminated at 4m							

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Geotechnical Log - Borehole

19

UTM	:	**Drill Rig**	: Gemco HS7 - Trailer Mount	**Job Number**	: 24C 0548
Easting (m)	: 0.00	**Driller Supplier**	:	**Client**	: Coliban Region Water Corporation
Northing (m)	: 0.00	**Logged By**	: PR	**Project**	: Geotechnical Investigation - Cohuna WTP
Ground Elevation	: Not Surveyed	**Reviewed By**	:	**Location**	: Chuggs Road, Cohuna VIC
Total Depth	: 4 m BGL	**Date**	: 03/07/2024	**Loc Comment**	:

Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Weathering	Consistency	Testing: DCP	Testing: PP (kPa)	Testing: SPT	Remarks
	0.1	TOPSOIL		SM	Sandy SILT SM: stiff, low plasticity, brown, fine grained sand, moist.	M		St				
		Natural		CL-CI	Silty CLAY CL-CI: firm, low to medium plasticity, brown, with fine grained sand, moist.	M		F	4 2 3			
	0.6	Natural		CL	Sandy CLAY CL: firm, low plasticity, pale brown, fine grained sand, moist.	M		F	2 2			
	0.8	Natural		CL	Silty CLAY CL: firm to stiff, low plasticity, pale brown, with fine to coarse grained sand, wet.	W		F-St	3 3			
SWL	1.3	Natural		CL-CI	Sandy CLAY CL-CI: soft, low to medium plasticity, dark brown, fine grained sand, wet to moist.	W-M		S				
	1.7	Natural		CH	Silty CLAY CH: stiff, high plasticity, pale brown mottled grey, trace fine grained sand, moist.	M		St		190		
					19 Terminated at 4m					250		

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Geotechnical Log - Borehole

20

UTM	:	**Drill Rig**	: Gemco HS7 - Trailer Mount	**Job Number**	: 24C 0548
Easting (m)	: 0.00	**Driller Supplier**	:	**Client**	: Coliban Region Water Corporation
Northing (m)	: 0.00	**Logged By**	: PR	**Project**	: Geotechnical Investigation - Cohuna WTP
Ground Elevation	: Not Surveyed	**Reviewed By**	:	**Location**	: Chuggs Road, Cohuna VIC
Total Depth	: 4 m BGL	**Date**	: 03/07/2024	**Loc Comment**	:

Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Weathering	Consistency	Testing: DCP	Testing: PP (kPa)	Testing: SPT	Remarks
	0.1	TOPSOIL		SM	Sandy SILT SM: stiff, low plasticity, brown, fine grained sand, moist.	M		St				
		Natural		Cl	Silty CLAY Cl: stiff, medium plasticity, brown, with fine grained sand, moist.	M		St	2			
	0.5								3			
		Natural		CL	Silty CLAY CL: firm to stiff, low plasticity, pale brown, with fine grained sand, trace fine to medium sized gravel, moist.	M		F-St	2			
									2			
									2			
									3			
									3			
	1.3	Natural		CH	Silty CLAY CH: stiff, high plasticity, pale brown mottled grey, trace fine grained sand, moist.	M		St				
SWL												
	3	Natural		CH	As above, but wet.	W		St		150		
					20 Terminated at 4m					150		

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Geotechnical Log - Borehole

21

UTM	:	**Drill Rig**	: Gemco HS7 - Trailer Mount	**Job Number**	: 24C 0548
Easting (m)	: 0.00	**Driller Supplier**	:	**Client**	: Coliban Region Water Corporation
Northing (m)	: 0.00	**Logged By**	: PR	**Project**	: Geotechnical Investigation - Cohuna WTP
Ground Elevation	: Not Surveyed	**Reviewed By**	:	**Location**	: Chuggs Road, Cohuna VIC
Total Depth	: 4 m BGL	**Date**	: 03/07/2024	**Loc Comment**	:

Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Weathering	Consistency	Testing: DCP	Testing: PP (kPa)	Testing: SPT	Remarks
	0.1	TOPSOIL		SM	Sandy SILT SM: stiff, low plasticity, brown, fine grained sand, moist.	M		St				
		Natural		CL-CI	Silty CLAY CL-CI: firm, low to medium plasticity, brown, with fine grained sand, moist.	M		F				
	0.4								3			
		Natural		CL	Sandy CLAY CL: firm to stiff, low plasticity, pale brown, fine grained sand, moist.	M		F-St	3			
									2			
									3			
									2			
									2			
									2			
									3			
	1.2	Natural		CH	Silty CLAY CH: stiff, high plasticity, pale brown mottled grey, trace fine grained sand, moist.	M		St				
										200		
	3.5	Natural		CH	As above, but wet.	W		St				
SWL										250		
					21 Terminated at 4m							

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Geotechnical Log - Borehole

22

UTM	:	**Drill Rig**	: Gemco HS7 - Trailer Mount	**Job Number**	: 24C 0548
Easting (m)	: 0.00	**Driller Supplier**	:	**Client**	: Coliban Region Water Corporation
Northing (m)	: 0.00	**Logged By**	: PR	**Project**	: Geotechnical Investigation - Cohuna WTP
Ground Elevation	: Not Surveyed	**Reviewed By**	:	**Location**	: Chuggs Road, Cohuna VIC
Total Depth	: 4 m BGL	**Date**	: 03/07/2024	**Loc Comment**	:

Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Weathering	Consistency	Testing: DCP	Testing: PP (kPa)	Testing: SPT	Remarks
	0.1	TOPSOIL		SM	Sandy SILT SM: stiff, low plasticity, brown, fine grained sand, moist.	M		St				
		Natural		Cl	Silty CLAY Cl: stiff, medium plasticity, brown, with fine grained sand, moist.	M		St				
	0.4								3			
		Natural		CL-Cl	Silty to sandy CLAY CL-Cl: stiff, low to medium plasticity, pale brown, fine grained sand, trace fine to medium sized gravel, moist.	M		St	2			
									3			
									3			
	0.8								4			
		Natural		CH	Silty CLAY CH: stiff, high plasticity, pale brown mottled grey, with fine grained sand, moist.	M		St	5			
									5			
	1.7	Natural		CH	As above, but trace fine grained sand.	M		St				
										250		
										200		

22 Terminated at 4m

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Geotechnical Log - Borehole

23

UTM	:	**Drill Rig**	: Gemco HS7 - Trailer Mount	**Job Number**	: 24C 0548
Easting (m)	: 0.00	**Driller Supplier**	:	**Client**	: Coliban Region Water Corporation
Northing (m)	: 0.00	**Logged By**	: PR	**Project**	: Geotechnical Investigation - Cohuna WTP
Ground Elevation	: Not Surveyed	**Reviewed By**	:	**Location**	: Chuggs Road, Cohuna VIC
Total Depth	: 4 m BGL	**Date**	: 03/07/2024	**Loc Comment**	:

Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Weathering	Consistency	Testing: DCP	Testing: PP (kPa)	Testing: SPT	Remarks
	0.1	TOPSOIL		SM	Sandy SILT SM: stiff, low plasticity, brown, fine grained sand, moist.	M		St				
		Natural		CI-CH	Silty CLAY CI-CH: firm to stiff, medium to high plasticity, grey, trace fine grained sand, moist.	M		F-St	1 2 2 2 1 5			
	0.9	Natural		CH	Silty CLAY CH: stiff, high plasticity, pale brown, trace fine to medium sized gravel, trace fine grained sand, moist.	M		St	6 6			
	1.6	Natural		CH	Silty CLAY CH: stiff, high plasticity, pale brown mottled grey, trace fine grained sand, moist.	M		St		300		
SWL					**23 Terminated at 4m**					350		

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Geotechnical Log - Borehole

24

UTM	:	**Drill Rig**	: Gemco HS7 - Trailer Mount	**Job Number**	: 24C 0548
Easting (m)	: 0.00	**Driller Supplier**	:	**Client**	: Coliban Region Water Corporation
Northing (m)	: 0.00	**Logged By**	: PR	**Project**	: Geotechnical Investigation - Cohuna WTP
Ground Elevation	: Not Surveyed	**Reviewed By**	:	**Location**	: Chuggs Road, Cohuna VIC
Total Depth	: 4 m BGL	**Date**	: 03/07/2024	**Loc Comment**	:

Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Weathering	Consistency	Testing: DCP	Testing: PP (kPa)	Testing: SPT	Remarks
	0.1	TOPSOIL		SM	Sandy SILT SM: stiff, low plasticity, brown, fine grained sand, moist.	M		St				
		Natural		CI-CH	Silty CLAY CI-CH: stiff, medium to high plasticity, grey, trace fine grained sand, moist.	M		St				
	0.4								3			
		Natural		CI-CH	Silty CLAY CI-CH: stiff, medium to high plasticity, brown, trace fine sized gravel, trace fine grained sand, moist.	M		St	2			
									1			
									2			
									3			
									4			
									3			
									3			
	1.9	Natural		CH	Silty CLAY CH: stiff, high plasticity, pale brown mottled grey, moist.	M		St		350		
					24 Terminated at 4m					325		

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Geotechnical Log - Borehole

25

UTM	:	**Drill Rig**	: Gemco HS7 - Trailer Mount	**Job Number**	: 24C 0548
Easting (m)	: 0.00	**Driller Supplier**	:	**Client**	: Coliban Region Water Corporation
Northing (m)	: 0.00	**Logged By**	: PR	**Project**	: Geotechnical Investigation - Cohuna WTP
Ground Elevation	: Not Surveyed	**Reviewed By**	:	**Location**	: Chuggs Road, Cohuna VIC
Total Depth	: 4 m BGL	**Date**	: 10/07/2024	**Loc Comment**	:

Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Weathering	Consistency	Testing: DCP	Testing: PP (kPa)	Testing: SPT	Remarks
	0.1	TOPSOIL		SM	Sandy SILT SM: stiff, low plasticity, dark brown, fine grained sand, moist.	M		St				
		Natural		CH	Silty CLAY CH: firm to stiff, high plasticity, grey, trace fine to coarse grained sand, moist.	M		F-St	3			
									3			
									2			
									2			
									2			
	0.8	Natural		CH	Silty CLAY CH: firm, high plasticity, pale brown, trace fine grained sand, moist.	M		F	2			
									1			
									3			
	1.7	Natural		CH	Silty CLAY CH: stiff, high plasticity, pale brown mottled pale grey, moist.	M		St		300		
SWL												
					25 Terminated at 4m					325		

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Geotechnical Log - Borehole

26

UTM	:	Drill Rig	: Gemco HS7 - Trailer Mount	Job Number	: 24C 0548
Easting (m)	: 0.00	Driller Supplier	:	Client	: Coliban Region Water Corporation
Northing (m)	: 0.00	Logged By	: PR	Project	: Geotechnical Investigation - Cohuna WTP
Ground Elevation	: Not Surveyed	Reviewed By	:	Location	: Chuggs Road, Cohuna VIC
Total Depth	: 4 m BGL	Date	: 10/07/2024	Loc Comment	:

Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Weathering	Consistency	Testing: DCP	Testing: PP (kPa)	Testing: SPT	Remarks
	0.1	TOPSOIL		SM	Sandy SILT SM: stiff, low plasticity, dark brown, fine grained sand, moist.	M		St				
		Natural		CH	Silty CLAY CH: soft to firm, high plasticity, grey, trace fine grained sand, moist.	M		S-F	2			
									2			
	0.6								1			
		Natural		CH	Silty CLAY CH: firm to stiff, high plasticity, pale brown, trace fine grained sand, moist.	M		F-St	2			
									2			
									3			
									3			
	1.7	Natural		CH	Silty CLAY CH: stiff, high plasticity, pale brown mottled pale grey, trace fine grained sand, moist.	M		St				
										150		
SWL												
										200		
					26 Terminated at 4m							

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Geotechnical Log - Borehole

27

UTM	:	**Drill Rig**	: Gemco HS7 - Trailer Mount	**Job Number**	: 24C 0548
Easting (m)	: 0.00	**Driller Supplier**	:	**Client**	: Coliban Region Water Corporation
Northing (m)	: 0.00	**Logged By**	: PR	**Project**	: Geotechnical Investigation - Cohuna WTP
Ground Elevation	: Not Surveyed	**Reviewed By**	:	**Location**	: Chuggs Road, Cohuna VIC
Total Depth	: 4 m BGL	**Date**	: 10/07/2024	**Loc Comment**	:

Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Weathering	Consistency	Testing: DCP	Testing: PP (kPa)	Testing: SPT	Remarks
	0.1	TOPSOIL		SM	Sandy SILT SM: stiff, low plasticity, brown, fine grained sand, moist.	M		St				
		Natural		CL	Silty CLAY CL: stiff, low plasticity, brown, with fine grained sand, dry.	D		St	6 10 7 5 5			
	0.8	Natural		CI-CH	Silty CLAY CI-CH: stiff, medium to high plasticity, pale brown, with fine grained sand, moist.	M		St	5 5			
	2.5	Natural		CH	Silty CLAY CH: stiff, high plasticity, pale brown mottled pale grey, moist.	M		St		300		
SWL					**27 Terminated at 4m**					250		

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Geotechnical Log - Borehole

28

UTM	:	**Drill Rig**	: Gemco HS7 - Trailer Mount	**Job Number**	: 24C 0548
Easting (m)	: 0.00	**Driller Supplier**	:	**Client**	: Coliban Region Water Corporation
Northing (m)	: 0.00	**Logged By**	: PR	**Project**	: Geotechnical Investigation - Cohuna WTP
Ground Elevation	: Not Surveyed	**Reviewed By**	:	**Location**	: Chuggs Road, Cohuna VIC
Total Depth	: 4 m BGL	**Date**	: 10/07/2024	**Loc Comment**	:

Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Weathering	Consistency	Testing: DCP	Testing: PP (kPa)	Testing: SPT	Remarks
	0.1	TOPSOIL		SM	Sandy SILT SM: stiff, low plasticity, brown, fine grained sand, moist.	M		St				
		Natural		CI	Silty CLAY CI: stiff, medium plasticity, brown, trace fine to coarse grained sand, moist.	M		St	3 2 3 4			
	0.7	Natural		CH	Silty CLAY CH: stiff, high plasticity, pale brown, trace fine to medium sized gravel, trace fine grained sand, moist.	M		St	5 5 6			
	2.1	Natural		CH	Silty CLAY CH: stiff, high plasticity, pale grey mottled pale brown, trace fine grained sand, moist.	M		St		325 300		
SWL					**28 Terminated at 4m**							

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Geotechnical Log - Borehole

29

UTM	:	**Drill Rig**	: Gemco HS7 - Trailer Mount	**Job Number**	: 24C 0548
Easting (m)	: 0.00	**Driller Supplier**	:	**Client**	: Coliban Region Water Corporation
Northing (m)	: 0.00	**Logged By**	: PR	**Project**	: Geotechnical Investigation - Cohuna WTP
Ground Elevation	: Not Surveyed	**Reviewed By**	:	**Location**	: Chuggs Road, Cohuna VIC
Total Depth	: 4 m BGL	**Date**	: 10/07/2024	**Loc Comment**	:

Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Weathering	Consistency	Testing: DCP	Testing: PP (kPa)	Testing: SPT	Remarks
	0.1	TOPSOIL		SM	Sandy SILT SM: stiff, low plasticity, brown, fine grained sand, moist.	M		St				
		Natural		Cl	Silty CLAY Cl: soft, medium plasticity, brown, with fine grained sand, moist.	M		S	2			
	0.5								2			
		Natural		CL	Silty CLAY CL: soft, low plasticity, pale brown, trace fine grained sand, moist.	M		S	1			
									1			
									1			
									1			
									2			
	1.2								3			
SWL		Natural		CH	Silty CLAY CH: firm, high plasticity, pale brown, with fine grained sand, moist.	M		F				
	2	Natural		CH	As above, but stiff.	M		St				
	2.4	Natural		CH	Silty CLAY CH: firm, high plasticity, pale brown mottled grey, trace fine grained sand, moist.	M		F		100		
	3.2	Natural		CH	As above, but wet.	W		F		50		
					29 Terminated at 4m							

Page 1 of 1

GTS - Bendigo

[redacted]

Geotechnical Log - Borehole

30

UTM	:	**Drill Rig**	: Gemco HS7 - Trailer Mount	**Job Number**	: 24C 0548
Easting (m)	: 0.00	**Driller Supplier**	:	**Client**	: Coliban Region Water Corporation
Northing (m)	: 0.00	**Logged By**	: PR	**Project**	: Geotechnical Investigation - Cohuna WTP
Ground Elevation	: Not Surveyed	**Reviewed By**	:	**Location**	: Chuggs Road, Cohuna VIC
Total Depth	: 4 m BGL	**Date**	: 10/07/2024	**Loc Comment**	:

Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Weathering	Consistency	Testing: DCP	Testing: PP (kPa)	Testing: SPT	Remarks
	0.1	TOPSOIL		SM	Sandy SILT SM: stiff, low plasticity, brown, fine grained sand, moist.	M		St				
		Natural		CL	Silty CLAY CL: firm to stiff, low plasticity, brown, with fine grained sand, moist.	M		F-St	3 2 3			
	0.6	Natural		CH	Silty CLAY CH: firm, high plasticity, pale brown, trace fine to medium sized gravel, trace fine grained sand, moist.	M		F	2 1 2 3			
	2.1	Natural		CH	Silty CLAY CH: stiff, high plasticity, pale brown mottled pale grey, trace fine grained sand, moist.	M		St		300		
SWL					**30 Terminated at 4m**					250		

Page 1 of 1

Material Test Report

Report Number: **P242717-1**
Issue Number: 1
Date Issued: 15/08/2024
Client: GTS Consultancy Department
[redacted]
Contact: [redacted]
Project Number: P242717
Project Name: Cohuna WTP
Project Location: Site 1 - Chuggs Rd (2/PS428326)
Client Reference: 24C 0548-1
Work Request: 15842
Sample Number: B24-15842A
Date Sampled: 12/07/2024
Dates Tested: 12/07/2024 - 19/07/2024
Sampling Method: Sampled by Client
The results apply to the sample as received
Sample Location: **BH1 , Depth: 0.5-1.0m**
Material: Refer to Borehole Logs

Geotechnical Testing Services (Southern)
B[redacted]
U

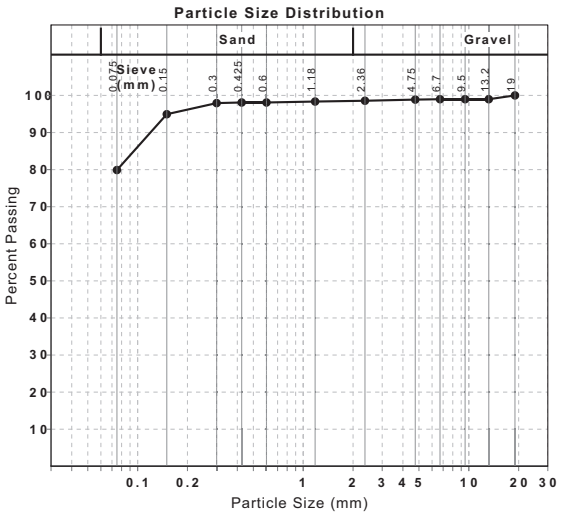
Accredited for compliance with ISO/IEC 17025 - Testing
[redacted]
Approved Signatory: [redacted]
CMT Laboratory Supervisor
NATA Accredited Laboratory Number: 19506

Particle Size Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
19 mm	**100**			0		
13.2 mm	**99**			1		
9.5 mm	**99**			0		
6.7 mm	**99**			0		
4.75 mm	**99**			0		
2.36 mm	**99**			0		
1.18 mm	**98**			0		
0.6 mm	**98**			0		
0.425 mm	**98**			0		
0.3 mm	**98**			0		
0.15 mm	**95**			3		
0.075 mm	**80**			15		

Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	**4 ***		
Soil Description	Refer to Borehole Logs		
Nature of Water	Potable		
Temperature of Water (°C)	23		
* Mineral Present	Carbonate		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	26		
Plastic Limit (%)	20		
Plasticity Index (%)	**6**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**4.0**		
Cracking Crumbling Curling	Cracking		



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Material Test Report

Report Number: **P242717-1**
Issue Number: 1
Date Issued: 15/08/2024
Client: GTS Consultancy Department
[redacted]
Contact: [redacted]
Project Number: P242717
Project Name: Cohuna WTP
Project Location: Site 1 - Chuggs Rd (2/PS428326)
Client Reference: 24C 0548-1
Work Request: 15842
Sample Number: B24-15842B
Date Sampled: 12/07/2024
Dates Tested: 12/07/2024 - 19/07/2024
Sampling Method: Sampled by Client
The results apply to the sample as received
Sample Location: **BH1 , Depth: 1.5-2.0m**
Material: Refer to Borehole Logs

Geotechnical Testing Services (Southern)
Bendigo Soil and Concrete Testing Laboratory
[redacted]

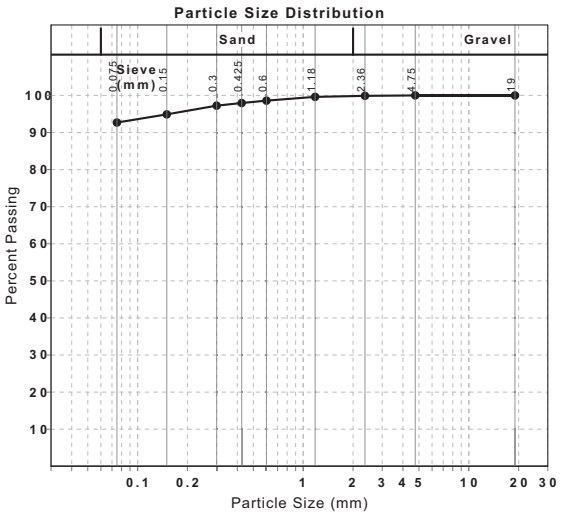
Accredited for compliance with ISO/IEC 17025 - Testing
[redacted]
Approved Signatory: [redacted]
CMT Laboratory Supervisor
NATA Accredited Laboratory Number: 19506

Particle Size Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
19 mm	**100**			0		
4.75 mm	**100**			0		
2.36 mm	**100**			0		
1.18 mm	**100**			0		
0.6 mm	**99**			1		
0.425 mm	**98**			1		
0.3 mm	**97**			1		
0.15 mm	**95**			2		
0.075 mm	**93**			2		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	45		
Plastic Limit (%)	18		
Plasticity Index (%)	**27**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**10.5**		
Cracking Crumbling Curling	Cracking		

Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	**6**		
Soil Description	Refer to Borehole Logs		
Nature of Water	Potable		
Temperature of Water (°C)	23		



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Material Test Report

Report Number: **P242717-1**
Issue Number: 1
Date Issued: 15/08/2024
Client: GTS Consultancy Department
[redacted]
Contact: [redacted]
Project Number: P242717
Project Name: Cohuna WTP
Project Location: Site 1 - Chuggs Rd (2/PS428326)
Client Reference: 24C 0548-1
Work Request: 15842
Sample Number: B24-15842C
Date Sampled: 12/07/2024
Dates Tested: 12/07/2024 - 19/07/2024
Sampling Method: Sampled by Client
The results apply to the sample as received
Sample Location: **BH1 , Depth: 2.3-3.0m**
Material: Refer to Borehole Logs

Geotechnical Testing Services (Southern)
Bendigo Soil and Concrete Testing Laboratory
[redacted]

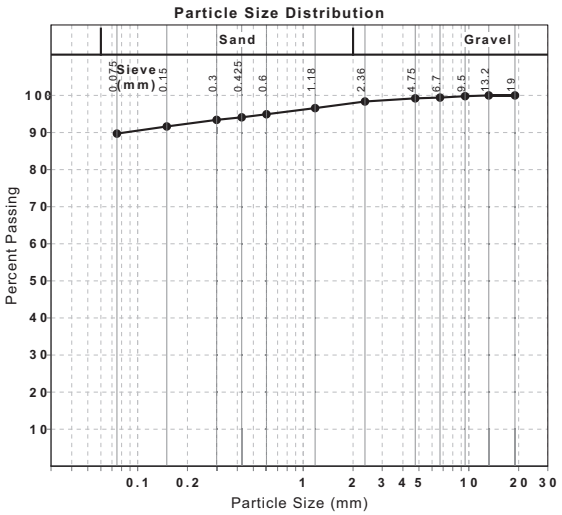
Accredited for compliance with ISO/IEC 17025 - Testing
[redacted]
Approved Signatory: [redacted]
CMT Laboratory Supervisor
NATA Accredited Laboratory Number: 19506

Particle Size Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
19 mm	**100**			0		
13.2 mm	**100**			0		
9.5 mm	**100**			0		
6.7 mm	**99**			0		
4.75 mm	**99**			0		
2.36 mm	**98**			1		
1.18 mm	**97**			2		
0.6 mm	**95**			2		
0.425 mm	**94**			1		
0.3 mm	**93**			1		
0.15 mm	**92**			2		
0.075 mm	**90**			2		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	63		
Plastic Limit (%)	22		
Plasticity Index (%)	**41**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**18.0**		
Cracking Crumbling Curling	Curling		

Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	**4 ***		
Soil Description	Refer to Borehole Logs		
Nature of Water	Potable		
Temperature of Water (°C)	23		
* Mineral Present	Carbonate		



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Material Test Report

Report Number: **P242717-1**
Issue Number: 1
Date Issued: 15/08/2024
Client: GTS Consultancy Department
[redacted]
Contact: [redacted]
Project Number: P242717
Project Name: Cohuna WTP
Project Location: Site 1 - Chuggs Rd (2/PS428326)
Client Reference: 24C 0548-1
Work Request: 15842
Sample Number: B24-15842D
Date Sampled: 12/07/2024
Dates Tested: 12/07/2024 - 18/07/2024
Sampling Method: Sampled by Client
The results apply to the sample as received
Sample Location: **BH4 , Depth: 0.2-0.7m**
Material: Refer to Borehole Logs

Geotechnical Testing Services (Southern)
Bendigo Soil and Concrete Testing Laboratory
[redacted]

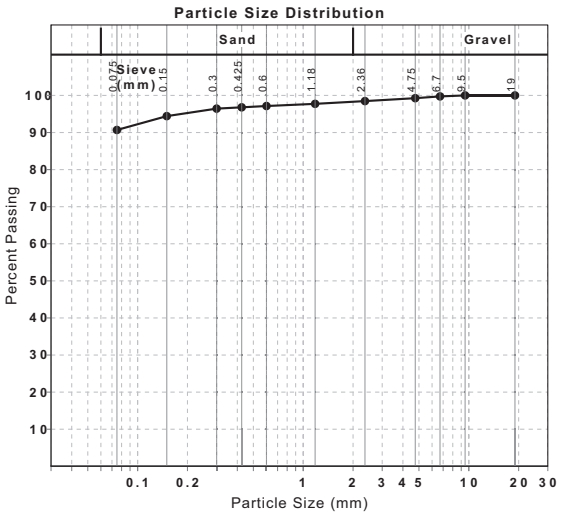
Accredited for compliance with ISO/IEC 17025 - Testing
[redacted]
Approved Signatory: [redacted]
CMT Laboratory Supervisor
NATA Accredited Laboratory Number: 19506

Particle Size Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
19 mm	**100**			0		
9.5 mm	**100**			0		
6.7 mm	**100**			0		
4.75 mm	**99**			0		
2.36 mm	**98**			1		
1.18 mm	**98**			1		
0.6 mm	**97**			1		
0.425 mm	**97**			0		
0.3 mm	**96**			0		
0.15 mm	**94**			2		
0.075 mm	**91**			4		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	48		
Plastic Limit (%)	18		
Plasticity Index (%)	**30**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**14.5**		
Cracking Crumbling Curling	Curling		

Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	**4** *		
Soil Description	Refer to Borehole Logs		
Nature of Water	Potable		
Temperature of Water (°C)	23		
* Mineral Present	Carbonate		



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Material Test Report

Report Number: **P242717-1**
Issue Number: 1
Date Issued: 15/08/2024
Client: GTS Consultancy Department
[redacted]
Contact: [redacted]
Project Number: P242717
Project Name: Cohuna WTP
Project Location: Site 1 - Chuggs Rd (2/PS428326)
Client Reference: 24C 0548-1
Work Request: 15842
Sample Number: B24-15842E
Date Sampled: 12/07/2024
Dates Tested: 12/07/2024 - 19/07/2024
Sampling Method: Sampled by Client
The results apply to the sample as received
Sample Location: **BH4 , Depth: 2.5-3.0m**
Material: Refer to Borehole Logs

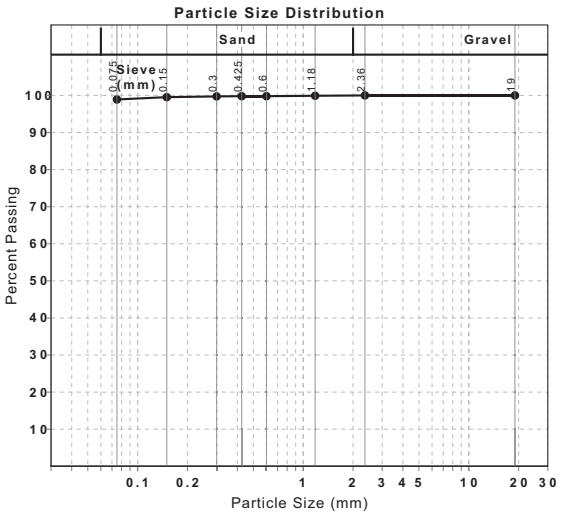
Geotechnical Testing Services (Southern)
Bendigo Soil and Concrete Testing Laboratory
[redacted]
Accredited for compliance with ISO/IEC 17025 - Testing
[redacted]
Approved Signatory: [redacted]
CMT Laboratory Supervisor
NATA Accredited Laboratory Number: 19506

Particle Size Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
19 mm	**100**			0		
2.36 mm	**100**			0		
1.18 mm	**100**			0		
0.6 mm	**100**			0		
0.425 mm	**100**			0		
0.3 mm	**100**			0		
0.15 mm	**100**			0		
0.075 mm	**99**			1		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	59		
Plastic Limit (%)	22		
Plasticity Index (%)	**37**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**16.5**		
Cracking Crumbling Curling	Curling		

Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	**6**		
Soil Description	Refer to Borehole Logs		
Nature of Water	Potable		
Temperature of Water (^{o}C)	23		



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Material Test Report

Report Number: **P242717-1**
Issue Number: 1
Date Issued: 15/08/2024
Client: GTS Consultancy Department
[redacted]
Contact: [redacted]
Project Number: P242717
Project Name: Cohuna WTP
Project Location: Site 1 - Chuggs Rd (2/PS428326)
Client Reference: 24C 0548-1
Work Request: 15842
Sample Number: B24-15842F
Date Sampled: 12/07/2024
Dates Tested: 12/07/2024 - 19/07/2024
Sampling Method: Sampled by Client
The results apply to the sample as received
Sample Location: **BH4 , Depth: 3.5-4.0m**
Material: Refer to Borehole Logs

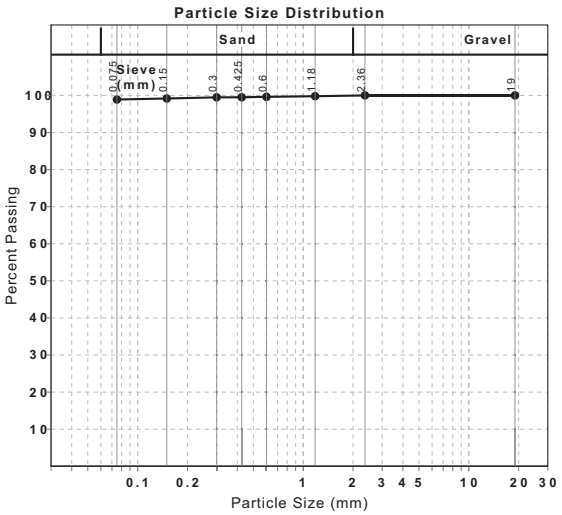
Geotechnical Testing Services (Southern)
Bendigo Soil and Concrete Testing Laboratory
[redacted]
Accredited for compliance with ISO/IEC 17025 - Testing
[redacted]
Approved Signatory: [redacted]
CMT Laboratory Supervisor
NATA Accredited Laboratory Number: 19506

Particle Size Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
19 mm	**100**			0		
2.36 mm	**100**			0		
1.18 mm	**100**			0		
0.6 mm	**100**			0		
0.425 mm	**100**			0		
0.3 mm	**99**			0		
0.15 mm	**99**			0		
0.075 mm	**99**			0		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	44		
Plastic Limit (%)	17		
Plasticity Index (%)	**27**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**12.0**		
Cracking Crumbling Curling	Curling		

Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	**6**		
Soil Description	Refer to Borehole Logs		
Nature of Water	Potable		
Temperature of Water (°C)	23		



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Material Test Report

Report Number: **P242717-1**
Issue Number: 1
Date Issued: 15/08/2024
Client: GTS Consultancy Department
[redacted]
Contact: [redacted]
Project Number: P242717
Project Name: Cohuna WTP
Project Location: Site 1 - Chuggs Rd (2/PS428326)
Client Reference: 24C 0548-1
Work Request: 15842
Sample Number: B24-15842G
Date Sampled: 12/07/2024
Dates Tested: 12/07/2024 - 18/07/2024
Sampling Method: Sampled by Client
The results apply to the sample as received
Sample Location: **BH7 , Depth: 3.5-4.0m**
Material: Refer to Borehole Logs

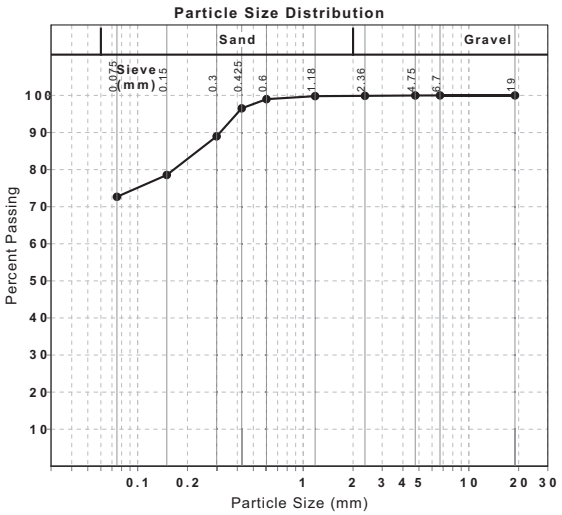
Geotechnical Testing Services (Southern)
Bendigo Soil and Concrete Testing Laboratory
[redacted]
Accredited for compliance with ISO/IEC 17025 - Testing
[redacted]
Approved Signatory: [redacted]
CMT Laboratory Supervisor
NATA Accredited Laboratory Number: 19506

Particle Size Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
19 mm	**100**			0		
6.7 mm	**100**			0		
4.75 mm	**100**			0		
2.36 mm	**100**			0		
1.18 mm	**100**			0		
0.6 mm	**99**			1		
0.425 mm	**97**			2		
0.3 mm	**89**			8		
0.15 mm	**79**			10		
0.075 mm	**73**			6		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	41		
Plastic Limit (%)	15		
Plasticity Index (%)	**26**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**12.0**		
Cracking Crumbling Curling	Curling		

Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	**5**		
Soil Description	Refer to Borehole Logs		
Nature of Water	Potable		
Temperature of Water (°C)	23		



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Material Test Report

Report Number: **P242717-1**
Issue Number: 1
Date Issued: 15/08/2024
Client: GTS Consultancy Department
[redacted]
Contact: [redacted]
Project Number: P242717
Project Name: Cohuna WTP
Project Location: Site 1 - Chuggs Rd (2/PS428326)
Client Reference: 24C 0548-1
Work Request: 15842
Sample Number: B24-15842H
Date Sampled: 12/07/2024
Dates Tested: 12/07/2024 - 19/07/2024
Sampling Method: Sampled by Client
The results apply to the sample as received
Sample Location: **BH11 , Depth: 0.7-1.2m**
Material: Refer to Borehole Logs

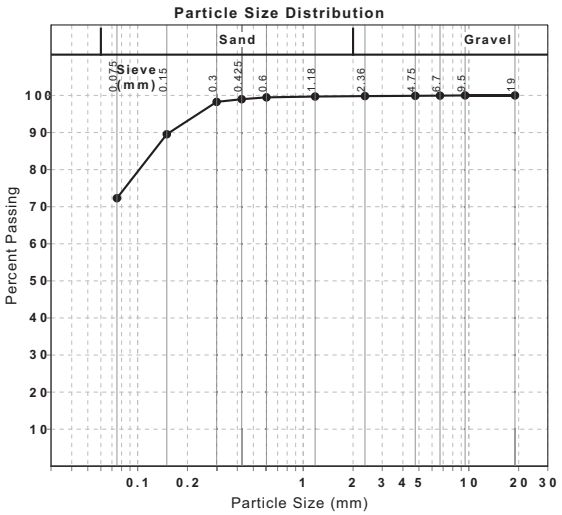
Geotechnical Testing Services (Southern)
Bendigo Soil and Concrete Testing Laboratory
[redacted]
Accredited for compliance with ISO/IEC 17025 - Testing
[redacted]
Approved Signatory: [redacted]
CMT Laboratory Supervisor
NATA Accredited Laboratory Number: 19506

Particle Size Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
19 mm	**100**			0		
9.5 mm	**100**			0		
6.7 mm	**100**			0		
4.75 mm	**100**			0		
2.36 mm	**100**			0		
1.18 mm	**100**			0		
0.6 mm	**99**			0		
0.425 mm	**99**			0		
0.3 mm	**98**			1		
0.15 mm	**90**			9		
0.075 mm	**72**			17		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	26		
Plastic Limit (%)	17		
Plasticity Index (%)	**9**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**5.0**		
Cracking Crumbling Curling	Cracking		

Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	**4** *		
Soil Description	Refer to Borehole Logs		
Nature of Water	Potable		
Temperature of Water (°C)	23		
* Mineral Present	Carbonate		



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Material Test Report

Report Number: **P242717-1**
Issue Number: 1
Date Issued: 15/08/2024
Client: GTS Consultancy Department
[redacted]
Contact: [redacted]
Project Number: P242717
Project Name: Cohuna WTP
Project Location: Site 1 - Chuggs Rd (2/PS428326)
Client Reference: 24C 0548-1
Work Request: 15842
Sample Number: B24-15842I
Date Sampled: 12/07/2024
Dates Tested: 12/07/2024 - 19/07/2024
Sampling Method: Sampled by Client
The results apply to the sample as received
Sample Location: **BH19 , Depth: 0.8-1.5m**
Material: Refer to Borehole Logs

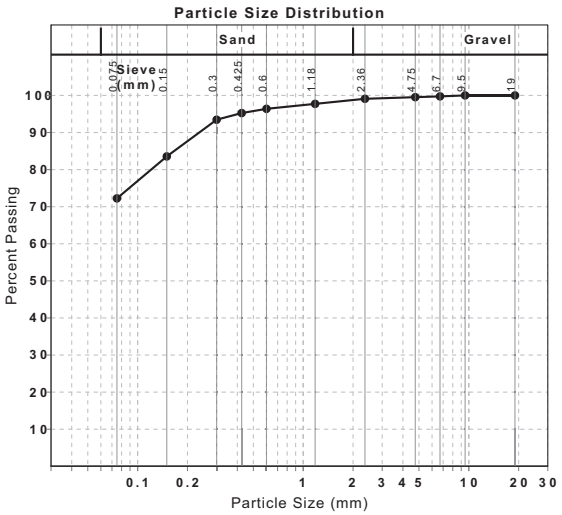
Geotechnical Testing Services (Southern)
Bendigo Soil and Concrete Testing Laboratory
[redacted]
Accredited for compliance with ISO/IEC 17025 - Testing
[redacted]
Approved Signatory: [redacted]
CMT Laboratory Supervisor
NATA Accredited Laboratory Number: 19506

Particle Size Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
19 mm	**100**			0		
9.5 mm	**100**			0		
6.7 mm	**100**			0		
4.75 mm	**100**			0		
2.36 mm	**99**			0		
1.18 mm	**98**			1		
0.6 mm	**96**			1		
0.425 mm	**95**			1		
0.3 mm	**93**			2		
0.15 mm	**84**			10		
0.075 mm	**72**			11		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	25		
Plastic Limit (%)	17		
Plasticity Index (%)	**8**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**4.5**		
Cracking Crumbling Curling	Cracking & Crumbling		

Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	**4** *		
Soil Description	Refer to Borehole Logs		
Nature of Water	Potable		
Temperature of Water (°C)	23		
* Mineral Present	Carbonate		



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Material Test Report

Report Number: **P242717-1**
Issue Number: 1
Date Issued: 15/08/2024
Client: GTS Consultancy Department
[redacted]
Contact: [redacted]
Project Number: P242717
Project Name: Cohuna WTP
Project Location: Site 1 - Chuggs Rd (2/PS428326)
Client Reference: 24C 0548-1
Work Request: 15842
Sample Number: B24-15842J
Date Sampled: 12/07/2024
Dates Tested: 12/07/2024 - 19/07/2024
Sampling Method: Sampled by Client
The results apply to the sample as received
Sample Location: **BH29 , Depth: 0.5-1.2m**
Material: Refer to Borehole Logs

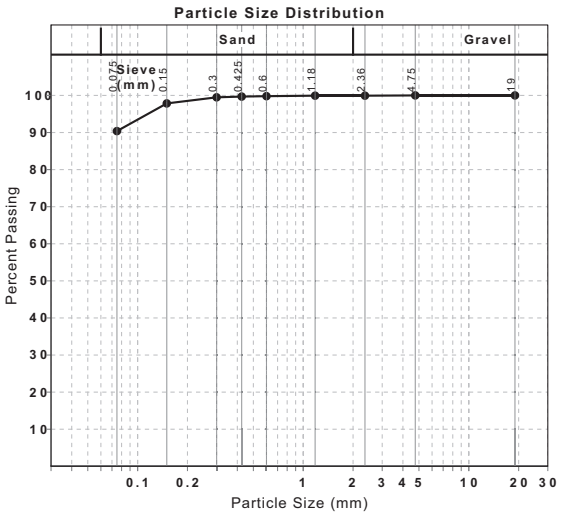
Geotechnical Testing Services (Southern)
Bendigo Soil and Concrete Testing Laboratory
[redacted]
Accredited for compliance with ISO/IEC 17025 - Testing
[redacted]
Approved Signatory: [redacted]
CMT Laboratory Supervisor
NATA Accredited Laboratory Number: 19506

Particle Size Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
19 mm	**100**			0		
4.75 mm	**100**			0		
2.36 mm	**100**			0		
1.18 mm	**100**			0		
0.6 mm	**100**			0		
0.425 mm	**100**			0		
0.3 mm	**99**			0		
0.15 mm	**98**			2		
0.075 mm	**90**			7		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	27		
Plastic Limit (%)	18		
Plasticity Index (%)	**9**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**4.0**		
Cracking Crumbling Curling	Cracking		

Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	**6**		
Soil Description	Refer to Borehole Logs		
Nature of Water	Potable		
Temperature of Water (°C)	23		



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Material Test Report

Report Number: **P242717-1**
Issue Number: 1
Date Issued: 15/08/2024
Client: GTS Consultancy Department
[redacted]
Contact: [redacted]
Project Number: P242717
Project Name: Cohuna WTP
Project Location: Site 1 - Chuggs Rd (2/PS428326)
Client Reference: 24C 0548-1
Work Request: 15842
Sample Number: B24-15842K
Date Sampled: 12/07/2024
Dates Tested: 12/07/2024 - 19/07/2024
Sampling Method: Sampled by Client
The results apply to the sample as received
Sample Location: **BH9 (0.6-0.9m)**
Material: Refer to Borehole Logs

Geotechnical Testing Services (Southern)
Bendigo Soil and Concrete Testing Laboratory
[redacted]
Accredited for compliance with ISO/IEC 17025 - Testing
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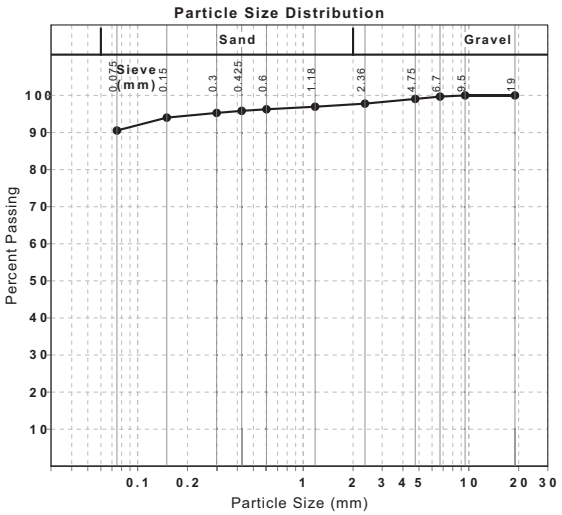
Approved Signatory: [redacted]
CMT Laboratory Supervisor
NATA Accredited Laboratory Number: 19506

Particle Size Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
19 mm	**100**			0		
9.5 mm	**100**			0		
6.7 mm	**100**			0		
4.75 mm	**99**			1		
2.36 mm	**98**			1		
1.18 mm	**97**			1		
0.6 mm	**96**			1		
0.425 mm	**96**			0		
0.3 mm	**95**			1		
0.15 mm	**94**			1		
0.075 mm	**91**			3		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	42		
Plastic Limit (%)	16		
Plasticity Index (%)	**26**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**9.0**		
Cracking Crumbling Curling	Cracking		

Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	**4** *		
Soil Description	Refer to Borehole Logs		
Nature of Water	Potable		
Temperature of Water (°C)	23		
* Mineral Present	Carbonate		



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Material Test Report

Report Number: **P242717-1**
Issue Number: 1
Date Issued: 15/08/2024
Client: GTS Consultancy Department
[redacted]
Contact: [redacted]
Project Number: P242717
Project Name: Cohuna WTP
Project Location: Site 1 - Chuggs Rd (2/PS428326)
Client Reference: 24C 0548-1
Work Request: 15842
Sample Number: B24-15842L
Date Sampled: 12/07/2024
Dates Tested: 12/07/2024 - 19/07/2024
Sampling Method: Sampled by Client
The results apply to the sample as received
Sample Location: **BH12 (0.4-1.3m)**
Material: Refer to Borehole Logs

Geotechnical Testing Services (Southern)
Bendigo Soil and Concrete Testing Laboratory
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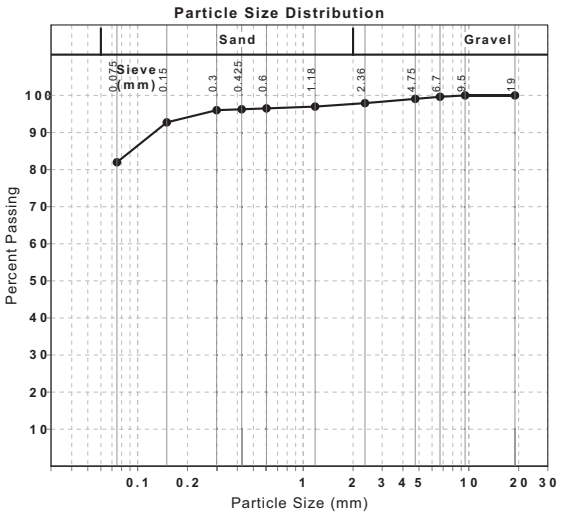
Accredited for compliance with ISO/IEC 17025 - Testing
[redacted]
Approved Signatory: [redacted]
CMT Laboratory Supervisor
NATA Accredited Laboratory Number: 19506

Particle Size Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
19 mm	**100**			0		
9.5 mm	**100**			0		
6.7 mm	**100**			0		
4.75 mm	**99**			1		
2.36 mm	**98**			1		
1.18 mm	**97**			1		
0.6 mm	**97**			0		
0.425 mm	**96**			0		
0.3 mm	**96**			0		
0.15 mm	**93**			3		
0.075 mm	**82**			11		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	31		
Plastic Limit (%)	14		
Plasticity Index (%)	**17**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**9.0**		
Cracking Crumbling Curling	Cracking		

Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	**4** *		
Soil Description	Refer to Borehole Logs		
Nature of Water	Potable		
Temperature of Water (°C)	23		
* Mineral Present	Carbonate		



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Material Test Report

Report Number: **P242717-1**
Issue Number: 1
Date Issued: 15/08/2024
Client: GTS Consultancy Department
[redacted]
Contact: [redacted]
Project Number: P242717
Project Name: Cohuna WTP
Project Location: Site 1 - Chuggs Rd (2/PS428326)
Client Reference: 24C 0548-1
Work Request: 15842
Sample Number: B24-15842M
Date Sampled: 12/07/2024
Dates Tested: 12/07/2024 - 18/07/2024
Sampling Method: Sampled by Client
The results apply to the sample as received
Sample Location: **BH14 (0.1-0.9m)**
Material: Refer to Borehole Logs

Geotechnical Testing Services (Southern)
Bendigo Soil and Concrete Testing Laboratory
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[redacted]

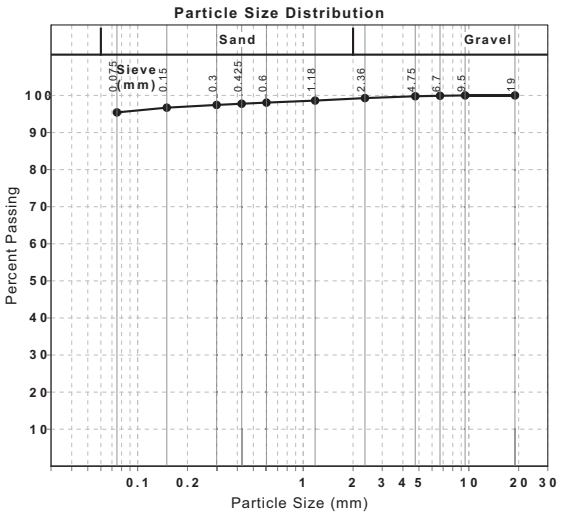
Approved Signatory: [redacted]
CMT Laboratory Supervisor
NATA Accredited Laboratory Number: 19506

Particle Size Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
19 mm	**100**			0		
9.5 mm	**100**			0		
6.7 mm	**100**			0		
4.75 mm	**100**			0		
2.36 mm	**99**			0		
1.18 mm	**99**			1		
0.6 mm	**98**			1		
0.425 mm	**98**			0		
0.3 mm	**97**			0		
0.15 mm	**97**			1		
0.075 mm	**95**			1		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	64		
Plastic Limit (%)	21		
Plasticity Index (%)	**43**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**17.5**		
Cracking Crumbling Curling	Cracking & Curling		

Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	**4** *		
Soil Description	Refer to Borehole Logs		
Nature of Water	Potable		
Temperature of Water (°C)	23		
* Mineral Present	Carbonate		



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Material Test Report

Report Number: **P242717-1**
Issue Number: 1
Date Issued: 15/08/2024
Client: GTS Consultancy Department
[redacted]
Contact: [redacted]
Project Number: P242717
Project Name: Cohuna WTP
Project Location: Site 1 - Chuggs Rd (2/PS428326)
Client Reference: 24C 0548-1
Work Request: 15842
Sample Number: B24-15842N
Date Sampled: 12/07/2024
Dates Tested: 12/07/2024 - 19/07/2024
Sampling Method: Sampled by Client
The results apply to the sample as received
Sample Location: **BH15 (0.2-0.9m)**
Material: Refer to Borehole Logs

Geotechnical Testing Services (Southern)
Bendigo Soil and Concrete Testing Laboratory
[redacted]

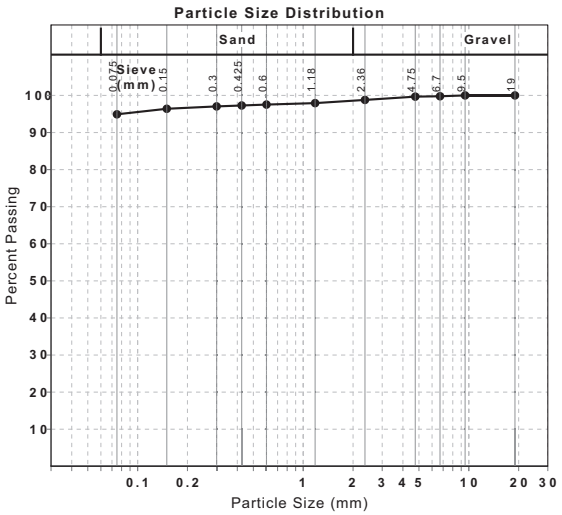
Accredited for compliance with ISO/IEC 17025 - Testing
[redacted]
Approved Signatory: [redacted]
CMT Laboratory Supervisor
NATA Accredited Laboratory Number: 19506

Particle Size Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
19 mm	**100**			0		
9.5 mm	**100**			0		
6.7 mm	**100**			0		
4.75 mm	**100**			0		
2.36 mm	**99**			1		
1.18 mm	**98**			1		
0.6 mm	**98**			0		
0.425 mm	**97**			0		
0.3 mm	**97**			0		
0.15 mm	**96**			1		
0.075 mm	**95**			1		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	44		
Plastic Limit (%)	16		
Plasticity Index (%)	**28**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**12.0**		
Cracking Crumbling Curling	Cracking & Curling		

Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	**4** *		
Soil Description	Refer to Borehole Logs		
Nature of Water	Potable		
Temperature of Water (°C)	23		
* Mineral Present	Carbonate		



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Material Test Report

Report Number: **P242717-1**
Issue Number: 1
Date Issued: 15/08/2024
Client: GTS Consultancy Department
[redacted]
Contact: [redacted]
Project Number: P242717
Project Name: Cohuna WTP
Project Location: Site 1 - Chuggs Rd (2/PS428326)
Client Reference: 24C 0548-1
Work Request: 15842
Sample Number: B24-15842O
Date Sampled: 12/07/2024
Dates Tested: 12/07/2024 - 19/07/2024
Sampling Method: Sampled by Client
The results apply to the sample as received
Sample Location: **BH18 (0.1-1.0m)**
Material: Refer to Borehole Logs

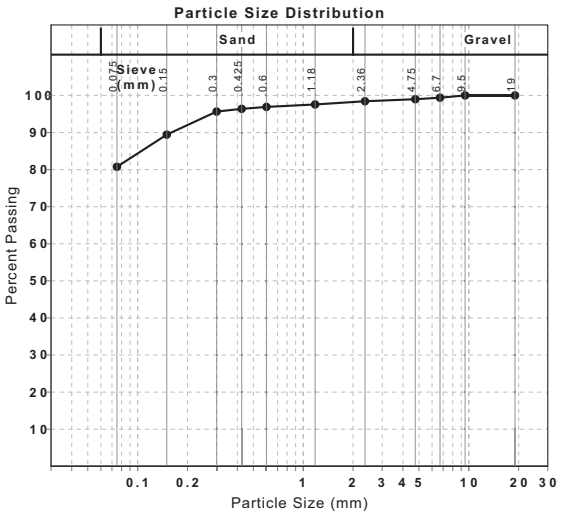
Geotechnical Testing Services (Southern)
Bendigo Soil and Concrete Testing Laboratory
[redacted]
Accredited for compliance with ISO/IEC 17025 - Testing
[redacted]
Approved Signatory: [redacted]
CMT Laboratory Supervisor
NATA Accredited Laboratory Number: 19506

Particle Size Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
19 mm	**100**			0		
9.5 mm	**100**			0		
6.7 mm	**99**			1		
4.75 mm	**99**			0		
2.36 mm	**98**			1		
1.18 mm	**98**			1		
0.6 mm	**97**			1		
0.425 mm	**96**			1		
0.3 mm	**96**			1		
0.15 mm	**89**			6		
0.075 mm	**81**			9		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	30		
Plastic Limit (%)	15		
Plasticity Index (%)	**15**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**8.0**		
Cracking Crumbling Curling	None		

Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	**4** *		
Soil Description	Refer to Borehole Logs		
Nature of Water	Potable		
Temperature of Water (°C)	23		
* Mineral Present	Carbonate		



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Material Test Report

Report Number: **P242717-1**
Issue Number: 1
Date Issued: 15/08/2024
Client: GTS Consultancy Department
[redacted]
Contact: [redacted]
Project Number: P242717
Project Name: Cohuna WTP
Project Location: Site 1 - Chuggs Rd (2/PS428326)
Client Reference: 24C 0548-1
Work Request: 15842
Sample Number: B24-15842P
Date Sampled: 12/07/2024
Dates Tested: 12/07/2024 - 22/07/2024
Sampling Method: Sampled by Client
The results apply to the sample as received
Sample Location: **BH25 (0.1-0.6m)**
Material: Refer to Borehole Logs

Geotechnical Testing Services (Southern)
Bendigo Soil and Concrete Testing Laboratory
[redacted]

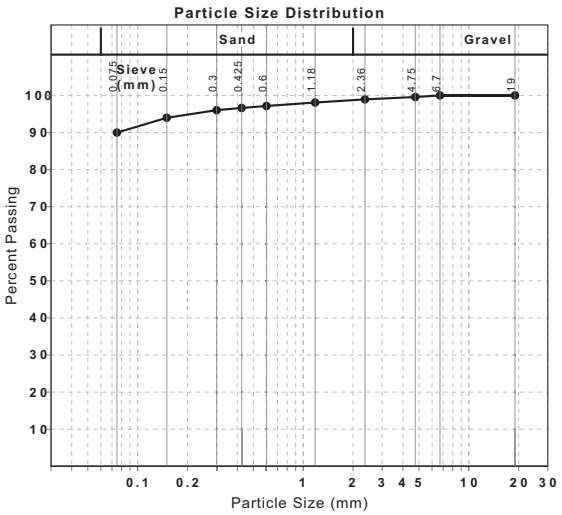
Accredited for compliance with ISO/IEC 17025 - Testing
[redacted]
Approved Signatory: [redacted]
CMT Laboratory Supervisor
NATA Accredited Laboratory Number: 19506

Particle Size Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
19 mm	**100**			0		
6.7 mm	**100**			0		
4.75 mm	**100**			0		
2.36 mm	**99**			1		
1.18 mm	**98**			1		
0.6 mm	**97**			1		
0.425 mm	**97**			1		
0.3 mm	**96**			1		
0.15 mm	**94**			2		
0.075 mm	**90**			4		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	54		
Plastic Limit (%)	16		
Plasticity Index (%)	**38**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**13.5**		
Cracking Crumbling Curling	Curling		

Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	**4** *		
Soil Description	Refer to Borehole Logs		
Nature of Water	Potable		
Temperature of Water (°C)	23		
* Mineral Present	Carbonate		



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Material Test Report

Report Number: **P242717-1**
Issue Number: 1
Date Issued: 15/08/2024
Client: GTS Consultancy Department
[redacted]
Contact: [redacted]
Project Number: P242717
Project Name: Cohuna WTP
Project Location: Site 1 - Chuggs Rd (2/PS428326)
Client Reference: 24C 0548-1
Work Request: 15842
Sample Number: B24-15842Q
Date Sampled: 12/07/2024
Dates Tested: 12/07/2024 - 19/07/2024
Sampling Method: Sampled by Client
The results apply to the sample as received
Sample Location: **BH28 (0.1-0.5m)**
Material: Refer to Borehole Logs

Geotechnical Testing Services (Southern)
B[redacted]

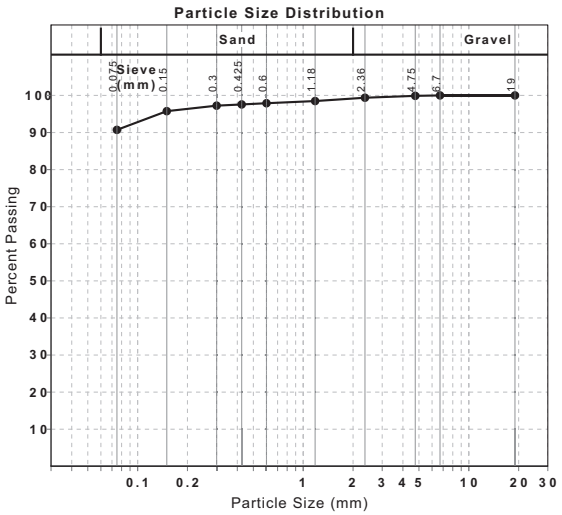
Accredited for compliance with ISO/IEC 17025 - Testing
[redacted]
Approved Signatory: [redacted]
CMT Laboratory Supervisor
NATA Accredited Laboratory Number: 19506

Particle Size Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
19 mm	**100**			0		
6.7 mm	**100**			0		
4.75 mm	**100**			0		
2.36 mm	**99**			1		
1.18 mm	**98**			1		
0.6 mm	**98**			1		
0.425 mm	**98**			0		
0.3 mm	**97**			0		
0.15 mm	**96**			1		
0.075 mm	**91**			5		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	40		
Plastic Limit (%)	13		
Plasticity Index (%)	**27**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**13.5**		
Cracking Crumbling Curling	Curling		

Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	**4** *		
Soil Description	Refer to Borehole Logs		
Nature of Water	Potable		
Temperature of Water (°C)	23		
* Mineral Present	Carbonate		



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Material Test Report

Report Number: **P242717-1**
Issue Number: 1
Date Issued: 15/08/2024
Client: GTS Consultancy Department
[redacted]

Project Number: P242717
Project Name: Cohuna WTP
Project Location: Site 1 - Chuggs Rd (2/PS428326)
Client Reference: 24C 0548-1
Work Request: 15842
Sample Number: B24-15842R
Date Sampled: 12/07/2024
Dates Tested: 12/07/2024 - 19/07/2024
Sampling Method: Sampled by Client
The results apply to the sample as received
Sample Location: **BH30 (0.1-0.7m)**
Material: Refer to Borehole Logs

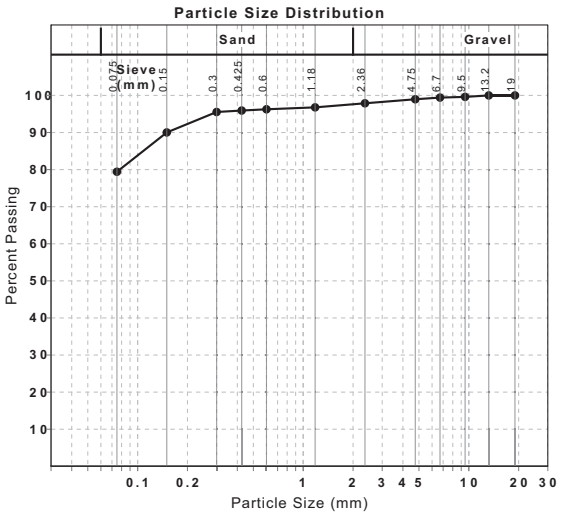
Geotechnical Testing Services (Southern)
Bendigo Soil and Concrete Testing Laboratory
[redacted]
Accredited for compliance with ISO/IEC 17025 - Testing
[redacted]
Approved Signatory: [redacted]
CMT Laboratory Supervisor
NATA Accredited Laboratory Number: 19506

Particle Size Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
19 mm	**100**			0		
13.2 mm	**100**			0		
9.5 mm	**100**			0		
6.7 mm	**99**			0		
4.75 mm	**99**			0		
2.36 mm	**98**			1		
1.18 mm	**97**			1		
0.6 mm	**96**			1		
0.425 mm	**96**			0		
0.3 mm	**96**			0		
0.15 mm	**90**			6		
0.075 mm	**79**			11		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	31		
Plastic Limit (%)	15		
Plasticity Index (%)	**16**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**7.0**		
Cracking Crumbling Curling	Cracking		

Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	**4 ***		
Soil Description	Refer to Borehole Logs		
Nature of Water	Potable		
Temperature of Water (°C)	21		
* Mineral Present	Carbonate		



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Material Test Report

Report Number: P242717-1
Issue Number: 1
Date Issued: 15/08/2024
Client: GTS Consultancy Department
[redacted]
Contact: [redacted]
Project Number: P242717
Project Name: Cohuna WTP
Project Location: Site 1 - Chuggs Rd (2/PS428326)
Client Reference: 24C 0548-1
Work Request: 15842
Dates Tested: 12/07/2024 - 15/07/2024
Location: Material Investigation - Cohuna WTP - P242717

Geotechnical Testing Services (Southern)
Bendigo Soil and Concrete Testing Laboratory
[redacted]
Accredited for compliance with ISO/IEC 17025 - Testing
[redacted]
Approved Signatory: [redacted]
CMT Laboratory Supervisor
NATA Accredited Laboratory Number: 19506

Moisture Content AS 1289 2.1.1

Sample Number	Sample Location	Moisture Content (%)	Min	Max	Material
B24-15842A	BH1 , Depth: 0.5-1.0m	20.7 %	**	**	Refer to Borehole Logs
B24-15842B	BH1 , Depth: 1.5-2.0m	30.1 %	**	**	Refer to Borehole Logs
B24-15842C	BH1 , Depth: 2.3-3.0m	29.4 %	**	**	Refer to Borehole Logs
B24-15842D	BH4 , Depth: 0.2-0.7m	24.1 %	**	**	Refer to Borehole Logs
B24-15842E	BH4 , Depth: 2.5-3.0m	24.4 %	**	**	Refer to Borehole Logs
B24-15842F	BH4 , Depth: 3.5-4.0m	20.6 %	**	**	Refer to Borehole Logs
B24-15842G	BH7 , Depth: 3.5-4.0m	23.9 %	**	**	Refer to Borehole Logs
B24-15842H	BH11 , Depth: 0.7-1.2m	19.2 %	**	**	Refer to Borehole Logs
B24-15842I	BH19 , Depth: 0.8-1.5m	25.5 %	**	**	Refer to Borehole Logs
B24-15842J	BH29 , Depth: 0.5-1.2m	23.7 %	**	**	Refer to Borehole Logs

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Triaxial Permeability Test Report

Report Number: **11573-1**
Date Issued: 15/08/2024
Client: Geotechnical Testing Services Pty Ltd
[redacted]
Contact: [redacted]
Project Number: 11573
Project Name: Material Analysis Project #P24217
Project Location: Bendigo VIC
Date Sampled: 17/07/2024
Dates Tested: 24/07-14/08/2024
Sampling Method: Sampled by client
Specification: N/A
Sample Identification: P24-15569A
Sample Number: **B24-15842K**
Location: **B24-15842K**
Material Description: silty CLAY trace gravel, light brown

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Approved Signatory: [redacted]

NATA Accredited Laboratory Number: 15357

Triaxial Permeability AS 1289 6.7.3-2016	
Permeant Used	De-aired Water
Confining Pressure(kPa)	600
Head Pressure(kPa)	590
Bottom Pressure(kPa)	570
Mean Pressure(kPa)	20
Specimen Height(mm)	70
Specimen Diameter(mm)	63
Length to Height Ratio	1.11
Laboratory Density Ratio(%)	98
Laboratory Moisture Ratio(%)	102
Compactive Effort	Standard
Material Retained on the 37.5mm sieve (%)	0
Final Moisture Content (%)	20.8
Permeability(m/s)	**5.E-11**

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Material Test Report

Report Number: **P241940-1**
Issue Number: 1
Date Issued: 14/08/2024
Client: Geotechnical Testing Services
[redacted]
Project Number: P241940
Project Name: Material Analysis Project - Cohuna WTP - #P24217
Work Request: 15569
Date Sampled: 17/07/2024
Dates Tested: 17/07/2024 - 30/07/2024
Sampling Method: Sampled by Client
The results apply to the sample as received
Location: Material Analysis

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Accredited for compliance with ISO/IEC 17025 - Testing
[redacted]
Approved Signatory: T[redacted]
NATA Accredited Laboratory Number: 15357

Determination of pinhole dispersion classification of a soil (AS 1289.3.8.3)				
Sample Number	P24-15569A	P24-15569B	P24-15569C	P24-15569D
Date Sampled	17/07/2024	17/07/2024	17/07/2024	17/07/2024
Sample Location	B24-15842K	B24-15842L	B24-15842M	B24-15842N
Sample Depth	**	**	**	**
Material	**	**	**	**
Pinhole Dispersion Classification	D1 Highly dispersive	ND2 Erosion resistant	D1 Highly dispersive	D1 Highly dispersive
Rate of Flow on completion (ml/s)	0.90	4.9	0.5	0.7
Natural Moisture Content (%)	13.4	17.8	2.8	17.5
Moisture Content Before Testing (%)	17.2	15.2	22.8	17.9
Standard Maximum Dry Density (t/m^3)	1.76	1.82	1.61	1.74
Time Matured in Cylinder (hh:mm)	24:00	24	24	24
Method of Moisture Determination for Remoulding	OMC	OMC	OMC	OMC
Source of Water Used	Melbourne Tap Water	Melbourne Tap Water	Melbourne Tap Water	Melbourne Tap Water
Was Hole Reformed at 50mm Head	N	N	N	N

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Results relate only to the items tested/sampled.

Material Test Report

Report Number: **P241940-1**
Issue Number: 1
Date Issued: 14/08/2024
Client: Geotechnical Testing Services
[redacted]
Project Number: P241940
Project Name: Material Analysis Project - Cohuna WTP - #P24217
Work Request: 15569
Date Sampled: 17/07/2024
Dates Tested: 17/07/2024 - 30/07/2024
Sampling Method: Sampled by Client
The results apply to the sample as received
Location: Material Analysis

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Pakenham Laboratory
[redacted]
Accredited for compliance with ISO/IEC 17025 - Testing
[redacted]
Approved Signatory:
NATA Accredited Laboratory Number: 15357

Determination of pinhole dispersion classification of a soil (AS 1289.3.8.3)				
Sample Number	P24-15569E	P24-15569F	P24-15569G	P24-15569H
Date Sampled	17/07/2024	17/07/2024	17/07/2024	17/07/2024
Sample Location	B24-15842O	B24-15842P	B24-15842Q	B24-15842R
Sample Depth	**	**	**	**
Material	**	**	**	**
Pinhole Dispersion Classification	ND2 Erosion resistant	D1 Highly dispersive	D2 Dispersive	ND2 Erosion resistant
Rate of Flow on completion (ml/s)	3.75	0.6	0.35	3.7
Natural Moisture Content (%)	17.8	3.5	1.9	1.6
Moisture Content Before Testing (%)	15.5	19.4	16.3	15.0
Standard Maximum Dry Density (t/m^3)	1.84	1.66	1.76	1.80
Time Matured in Cylinder (hh:mm)	24	24	60	24
Method of Moisture Determination for Remoulding	OMC	OMC	OMC	OMC
Source of Water Used	Melbourne Tap Water	Melbourne Tap Water	Melbourne Tap Water	Melbourne Tap Water
Was Hole Reformed at 50mm Head	N	N	N	N

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Triaxial Permeability Test Report

Report Number: **11573-3**
Date Issued: 13/08/2024
Client: Geotechnical Testing Services Pty Ltd
[redacted]
Contact: [redacted]
Project Number: 11573
Project Name: Material Analysis Project #P24217
Project Location: Bendigo VIC
Date Sampled: 17/07/2024
Dates Tested: 24/07-12/08/2024
Sampling Method: Sampled by client
Specification: N/A
Sample Identification: P24-15569C
Sample Number: **B24-15842M**
Location: **B24-15842M**
Material Description: silty CLAY trace gravel, brown

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Approved Signatory: [redacted]

NATA Accredited Laboratory Number: 15357

Triaxial Permeability AS 1289 6.7.3-2016	
Permeant Used	De-aired Water
Confining Pressure(kPa)	600
Head Pressure(kPa)	590
Bottom Pressure(kPa)	570
Mean Pressure(kPa)	20
Specimen Height(mm)	70
Specimen Diameter(mm)	63
Length to Height Ratio	1.12
Laboratory Density Ratio(%)	98
Laboratory Moisture Ratio(%)	98
Compactive Effort	Standard
Material Retained on the 37.5mm sieve (%)	0
Final Moisture Content (%)	28.8
Permeability(m/s)	**4.E-11**

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Triaxial Permeability Test Report

Report Number: **11573-2**
Date Issued: 9/08/2024
Client: Geotechnical Testing Services Pty Ltd
Contact: [redacted]
Project Number: 11573
Project Name: Material Analysis Project #P24217
Project Location: Bendigo VIC
Date Sampled: 17/07/2024
Dates Tested: 24/07-08/08/2024
Sampling Method: Sampled by client
Specification: N/A
Sample Identification: P24-15569B
Sample Number: **B24-15842L**
Location: **B24-15842L**
Material Description: silty CLAY trace gravel, brown

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Approved Signatory: [redacted]

NATA Accredited Laboratory Number: 15357

Triaxial Permeability AS 1289 6.7.3-2016	
Permeant Used	De-aired Water
Confining Pressure(kPa)	600
Head Pressure(kPa)	590
Bottom Pressure(kPa)	570
Mean Pressure(kPa)	20
Specimen Height(mm)	70
Specimen Diameter(mm)	63
Length to Height Ratio	1.12
Laboratory Density Ratio(%)	98
Laboratory Moisture Ratio(%)	100
Compactive Effort	Standard
Material Retained on the 37.5mm sieve (%)	0
Final Moisture Content (%)	27.6
Permeability(m/s)	**2.E-10**

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Results relate only to the items tested/sampled.

Triaxial Permeability Test Report

Report Number: **11573-4**
Date Issued: 14/08/2024
Client: Geotechnical Testing Services Pty Ltd
[redacted]
Contact: [redacted]
Project Number: 11573
Project Name: Material Analysis Project #P24217
Project Location: Bendigo VIC
Date Sampled: 17/07/2024
Dates Tested: 18/07-13/08/2024
Sampling Method: Sampled by client
Specification: N/A
Sample Identification: P24-15569D
Sample Number: **B24-15842N**
Location: **B24-15842N**
Material Description: silty CLAY trace gravel,brown

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Approved Signatory: [redacted]

NATA Accredited Laboratory Number: 15357

Triaxial Permeability AS 1289 6.7.3-2016	
Permeant Used	De-aired Water
Confining Pressure(kPa)	600
Head Pressure(kPa)	590
Bottom Pressure(kPa)	570
Mean Pressure(kPa)	20
Specimen Height(mm)	70
Specimen Diameter(mm)	63
Length to Height Ratio	1.11
Laboratory Density Ratio(%)	98
Laboratory Moisture Ratio(%)	101
Compactive Effort	Standard
Material Retained on the 37.5mm sieve (%)	0
Final Moisture Content (%)	21.9
Permeability(m/s)	**6.E-11**

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Results relate only to the items tested/sampled.

Triaxial Permeability Test Report

Report Number: **11573-5**
Date Issued: 7/08/2024
Client: Geotechnical Testing Services Pty Ltd
[redacted]
Contact: [redacted]
Project Number: 11573
Project Name: Material Analysis Project #P24217
Project Location: Bendigo VIC
Date Sampled: 17/07/2024
Dates Tested: 18/07-06/08/2024
Sampling Method: Sampled by client
Specification: N/A
Sample Identification: P24-15569E
Sample Number: **B24-15842O**
Location: **B24-15842O**
Material Description: silty CLAY trace gravel, brown

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Approved Signatory: [redacted]

NATA Accredited Laboratory Number: 15357

Triaxial Permeability AS 1289 6.7.3-2016	
Permeant Used	De-aired Water
Confining Pressure(kPa)	600
Head Pressure(kPa)	590
Bottom Pressure(kPa)	570
Mean Pressure(kPa)	20
Specimen Height(mm)	102
Specimen Diameter(mm)	100
Length to Height Ratio	1.02
Laboratory Density Ratio(%)	98
Laboratory Moisture Ratio(%)	100
Compactive Effort	Standard
Material Retained on the 37.5mm sieve (%)	0
Final Moisture Content (%)	17.3
Permeability(m/s)	**2.E-10**

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Triaxial Permeability Test Report

Report Number: **11573-6**
Date Issued: 12/08/2024
Client: Geotechnical Testing Services Pty Ltd [redacted]
Contact: [redacted]
Project Number: 11573
Project Name: Material Analysis Project #P24217
Project Location: Bendigo VIC
Date Sampled: 17/07/2024
Dates Tested: 24/07-09/08/2024
Sampling Method: Sampled by client
Specification: N/A
Sample Identification: P24-15569F
Sample Number: **B24-15842P**
Location: **B24-15842P**
Material Description: silty CLAY trace gravel, grey

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NATA WORLD RECOGNISED ACCREDITATION

Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: [redacted]

NATA Accredited Laboratory Number: 15357

Triaxial Permeability AS 1289 6.7.3-2016	
Permeant Used	De-aired Water
Confining Pressure(kPa)	600
Head Pressure(kPa)	590
Bottom Pressure(kPa)	570
Mean Pressure(kPa)	20
Specimen Height(mm)	70
Specimen Diameter(mm)	63
Length to Height Ratio	1.11
Laboratory Density Ratio(%)	98
Laboratory Moisture Ratio(%)	99
Compactive Effort	Standard
Material Retained on the 37.5mm sieve (%)	0
Final Moisture Content (%)	27.0
Permeability(m/s)	**6.E-10**

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Triaxial Permeability Test Report

Report Number: **11573-7**
Date Issued: 12/08/2024
Client: Geotechnical Testing Services Pty Ltd
[redacted]
Contact: [redacted]
Project Number: 11573
Project Name: Material Analysis Project #P24217
Project Location: Bendigo VIC
Date Sampled: 17/07/2024
Dates Tested: 24/07-09/08/2024
Sampling Method: Sampled by client
Specification: N/A
Sample Identification: P24-15569G
Sample Number: **B24-15842Q**
Location: **B24-15842Q**
Material Description: silty CLAY, grey

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Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: [redacted]

NATA Accredited Laboratory Number: 15357

Triaxial Permeability AS 1289 6.7.3-2016	
Permeant Used	De-aired Water
Confining Pressure(kPa)	600
Head Pressure(kPa)	590
Bottom Pressure(kPa)	570
Mean Pressure(kPa)	20
Specimen Height(mm)	70
Specimen Diameter(mm)	63
Length to Height Ratio	1.11
Laboratory Density Ratio(%)	98
Laboratory Moisture Ratio(%)	100
Compactive Effort	Standard
Material Retained on the 37.5mm sieve (%)	0
Final Moisture Content (%)	20.8
Permeability(m/s)	**3.E-10**

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Triaxial Permeability Test Report

Report Number: **11573-8**
Date Issued: 12/08/2024
Client: Geotechnical Testing Services Pty Ltd
Contact: [redacted]
Project Number: 11573
Project Name: Material Analysis Project #P24217
Project Location: Bendigo VIC
Date Sampled: 17/07/2024
Dates Tested: 24/07-09/08/2024
Sampling Method: Sampled by client
Specification: N/A
Sample Identification: P24-15569H
Sample Number: **B24-15842R**
Location: **B24-15842R**
Material Description: silty CLAY, yellow/brown

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Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: [redacted]

NATA Accredited Laboratory Number: 15357

Triaxial Permeability AS 1289 6.7.3-2016	
Permeant Used	De-aired Water
Confining Pressure(kPa)	600
Head Pressure(kPa)	590
Bottom Pressure(kPa)	570
Mean Pressure(kPa)	20
Specimen Height(mm)	70
Specimen Diameter(mm)	63
Length to Height Ratio	1.11
Laboratory Density Ratio(%)	98
Laboratory Moisture Ratio(%)	99
Compactive Effort	Standard
Material Retained on the 37.5mm sieve (%)	0
Final Moisture Content (%)	18.9
Permeability(m/s)	**8.E-09**

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DESCRIPTIVE TERMS
BOREHOLE/EXCAVATION LOG

Classification Symbol & Soil Name

Classification of material and its description is based on the Unified Classification System as referenced in AS1726 – 1993 Geotechnical Site Investigations, Appendix A. A summary of the more common terms is included within.

Particle Size Descriptive Terms

Name	Subdivision	Size
Boulders		>200mm
Cobbles		63 – 200mm
Gravel	Coarse	20 – 63mm
	Medium	6 – 20mm
	Fine	2.36 – 6mm
Sand	Coarse	0.6 – 2.36mm
	Medium	200 – 600 micron
	Fine	75 – 200 micron
Silt		2 – 75 micron
Clay		< 2 micron

Consistency of Cohesive Soils

Term	Undrained shear strength, s_u (kPa)	Field Guide
Very Soft (VS)	<12	A finger can be pushed well into the soil with little effort
Soft (S)	12 – 25	A finger can be pushed into the soil to about 25mm depth
Firm (F)	25 – 50	The soil can be indented about 5mm with the thumb
Stiff (St)	50 – 100	The surface of the soil can be indented with the thumb
Very Stiff (VSt)	100 – 200	The surface of the soil can be indented by thumb nail
Hard (H)	>200	The surface of the soil can be marked only with the thumbnail
Friable (F)	-	Crumbles or powders when scraped by thumbnail

Density of Granular Soils

Term	Density Index (%)
Very Loose (VL)	< 15
Loose (L)	15 – 35
Medium Dense (MD)	35 – 65
Dense (D)	65 – 85
Very Dense (VD)	> 85

Minor Components

Term	Field Guide	Proportion of Minor Component In:
Trace of	Presence just detectable by feel or eye	Coarse grained soils: <5% Fine grained soils: <15%
Some	Presence easily detectable by feel or eye	Coarse grained soils: 5-12% Fine grained soils: 15-30%

Moisture Condition

Dry (D) Looks & feels dry. Cohesive soils are usually hard, powdery or friable. Granular soils run freely through the hand.

Moist (M) Soil feels cool and darkened in colour. Cohesive soils can be moulded. Granular soils tend to cohere. Free water does not form.

Wet (W) As for moist, but with free water forming on hands when remoulded.

Method

S Auger Screwing
D Auger Drilling
R Roller/tricone
W Washboring
N Natural Exposure
E Existing Excavation
B Blade/bucket
C Coring
H Hammer Drill

Support

***** Nil
C Casing
M Mud/polymer

Water

* Not observed
Observed water level (date shown)
Observed water inflow
Observed water outflow
R Refer to report for details

Notes, Samples, Tests

U63 Undisturbed sample, 63mm diameter
D Disturbed sample
N* Standard Penetration Test, (*) Sample Figure = results

Structures, Additional Observations

PP Pocket Penetrometer test (kPa)
DCP Dynamic Cone Penetrometer test (blows/100mm)

Surface

Known boundary
Probably boundary
Possible boundary

Appendix D

Key design documents

Coliban Water

Basis of Design Report – Cohuna WRP Lagoons Design

4 July 2025

Coliban Water

Basis of Design Report – Cohuna WRP Lagoons Design

[redacted]

Prepared for:

[redacted]

Prepared by: [redacted]
Reviewed:
Approved:
Version: 2.0
Date: 4/07/2025

Fifteen50 Consulting PTY LTD
ABN 21 630 372 208

Document status

Version	Purpose of Document	Prepared By	Reviewed By	Review Date
1.0	BOD Report - DRAFT	[redacted]	[redacted]	19/05/2025
2.0	BOD for final review	[redacted]	[redacted]	04/07/2025

Approval for issue

Name	Signature	Date

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We have prepared this report for the sole use of Coliban Water ('Client') for the specific purpose of only for which it is supplied ('Purpose'). This report is strictly limited to the purpose and the facts and matters stated in it and does not apply directly or indirectly and shall not be used for any other application, purpose, use or matter.

FIFTEEN50

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1. Introduction

1.1 Problem Statement

The Cohuna Water Reclamation Plant (WRP), located approximately 1.5 km south of Cohuna in northern Victoria, serves a local population of around 2,000. The facility comprises four treatment and evaporation lagoons and currently operates as a disposal scheme, with no mechanical treatment, effluent reuse or regulated discharge. The reticulation network in Cohuna intakes considerable volumes of saline groundwater. Inflows are also impacted by wash water flow rates from the town water treatment plant. Further, the existing lagoon embankments and floors are in varying condition, seepage from at least one lagoon has been confirmed, resulting in offsite impacts.

The existing lagoon surface area is insufficient to evaporate incoming flows for the business planning horizon, with demands projected to reach up to 290 ML/year by 2040. The target is 100% flow containment on site.

Coliban Water engaged Fifteen50 to undertake the design of upgrades to the facility, including the relining/refurbishment of lagoons 3 and 4 and development of a new 'greenfield' evaporation site to support compliance with EPA licence requirements. Initial design has this site set up as two new lagoons – 5 and 6 – which will share a common lengthwise embankment.

1.2 Project Scope

The scope of works from design through implementation includes the following primary items:

- Design and construction of additional lagoon/s (15 Ha surface area, approx. 2m high embankments) for evaporation disposal capacity and winter storage, to be constructed on property 2/PS428326
- Design and construction of a pump station to transfer wastewater from lagoons 3 and 4 to new lagoons 5 and 6
- Relining and remediation of lagoon 3 and 4 on the existing WRP property
- Upgraded WRP lagoons are to meet containment compliance regulations and EPA licence operating conditions

2. Site Description

Coliban Water advises that Lagoon 3 is currently offline and undergoing drying, while Lagoon 4 remains operational and inundated, with water depths reaching approximately 2 m in the lower sections of the floor (borrow pits). The embankments of Lagoon 4 exhibit variable structural integrity and may require reconstruction or repair. Vegetation across Lagoons 3 and 4 includes dense grassy swampland growth up to 2 m in height.

The existing WRP site does not have mains power connection and relies on limited infrastructure. The adjacent property, proposed for Lagoons 5/6, was formerly farmland with bay irrigation and contains legacy infrastructure such as channels, drains, fencing, and livestock facilities. The southeast corner of this property is leased for composting operations; however, no geotechnical investigations have been conducted in the leased area. A SWER (Single Wire Earth Return) overhead power line traverses the site and will require removal as part of the works.

3. Standard and Supporting Documents

The proposed design is based on the following standards and supporting documents:

- Victorian Guideline for Water Recycling, Publication 1911.2 March 2021 by Environmental Protection Authority Victoria
- Correspondence with Coliban Water regarding lagoon design and requirements
- Geotechnical report 24C 0548 dated Sept 2024 – Proposed Lagoon 5 and 6 Land

- Geotechnical report 24C 0548-1 March 2025 – Lagoon 3
- Geotechnical report 13C 434 June 2013 – Lagoon 4
- Geotechnical report 13C 807 Sept 2013 – Lagoon 4

4. Design Criteria

4.1 Lagoon Design

To achieve constructability without compromising lagoon system capacity, flexibility and compliance, the target final lagoon floor depth parameters were amended. The revised lagoon sizes are shown in the following Table 1.

Table 1: Design areas and volumes for revised lagoon floor depths (source Coliban Water)

Lagoon No.	Modelled Area (ha)	Volume (ML)	Average depth (m)
3	7.9	79.0	1.0
4	11.7	117.0	1.0
5	7.5	75	1.0
6	7.5	75	1.0

Note: the new lagoon design (Lagoons 5 & 6) has been set out as two separate lagoons (with a common wall).

The basis for the lagoon earthworks design is in accordance with Technical Information for the Victorian Guideline for Water Recycling (Technical information for the Victorian guideline for water recycling, 2021). This includes requirements for the design of lagoon embankments and base liners to minimise seepage, ensure structural stability, and protect underlying groundwater. Design considerations include material selection, compaction standards and embankment geometry, informed by site-specific geotechnical assessments.

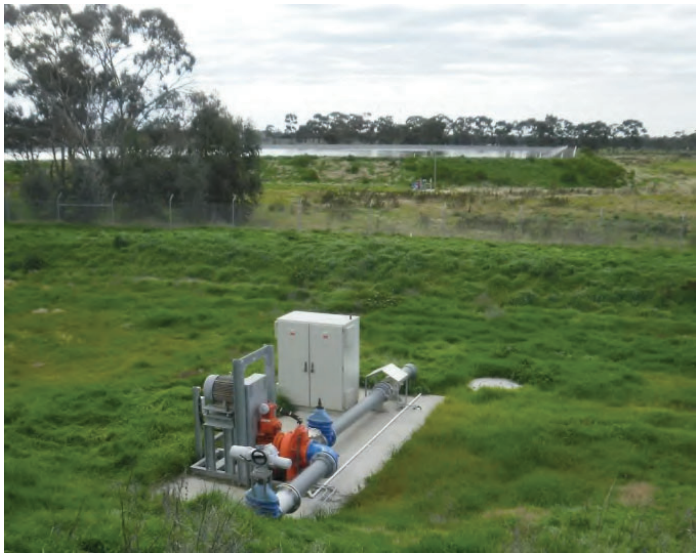
4.2 Pump Station Design

The anticipated pumping solution type is design is for self-priming end suction centrifugal pumps, situated at ground level adjacent to the lagoon 3 / lagoon 4 embankments.

Envirotech Water has provided a suitable model option based on the draft design, utilising units manufactured by Pioneer Pumps. The pumps would use a vacuum priming assist system to ensure function at all lagoon operating levels.

These pumps are suited to high pressure sewage and trash applications. The large stainless-steel impeller eye provides for a lower NPSHr and vapor-handling capabilities.

The installed facility would have similarities to Coliban Water's existing brine pump at Epsom WRP as shown below, with a pumping facility to be situated outside of the lagoon embankments at ground level, drawing suction flow from a pit inside each of lagoons 3 and 4 and then transferring direct to the pipeline that crosses Chuggs Rd and supplies new lagoons 5 and 6 (see also Figure 5).



4.3 Transfer Pipeline

Based on a pump duty of:

- Dynamic head loss 6.5m
- Static lift 3.0m

TOTAL: **9.5m**

- Flow rate 15.0 l/s

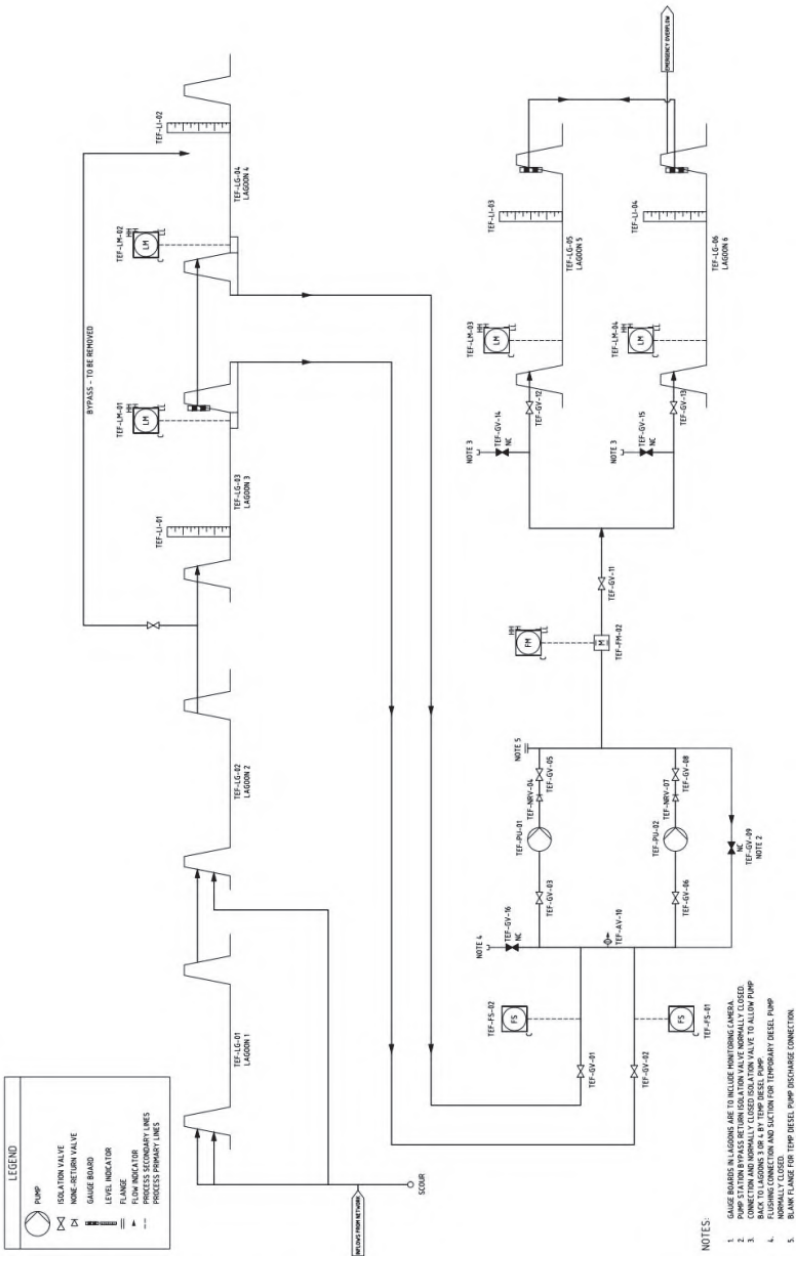
A suitable pipe design consists of 200mm PN16 HDPE. The design will ensure sufficient velocity to transfer raw sewage without fostering settlement and pipe sludging over time.

5. Basis of Design

Earth work modelling was conducted using 12D software. This generated accurate earthwork modelling horizontal and vertical alignment, batters, ensuring proper slopes and patterns. This tool also provides direct support to the preparation of plan drawings, long. sections and cross section drawings, and cut/fill quantity calculations.

5.1 Site P&ID

FIFTEEN50


LEGEND
PUMP
ISOLATION VALVE
NONE-RETURN VALVE
GAUGE BOARD
LEVEL INDICATOR
FLANGE
FLOW INDICATOR
PROCESS SECONDARY LINES
PROCESS PRIMARY LINES
BYPASS - TO BE REMOVED
TEF-LG-01 LAGOON 1
TEF-LG-02 LAGOON 2
TEF-LG-03 LAGOON 3
TEF-LG-04 LAGOON 4
TEF-LG-05 LAGOON 5
TEF-LG-06 LAGOON 6
TEF-LI-01
TEF-LI-02
TEF-LI-03
TEF-LI-04
TEF-LM-01
TEF-LM-02
TEF-LM-03
TEF-LM-04
TEF-GV-01
TEF-GV-02
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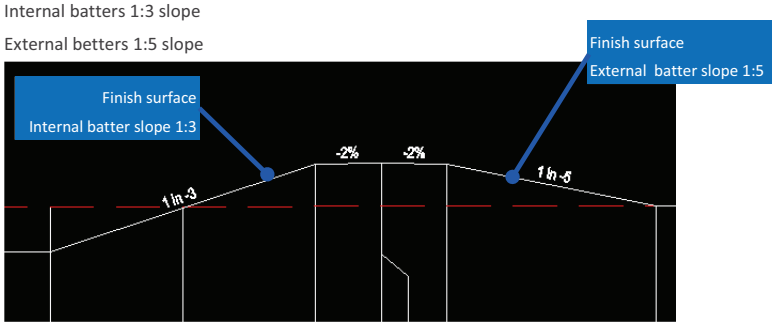
TEF-GV-14
TEF-GV-15
TEF-GV-16
TEF-PU-01
TEF-PU-02
TEF-MRV-04
TEF-MRV-07
TEF-AV-10
TEF-FM-02
TEF-FS-01
TEF-FS-02
NOTE 2
NOTE 3
NOTE 4
NOTE 5
NC
SCOUR
NOTES:
1. GAUGE BOARDS IN LAGOONS ARE TO INCLUDE MONITORING CAMERA.
2. CHANGE FLOW PATH SCHEDULE FOR DIESEL PUMP. NORMALLY CLOSED.
3. CONNECTION AND NORMALLY CLOSED ISOLATION VALVE TO ALLOW PUMP BACK TO LAGOONS 3 OR 4 BY TEMP DIESEL PUMP
4. FLUSHING CONNECTION AND SUCTION FOR TEMPORARY DIESEL PUMP NORMALLY CLOSED.
5. BLANK FLANGE FOR TEMP DIESEL PUMP DISCHARGE CONNECTION.

5.2 Lagoon Earthworks Design

5.2.1 Design References

Table 2 describes the source parameters for each lagoon in scope.

Table 2: Basis of Design for Lagoons 3/4/5/6 Earthworks

Parameter	Value	Reference source or comment
New lagoon liner design	600mm Clay Liner with permeability less than $1x10^{-9}$ m/s According to Table 20 of EPA 2021, it can use 300mm clay liner but it required special care during the construction phase to avoid cracking and to ensure an even thickness and compaction.	EPA 2021 Table 20
Existing lagoon lining	600mm Clay Liner with permeability less than $1x10^{-9}$ m/s	
Lagoon batters	For lagoon 4 (except for common wall between lagoon 3 and 4), lagoon 5 and 6; Internal batters 1:3 slope External betters 1:5 slope 	
Wind induces wave heights	Fetch length 406m Hs = 0.36m	Jonswap Eq
Rock beaching	225mm thickness 150mm D50 rock from inside crest down to internal better toe.	
Crest width	3m	
Crest slope	2% fall towards both side from the control line	
Buffer	30m buffer from the property boundary/fences	
Freeboard	1m for proposed lagoons and 600mm for relining lagoons	

5.2.2 Design Solution

The proposed new greenfield lagoon has been designed as two separate lagoons i.e. Lagoon 5 and Lagoon 6, with one common embankment. The required design depth, full supply level (FSL) area and storage volume for the proposed lagoons have been established through the earthworks design.

The FSL area of Lagoon 4 and the storage volumes of both Lagoons 3 and 4 are marginally below the specified targets. It is to be noted that lagoon 3 and lagoon 4 has been designed by following the general layout and geometry of the existing lagoons. The following Table 3 provides a summary:

Table 3: Design Parameters/Outputs

Lagoon No.	FSL – Full Supply Level (or TWL) (RL m)	Operational Depth (m)	Design Free Board (m)	Target Surface Area @ FSL (Ha)	Design Surface Area @ FSL (Ha)	Target Volume (ML)	Design Volume (ML)
3	81.30	1.0	0.6	7.9	8.0	79	79
4	81.00	1.0	0.6	11.7	11.2	117	110
5	80.05	1.0	1.0	7.5	8.1	75	79
6	80.05	1.0	1.0	7.5	7.8	75	76
			Total	**34.6**	**35.1**	**346**	**344**

5.2.3 Earth Work Quantity Calculation

Quantity calculations have been undertaken primarily to estimate the volume of liner clay material required for the construction of proposed Lagoons 5 and 6, as well as the relining of existing Lagoons 3 and 4. The liner clay must achieve a permeability of less than 1×10^{-9} m/s to meet containment requirements. Clay volume estimates are based on findings from the following geotechnical investigation reports:

- Geotechnical Report 24C 0548 (September 2024) – Proposed Lagoon 5 and 6 site
- Geotechnical Report 24C 0548-1 (March 2025) – Lagoon 3
- Geotechnical Report 13C 434 (June 2013) – Lagoon 4
- Geotechnical Report 13C 807 (September 2013) – Lagoon 4
- Geotechnical Report 16C 0144 (March 2016) – Lagoon 4

Figure 1 illustrates the locations of boreholes assessed by the geotechnical investigation:

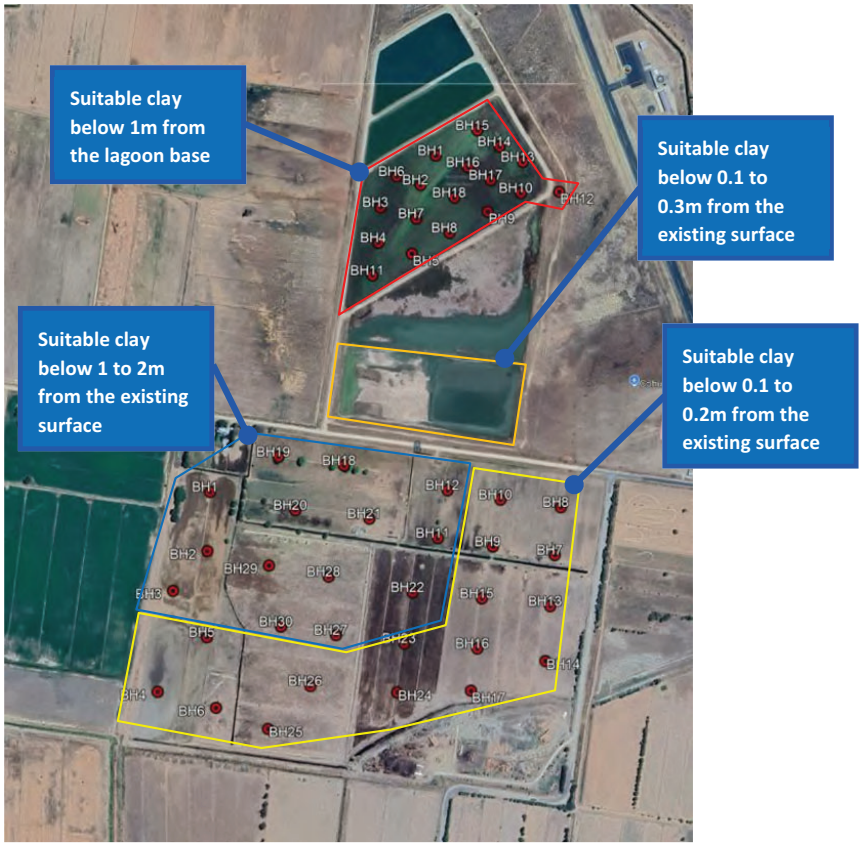


Figure 1: Locations of Bore Holes for Geotechnical Investigations / Depths of Material for Clay Liner

The purpose of the above diagram is to broadly 'characterise' the depth locations of suitable available clay. For the purposes of the clay balance calculation below, borrow volumes are only sourced from the lagoon 3/4/5/6 footprints.

5.2.3.1 New Lagoons 5 and 6

Based on the results of permeability, Emerson Class and pinhole dispersion testing (Refer (Geotechnical report 24C 0548 – Proposed Lagoon 5 and 6 Land, 2024), the medium to high plasticity clays present across the site have been assessed as suitable for use in the embankments and base liners of the wastewater lagoons. These suitable clay layers have found beneath the topsoil layer (0.1 to 0.2m depth) along the southern and eastern boundaries of the Lot and at greater depths between 1.5 and 2.0 m along the northern and western boundaries (marked as boreholes BH1 to BH3, BH11, BH12, BH18 to BH22 and BH27 to BH30) - refer Table 4.

Table 4: Permeability (Geotechnical report 24C 0548 – Proposed Lagoon 5 and 6 Land, 2024)

Location & Depth (m)	BH9 (0.6–0.9)	BH12 (0.4–1.3)	BH14 (0.1–0.9)	BH15 (0.2–0.9)	BH18 (0.1–1.0)	BH25 (0.1–0.6)	BH28 (0.1–0.5)	BH30 (0.1–0.7)
Permeability (m/s)	5×10^{-11}	4×10^{-11}	2×10^{-10}	6×10^{-11}	2×10^{-10}	6×10^{-10}	3×10^{-10}	8×10^{-9}

To represent this scenario, it was assumed that within the footprint of proposed Lagoons 5 and 6, suitable clay is present below **1.75 m** and **0.15 m** from the existing surface level, respectively as given in the geotechnical report. Based on this assumption, a Triangulated Irregular Network (TIN) surface (Namely "Clay Liner Surface TIN) was created in 12D for quantity calculations. Similarly, with the available data from the geotechnical investigations, Ground Water Table surface TIN has been created. Section 5.2.3.3 describes the relevant investigation data and impact of the groundwater table for this project.

Following Figure 2 illustrates the existing site condition and individual lagoon TIN surfaces used for 12D modelling purposes.

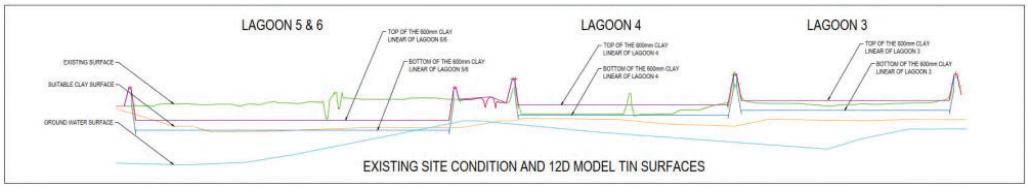


Figure 2: Construction Sequence – 1:Existing Condition

Considering the construction sequence and ongoing operations at Lagoon 4, all required clay liner material will be sourced from over-excavation works at Lagoons 5 and 6, extending down to the groundwater table. Based on the 12D model calculations, approximately 296,271 m³ of suitable clay material can be extracted from this area. The total clay liner volume required for the construction of all lagoon bases and embankment liners is estimated at 232,940 m³.

5.2.3.2 Existing Lagoons 3 and 4

Further, Site investigations for lagoon 3 state that suitable clay for lagoon relining is available below 1m from the lagoon base (Geotechnical report 24C 0548 – Lagoon 3, 2025) and at Lagoon 4, suitable clay material is located beneath the existing base, starting at a depth of approximately 0.1 to 0.3 m and is confined to the southern block—bounded between the middle common wall and the southern embankment. This zone is estimated to contain approximately 39,186 m³ of suitable clay.

Since suitable clay material is located approximately **1m** below the base of existing Lagoon 3 and current operations require Lagoon 4 online, clay extraction calculations were limited to the proposed new lagoon footprint (Lagoons 5 and 6) only.

5.2.3.3 Site Groundwater Constraints

Groundwater levels directly impact the design and clay borrow capability. Levels are represented using data from geotechnical investigation reports– refer Table 5. These levels are shown the SWL identified depths from the existing surface level.

Table 5: Surface Water Level of Lagoon 3/5/6 (Geotechnical report 24C 0548 – Proposed Lagoon 5 and 6 Land, 2024) (Coliban Water, 2016)

Lagoon 5&6

Location	BH3	BH7	BH14	BH19	BH20	BH21	BH23	BH25	BH26	BH27	BH28	BH29	BH30
SWL (m)	2.3	2.1	1.9	1.4	1.6	3.6	3.9	3.6	3.4	3.7	3.5	1.5	3.5

Lagoon 3

Location	BH1	BH3	BH6	BH8	BH12
SWL (m)	1.6	2.4	1.6	3.4	2.3

Figure 4 shows the interaction of the groundwater profile with the proposed lagoons dimensions.

5.2.3.4 Clay Lining Calculation

With available borrow pit areas at Coliban Water's existing and new properties, construction is able to rely on site clay borrowed with no synthetic lining support required.

The lagoon volumes and material quantity estimates were developed using 12D storage and TIN-to-TIN calculations. To determine the volume of suitable clay material, a 12D calculation was performed between the final excavation level TIN (representing the base of the proposed clay liner in Lagoons 5 and 6) and the clay liner surface level TIN. Additionally, to estimate the total recoverable clay volume from the site, another 12D calculation was carried out between the clay liner surface level TIN and the existing ground surface TIN. The results of these calculations are summarised in Table 6.

Table 6: Clay lining volume requirement for lagoons

Lagoon No.	Clay Lining Requirement (600mm Thick) (m^3)
3	51,818
4	72,249
5	53,318
6	51,450

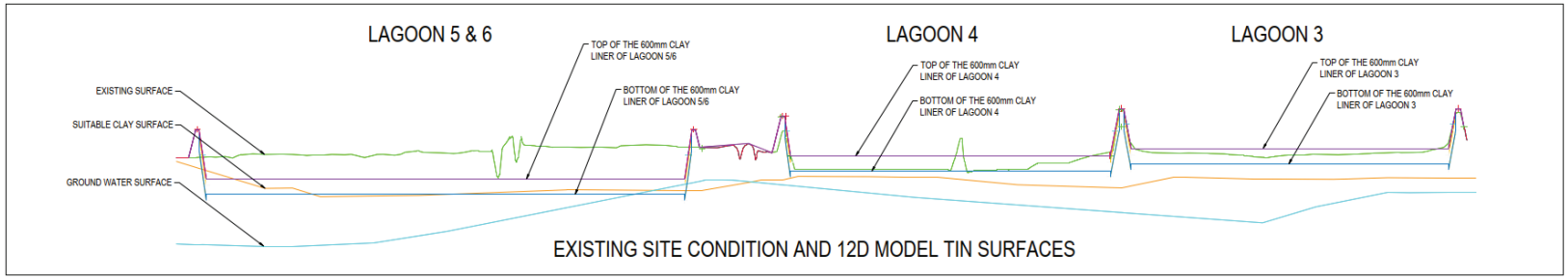
5.2.3.5 Construction Sequence

Table 7 summarises the clay and spoil volume calculations across the lagoon group.

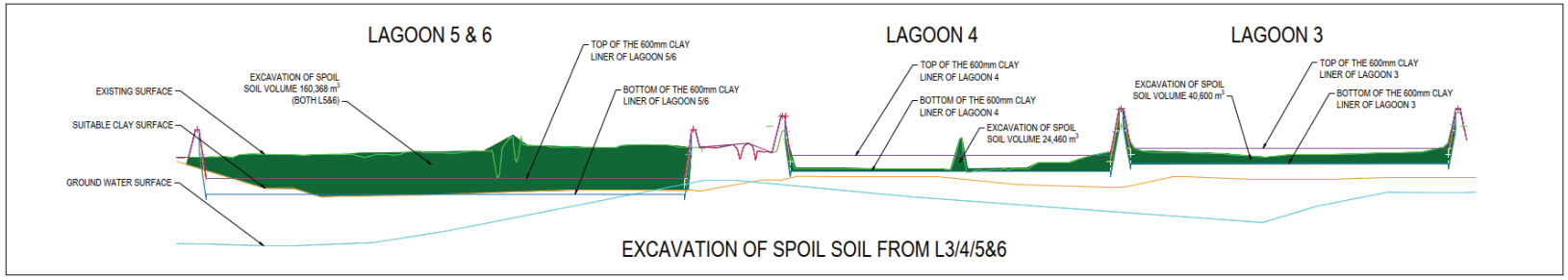
Table 7: Earthworks Volumes & Construction Sequencing

Sequence And Volumes	Total Excavated	Avail. Clay Un-Compacted	Spoil	Fill Void Below Clay Liner	Embankment Fill (General Fill)	Avail. Clay Compacted	Clay Required
Over-excavate L5 and L6 down to g/water level	456,639	296,271	160,368	198,542		237,016	
Construct L5 total					4,690		53,318
Excavate Lagoon 3 floor	40,600		40,600		1,009		
Construct new floor L3							46,039
Refurbish banks L3							5,779
Construct L6 total					4,690		51,450
Excavate Lagoon 4 floor		39,186	24,460	9,226	6,782	31,349	
Construct new floor L4							64,718
Refurbish banks L4							7,531
Clay under common wall L5/L6							4,104
		335,457	**225,428**	**207,768**	**17,170**	**237,016**	**232,940**

Figure 3 and Figure 4 display the design plan and the long-section modelling of the proposed lagoon geometry and associated earthworks.

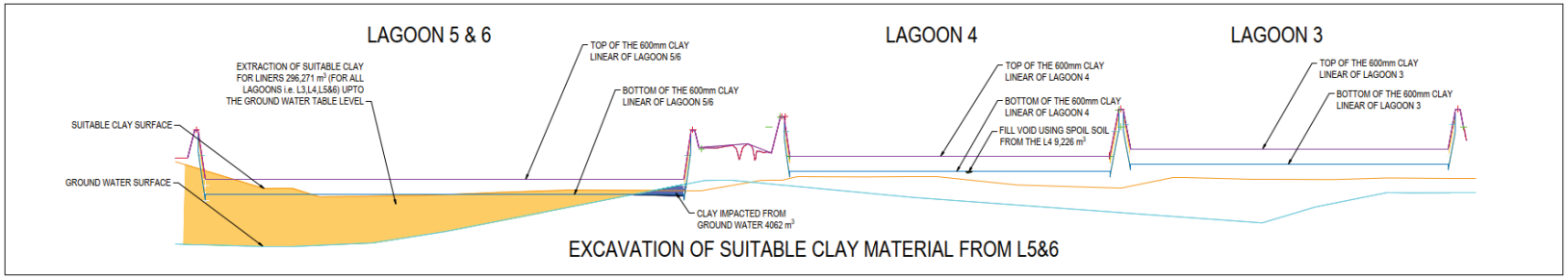


Existing site and the modelling profile is shown in the above picture to demonstrate the lagoon levels and profiles.

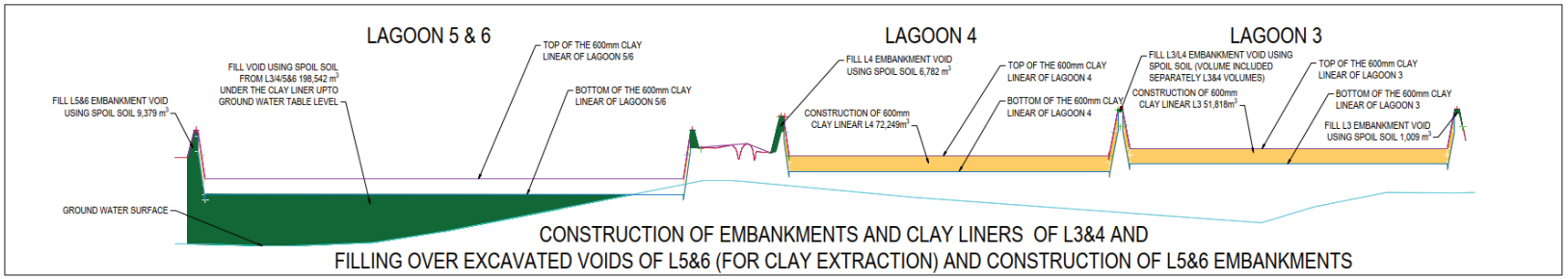


Construction will commence with the progressive excavation of spoil material and clay liner preparation in 50 m or otherwise suitable strips within the lagoons. This includes removing the topsoil layer above the identified clay material in Lagoons 5 and 6 and excavating down to the base of the clay liner in Lagoons 3 and 4. Excavated material will be directly placed, spread and compacted as part of the removal of clay at lagoon 5 & 6 and clay liner construction, minimising double handling and avoiding the need for interim stockpiling.

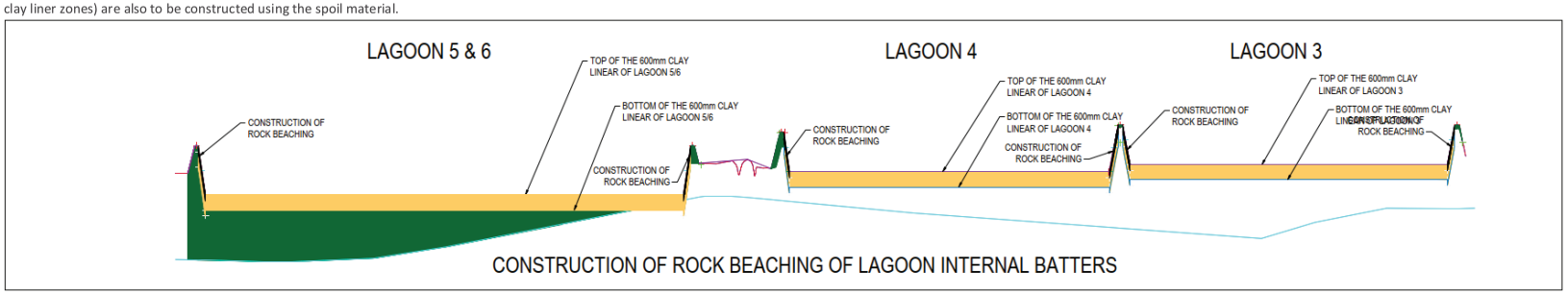
The contractor must plan excavation and liner construction to occur simultaneously within working zones. This staged approach is intended to limit exposed surfaces, reduce spoil management requirements and optimise moisture control in the liner clay. A detailed construction schedule is to be submitted by the contractor prior to commencement, demonstrating how this progressive construction methodology will be implemented efficiently and safely across all lagoon cells. However, there are potential stockpiles for any temporary stockpiling materials.



Once the spoil material has been fully or partially excavated, as identified in the construction plans, the extraction clay liner material to be commenced. Simultaneously, construction of the clay liners for Lagoons 3 and 4 can be undertaken to minimise the need for long-term storage of clay liner material.



During the extraction of clay liner material, resulting voids may be backfilled using spoil material and compacted in accordance with the specified compaction requirements. In addition to backfilling the excavation voids, portions of the embankment fill (outside the clay liner zones) are also to be constructed using the spoil material.



Following the completion of clay liner construction for all four lagoons, the final rock beaching works can be carried out as required.

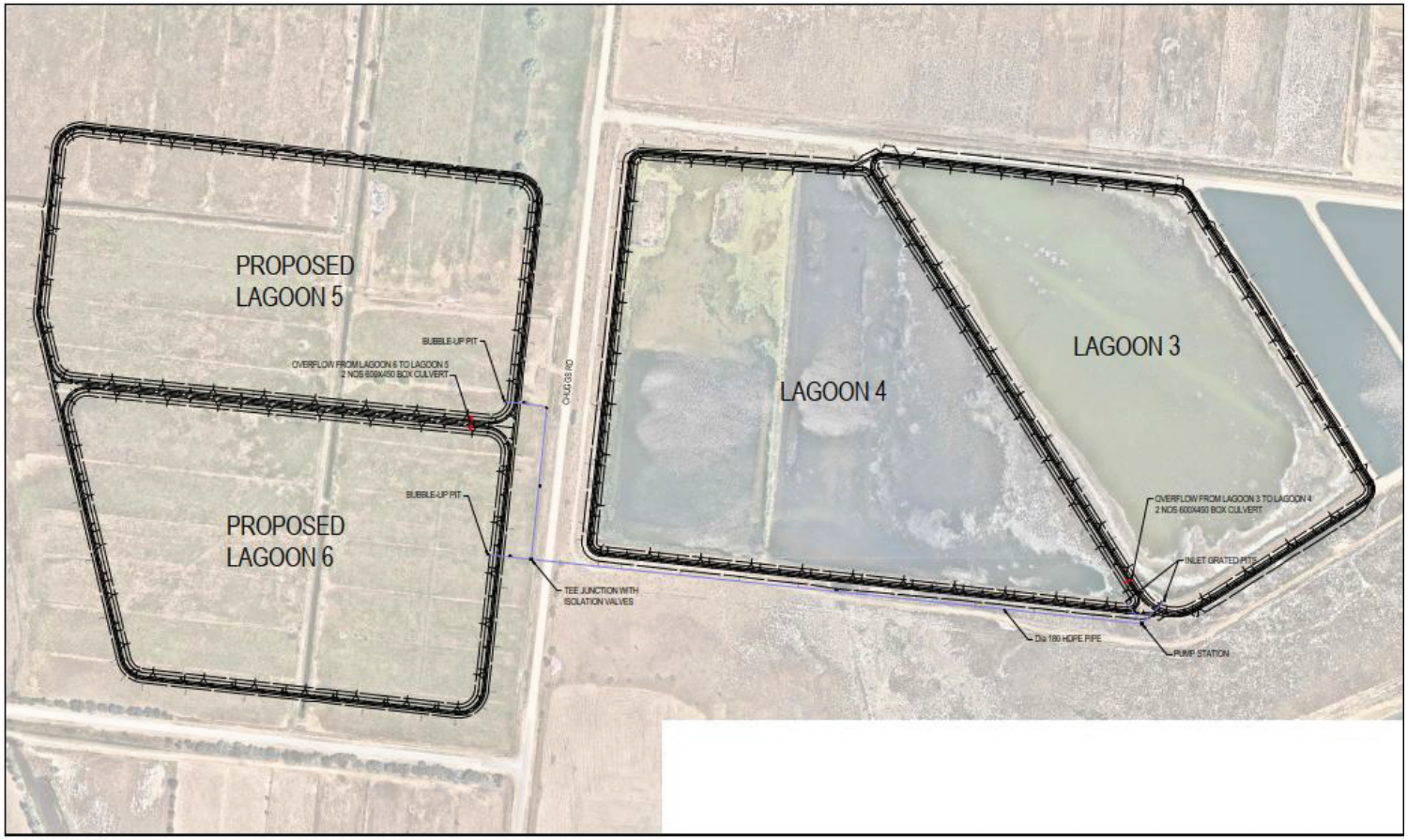
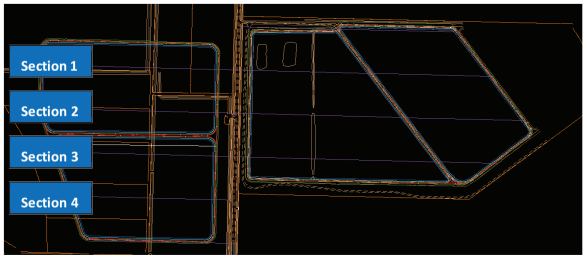
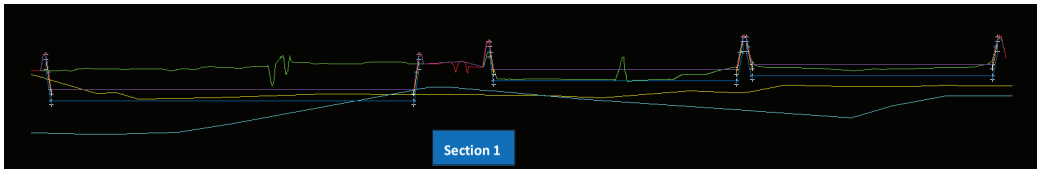
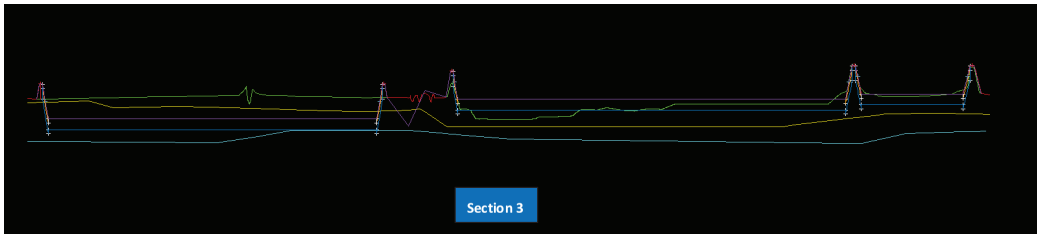


Figure 3: Design Plan of the Lagoons Group, Pump Station, and Transfer Pipeline Alignment



Green	Existing surface
Purple	Lagoon design floor
Blue	Bottom of 600mm clay liner
Orange	Top surface of suitable clay (interpolated)
Cyan	Ground Water Table (interpolated)





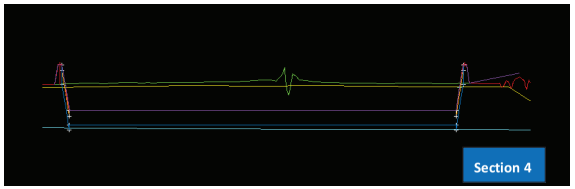


Figure 4: Design Cross Section used Quantity Calculation (12D Model)

5.3 Lagoons 3 and 4 outlet pits and pipework

Two inlet pits in Lagoons 3 and 4 will be constructed as reinforced concrete structures with front openings and fitted with screening units. These pits will serve as the intake points for the new pump station, in turn transferring waste water to new Lagoons 5 and 6.

Figure 5 illustrates the arrangements for the Lagoons 3 & 4 outlet pits and pipework to the new pump station suction line.

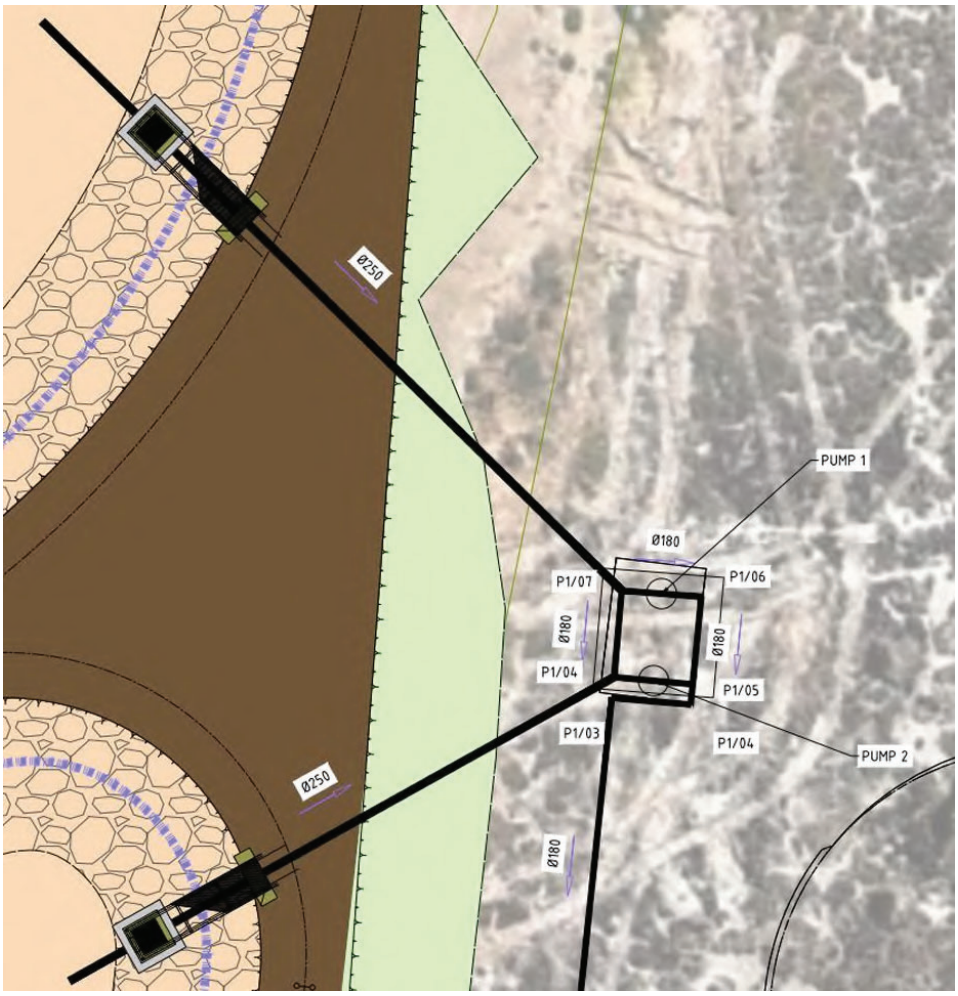


Figure 5: Lagoons 3 & 4 outlet pit/pipework to new pump station

A DN250 PE pipeline is designed to convey flows from the inlet pits to the pump station. The pump station itself will be constructed on a reinforced concrete slab and protected with perimeter safety bollards for operational safety and vehicle impact resistance.

The pump station configuration includes the following:

- Two isolation valves on the inlet lines from Lagoons 3 and 4
- Two non-return valves to prevent backflow
- Two standard centrifugal Pioneer Prime pumps
- Three isolation valves on the outlet lines for flow management to Lagoons 5 and 6
- An additional isolation valve to allow for the future integration of a booster pump

This setup allows for controlled transfer and flexibility in pump operation while ensuring redundancy and provision for future capacity upgrades.

5.4 Overflow culverts between lagoons

Inter-lagoon overflow culverts have been designed to facilitate overflow when the water level rises above the full supply level. The arrangement mirrors the existing configuration between Lagoons 1 and 2.

Each overflow structure comprises a 1200 mm × 300 mm precast concrete box culvert, fitted with proprietary headwalls. The culverts are designed to convey up to 0.3 m³/s of flow under gravity. The outlets will discharge onto a rock-beached batter to prevent scouring and erosion. The culvert slope is set at 0.5% to achieve a flow velocity of approximately 1.35 m/s, which is effective for scouring and minimising sediment build-up.

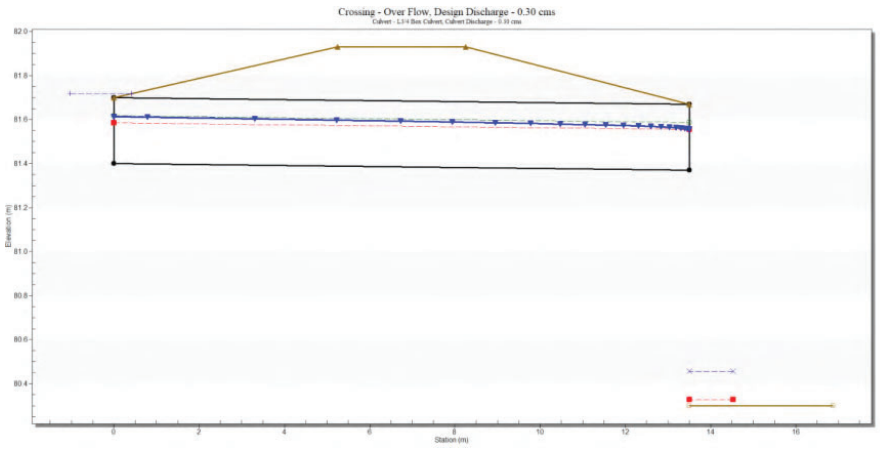


Figure 6: HY-8 Model Snippet

Culvert hydraulic was checked using HY-8 model.

The invert levels (ILs) for all overflow culverts are set 100 mm above the lagoon full supply level (FSL).

5.5 Inlet Pits and Walkways

Two 1500 mm × 900 mm reinforced concrete inlet pits have been designed at Lagoons 3 and 4 to serve dual functions such that directing water towards the new pump station inlets and providing accessible locations for lagoon water sampling.

Each inlet pit includes:

- A front-facing heavy-duty steel bar grate to prevent debris entry.
- A sump depth of 1.0 m below the lagoon base, enabling partial sedimentation before inflow reaches the pumps.
- Side wall connecting HDPE pipework (as per pump station design requirements).

In support of these structures, a 1.5 m wide grated steel walkway is provided, extending from the lagoon crest to the inlet pit access. The walkway is constructed using a galvanised steel frame and steel grating to meet slip-resistance and durability requirements. Safety is ensured with Monowills handrails on three sides, compliant with AS 1657 for elevated platforms and walkways.

A structural load of 5 kPa, as per Table 3.1 of AS/NZS 1170.1, was selected for the walkway structural loading. The current design is at the functional stage and detailed design is required.

The ILs for any pipe connections to the inlet pits are also set 200 mm above the lagoon floor to minimise sediment transport, maintaining water quality for downstream pumping and treatment processes.

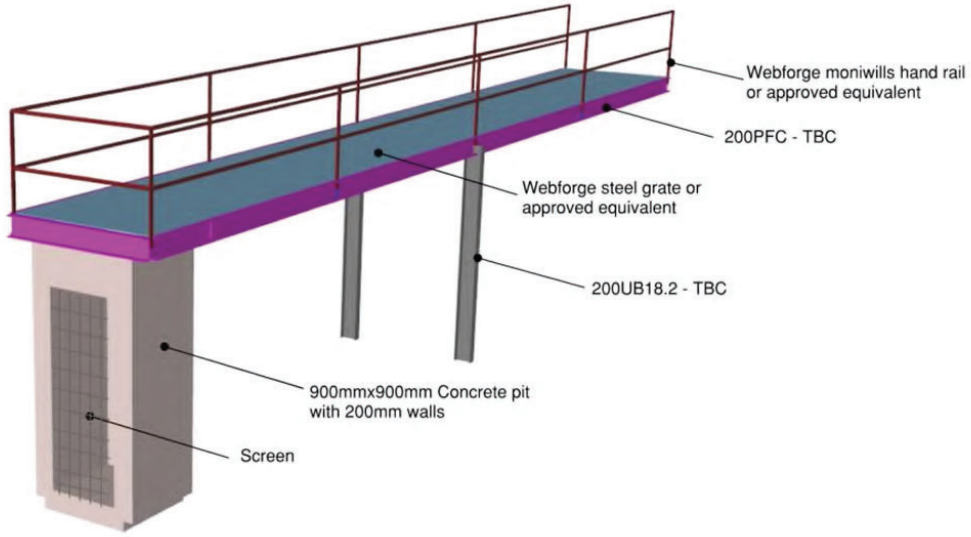


Figure 7: Inlet pits and walkway concept drawing (monowills handrail to be fixed)

5.6 Access Road

Two 4 m wide gravel access roads have been included in the project scope to ensure long-term maintenance and operational access:

- Access Road A: Connects Chuggs Road to the new pump station.
- Access Road B: Provides access from Chuggs Road to the batter crest of Lagoons 5 and 6.

Road alignments have been designed in accordance with Infrastructure Design Manual (IDM) standards for rural road access, including appropriate crossfalls, base preparation and drainage.

Subgrade preparation includes a 150 mm thick Class 3 crushed rock pavement over compacted subgrade (CBR > 10), ensuring structural stability under light vehicle traffic. Turnarounds are incorporated at endpoints to allow for truck and maintenance vehicle maneuvering.

5.7 Site Drainage Design

Given the flat topography and the introduction of new access roads, the drainage design focuses on preserving pre-development flow paths and preventing localised ponding or erosion.

For Access Road A (to the pump station), the following features are included:

- A triangular earth drain along the southern verge, 4 m wide with 1:4 side batters and 0.5 m minimum depth, capable of capturing and redirecting road runoff.
- A 1200 mm × 600 mm box culvert crossing to allow flow continuity in line with the natural drainage pattern.

For Access Road B (to Lagoons 5 and 6), the drainage infrastructure includes:

- A 375 mm diameter RCP culvert to intercept runoff from Chuggs Road.
- A 600 mm × 375 mm box culvert installed beneath the road to allow east-west flow continuity across the embankment.

Hydraulic modelling confirms that these culverts meet capacity requirements for up to the 10% AEP (Annual Exceedance Probability) rainfall event, with flow velocities and depths remaining within safe, non-scouring limits.

In addition, stormwater accumulation within Lagoons 5 and 6 from direct rainfall was assessed using standard runoff calculations. As shown in Table 8, the combined inflow volume during a 1-hour, 1% AEP event results in a 51 mm rise in lagoon water level – well below the 1.0 m freeboard, providing a robust safety margin.

5.8 Emergency Relief Structure (at Lagoon 6)

To safeguard against unexpected inflow surges or structural failures, an emergency relief structure has been incorporated into Lagoon 6. The design includes:

- A 1000 mm × 1000 mm grated pit, with the grate level set 300 mm below the batter crest.
- The pit is connected via 450 mm diameter RCP to the site's existing surface drainage channel.

The emergency structure ensures overflow can be safely redirected away from the lagoon embankments, mitigating risk of overtopping or erosion. Pipe sizing was determined based on a 1% AEP storm event, using Rational Method flow estimates and ensuring the structure can convey peak runoff without surcharge.

The system functions passively and will remain dry under normal operating conditions, activating only in overflow scenarios.

Table 8: Stormwater calculations for lagoons 5 and 6 combined

Lagoon No.	Area (Ha)	Rainfall Intensity (mm/hr for 1%AEP Event)	Run off coefficient	Flow rate (m^3/s)	1 Hour Flow (m^3)	Water Depth (mm)
Lagoon 5	8.06	51.1	1	1.1	4118.66	51.1
Lagoon 6	7.76	51.1	1	1.1	3965.36	51.1

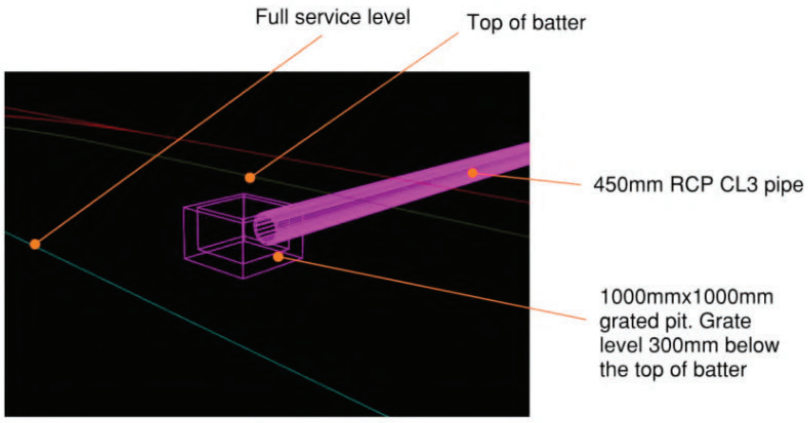


Figure 8: Emergency relief structure

5.9 Electrical Design, Pump Station Interface, SCADA

5.9.1 Electrical Supply to Pump

- A 30A electrical supply will be provided to the pump station to supply the estimated 27kva maximum demand
- The supply cable shall be cross sectional XLPE copper cable
- The duty pump motor will be started/stopped via a DOL starter located in the adjacent control cabinet

5.9.2 Pump Control

There will be a selector switch on the control cubicle that selects either Auto/Off/Manual.

3 x modes of Auto operation will be available – selectable from Coliban Water SCADA:

- **Local Manual Mode:** The operator sets the switchboard's Auto/Off/Man selector to "Man". The applicable pump runs continuously. Software inhibits are ignored; hardwired interlocks still apply. The pump will run until switched back to either "Auto" or "Off".
- **Transfer Time Mode:** Auto/OFF/Manual Selector is in "Auto" position. Operator chooses "Transfer Time Mode" via HMI or SCADA.. A popup prompts the operator to select a run duration (mins).

  The duty pump runs for the operator's selected duration. Once the duration time is exceeded the pump run command is removed. Duty / Standby is toggled.
- **Transfer Volume Mode:** Auto/OFF/Manual Selector is in "Auto" position. Operator chooses "Transfer Volume Mode" via HMI or SCADA. A popup prompts the operator to select a volume (ML) to be transferred.

  The duty pump runs until the operator's selected volume is transferred. Transfer Volume feedback is provided by Flowmeter TEF-FM-02. Once the volume has been transferred the pump run command is removed. Duty / Standby is toggled.

Monitoring / Instrumentation

Instrument	Purpose	Associated Alarm
Discharge Flowmeter at Pump Station	Provide Flow Volume (Volume Mode) Provide Flow Rate (No Flow Protection)	Pump No Flow
Lagoons 3 and 4 - Level Sensor and Gauge Board with Camera	Provide Level feedback for monitoring and pump control	Lagoon Low Level Lagoon High Level
Lagoons 5 and 6 - Site Sentinel and Gauge Board with Camera	Provide Level feedback for monitoring	Lagoon High Level

5.10 Design Assumptions Log

- The suitable clay material for lagoon liner construction has a permeability of less than 1×10^{-9} m/s, as required by regulatory guidelines.
- Technical basis for earthworks and liner design is derived from the Victorian Guideline for Water Recycling (EPA Publication 1911.2, March 2021).
- Within the proposed Lagoon 5 & 6 footprint, suitable clay is assumed to be present between 0.15 m and 1.75 m below the existing surface.
- Suitable clay exists at approximately 1.0 m below the base of existing Lagoon 3, based on recent geotechnical data however this has not been accessed for design
- For Lagoon 4 suitable clay exists approx. 0.3m below the surface in the southern half. For the northern half it is assumed that similar clay conditions to Lagoon 3 apply, based on historical geotechnical reports (2013).
- Due to the uncertainty in clay depth, quality and contamination content at Lagoons 3 & 4, clay extraction has been limited to the proposed new lagoon areas (Lagoons 5 & 6).
- Groundwater levels were assessed using 14 boreholes and inform the minimum depth of excavation to avoid intersecting shallow water tables.
- Material suitability for lining was confirmed through permeability, Emerson Class and Pinhole Dispersion test supporting use of medium to high plasticity clays.

- 12D TIN-to-TIN calculations were used to estimate excavation volumes and suitable clay volumes.
- Final design lagoon surface areas, depths and volumes were based on Coliban Water's revised design criteria.

5.11 Anticipated Construction Sequencing

- Progressively empty Lagoon 3 (bypass in place from Lagoon 2 to Lagoon 4)
- Installation of power supply to Cohuna WRP site as early as practical (by Powercor)
- Construct pump station and pipework to allow future transfer of effluent from Lagoon 3 & 4 to new lagoons as early as practical
- Excavate Lagoon 5 to approximately groundwater level, material stored as spoil and clay stockpile for later use
- Excavate Lagoon 3 to base of new liner, transfer spoil to new lagoon site
- Place and compact clay floor and embankment lining, rock beaching for Lagoon 3
- Re-commission Lagoon 3 and return online
- Progressively empty Lagoon 4 and dewater
- Partially construct Lagoon 5 with available clay
- Excavate Lagoon 6 to approximately groundwater level, material stored as spoil and clay stockpile for later use
- Complete Lagoon 5 using available clay and return online
- Excavate net spoil from Lagoon 4 and place spoil beneath Lagoon 6 up to base of new clay liner
- Use clay stockpile to construct L6 and L4, complete lining and rock beaching, bring online
- All lagoons 3/4/5/6 now functional and online

6. References

Coliban Water. (2013). *eotechnical report 13C 434 – Lagoon 4.*

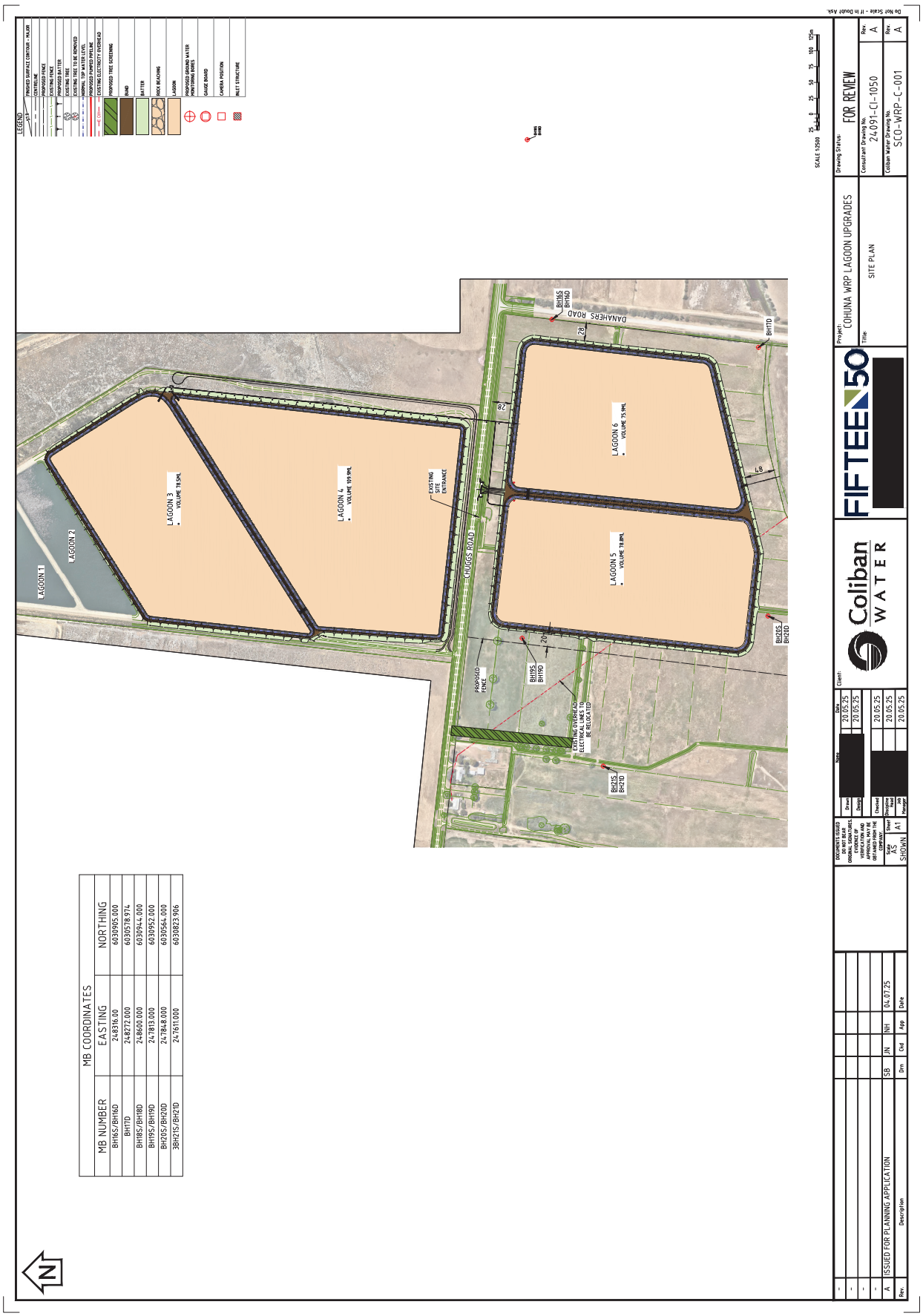
Coliban Water. (2013). *Geotechnical report 13C 807 – Lagoon 4.*

Coliban Water. (2016). *Geotechnical Investigation report 16C 0144 - Lagoon 4.*

Coliban Water. (2024). *Geotechnical report 24C 0548 – Proposed Lagoon 5 and 6 Land.*

Coliban Water. (2025). *Geotechnical report 24C 0548 – Lagoon 3.*

Environmental Protection Authority Victoria. (2021). *Technical information for the Victorian guideline for water recycling.* State of Victoria: EPA .



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BH7D	248272.000	6030518.974
BH8S/BH8D	248600.000	6030944.000
BH9S/BH9D	247813.000	6030952.000
BH10S/BH20D	247848.000	6030564.000
3BH21S/BH21D	247611.000	6030823.906

Rev.	Description	Drn	Chd	App	Date
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Project: COHUNA WRP LAGOON UPGRADES

Title: SITE PLAN

FIFTEEN 50 [redacted]

Drawing Status: FOR REVIEW

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Coliban Water Drawing No: SCO-WRP-C-001 Rev. A

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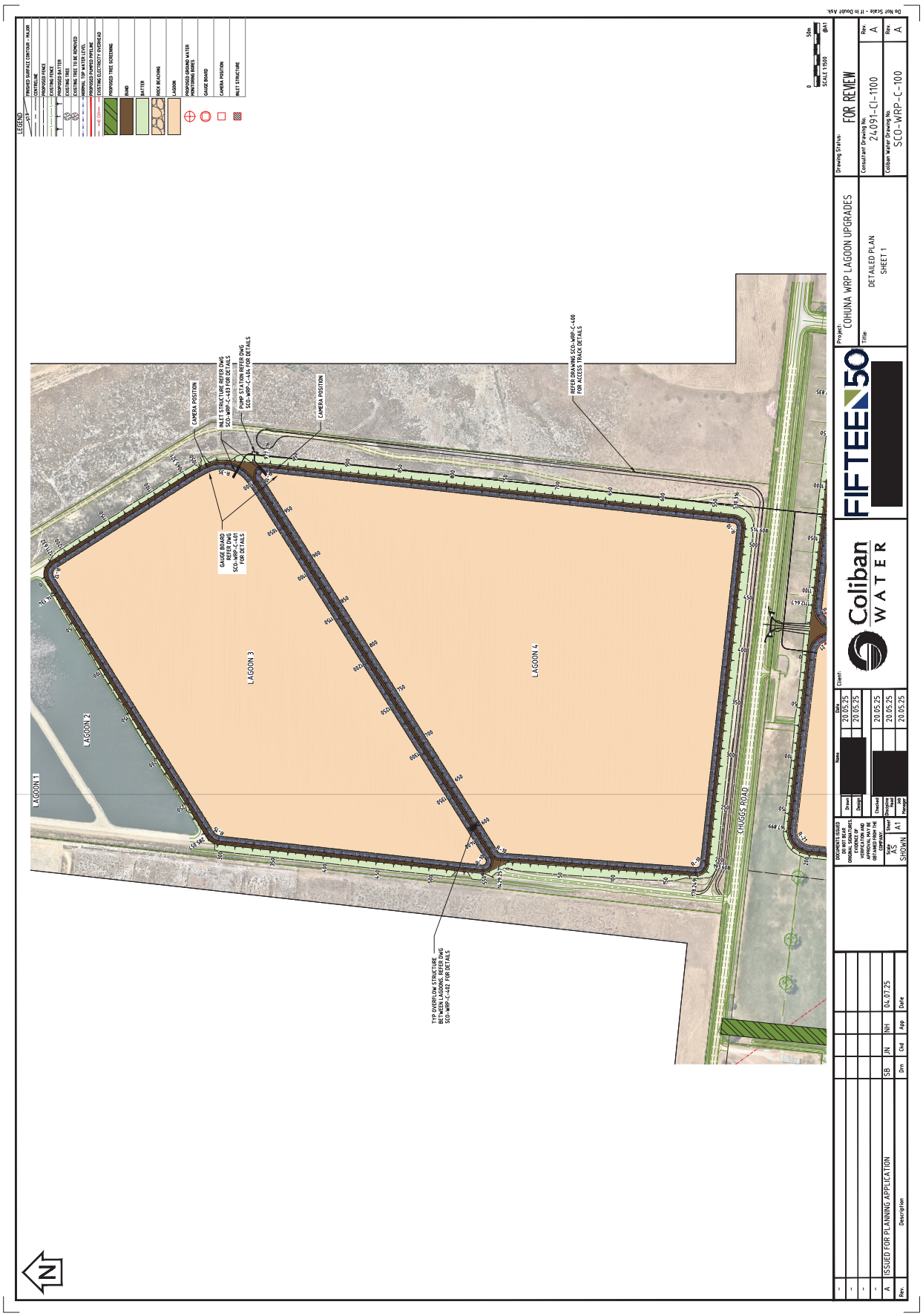
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CONTOURS
PROPOSED FENCE
EXISTING FENCE
PROPOSED BATTER
EXISTING TREE
EXISTING TREE TO BE REMOVED
PROPOSED WATER MAIN
PROPOSED PUMPED PIPELINE
EXISTING ELECTRICITY OVERHEAD
PROPOSED TREE SCREENING
ROAD
BATTER
ROCK BEACHING
LAGOON
PROPOSED GROUND WATER MONITORING BORES
GAUGE BOARD
CAMERA POSITION
INLET STRUCTURE
LAGOON 1
LAGOON 2
LAGOON 3
LAGOON 4
CAMERA POSITION
GAUGE BOARD REFER DWG SCO-WRP-C-401 FOR DETAILS
INLET STRUCTURE REFER DWG SCO-WRP-C-410 FOR DETAILS
TYP OVERFLOW STRUCTURE BETWEEN LAGOONS. REFER DWG SCO-WRP-C-412 FOR DETAILS
REFER DRAWING SCO-WRP-C-600 FOR ACCESS TRACK DETAILS
CAMERA POSITION
CHUGGS ROAD
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Project:
COHUNA WRP LAGOON UPGRADES
Title:
DETAILED PLAN
SHEET 1
Drawing Status:
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24091-CI-1100
Rev.
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SCO-WRP-C-100
Rev.
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Checked
Drafting Check
Job Manager
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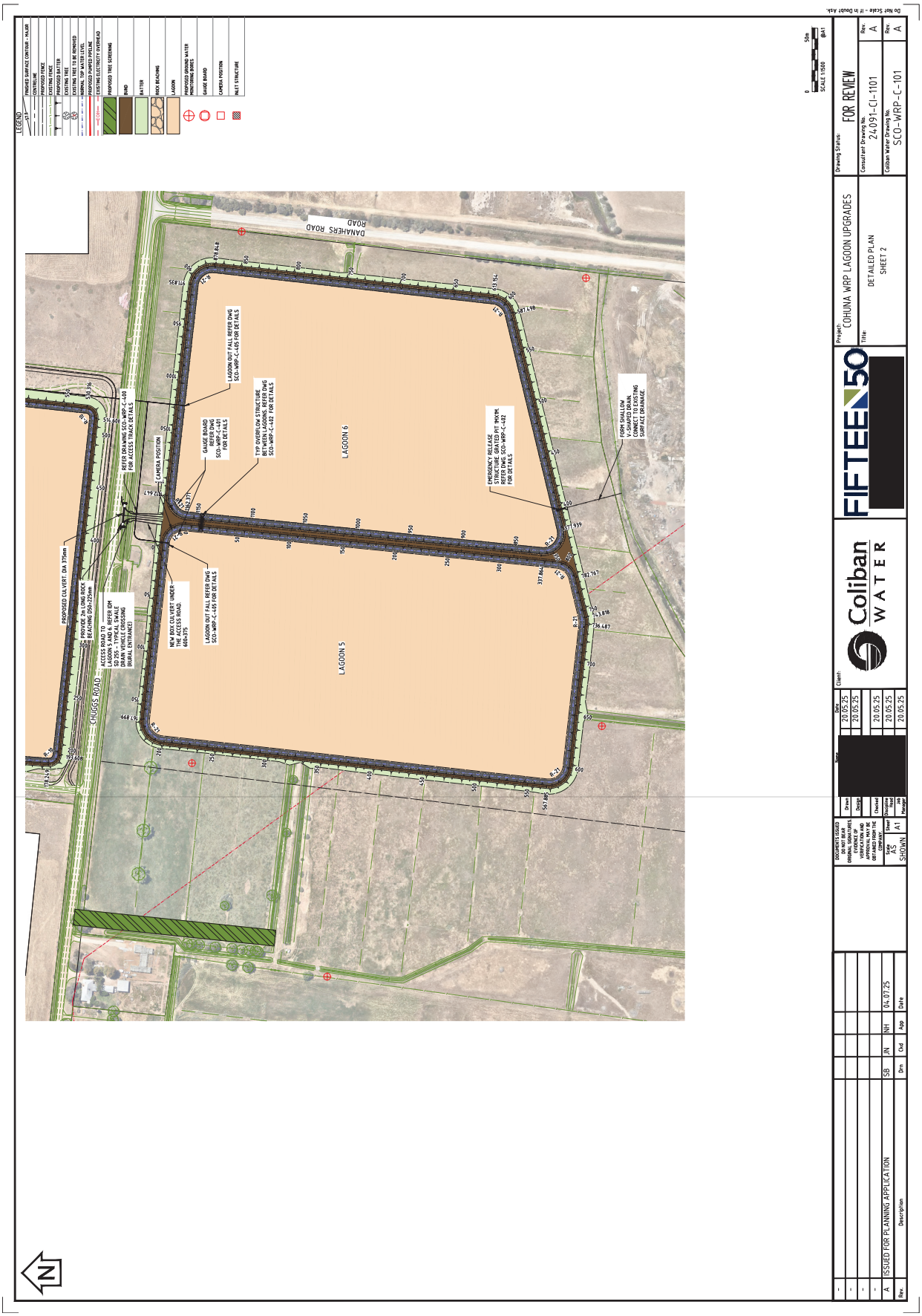
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INLET STRUCTURE
EXISTING ELECTRICITY OVERHEAD
PROPOSED PUMPED PIPELINE
EXISTING WATER MAIN
EXISTING TREE TO BE REMOVED
EXISTING TREE
PROPOSED BATTER
PROPOSED FENCE
EXISTING FENCE
CONTROLLINE
FINISHED SURFACE CONTOUR - MAJOR
DANAHERS ROAD
CHUGGS ROAD
LAGOON 5
LAGOON 6
CAMERA POSITION
GAUGE BOARD REFER DWG SCO-WRP-C-401 FOR DETAILS
LAGOON OUT FALL REFER DWG SCO-WRP-C-405 FOR DETAILS
TYP OVERFLOW STRUCTURE BETWEEN LAGOONS REFER DWG SCO-WRP-C-402 FOR DETAILS
EMERGENCY RELEASE STORE REFER DWG SCO-WRP-C-402 FOR DETAILS
FROM SHALLOW V-SHAPED DRAIN. CONNECT TO EXISTING SURFACE DRAINAGE.
REFER DRAWING SCO-WRP-C-449 FOR ACCESS TRACK DETAILS
PROPOSED CUL VERT DIA 375mm
NEW BOX CUL VERT UNDER THE ACCESS ROAD. 6400 X 375
LAGOON OUT FALL REFER DWG SCO-WRP-C-405 FOR DETAILS
ACCESS ROAD TO LAGOON 5 AND 6. REFER IDM SD 255 - TYPICAL SWALE DRAIN ACROSS CROSSING (RURAL ENTRANCE)
PROPOSED CUL VERT DIA 375mm
FOOTPRINT OF LONG REACH EXCAVATOR FOR ROCK BEACHING D50=225mm
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Do Not Scale - If In Doubt Ask.
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Title: DETAILED PLAN SHEET 2
Drawing Status: FOR REVIEW
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Coliban Water Drawing No. SCO-WRP-C-101 Rev. A
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Coliban WATER
Client
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Job Manager
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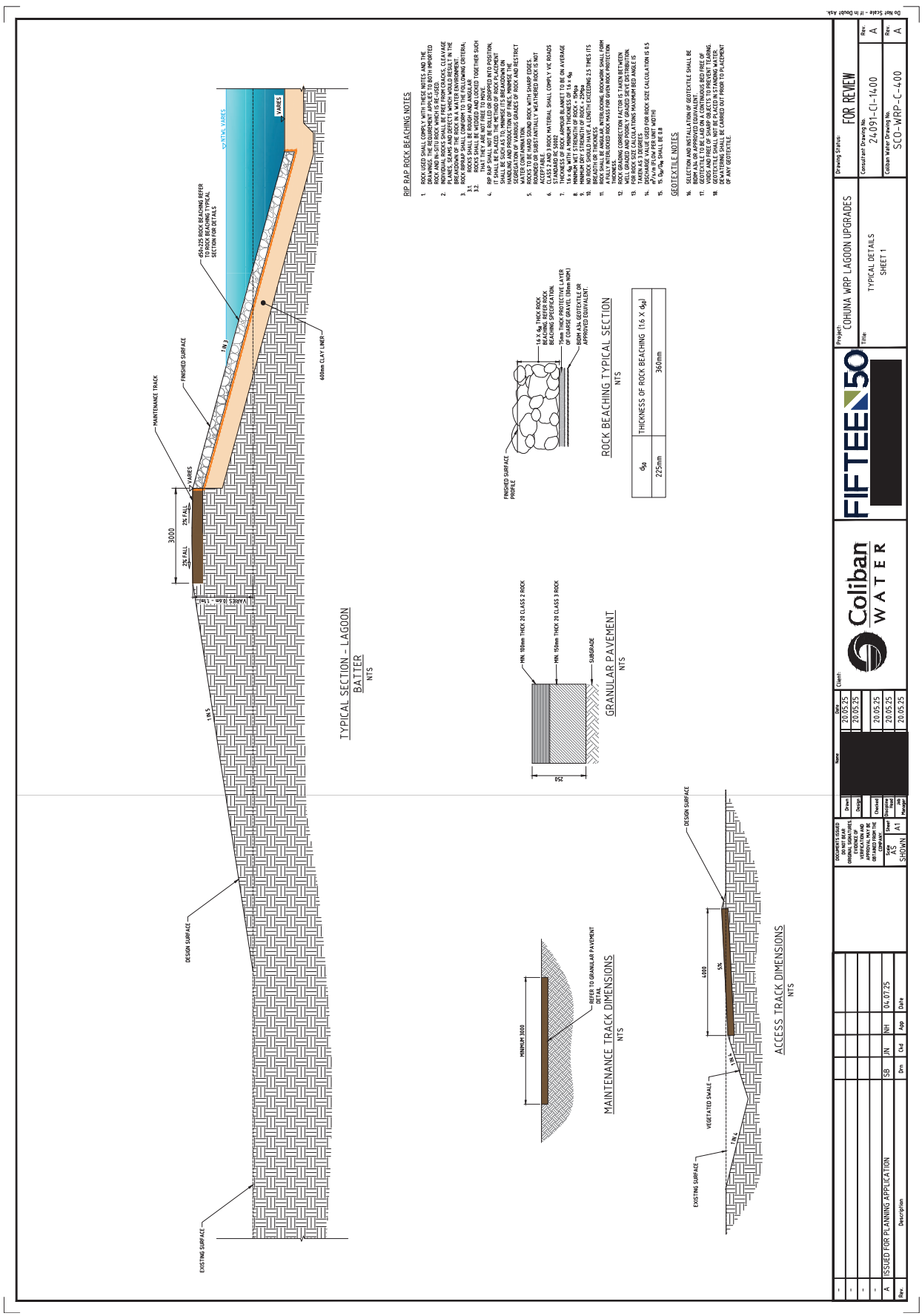
RIP RAP ROCK BEACHING NOTES
1. ROCK USED SHALL COMPLY WITH THESE NOTES AND THE DRAWINGS. THE REQUIREMENT APPLIES TO BOTH IMPORTED ROCK AND ROCK FROM EXCAVATIONS ON SITE.
2. INDIVIDUAL ROCKS SHALL BE FREE FROM CRACKS, CLEAVAGE PLANES, SEAMS AND DEFECTS WHICH WOULD RESULT IN THE BREAKAGE OF ROCKS BY NATURAL PROCESSES OR HANDLING.
3. ROCK RIPRAP SHALL CONFORM TO THE FOLLOWING CRITERIA.
3.1 ROCKS SHALL BE ROUGH AND ANGULAR
3.2 ROCKS SHALL BE PACKED TIGHTLY TOGETHER SUCH THAT THEY ARE NOT FREE TO MOVE.
4. RIP RAP SHALL BE PLACED SO AS TO CONFORM INTO POSITION, IT SHALL BE PLACED IN THE METHOD OF ROCK PLACEMENT HAS BEEN ADOPTED TO MINIMISE SEGREGATION OF VARIOUS GRADES OF ROCK AND RESTRICT WATER CONFARNATION.
5. ROCKS SHALL BE HARD WEARING ROCK WITH SHARP EDGES, ROUNDED OR SUBSTANTIALLY WEATHERED ROCK IS NOT ACCEPTABLE.
6. CLASS 2 AND CLASS 3 ROCK MATERIAL SHALL COMPLY VIC ROADS STANDARD SC 6002
7. THICKNESS OF ROCK BEACHING BLANKET TO BE ON AVERAGE 1.5x MAX NOMINAL THICKNESS OF 1.6 d_{50}
8. MINIMUM WET STRENGTH OF ROCK = 45Mpa
9. MINIMUM DRY STRENGTH OF ROCK = 75Mpa
10. NO ROCK SHOULD HAVE A LENGTH EXCEEDING 2.5 TIMES ITS BREADTH OR THICKNESS
11. ROCKS SHALL BE PLACED AS INTERLOCKING, ROCKWORK SHALL FORM A FULLY INTERLOCKED ROCK MASS FOR GIVEN ROCK PROTECTION
12. ROCK GRADING CORRECTION FACTOR IS TAKEN BETWEEN WELL GRADED AND POORLY GRADED SIEVE DISTRIBUTION.
13. ANGLE OF REPOSE OF ROCK FILLING IS TAKEN AS 37 DEGREES
14. DISCHARGE VALUE USED FOR ROCK SIZE CALCULATION IS 0.5 $m^3/s/m$ AT THE BOTTOM OF BATTER
15. S_g/S_w SHALL BE 0.8
GEOTEXTILE NOTES
16. SELECTION AND INSTALLATION OF GEOTEXTILE SHALL BE UNDERTAKEN BY SUITABLY QUALIFIED PERSONNEL
17. GEOTEXTILE TO BE LAID ON A CONTINUOUS BED FREE OF VOIDS AND FREE OF SHARP OBJECTS TO PREVENT TEARING.
18. GEOTEXTILE SHALL BE PLACED AS SOON AS PRACTICABLE AFTER DEVIATIONS SHALL BE CARRIED OUT PRIOR TO PLACEMENT OF ANY GEOTEXTILE
TYPICAL SECTION - LAGOON BATTER
NTS
MAINTENANCE TRACK
FINISHED SURFACE
65x225 ROCK BEACHING REFER TYPICAL BEACHING DETAIL SECTION FOR DETAILS
VARIES
1 IN 3
600mm CLAY LINER
3000
2% FALL
2% FALL
VARIES
1 IN 5
DESIGN SURFACE
EXISTING SURFACE
ROCK BEACHING TYPICAL SECTION
NTS
FINISHED SURFACE PROFILE
1.6 X d_{50} THICK ROCK BEACHING REFER ROCK BEACHING SPECIFICATION.
300mm THICK PROTECTION LAYER OF COARSE GRAVEL (10mm NMM)
BIDIM A34 GEOTEXTILE OR APPROVED EQUIVALENT.
d_{50} | THICKNESS OF ROCK BEACHING (1.6 X d_{50})
225mm | 360mm
GRANULAR PAVEMENT
NTS
MIN. 100mm THICK 20 CLASS 2 ROCK
MIN. 150mm THICK 20 CLASS 3 ROCK
SUBGRADE
250
MAINTENANCE TRACK DIMENSIONS
NTS
MINIMUM 3000
REFER TO GRANULAR PAVEMENT DETAIL
ACCESS TRACK DIMENSIONS
NTS
DESIGN SURFACE
4000
5%
1 IN 4
VEGETATED SWALE
EXISTING SURFACE
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Size A3 SHOWN
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Drawn
Design
Checked
Discipline Manager
Job Manager
Name
Date
Client
Coliban WATER
FIFTEEN50
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Rev. Description Drn Chd App Date
A ISSUED FOR PLANNING APPLICATION SB JN NH 04.07.25
20.05.25
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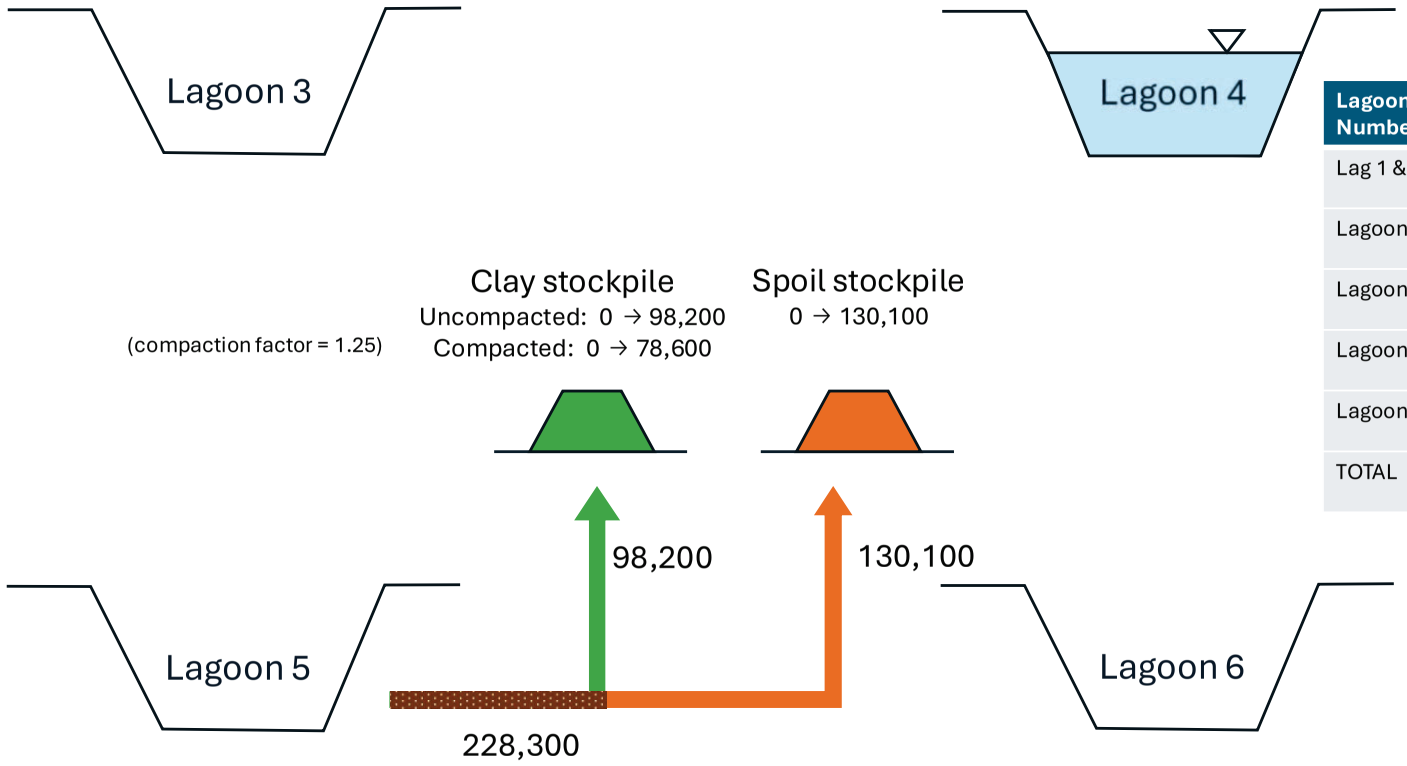
Appendix E

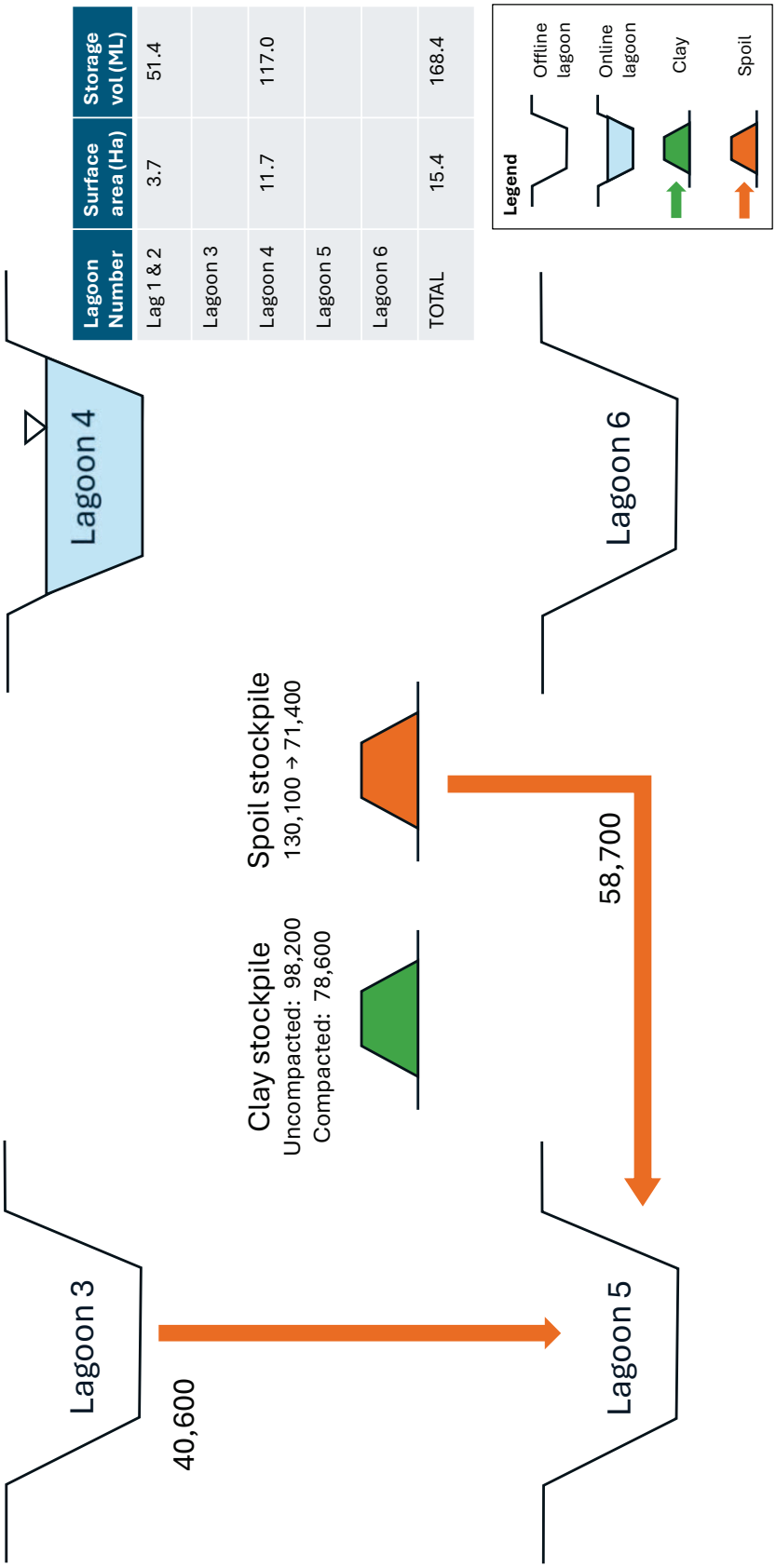
Earthworks sequencing schematic

STEP A – EXCAVATE L5 TO APPROX. GROUNDWATER LEVEL

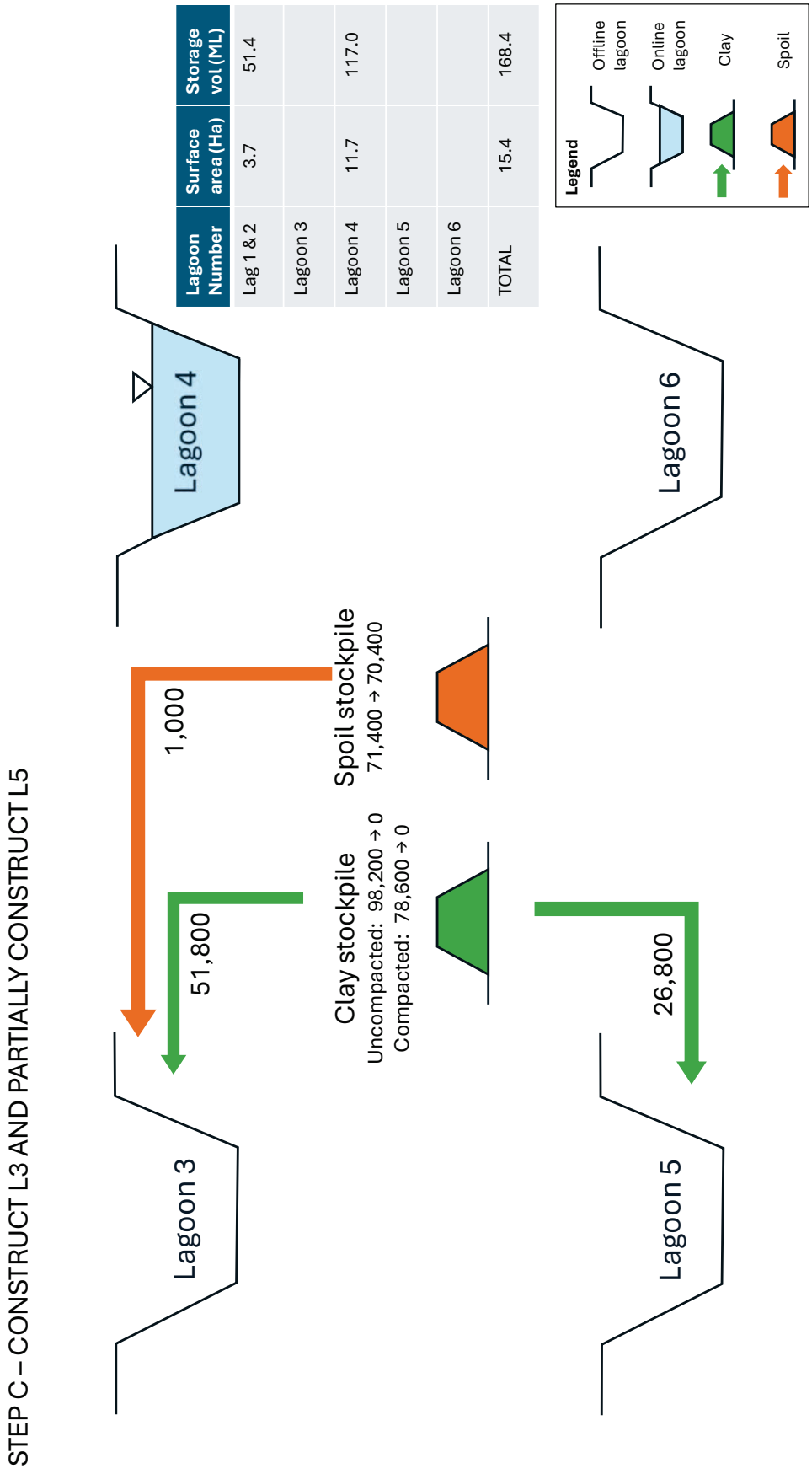


Lagoon Number	Surface area (Ha)	Storage vol (ML)
Lag 1 & 2	3.7	51.4
Lagoon 3		
Lagoon 4	11.7	117.0
Lagoon 5		
Lagoon 6		
TOTAL	15.4	168.4

STEP B – EXCAVATE L3 TO BASE OF NEW CLAY LINER AND PLACE SPOIL BENEATH L5 UP TO BASE OF NEW CLAY LINER

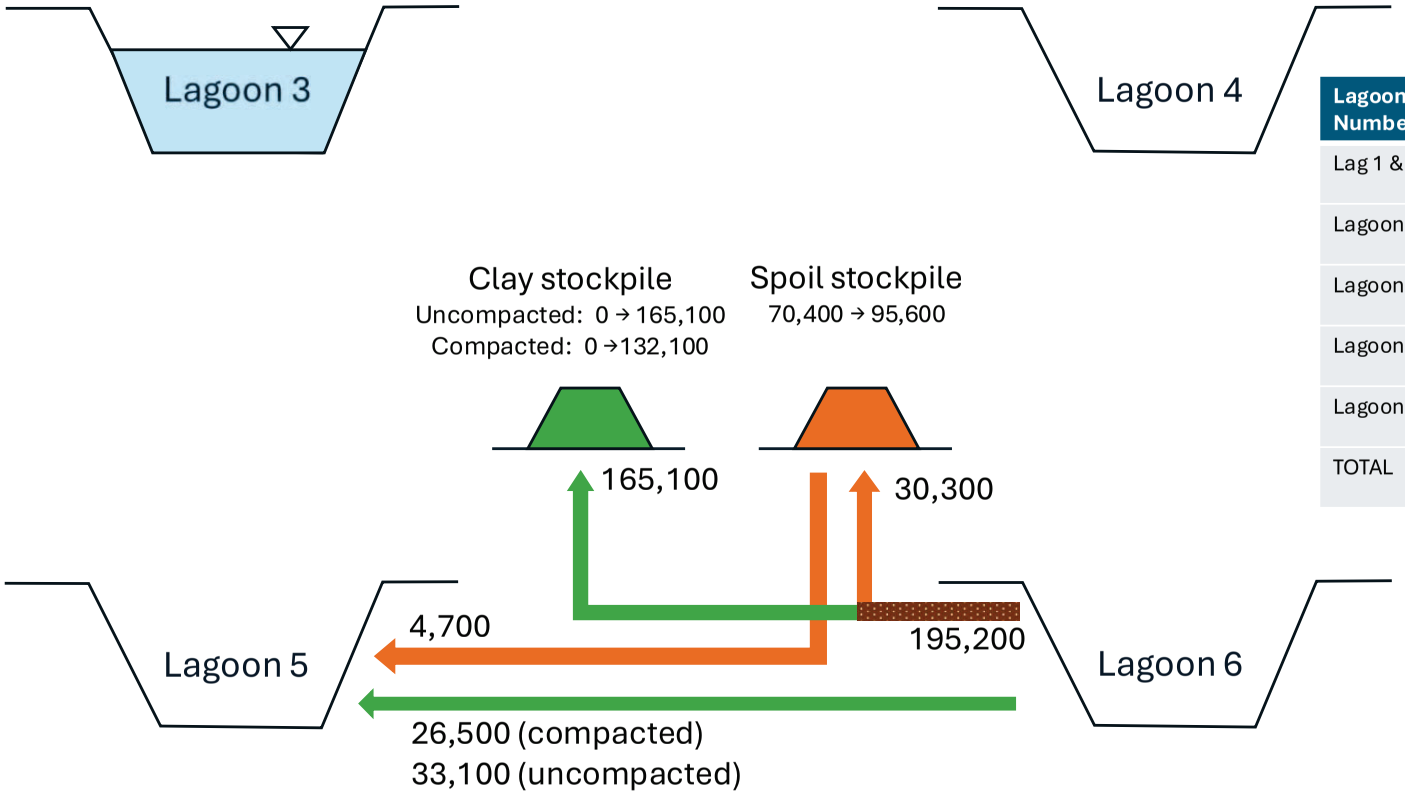


Lagoon Number	Surface area (Ha)	Storage vol (ML)
Lag 1 & 2	3.7	51.4
Lagoon 3		
Lagoon 4	11.7	117.0
Lagoon 5		
Lagoon 6		
TOTAL	15.4	168.4

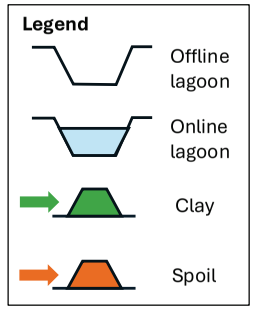


Lagoon Number	Surface area (Ha)	Storage vol (ML)
Lag 1 & 2	3.7	51.4
Lagoon 3		
Lagoon 4	11.7	117.0
Lagoon 5		
Lagoon 6		
TOTAL	15.4	168.4

STEP D – EXCAVATE L6 TO APPROX. GROUNDWATER LEVEL AND COMPLETE L5

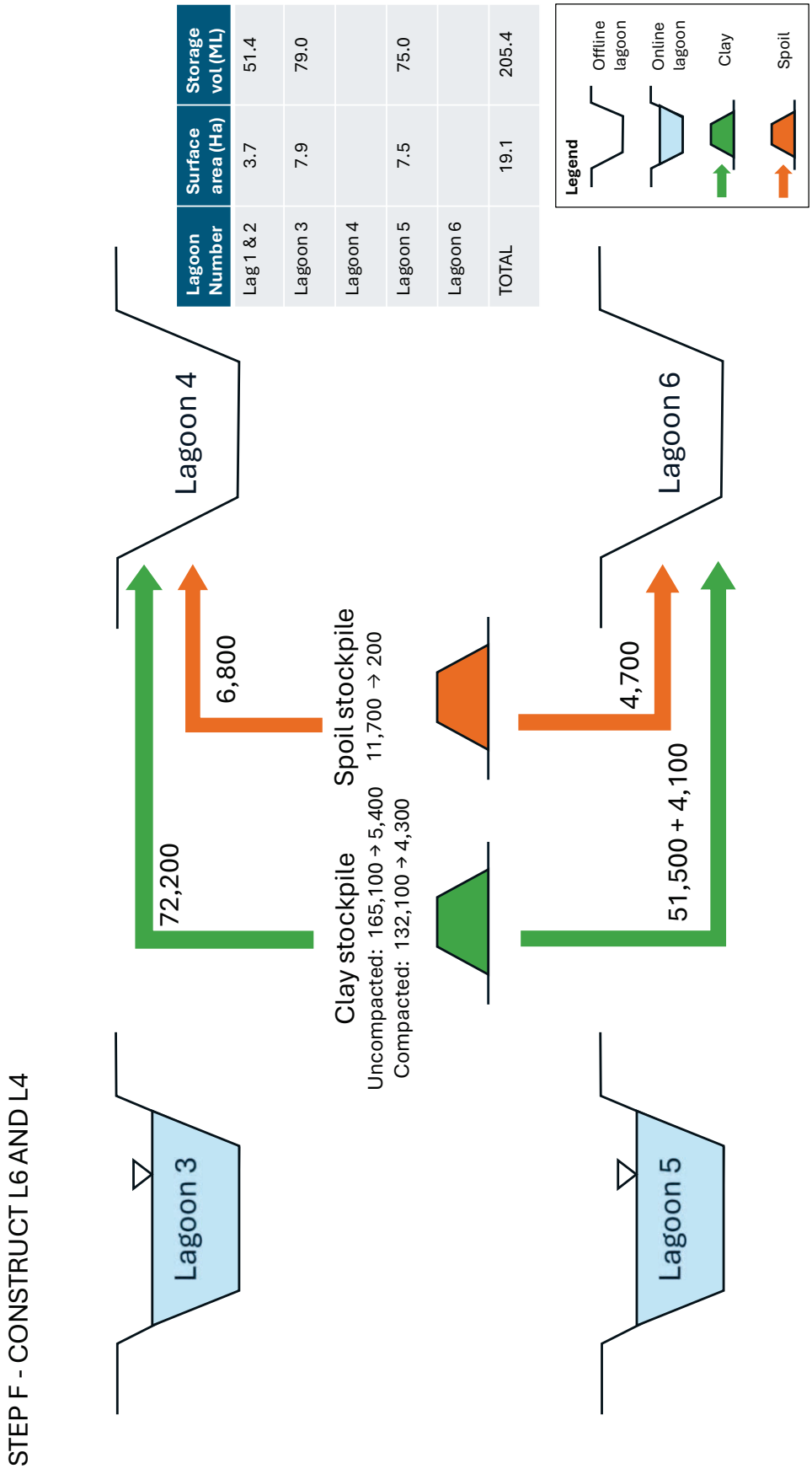


Lagoon Number	Surface area (Ha)	Storage vol (ML)
Lag 1 & 2	3.7	51.4
Lagoon 3	7.9	79.0
Lagoon 4		
Lagoon 5		
Lagoon 6		
TOTAL	11.6	130.4



STEP E – REMOVE 'NET' SPOIL FROM L4 AND PLACE SPOIL BENEATH L6 UP TO BASE OF NEW CLAY LINER

Lagoon Number	Surface area (Ha)	Storage vol (ML)
Lag 1 & 2	3.7	51.4
Lagoon 3	7.9	79.0
Lagoon 4		
Lagoon 5	7.5	75.0
Lagoon 6		
TOTAL	19.1	205.4



Lagoon Number	Surface area (Ha)	Storage vol (ML)
Lag 1 & 2	3.7	51.4
Lagoon 3	7.9	79.0
Lagoon 4		
Lagoon 5	7.5	75.0
Lagoon 6		
TOTAL	19.1	205.4

Lagoon Number	Surface area (Ha)	Storage vol (ML)
Lag 1 & 2	3.7	51.4
Lagoon 3	7.9	79.0
Lagoon 4	11.7	117.0
Lagoon 5	7.5	75.0
Lagoon 6	7.5	75.0
TOTAL	38.3	397.4

Appendix F

Groundwater monitoring network review

Cohuna WRP

Groundwater monitoring network review

Coliban Water

11 July 2025

→ The Power of Commitment

Project name	Cohuna WRP monitoring bore network review						
Document title	Cohuna WRP | Groundwater monitoring network review						
Project number	12643136						
File name	12643136-RPT_Cohuna WRP monitoring bore network review.docx						
Status Code	**Revision**	**Author**	**Reviewer**		**Approved for issue**		
			Name	**Signature**	**Name**	**Signature**	**Date**
S4	0	[redacted]	[redacted]		[redacted]		22/10/24
S4	1						12/12/24
S4	2			[redacted]		[redacted]	11/07/25

GHD Pty Ltd | ABN 39 008 488 373

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→ The Power of Commitment

Executive summary

GHD Pty Ltd (GHD) was engaged by Coliban Region Water Authority (Coliban Water) to undertake a review of the monitoring bore network at the Cohuna Water Reclamation Plant (WRP) following the completion of a business case that identified the need for additional lagoon evaporation capacity and winter storage (lagoon 5) along with relining of lagoons 3 and 4. Coliban Water now require an understanding of additional potential monitoring bore requirements to:

– Support the construction of lagoon 5
– Provide for ongoing monitoring of groundwater levels and quality surrounding lagoon 5 during operation, i.e., to assess compliance with license conditions

Coliban Water maintain a groundwater monitoring bore network at the site consisting of 20 bores. Monitoring bores have been installed at nested locations surrounding the lagoons as well as north and south of the site, and on private land to the west of the site. The review of existing data identified that:

– Generally, bores at the site have shown a seasonal response with the lowest levels occurring in the drier summer months and higher water levels during the wetter winter months (this is in line with the previous assessments)
– The bores closest to where lagoon 5 is to be constructed are BH1S, BH1D and BH09. The levels from these bores indicate that groundwater levels are likely to be <1 to 2 metres below ground level (mbgl) at the proposed location of lagoon 5
– The groundwater contours show groundwater is flowing radially from the existing lagoons, indicating groundwater mounding is occurring. These contours are similar to those produced by GHD (2020) which also showed mounding around the WRP lagoons
– Effluent at the Cohuna WRP is characterised by low Electrical Conductivity (EC) and Total Dissolved Solids (TDS) concentrations, and high nutrient concentrations
– Groundwater quality data showed indications of effluent recharging groundwater around the existing lagoons based on:
    - Decreasing concentrations of EC at bores BH1S, BH1D, BH2S, BH2D, BH3S, BH3D, BH4S BH5S and BH5D
    - Bores BH3D, BH3S and BH5D generally had consistently higher concentrations of Ammonia post 2020 compared to earlier on in their records
    - Bores BH1D, BH1S, BH3D BH3S BH4D, BH4S, BH5D and BH8 generally had consistently higher concentrations of Total Phosphorous post 2020 compared to earlier on in their records
– There was insufficient data was to comment on the surface water quality at Barr Creek and the dynamics of groundwater – surface water interaction at the creek
– No extractive uses of groundwater were identified within 5 km of the Cohuna WRP

A qualitative risk assessment was completed in general accordance with EPA publication 1321.2, Licence assessment guidelines. The risk assessment identified high and moderate risks associated with operation of lagoon 5 based on the available information, these risks are summarised in Table E1.

Table E 1 Summary of high and medium risks from risk register

ID	Activity	Potential event	Potential impact	Pathways for risk	Existing control	Level of risk
Operation of lagoon 5						
OP01	Leakage of treated effluent from lagoon 5 to the underlying soil	Treated effluent infiltrates soil and shallow groundwater	Change in groundwater quality including increase in nutrients and decrease in salinity, impacting groundwater environmental values	Issues with the integrity/performance of the clay liner	Operation Environment Management Plan (OEMP) Clay liner is constructed in accordance with EPA Publication 1911.2 *Technical information for the Victorian guideline for water recycling*	High
OP02	Leakage of treated effluent from lagoon 5 to the underlying soil	Treated effluent infiltrates soil and shallow groundwater and migrates to creek	Impacts surface water quality and impacts ecosystem health of the waterway	As per OP-01	As per OP-01	High
OP03	Leakage of treated effluent from lagoon 5 to the underlying soil	Treated effluent infiltrates soil	Change to environmental value of land due to water logged soils	As per OP-01	As per OP-01	High
OP06	Overflow of wastewater from the lagoon	Lagoon reaches capacity and wastewater overflows from the lagoon to the surrounding environment	Change to environmental value of land	High rainfall event(s) WRP receives more wastewater for evaporation than capacity of the plant	Operation Environment Management Plan (OEMP) Design of lagoon takes into consideration climate conditions Maintaining freeboard full supply level to embankment crest level	Medium
OP07	Overflow of wastewater from the lagoon	Lagoon reaches capacity and treated effluent infiltrates soil and shallow groundwater	Change in groundwater quality including increase in nutrients and decrease in salinity, impacting groundwater environmental values	As per OP06	As per OP06	Medium
OP08	Overflow of wastewater from the lagoon	Lagoon reaches capacity and the overflow runs-off of treated effluent to surface water bodies (Barr Creek)	Impacts surface water quality and impacts ecosystem health of the waterway	As per OP06	As per OP06	Medium

ID	Activity	Potential event	Potential impact	Pathways for risk	Existing control	Level of risk
OP09	Overflow of wastewater from the lagoon	Lagoon reaches capacity and treated effluent infiltrates soil and shallow groundwater and migrates to creek	Impacts surface water quality and impacts ecosystem health of the waterway	As per OP06	As per OP06	Medium

Based on the data review and risk assessment, additional monitoring infrastructure around the proposed lagoon 5 and along Barr Creek was recommended (shown in Table E2) to determine and demonstrate compliance with the licence conditions for the Cohuna WRP in association with lagoon 5.

Table E 2 Cohuna WRP recommendations

Number	Recommendation
R1	Surface water monitoring should be conducted for both the upstream and downstream gauges as a minimum. The monitoring should include both water quality monitoring and reading of the gauge board.
R2	Water quality of the effluent should include major ions (calcium, chloride, magnesium, sodium, potassium, sulphate, carbonate and bicarbonate) to support hydrochemical analysis and identification of potential mixing of water sources.
R3	The addition of 12 monitoring bores and one surface water monitoring site is recommended based on the risk assessment, to determine and demonstrate compliance with the licence conditions. The monitoring bores are located to the east and west of lagoon 5 and the surface water monitoring site upstream of the site. All bores should be installed by a licenced driller and constructed in accordance with NUDLC (2020) minimum requirements for water bores in Australia and adhere to the Coliban Water monitoring bore specification document (GHD 2023).
R4	The proposed monitoring bores and surface water location should follow the extended monitoring program (in terms of analytical suite). Monitoring from the proposed bores should be completed prior to the first water transfer to lagoon 5 to allow for the collection of baseline data. GHD (2017) recommended additional QA/QC procedures to be implemented as part of groundwater monitoring for the site. These recommendations should be adopted for any future groundwater monitoring at the site.
R5	The conceptual hydrogeological model should be updated after at least one year of monitoring following the installation of the recommended monitoring infrastructure.

This report is subject to, and must be read in conjunction with, the limitations set out in section 1.3 and the assumptions and qualifications contained throughout the Report.

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1. Introduction

GHD Pty Ltd (GHD) was engaged by Coliban Region Water Authority (Coliban Water) to undertake a review of the monitoring bore network at the Cohuna Water Reclamation Plant (WRP), herin referred to as the site, located approximately 2 km south of the Cohuna town centre.

The site consists of four ponds arranged in series, north to south. The plant is intended to function as an evaporation plant and as such there is neither an effluent irrigation system nor a regulated discharge of effluent to the environment. Coliban Water have completed a business case that identified the need for additional lagoon evaporation capacity and winter storage (lagoon 5) along with relining of lagoons 3 and 4.

Coliban Water maintain a groundwater monitoring bore network at the site consisting of 20 bores. Monitoring bores have been installed at nested locations surrounding the lagoons as well as north and south of the site, and on private land to the west of the site.

Coliban Water now require an understanding of additional potential monitoring bore requirements to:

– Support the construction of lagoon 5
– Provide for ongoing monitoring of groundwater levels and quality surrounding lagoon 5 during operation, i.e., to assess compliance with license conditions

This report has been prepared to review the current information available for the site in order to update the conceptual hydrogeological model and identify where additional monitoring bores may be required using a risk-based approach.

1.1 Purpose of this report

The purpose of this report is to document the review the current information available for the site and provide recommendations if additional groundwater monitoring infrastructure is needed to assess compliance with licence conditions and support the construction of lagoon 5.

1.2 Scope

The scope of this report includes:

– Desktop review of existing groundwater monitoring bore installations and monitoring at the site
– Refinement of the existing conceptual hydrogeological model based on more recent monitoring information and the proposed new lagoon development
– A risk assessment based on EPA Publication 1321.2 to information potential additional monitoring bore requirements for the proposed lagoon 5
– Provide recommendations for additional monitoring bore requirements to support the proposed additional lagoon 5 including:
    - Bore locations, depths/target formation, bore construction
    - Proposed monitoring requirements (monitoring required, frequency, etc)

1.3 Limitations

This report: has been prepared by GHD for Coliban Water and may only be used and relied on by Coliban Water for the purpose agreed between GHD and Coliban Water as set out in section 1.1 of this report.

GHD otherwise disclaims responsibility to any person other than Coliban Water arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report (refer section(s) 1.4 and throughout this report). GHD disclaims liability arising from any of the assumptions being incorrect.

The opinions, conclusions and any recommendations in this report are based on information obtained from, and testing undertaken at or in connection with, specific sample points. Site conditions at other parts of the site may be different from the site conditions found at the specific sample points.

Investigations undertaken in respect of this report are constrained by the particular site conditions, such as the location of buildings, services and vegetation. As a result, not all relevant site features and conditions may have been identified in this report.

GHD has prepared this report on the basis of information provided by Coliban Water and others who provided information to GHD (including Government authorities)], which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

Accessibility of documents

If this report is required to be accessible in any other format, this can be provided by GHD upon request and at an additional cost if necessary.

1.4 Assumptions

GHD has made the following assumptions in developing this report:

- Groundwater monitoring has been conducted in accordance with EPA (2020) Publication 669.1 *Groundwater Sampling Guidelines*
- Coliban Water would be developing a Construction Environment Management Plan and Operational Environment Management Plan to manage environmental risks posed by the proposed lagoon 5
- Coliban Water have provided all the available groundwater and surface water data since the last monitoring review in 2020
- The data extracted from the VVG database includes all registered bores within 5 km of the site
- The monitoring program from GHD (2020) is the most up to date monitoring program for the site
- The groundwater level unit used in GTS (2024) is metres below ground level

2. Information reviewed

To assist in determining the potential additional monitoring bore requirements to support the proposed lagoon 5, GHD reviewed information previously collected for the site.

Table 1 summarises the information reviewed by GHD including that supplied by Coliban Water and other publicly available information. This information has been used as the basis of this monitoring bore assessment.

Table 1 Summary of data sources

Data Source	Description
Coliban Water, 2016	Review of Groundwater – Water Monitoring Data from Bores at Water Reclamation Plants
GHD, 2017	Draft Cohuna WWTP Hydrogeological Assessment
GHD, 2020	Cohuna Water Reclamation Plan – Report on drilling and preliminary monitoring data review
GHD, 2023	Monitoring bores – Specification
Coliban Water 2024	Cohuna WRP Lagoon Upgrades – Project Description, Version 1.0, 26 March 2024
GTS, 2024	Cohuna Water Reclamation Plant, Chuggs Road, Cohuna – Geotechnical Investigation, September 2024
Publicly available information	Bureau of Meteorology Groundwater Dependent Ecosystem Atlas Visualising Victorias Groundwater (VVG) DEECA Groundwater Salinity Layers (CDM Smith 2022) Scientific Information for Land Owners (SILO)

3. Previous investigations

Based on the information provided to GHD, the following section summarises our understanding of recent previous investigations at the site (from 2016). Where required, the results of these investigations have been discussed in later sections in this report.

Review of Groundwater Monitoring Data from Bores at Water Reclamation Plants (Coliban Water 2016)

Coliban Water undertook a review to assess whether the environment was adversely being impacted by groundwater accession from WRP lagoons and on site irrigation activities using available groundwater monitoring data across their 14 WRPs that were under an EPA corporate licence and an approved Environmental Improvement Plan. The review included the site and covered the following:

– Assessment of any significant changes in groundwater levels which could be an indication of potential leakage
– Assessment of Electrical Conductivity (EC) and Total Nitrogen (TN) to identify any abnormalities in the data that may suggest potential contamination due to lagoon leaks
– Identification of the Beneficial use category (related to the now superseded State Environment Protection Policy (SEPP) (Groundwaters of Victoria)

The review identified that groundwater at the Cohuna WRP fell within Beneficial use category C to D (5-22,0000°µS/cm or >22,000°µS/cm EC). Bores closest to the lagoons had the lowest EC and showed an overall declining trend which was interpreted as the lagoon effluent recharging groundwater. The water table depth was reported as being <5 mbgl and the levels at bores BH1S and BH1D behave differently to others at the site; these are both south of the lagoon and further from other bores. No conclusions regarding leakage from the lagoons could be determined at the time of the reporting.

Draft Cohuna WWTP Hydrogeological Assessment (GHD 2017)

GHD undertook a Hydrogeological Assessment (HA) of the site to determine the risk posed to existing and potential groundwater beneficial uses (related to the superseded SEPP) by the site, as well as to provide Coliban Water confidence in the existing groundwater monitoring network or to recommend changes if such is required. The HA included:

– A desktop review of relevant data for the site and previously investigations
– Development of a conceptual hydrogeological model
– A field program to inspect and conduct aquifer (slug) testing
– Review of the groundwater sampling procedures
– Risk assessment

The HA identified that the existing lagoons were leaking and were impacting the neighbouring land. Moderate to high risks were identified at the site. The report made recommendations including (but not limited to):

– The expansion of the monitoring network by installation bores remote to the site to characterise background water quality, to the west of the site and close to Barr Creek
– Include additional QA/QC procedures in the monitoring and expand the analytical suites
– Include surface water monitoring at Barr Creek upstream and downstream of the site

Cohuna Water Reclamation Plan – Report on drilling and preliminary monitoring data review (GHD 2020)

The report documents the results of the drilling program and an extended groundwater monitoring program that was undertaken throughout 2019/2020 for the site. The drilling program included the installation of seven new groundwater monitoring bores to improve the sites monitoring network based on previous recommendations. Along with the drilling program, gauge boards were established at Barr Creek, downstream and upstream of the site. A review of water quality data indicated that:

– Barr Creek was not being impacted by the site
– Groundwater quality becomes more saline further away from the site indicating seepage from lagoons

– Low risk of adverse impact to beneficial users

It was identified that mounding is occurring as a result of seepage from the site and could visually be seen in land neighbouring the lagoons.

Monitoring bores – Specification (GHD 2023)

GHD prepared a specification document for Coliban Water to enable consistent groundwater monitoring bore headworks construction. The document outlines:

– Types of headworks, the preferred headworks type and requirements for that headworks
– Requirements for marker posts and bollards to prevent damage to monitoring bores
– Bore labelling requirements to clearly identify groundwater monitoring bores
– Marker posts to indicate bore location
– Bore security requirements to prevent unauthorised access
– Bore registration requirements
– Bore surveying requirements
– Bore maintenance requirements
– Bore construction requirements

Cohuna Water Reclamation Plant, Chuggs Road, Cohuna – Geotechnical Investigation (GTS 2024)

GTS undertook a geotechnical investigation at Lot 2/PS428326 (the location of the proposed lagoon 5) to assess the subsurface conditions at the site and to inform the design of the proposed lagoon. The investigations included the drilling of 30 boreholes to 4 metres depth with Dynamic Cone Penetrometer and Pocket Penetrometer tests conducted at each borehole. No works were undertaken at lagoon 3 as it was reported to be flooded at the time of the investigations.

The lithology encountered during the field program included sandy SILT (<0.15 m), Sandy Silty CLAY (to 1.7 m) underlain by Silty Clay. Groundwater was encountered during the drilling of boreholes which ranged from 1.4 m to 3.9 m (it is assumed that the depths are in relation to the ground surface as it has not been specified in the report).

Soil samples were taken from the boreholes and underwent an array of tests included soaked CBR, Atterberg Limit, permeability and Particle Size Distribution. Permeabilities were tested at eight of the boreholes which ranged from $4x10^{-11}$ m/s (from low plasticity silty CLAY in northern area of plot) to $8x10^{-9}$ m/s (from low plasticity silty CLAY in centre-west area of lot).

The report provided an overview of the earthworks required to achieve a clay lined lagoon.

4. Proposed lagoon upgrades

As discussed in section 1, Coliban Water have completed a business case that identified the need for additional lagoon evaporation capacity and winter storage (lagoon 5) along with relining of lagoons 3 and 4. Coliban Water have developed a plan for the lagoon upgrades (Coliban Water 2024) with an indicative completion timeframe of March 2025.

The proposed lagoon 5 is to be constructed on property 2/PS428326 which was formerly a bay irrigated broadacre property with associated channels, drains, fencing, livestock handling equipment and other associated infrastructure (Coliban Water 2024). The south east corner of the property is currently leased to a third party who uses the land for a composting facility; the site has raw and finished organic material stockpiles and some basic infrastructure; however, no works are currently proposed for this area.

The construction of the new lagoon 5 would include:

– New embankments (up to 2 m high)
– Clay lining
– Rock beached internal batters
– Excavations to a minimum of 3 m below existing ground level (GTS 2024)
– A pump station and pipework to allow transfer of effluent from lagoon 3 and 4 to lagoon 5

The clay excavated from the construction of lagoon 5 is proposed to be used to re-line lagoon 3. Both lagoon 3 and 4 will be re-lined and rock beaching placed on internal batters.

5. Hydrogeological review

5.1 Site description

The site is a lagoon-based treatment plant located adjacent to Chuggs Road Cohuna and west of an airstrip. The site consists of two treatment lagoons and two evaporation lagoons (Coliban Water 2016). The lagoons hold wastewater and treated or partially treated effluent. In 2016, the two treatment lagoons were relined as they had been leaking, whilst the two evaporative lagoons were found to be leaking (Coliban Water 2016; GHD 2017).

The site is at an elevation of approximately 80 mAHD with only a slight fall in the land towards Barr Creek east and north of the site (GHD 2017). The site is surrounded largely by agricultural land but the Cohuna airstrip is located to the east of the site and a composting facility to the south of the site.

5.2 Surface water and drainage

There are two waterways located close to the site, Barr Creek and Gunbower Creek. Barr Creek is the closest to the site (approximately 300 m at closest point) and flows east and north of the site. The following has previously been documented in relation to Barr Creek (GHD 2017):

– May be contained in an engineered drain
– Is used to drain surrounding irrigated farmland with a large portion of the flow in the creek representing intersected groundwater
– It flows north-west through agricultural land before flowing into the Loddon River near Murrabit West

Gunbower Creek is located further afield (2 km at its closest point) north east of the site. Gunbower Creek is an anabranch of the Muray River with land between the Murray River (located around 10 km north east of the site) and Gunbower Creek forming a floodplain.

5.3 Climate

Climate information was obtained from the Scientific Information for Land Owners (SILO) portal for climate station Cohuna (Goulburn Murray) (Station number 80008), located approximately 3 km north of the site. A summary of the long-term average rainfall and temperature at this station between 1973 and 2023 (50 years) is shown in Table 2.

Table 2 Average monthly rainfall, temperature and evaporation (1973 – 2023) - Cohuna (80008)

Month	Monthly Rainfall (mm)	Monthly Evaporation (mm)	Minimum Temperature °C	Maximum Temperature °C
January	33	212.1	13.5	28.7
February	26.1	170.5	13	27.9
March	27.6	147.5	11.6	25.5
April	32.9	104.5	9.3	22.5
May	37.8	81.7	7.6	19.6
June	29.7	73.4	6.4	17.9
July	36.1	79.2	6	17.7
August	33.2	93.6	6.6	19.1
September	32.6	113.2	7.9	21.1
October	37.6	145.2	9.2	23.4
November	30.3	175.5	11.2	26
December	29.8	203.5	12.4	27.6

5.4 Geology and hydrogeology

The hydrogeology and geology of the site has previously been documented by GHD (2017). A summary of this information is presented in Table 3. The relevant water table aquifer for the site is the Shepparton Formation.

Table 3 Summary of regional geology and hydrogeology

Geological period	Lithological Unit	Hydrostratigraphic Unit	Lithology	Aquifer	Depth below surface (m)
Quaternary	Shepparton Formation	Quaternary Aquifer/Upper Tertiary (UTQA)	Layered clay, sand and silt. Shoe-string sands and gravels of the fluvial Shepparton Formation form local aquifers with surrounding clay and silt rich deposits functioning as aquitards	Aquifer porous media. Minor where sufficient saturated thickness exists	0 to 49
Tertiary	Calivil Formation	Upper Tertiary Aquifer (UTAM)	Sand		49 to 90
	Renmark Group	Lower Tertiary Aquifer (LTA)	Sands, gravels, clay, silt and minor coal		90 to 135
Palaeozoic (Ordovician)	Castlemaine Group	Basement Rocks (BSE)	Sandstone, siltstone, mudstone, shale (fractured). Volcanics, granite, granodiorites (fractured)	Aquifer where fractured or weathered	>135

5.4.1 Groundwater management arrangements

Discussion of groundwater management arrangements has previously been discussed by GHD (2017) which identified that the site is within an Unincorporated Area and that abstractive development of groundwater is negligible which is mostly likely due to the elevated regional groundwater salinity.

5.4.2 Groundwater dependent ecosystems

A Groundwater Dependent Ecosystem (GDE) is an ecosystem which has its species composition and natural ecological processes determined by groundwater. That is, they are natural ecosystems that require access to groundwater to meet all or some of their water requirements so as to maintain their communities of plants and animals, ecological processes and ecosystem services. If the availability of groundwater to GDEs is reduced, or if the quality is allowed to deteriorate, these ecosystems will be impacted.

GHD (2017) interrogated the Bureau of Meteorology's GDE Atlas identified several GDEs in close proximity to the site. Specifically, the following ecosystems were identified as potential GDEs:

– Gunbower Creek (located 2 km north east of the site)
– Wetlands associated with Gunbower Creek

A review of the GDE Atlas identified no additional GDEs to those listed above that were close to the site.

5.5 Monitoring network

5.5.1 Groundwater monitoring network

The groundwater monitoring network for the site comprises 20 groundwater monitoring bores and their details have been summarised in Table 4 and their locations are shown in Figure 1.

Table 4 ***Cohuna WRP groundwater monitoring network***

Bore ID	Location Description	Easting (MGA z55, GDA94)	Northing (MGA z55, GDA94)	TOC RL (mAHD)	Depth (m)	Screen interval (m)	Screen lithology
BH1d	Southern end of site, adjacent Chuggs Road	247,986	6,031,027	80.15	13	10 - 13	Silty CLAY
BH1s		247,992	6,031,026		5.6	0.5 - 5.6	CLAY/Silty CLAY
BH2d	North east of site near lagoon 2	248,149	6,031,657	80.17	16	13 - 16	Silty CLAY
BH2s		248,148	6,031,660		5.5	0.5 - 5.5	CLAY
BH3d		248,191	6,031,687	80.18	16	13 - 16	Silty CLAY
BH3s		248,190	6,031,691		5	0.5 - 5	CLAY
BH4d	North of site adjacent lagoon 1	247,996	6,031,864	79.86	14.3	11.3 - 14.3	Silty CLAY
BH4s		247,994	6,031,869		4.5	0.5 - 4.5	CLAY
BH5d	North west corner of site, adjacent lagoon 1	247,874	6,031,782	79.8	14.3	11.3 - 14.3	Silty CLAY/Clayey SAND
BH5s		247,875	6,031,786		5	0.5 - 5	CLAY
BH7d	East of site adjacent lagoon 4	248,218	6,031,379	80.11	15	12 - 15	Silty CLAY
BH7s		248,218	6,031,382		5	0.5 - 5	CLAY
BH8		248,262	6,031,380	80.04	5.3	0.5 - 5.3	CLAY
BH9	Danahers Road	248049	6,030,394	80.83	7.5	4.5 – 7.5	CLAY/Silty CLAY
BH10	North of WRP (near Barr Creek)	247968	6,032,203	80.575	9	6 – 9	CLAY/Silty CLAY
BH11	West of WRP (near Airfield Hangars)	248,414	6,031,798	1.04	7.5	4.5 – 7.5	CLAY/Silty CLAY
BH12	Cooke's No.1 (hayshed/west)	247,382	6,031,539	81.17	8.78	5.78 – 8.78	CLAY
BH13	Cooke's No.2 (north)	247,665	6,031,699	81.17	5.8	2.8 – 5.8	CLAY
BH14	Cooke's No.3 (Central)	247,654	6,031,480	81.00	5.82	2.82 – 5.82	CLAY
BH15	Cooke's No.4 (South)	247,632	6,031,280	81.02	5.82	2.82 – 5.82	CLAY

Notes:
RL – reduced level
TOC – top of casing

5.5.2 Surface water monitoring network

GHD (2020) indicates that gauge boards were installed along Barr Creek, upstream and downstream of the site in 2020. The locations of these monitoring points are provided in Table 5.

Table 5 Surface water monitoring locations

Bore ID	Location Description	Easting (MGA z55, GDA94)	Northing (MGA z55, GDA94)	TOC RL (mAHD)
Chuggs Road Bridge	Upstream of the WRP	248618.549	6030954.377	80.35
McMillans Road Bridge	Downstream of the WRP	246628.388	6032526.93	79.575

5.5.3 Monitoring program

The Coliban Water Monitoring Program for the site was presented in GHD (2020) and consists of compliance monitoring and extend monitoring.

5.5.3.1 Compliance monitoring

The existing groundwater monitoring network at the site is monitored as part of EPA compliance reporting. Bores are sampled quarterly for the suite of parameters summarised in Table 6.

Table 6 Groundwater analytical program

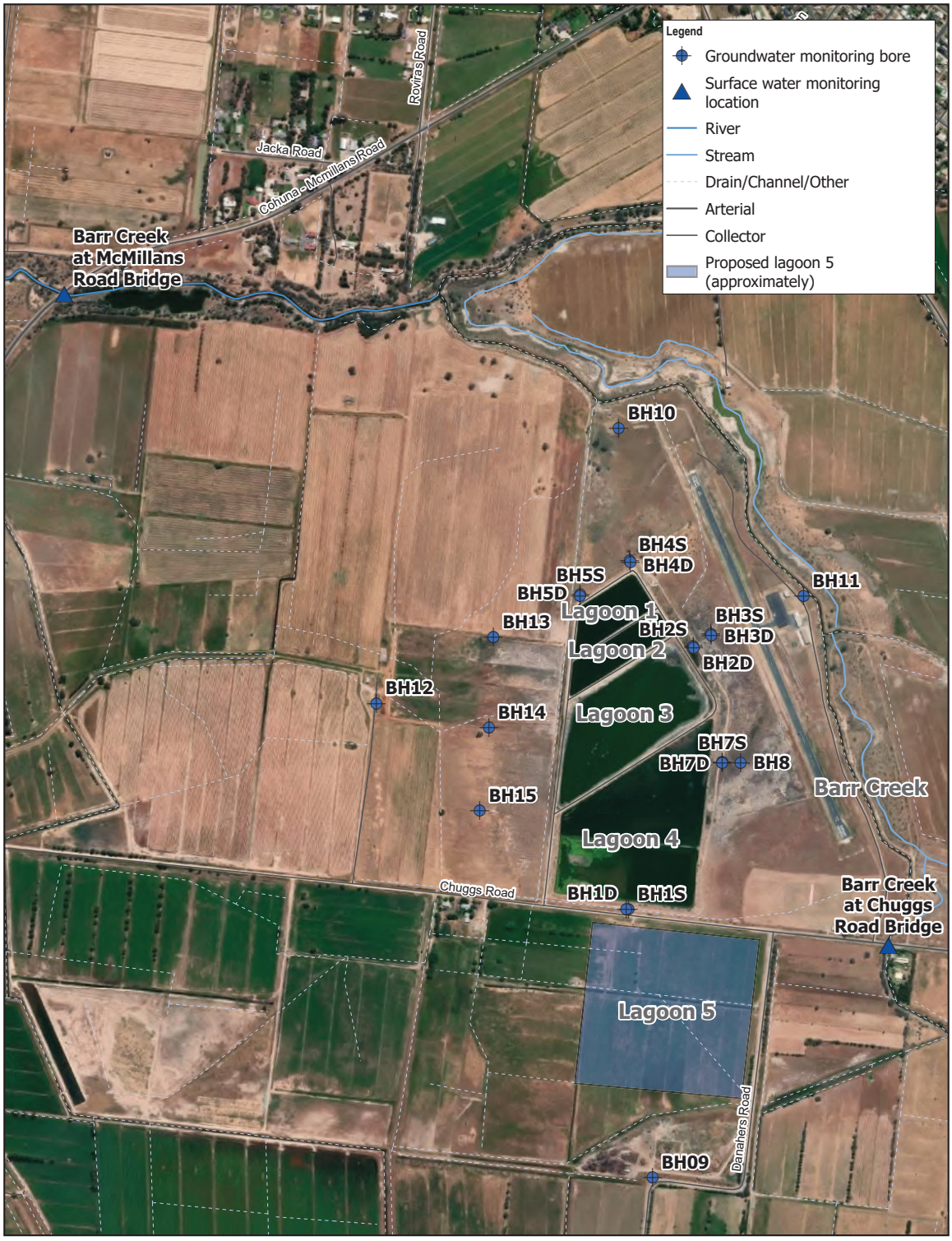
Groundwater chemical analysis	Groundwater chemical parameters
Field parameters	Dissolved Oxygen (DO), Electrical Conductivity (EC), pH
Laboratory analysis	Salinity, measured as mg/L TDS. Major ions: calcium, chloride, magnesium, sodium. Nutrients: total nitrogen, ammonia (as N), nitrate (as N), nitrite (as N), and total phosphorus. E.coli. Metals: As, B, Be, Cd, Co, Cu, Hg, Pb, Mn, Se, Ni, Zn.

5.5.3.2 Extended monitoring program

As part of investigating the leakage from the lagoons and assessing risks to the groundwater environment, GHD (2019) recommended that additional monitoring should be completed from the expanded monitoring network. This water quality monitoring program is summarised in Table 7 with groundwater and effluent were to be sampled quarterly and Barr Creek sampling to be undertaken monthly.

Table 7 Extended water analyte suite

Groundwater chemical analysis	Groundwater chemical parameters
Field parameters	Dissolved Oxygen (DO), Electrical Conductivity (EC), pH
Laboratory analysis	Salinity, measured as mg/L TDS. Major ions: calcium, chloride, magnesium, sodium, potassium, sulphate, carbonate and bicarbonate. Nutrients: total nitrogen, ammonia (as N), nitrate (as N), nitrate (as N), and total phosphorus. Metals: As, B, Be, Cd, Co, Cu, Hg, Pb, Mn, Se, Ni, Zn. E.coli.



Paper Size ISO A4
0 100 200 300 400
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

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GHD

Coliban Water
Cohuna WRP Monitoring Bore Network Review

Project No. 12643136
Revision No. 0
Date 11/07/2025

Monitoring network

FIGURE 1

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Print date: 11 Jul 2025 - 09:12

Data source: Coliban Water, bore and surface water locations, 2019; DEECA, VicMap, 2024; World Imagery: Maxar. Created by: bsmyth

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5.6 Groundwater levels

Groundwater levels have previously been assessed by Coliban Water (2016) and GHD (2017) over the period of 1997 to 2016; this review focuses on data collected in more recent years (2016 to 2024).

Groundwater levels from each of the onsite bores for the period of 2013 to 2024 are shown in the hydrographs in Appendix A. The hydrographs have been plotted with the monthly rainfall and the cumulative deviation from mean (CDFM) monthly rainfall.

Generally, bores at the site have shown a seasonal response with the lowest levels occurring in the drier summer months and higher water levels during the wetter winter months (this is in line with the previous assessments). The following is noted with regards to the groundwater levels since 2013:

- Since 2022, groundwater levels at bores BH1S and BH1D have generally increased with no strong evidence of seasonal variation in the year 2023. It's noted that these bores are the closest to the proposed lagoon 5
- At bores BH2S, BH2D, BH3S, BH3D, BH4S, BH4D, BH5D, BH5S, BH7S and BH8, groundwater levels decreased between 2017 and 2019 which was then followed by an increase between 2020 and 2023. These changes appear to follow the CDFM curve
- Bore BH7D showed groundwater level changes that are less aligned to the CDFM curve than other bores at the site
- At bores BH09, BH10, BH11, BH12, BH13, BH14 and BH15, groundwater levels have been increasing since monitoring commenced in late 2020; this increasing trend follows the CDFM curve
- The hydraulic gradient at the site varies spatially and with time as shown by the nested bores:
  - Groundwater levels at nested bores BH1, BH2 and BH3 have historically been quite similar, however, post-2022, BH1 has generally shown a slight downwards hydraulic gradient
  - Groundwater levels at nested bore BH4 generally show a slight upwards hydraulic gradient post 2022
  - Groundwater levels at nested bore BH5 show a variable hydraulic gradient, between 2018 and 2022 it was generally upwards but since 2022 it has variably changed
  - At nested bore BH7, pre-2019, the hydraulic gradient was slightly downwards, between 2019 and late 2021 groundwater levels were similar and post-2021 the gradient has variably changed
- The bores closest to the lagoon on its eastern side (bores BH7S, BH7D, BH8, BH3S, BH3D, BH2S and BH2D) have the highest groundwater levels
- The bores closest to where lagoon 5 is to be constructed are BH1S, BH1D and BH9:
  - BH1D: groundwater levels have ranged from 0.8 metres below top of casing (mbTOC) to 2.6 mbTOC (approximately 0.54 to 2.34 metres below ground level (mbgl)) with groundwater levels generally remaining around 1 mbTOC (or around 0.74 mbgl) since the start of 2023
  - BH1S: groundwater levels have ranged from 0.75 mbTOC to 2.5 mbTOC (approximately 0.5 to 2.25 mbgl) with groundwater levels below 1.2 mbTOC (or around 0.95 mbgl) since the start of 2023
  - BH9: groundwater levels have ranged from 2.1 mbTOC to 3.9 mbTOC with groundwater levels below 3 mbTOC since the start of 2023
  - The levels from these bores indicate that groundwater levels are likely to be <1 to 2 mbgl at the proposed location of lagoon 5. This somewhat aligns with the groundwater levels (1.4 to 3.9 mbgl) encountered by GTS (2024) during geotechnical drilling (note that these are the depths encountered during drilling not necessarily the stabilised levels which represent the actual water table depth)

An inspection by GHD (2017) identified areas of water logging at the site, including:

- The ground surrounding bores BH2S and BH2D on the eastern side of the lagoon was damp and salt scarring was noted on the ground surface
- Salt scarring was seen on the ground south of bores BH7S and BH7D and adjacent to bores BH4S and BH4D
- The swale drain located around the western edge of lagoon 3 contained water even though no rainfall had been recorded for at least five days prior to the inspection

5.7 Groundwater flow

Groundwater flow contours were constructed using groundwater level data from February 2024 and are shown in Figure 2. The groundwater contours show that groundwater is flowing radially from the lagoons, indicating groundwater mounding is occurring. These contours are similar to those produced by GHD (2020) which also depicted mounding around the WRP lagoons.

5.8 Hydraulic conductivity

Previous investigations by GHD (2017) included aquifer (slug) testing from five monitoring bores (BH1D, BH2S, BH2D, BH4S, BH4D) located next to the lagoons at the site. The tests showed that hydraulic conductivity ranged from <0.1 m/day (BH4S) up to 1.4 m/day (BH2S). Both bores BH2S and BH4D recorded hydraulic conductivities between 1 m/day and 1.4 m/day which is more consistent with a silty sand or fine sand rather than the silty clay and clay documented in the drillers logs (GHD, 2017).

Paper Size ISO A4

0 100 200 300 400

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

GHD

Coliban Water
Cohuna WRP Monitoring Bore Network Review

Inferred Groundwater Contours February 2024

Project No. **12643136**
Revision No. **0**
Date **11/07/2025**

FIGURE 2

\\ghdnet\ghd\AU\Melbourne\Projects\31\12643136\GIS\Maps\Deliverables\CohunaWRP.aprx - 12643136_01_GroundwaterContours_rev
Print date: 11 Jul 2025 - 09:10

Data source: Coliban Water, bore locations, 2019; GHD, groundwater contours, 2024; World Imagery: Maxar. Created by: bsmyth

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5.9 Influent and effluent quality

To understand if groundwater is receiving water from the lagoons at the site, the effluent quality needs to be understood and characterised. Table 8 provides a summary of the key analytical parameters of influent to the Cohuna WRP. The data presented indicates that influent is characterised by low EC and TDS concentrations, and high nutrient concentrations.

Effluent quality data (treated to Discharge Lagoon No. 3 stage) is summarised in Table 9 and is characterised by generally lower nutrient (i.e. Nitrogen, Phosphorus and Ammonia) concentrations than the raw influent (Table 8) that enters the treatment plant, however on average higher concentrations of Nitrate, pH, EC and TDS are recorded.

Table 8 Influent water quality summary

Parameter	Unit	Minimum concentration	Maximum concentration	Average concentration	Geomean	Recent Aug 24
EC	µS/cm	1,700	8,400	4,483	4,173	3,400
pH	pH units	6.9	7.9	7.43	7.43	7.4
TDS	mg/L	920	5,900	3,178	2,923	NA
Nitrate	mg/L	0.005	0.63	0.046	0.006	NA
Total Nitrogen	mg/L	24	85	48.5	46.4	NA
Total Phosphorous	mg/L	2.6	23	7.6	6.9	4.9
Ammonia (as N)	mg/L	0.99	53	32.2	26.5	35

Table 9 Discharge Lagoon No. 3 (effluent) water quality summary

Parameter	Unit	Minimum concentration	Maximum concentration	Average concentration	Geomean	Recent Feb 24
EC	µS/cm	2,600	28,000	7,802.70	6,687.43	8,200
pH	pH unit	7.6	9.7	8.42	8.40	8.2
TDS (only available 2003-2013, +1 in 2017)	mg/L	2,000	20,000	5,705	4,527	NA
Nitrate	mg/L	0.005	3.8	0.235	0.012	0.005
Total Nitrogen	mg/L	7.3	33	17.53	16.16	NA
Total Phosphorous	mg/L	0.2	5.5	1.61	1.23	1.2
Ammonia (as N)	mg/L	0.05	19	4.34	0.82	0.05

5.10 Groundwater quality

5.10.1 Regional salinity

CDM Smith (2022) water table salinity mapping conducted on behalf of DEECA (previously DELWP) indicates that the water table aquifer in the area has a groundwater salinity of 5,400 to 7,100 mg/L becoming less saline to the south west (3,100 to 5,400 mg/L).

5.10.2 Background groundwater quality

GHD (2020) indicated that BH09 was installed to the south of the site as a background bore. As such, the data obtained from this bore has been used to establish baseline conditions. It's noted that this bore is also located south of the proposed lagoon 5. The background water quality at BH09 is characterised by high EC concentrations and low nutrient concentrations as presented in Table 10.

Based on the average ratio of TDS to EC in groundwater bores across the site (0.67), EC has been converted to TDS. This approach indicates that the average TDS for BH09 is 21,440 mg/L.

Table 10 Background bore (BH09) water quality summary

Parameter	Unit	Minimum concentration	Maximum concentration	Average concentration	Geomean
EC	µS/cm	32,000	41,000	36,308	36,233
Nitrate (as N)	mg/L	0.005	0.12	0.0021	0.012
Total Nitrogen	mg/L	0.05	2.7	0.87	0.45
Total Phosphorous	mg/L	0.025	0.96	0.31	0.19
Ammonia (as N)	mg/L	0.05	0.9	0.24	0.14

5.10.3 Analysis of groundwater quality

5.10.3.1 Water quality plot review

Groundwater quality plots have been produced for the key analytes which characterise groundwater and effluent these are provided in Appendix B. A summary of the observations regarding each bore and analyte are provided in Table 11; the bores closest to the lagoons are highlighted blue. The key takeaway's from this table are:

– The data shows that bores BH1S, BH1D, BH2S, BH2D, BH3S, BH3D, BH4S, BH5S and BH5D have decreasing concentrations of EC which may indicate that water from the lagoons is recharging the groundwater
– Bores BH3D, BH3S and BH5D generally had consistently higher concentrations of Ammonia post 2020 compared to earlier on in their records
– Bores BH1D, BH1S, BH3D BH3S BH4D, BH4S, BH5D and BH8 generally had consistently higher concentrations of Total Phosphorous post-2020 compared to earlier records

Table 11 Summary of water quality plot review with concentrations (min-max(average)

Bore	EC		Total Nitrogen		Total Phosphorous		Ammonia as N	
	Concentrations (µS/cm)	Comment	Concentrations (mg/L)	Comment	Concentrations (mg/L)	Comment	Concentrations (mg/L)	Comment
BH1d	33000 - 59000 (50000)	Declining concentration since 2020 (47,000 Nov2019 to 20,000 May 2024)	0.2 - 6.6 (1.4)	No trend	0.005 - 1.4 (0.12)	Higher concentrations post 2020	0.05 - 1.9 (0.32)	No trend
BH1s	20000 - 47000 (36041)	Declining concentration since 2020 (59,000 Nov2019 to 40,000 May 2024)	0.05 - 7.4 (1.03)	No trend	0.005 - 0.84 (0.1)	Higher concentrations post 2020	0.05 - 1.5 (0.35)	Generally increasing since 2013
BH2d	5100 - 32000 (16243)	Overall declining trend	0.05 - 13 (1.61)	Elevated prior to 2013; no trend	0.005 - 0.86 (0.08)	No trend	0.05 - 5.1 (0.49)	Elevated prior to 2013; no trend
BH2s	5900 - 22000 (13722)	Overall declining trend	0.05 - 12 (1.25)	No trend	0.005 - 0.59 (0.05)	No trend	0.05 - 2.5 (0.23)	No trend
BH3d	12000 - 21000 (14633)	Overall declining trend	0.29 - 4.2 (0.78)	No trend	0.005 - 0.71 (0.06)	Higher concentrations post 2020	0.05 - 0.8 (0.11)	Higher concentrations post 2020; no trend

Bore	EC		Total Nitrogen		Total Phosphorous		Ammonia as N	
	Concentrations (µS/cm)	Comment	Concentrations (mg/L)	Comment	Concentrations (mg/L)	Comment	Concentrations (mg/L)	Comment
BH3s	13000 - 24000 (17633)	Overall declining trend	0.05 - 2.5 (0.53)	No trend	0.005 - 0.25 (0.04)	Higher concentrations post 2020	0.05 - 0.6 (0.12)	Higher concentrations post 2020; no trend
BH4d	8700 - 35000 (20990)	Large increasing in concentration in July 2013, concentrations have generally remained higher after this time	0.1 - 5.9 (1.48)	No trend	0.005 - 0.62 (0.1)	Higher concentrations post 2020	0.05 - 0.7 (0.23)	No trend
BH4s	3500 - 30000 (13010)	Overall declining trend	0.26 - 29 (3.51)	Large fluctuations, increased magnitude post 2015	0.005 - 3 (0.27)	Higher concentrations post 2020 with large fluctuations	0.05 - 0.6 (0.17)	No trend
BH5d	12000 - 18000 (14583)	Overall declining trend	0.05 - 2.5 (0.65)	No trend	0.005 - 0.92 (0.07)	Higher concentrations post 2020	0.05 - 1.1 (0.21)	Higher concentrations post 2020; no trend
BH5s	8700 - 13000 (10572)	Overall declining trend	0.05 - 2.5 (0.73)	No trend	0.005 - 0.35 (0.08)	No trend	0.05 - 1.2 (0.11)	No trend
BH7d	14000 - 21000 (17489)	Decreasing trend to March 2015 following by increasing concentrations	0.05 - 5.4 (0.74)	No trend	0.005 - 0.48 (0.07)	No trend	0.05 - 2 (0.3)	No trend
BH7s	10000 - 28000 (19333)	No trend	0.3 - 2.2 (0.94)	No trend	0.005 - 0.25 (0.05)	No trend	0.05 - 1.3 (0.38)	Increase in concentrations post 2012; no trend
BH8	3800 - 25000 (10258)	No trend	0.05 - 16 (2.89)	Generally increasing with large fluctuations	0.005 - 0.59 (0.1)	Higher concentrations post 2020	0.05 - 1.3 (0.17)	No trend
BH9	32000 - 41000 (36308)	Possibly increasing	0.05 - 2.7 (0.87)	No trend	0.025 - 0.96 (0.31)	Possibly decreasing	0.05 - 0.9 (0.24)	Possibly decreasing
BH10	15000 - 17000 (16000)	No trend	0.05 - 1.1 (0.38)	No trend	0.025 - 0.64 (0.2)	No trend	0.05 - 0.6 (0.2)	Possibly decreasing

Bore	EC		Total Nitrogen		Total Phosphorous		Ammonia as N	
	Concentrations (µS/cm)	Comment	Concentrations (mg/L)	Comment	Concentrations (mg/L)	Comment	Concentrations (mg/L)	Comment
BH11	21000 - 25000 (23308)	No trend	0.1 - 1.2 (0.61)	No trend	0.025 - 0.62 (0.25)	No trend	0.05 - 0.5 (0.3)	No trend
BH12	19000 - 30000 (25700)	Possibly increasing	0.3 - 8.8 (2.99)	Possibly increasing	0.025 - 0.76 (0.24)	No trend	0.05 - 0.6 (0.28)	No trend
BH13	12000 - 17000 (13909)	No trend	0.3 - 1 (0.48)	No trend	0.025 - 0.74 (0.17)	No trend	0.05 - 0.6 (0.2)	Possibly decreasing
BH14	19000 - 28000 (22700)	No trend	0.5 - 4.3 (1.31)	No trend	0.07 - 0.96 (0.32)	No trend	0.4 - 0.9 (0.62)	Possibly decreasing
BH15	17000 - 25000 (20000)	Possibly increasing	0.3 - 6.5 (1.34)	No trend	0.025 - 5 (0.74)	No trend	0.05 - 0.6 (0.41)	No trend

5.10.3.2 Hydrochemical analysis

Piper Trilinear diagrams can be used to characterise different water sources and identify potential mixing. This plot relies on concentrations of major ions and cations. Given this, piper trilinear plots could not be constructed using recent data as no major cation and anion data was available for the effluent which is required to enable identification of potential mixing.

5.11 Surface water monitoring

5.11.1 Surface water quality

Surface water quality data was provided for the upstream gauge at Barr Creek at Chuggs Road and the downstream gauge at McMillans Road Bridge, presented in Table 12. Analysis through comparison of the water quality at both these gauge locations indicate on average higher EC and slightly higher pH, and lower nutrient concentrations in general are recorded downstream. Where data is available between E Coli analysis testing methods (i.e. MPN/100mL and orgs/100 mL) similar results for minimum and maximums both upstream and downstream, although averages show reduced concentrations at the downstream gauge point. A like for like comparison in the recent February 2024 and August 2024 concentrations shows seasonal fluctuations exist.

Table 12 Upstream and Downstream water quality summary

Parameter	Unit	Minimum concentration	Maximum concentration	Average concentration	Geomean	Recent Feb 24 (Aug 24)
U/S – Barr Creek @ Chuggs Rd						
EC	µS/cm	520	4,700	1,535.62	1,185.54	800 (4,400)
pH	pH units	7	8.1	7.49	7.49	7.5 (8.1)
Nitrate	mg/L	0.005	1.1	0.25	0.05	0.005 (0.58)
Total Nitrogen	mg/L	1.2	76	10.11	5.79	8.4 (76)
Total Phosphorous	mg/L	0.27	7.5	3.37	2.48	3.5 (7.5)
Ammonia (as N)	mg/L	0.05	53	5.29	1.20	1.8 (53)
E Coli	MPN/100mL	4	2,400	696.4	252.43	180 (990)
E Coli (only 2020 to 2022)	orgs/100mL	3	2,400	544.33	96.89	-
D/S – Barr Creek @ McMillans Rd						
EC	µS/cm	450	9,700	2,500.62	1,931.53	1,900 (9,700)
pH	pH units	7	8	7.59	7.59	7.6 (8)
Nitrate	mg/L	0.005	1.3	0.24	0.04	0.005 (0.54)
Total Nitrogen	mg/L	2.6	34	7.03	5.31	8.6 (34)
Total Phosphorous	mg P/L	0.37	5	2.64	1.98	5 (2.1)
Ammonia (as N)	mg N/L	0.05	16	2.92	1.08	1.6 (16)
E Coli	MPN/100mL	0	2,400	476	246.36	210 (640)
E Coli (only 2020 to 2022)	orgs/100mL	4	140	63.67	41.90	-

5.11.2 Barr Creek (U/S and D/S) comparison with influent and effluent surface water quality

Comparison between Influent, Effluent (Discharge Lagoon No. 3) (Section 5.9) and the upstream and downstream concentrations along Barr Creek (Section 5.11.1) is summarised in Table 13 and indicates Total Nitrogen and Ammonia to be typically lower downstream compared with upstream and both influent and effluent concentrations.

Total Phosphorus has typically lower concentrations downstream than upstream; however, the downstream concentrations are higher on average than the Discharge Lagoon No. 3 (effluent) concentrations.

pH is on average higher at Discharge Lagoon No. 3 than the influent concentrations, however when compared with Barr Creek both upstream and downstream (both showing similar concentrations on average) are also similar to the Influent average concentration.

Nitrate values are on average higher at Discharge Lagoon No. 3 than the influent concentrations, however when compared with Barr Creek both upstream and downstream (both showing similar concentrations on average) are also similar to the Discharge Lagoon No.3 average concentration.

EC is higher on average downstream than upstream, but on average lower than both Influent and Effluent concentrations. Some influence from the lagoons may contribute to the downstream concentrations. In summary, Total Phosphorus and EC may be influenced by the Discharge Lagoons quality compared with influent and upstream creek quality to some extent.

Table 13 Comparative average concentrations across the various sampling locations in relation to each other

Parameter	Inputs		Outputs	
	Influent	Upstream	Discharge Lagoon No. 3 (Effluent)	Downstream
EC	Moderate	Lowest	Highest	Moderate to Low
pH	Lowest	Moderate	Highest	Moderate
Nitrate	Lowest	Moderate	Moderate	Moderate
Total Nitrogen	Highest	Low	Moderate	Lowest
Total Phosphorous	Highest	Moderate	Lowest	Low to Moderate
Ammonia (as N)	Highest	Moderate to Low	Low	Lowest

5.11.3 Surface water levels

Surface water level data can be obtained from the gauge boards installed at Chuggs Rd Bridge and McMillans Bridge. No further gauge data was made available at the two gauges since they were surveyed; the water levels at this time (14 December 2018) were:

– Chuggs Rd Bridge: 77.96 mAHD
– McMillans Rd Bridge: approximately 77.36 mAHD

The closest bore to McMillans Rd Bridge along Barr Creek is BH10 (located approximate 1,380 m away) and has recorded elevations of between approximately 77.78 mAHD and 78.88 mAHD; greater than the elevation recorded at McMillans Rd Bridge (although it's noted this is based on elevations at different periods due to the availability of data).

The closest bore to Chuggs Rd Bridge along Barr Creek is BH11 (located approximate 860 m away) and has recorded elevations of between approximately 78.24 mAHD and 78.64 mAHD; greater than the elevation recorded at Chuggs Rd Bridge (although it's noted this is based on elevations at different periods due to the availability of data).

5.12 Regional groundwater use

A search of VVG was undertaken to identify and characterise groundwater use surrounding the site. The search identified 50 bores within 5 km of the site. A breakdown of the use of the bores is presented in Table 14; none of the bores identified are used for extractive purposes.

Table 14 Regional groundwater use

Bore use type	Number of bores
Groundwater Investigation	8
Groundwater investigation and observation	39
Observation	1
Unknown	2
Total	**50**

5.13 Regulatory classification of groundwater

5.13.1 Regulatory framework for groundwater classification

Based on available salinity data at BH09, groundwater quality needs to be maintained to protect all the environmental values as per **Segment F** of the ERS (2021).

5.13.2 Relevant environmental values

The environmental values relevant to the site are summarised in Table 15.

Table 15 Environmental values

Environmental value	Comment	Relevance to assessment
Water dependent ecosystems and species	There are several potential GDEs identified within 5 km of the site.	This environmental value is considered relevant.
Potable water supply	The area is not designated within a water supply area and no water supply bores were identified within 5 km of the site. Additionally, this environmental value does not apply to groundwater Segment F.	This environmental value has been excluded from further assessment.
Potable mineral water supply	The area is not designated within a mineral spring area and no mineral water supply bores were identified within 5 km of the site. Additionally, this environmental value does not apply to groundwater Segment F.	This environmental value has been excluded from further assessment.
Agriculture and irrigation (irrigation)	There were no bores designated for irrigation within 5 km of the site. Water quality is generally unsuitable for agricultural activities such as stock watering and irrigation, or other uses such as the irrigation of domestic gardens, commercial agriculture, parks, and golf courses. Additionally, this environmental value does not apply to groundwater Segment F.	This environmental value has been excluded from further assessment.
Industrial and commercial use	There were no bores designated for industrial or commercial use within 5 km of the site. Additionally, this environmental value does not apply to groundwater Segment F.	This environmental value has been excluded from further assessment.
Water based recreation (primary contact based	There are several surface water bodies (including Gunbower Creek) within 5 km of the site.	This environmental value is considered relevant.
Traditional owner cultural values	A compilation of the views and values of Traditional Owners has been prepared for this region, which takes into account culture-based values of water. Aboriginal values and objectives should be considered in future Victorian water management and planning in this region. While not explicitly identifying specific water resources, Aboriginal values and objectives should be considered in future Victorian water management and planning in this groundwater region (DELWP 2019).	This environmental value is considered relevant.
Buildings and structures	There may be buildings and structures within and around the site that may be affected by groundwater quality.	This environmental value is considered relevant.
Geothermal properties	Geothermal properties have not been identified.	This environmental value has been excluded from further assessment.

6. Conceptual hydrogeological model

Table 16 presents a tabulated summary of the conceptual hydrogeological understanding of the site. The model focusses on conceptual aspects that specifically relate to the role of groundwater as it relates to other natural elements and anthropogenic features of the site.

Graphical representations of the current conceptual hydrogeological understanding relative to the site are presented in Figure 3.

Table 16 Tabulated conceptualisation

Characteristic & importance	Description	Degree of understanding
Aquifer extent and geometry		
Aquifer monitored	The UTQA is mapped as the aquifer intersecting the water table across the site.	Good, based on site bore data and relevant aquifer inferred through regional mapping.
Confined status (likelihood of interaction with surface water)	Water table (shallower sediments) within the UTQA are recorded as unconfined.	Inferred based on regional mapping. Not characterized at the local scale.
Aquifer thickness (geometry of the aquifer and fluxes)	UTQA can be thick (around 50 m)	Inferred based on regional mapping. Not characterized at the local scale.
Soil recharge and infiltration	Unknown/Limited. Borelogs from the site indicate the area is rich in clay. Clay in the upper 0.5 m tends to be more friable with those deeper changing to high plasticity clays.	Not characterized. High priority – influences conceptual model.
Aquifer permeability	Geotechnical investigations completed at the site indicate that soil permeability is between $3x10^{-11}$ m/s and $5x10^{-11}$ m/s (GHD 2017). Recent geotechnical investigations completed at the lot for the proposed lagoon 5 indicates permeabilities ranging from of $4x10^{-11}$ m/s to $8x10^{-9}$ m/s.	Reasonable understanding.
Current hydrological condition		
Groundwater level trend (gradients and groundwater flow directions (vertically and laterally))	Depth to groundwater is generally quite shallow (<1-2 mbgl), with the shallowest levels close to the existing lagoons. Groundwater levels show a seasonal response and have been increasing since 2020 across the site which follows the CDFM curve. GHD (2017) documented a downwards hydraulic gradient at some of the nested sites. Post-2022 the vertical hydraulic gradient has varied.	Reasonable understanding.
Groundwater quality (salinity trend)	Decreasing concentrations of EC have been identified at bores closest to the lagoons including nested bores BH1, BH2, BH3, BH5 as well as BH4S; indicating that water from the lagoons is recharging the groundwater.	Reasonable understanding.
Groundwater quality (chemicals of potential concern) trend	Effluent is characterized by low EC and high nutrients (Total Nitrogen, Total Phosphorous, Ammonia). Increases in some nutrients were identified at nested bores BH1, BH3 and BH4 as well as BH5D and BH8.	Reasonable understanding: further characterization could be undertaken if major cation and anion data is made available for the effluent.

Characteristic & importance	Description	Degree of understanding
Groundwater flow systems		
Type (local, intermediate, regional)	Local	Reasonable understanding.
Recharge mechanism	Rainfall recharge, seepage from the lagoons (estimated seepage rate of between 5 ML and 18 ML (GHD 2017)).	Reasonable understanding.
Discharge area	Barr Creek and directly to the land surface (due to water logging)	Not well characterized at the local scale, monitoring of levels at the gauge boards would assist in identifying if groundwater is discharging to Barr Creek.
Groundwater flow (lateral direction)	Groundwater lateral flow direction is occurring radially from the existing lagoons as a result of groundwater mounding. Regional groundwater flow is interpreted to be northwards (Williams and Wolley, 1992).	Reasonable understanding.
Inter-aquifer flow	Possible given no aquitards at the site.	Not well characterized at the local scale. Inferred based on regional bore data and mapping.
Groundwater dependence		
Surface water – groundwater connectivity	Likely connectivity with Gunbower Creek to the north of the site. Could possibly be connected to Barr Creek.	Low – local surface water heights not available. Further characterization needed
Losing/gaining dynamics	The dynamics of the interaction between groundwater and surface water features is unknown.	Low – not well understood. Local surface water heights not available. Further characterization needed
Role of groundwater in maintaining ecological values	Due to the shallow depth of groundwater, it could be important in maintaining ecological values, both terrestrial and that of waterways.	Low – not well understood.

Legend

Firm conceptualisation	Based on desktop review undertaken, the understanding of this element is suitable for informing the hydrogeological conceptualization at the site.
Action required	This element of the hydrogeological conceptualization has not been monitored or data gaps exist, which should be considered to improve conceptual understanding
No Action	Based on existing information reviewed, the understanding of this element is a low priority as it has limited influence on conceptual model. No further characterization considered necessary at this stage.

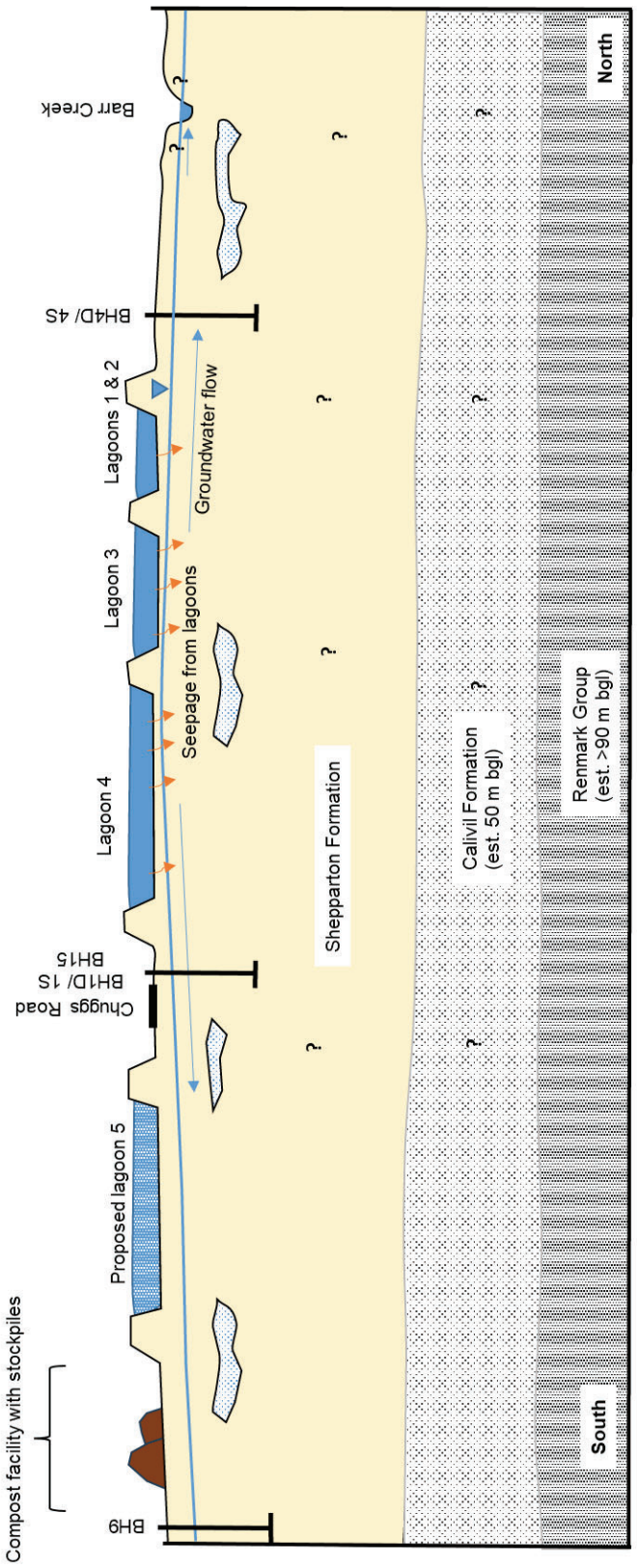


Figure 3 Cohuna WRP– Conceptual hydrogeological model

7. Risk assessment

7.1 Risk assessment framework

A qualitative risk assessment has been completed in general accordance with EPA publication 1321.2, Licence assessment guidelines. Guidelines for using a risk management approach to assess compliance with licence conditions. The following methodology was used to determine the groundwater impact pathways and define risk ratings for the site:

1. Determine the 'impact pathway' – how the site impacts on a given groundwater value or concern (using a source-pathway-receptor model)
2. Describe the 'consequences' of the impact pathway to define levels of consequence (Table 17)
3. Determine the 'likelihood' of the consequence occurring to the level assigned in Step 2. Likelihood descriptors are provided in Table 18
4. Determine the maximum credible 'consequence level' associated with the impact as defined in Table 17
5. Form the consequence and likelihood levels assigned to the impact pathway. Use a risk matrix to determine the risk rating (Table 19)

Tables describing measures of likelihood and consequence, adopted from EPA (2011), have been presented in Table 17 to Table 19.

Table 17 Consequence criteria

Level	Indicator	Description
1	Severe	Death, substantial offsite impacts to broader environment, long term environmental damage, extensive clean up required, complete failure of environmental protection controls.
2	Significant	Hospitalisation required, offsite impacts to a segment of the environment, medium term environmental damage, off-site clean up required, breach of environmental legislation
3	Moderate	Medical attention required, some offsite temporary impacts, moderate onsite impacts
4	Minor	First aid required, minimal onsite impacts immediately contained, no discernible offsite impacts, no external complaints received.
5	Negligible	No health impacts, negligible onsite impacts, no offsite impacts

Table 18 Likelihood criteria

Level	Rating	Description
A	Almost Certain	Is expected to occur almost all of the time
B	Likely	Is expected to occur most of the time
C	Probable	Might occur
D	Unlikely	Might occur but not expected
E	Rare	Only expected to occur under exceptional circumstances.

Table 19 Risk analysis matrix

Consequence	Likelihood				
	A Almost certain	B Likely	C Probable	D Unlikely	E Rare
1 Severe	V	V	V	V	H
2 Significant	V	V	V	H	H
3 Moderate	V	H	H	M	M
4 Minor	H	H	M	L	L
5 Negligible	H	M	L	L	L

7.2 Risk identification

The primary goal of this report is to inform if additional monitoring bores and monitoring is required to support the construction and operation of lagoon 5 using a risk-based approach. This is to assist with meeting the licence conditions and avoid groundwater being contaminated by site operations. Table 20 identifies the risks that construction and operation of the lagoon 5 may pose.

Table 20 Risk identification – lagoon 5

Environmental aspect or hazard	Potential event or incident	Potential consequence	Receptor or surrounding environment	Potential environmental impact
Constructions				
Excavations/earth works to create lagoon intersect groundwater triggering the need to dewater	Dewatering causes declines in groundwater levels	Changes in local groundwater flow regimes	Groundwater Surface water bodies (Barr Creek)	Impacts ecosystems dependent on groundwater by changing the surface water – groundwater interaction dynamics
Spillage from the storage and handling of hazardous materials	Hazardous material infiltrates the soil and shallow groundwater	Contamination of groundwater	Groundwater	Changes the groundwater quality of the water table aquifer impacting groundwater environmental values
Spillage from the storage and handling of hazardous materials	Hazardous material infiltrates the soil and shallow groundwater	Contamination of groundwater	Surface water bodies (Barr Creek)	Impacts surface water quality and impacts ecosystem health of the waterway
Operation				
Leakage of treated effluent from lagoon 5 to the underlying soil	Treated effluent infiltrates soil and shallow groundwater	Contamination of groundwater	Groundwater	Change in groundwater quality including increase in nutrients and decrease in salinity, impacting groundwater environmental values
Leakage of treated effluent from lagoon 5 to the underlying soil	Treated effluent infiltrates soil and shallow groundwater and migrates to creek	Contamination of nearby surface water bodies (Barr Creek)	Surface water bodies (Barr Creek)	Impacts surface water quality and impacts ecosystem health of the waterway
Leakage of treated effluent from lagoon 5 to the underlying soil	Treated effluent infiltrates soil	Contamination of land	Land	Change to environmental value of land due to water logged soils
Spillage from the storage and handling of hazardous materials	Hazardous material infiltrates the soil and shallow groundwater	Contamination of groundwater	Groundwater	Changes the groundwater quality of the water table aquifer impacting groundwater environmental values
Spillage from the storage and handling of hazardous materials	Hazardous material infiltrates the soil and shallow groundwater	Contamination of groundwater	Surface water bodies (Barr Creek)	Impacts surface water quality and impacts ecosystem health of the waterway
Overflow of wastewater from the lagoon	Lagoon reaches capacity and wastewater overflows from the lagoon to the surrounding environment	Contamination of land	Land	Change to environmental value of land

Environmental aspect or hazard	Potential event or incident	Potential consequence	Receptor or surrounding environment	Potential environmental impact
Overflow of wastewater from the lagoon	Lagoon reaches capacity and treated effluent infiltrates soil and shallow groundwater	Contamination of groundwater	Groundwater	Change in groundwater quality including increase in nutrients and decrease in salinity, impacting groundwater environmental values
Overflow of wastewater from the lagoon	Lagoon reaches capacity and the overflow runs-off of treated effluent to surface water bodies (Barr Creek)	Contamination of nearby surface water bodies (Barr Creek)	Surface water bodies (Barr Creek)	Impacts surface water quality and impacts ecosystem health of the waterway
Overflow of wastewater from the lagoon	Lagoon reaches capacity and treated effluent infiltrates soil and shallow groundwater and migrates to creek	Contamination of nearby surface water bodies (Barr Creek)	Surface water bodies (Barr Creek)	Impacts surface water quality and impacts ecosystem health of the waterway

7.3 Risk register

The risk assessment completed for this project in relation to the proposed construction and operation of lagoon 5 is tabulated in full in Table 21 and considers the reviewed information and data to develop the residual risk ratings for each impact pathway.

Table 21 Cohuna WRP groundwater risk register relating to proposed lagoon 5

ID	Activity	Potential event	Potential impact	Pathways for risk	Existing control	Likelihood	Consequence	Level of risk	Comment
Construction of lagoon 5									
C01	Excavations/earth works to create lagoon intersect groundwater triggering the need to dewater	Dewatering causes declines in groundwater levels	Impacts ecosystems dependent on groundwater by changing the surface water – groundwater interaction dynamics	Baseflow to surface water bodies reduce or changes the reach of the stream to a losing stream	Construction Environment Management Plan	Unlikely (D)	Minor (4)	Low	Elevations collected at the gauge boards along Barr Creek in 2018 are lower than those collected at BH10 and BH11 in 2020. However, as there were no levels collected from the gauge boards at the same time as the onsite monitoring bores, there is insufficient information to determine if baseflow to the creek is occurring. Coliban Water are not planning on undertaking any dewatering activities during construction.
C02	Spillage from the storage and handling of hazardous materials	Hazardous material infiltrates the soil and shallow groundwater	Changes the groundwater quality of the water table aquifer impacting groundwater environmental values	No designated area at the construction site for refuelling of machinery and/or insufficient procedures in place to manage spills	Construction Environment Management Plan (CEMP) Spill kits and response procedures	Unlikely (D)	Minor (4)	Low	There are a number of publications to assist with how to manage the handling of hazardous materials including: – EPA Publication 1698 Liquid storage and handling guidelines – Australian standard AS1940 – storage and handling of flammable and combustible liquid The CEMP should consider these publications and be used to inform management of spills and leaks. Installation of additional bores could be considered to assess potential impact if a spill should occur.
C03	Spillage from the storage and handling of	Hazardous material infiltrates the	Impacts surface water quality and	As per C-02 Groundwater flow transports	As per C-02	Unlikely (D)	Minor (4)	Low	As per C-02 Additional surface water monitoring along Barr Creek

ID	Activity	Potential event	Potential impact	Pathways for risk	Existing control	Likelihood	Consequence	Level of risk	Comment
	hazardous materials	soil and shallow groundwater	impacts ecosystem health of the waterway	the infiltrated material towards surface water body					upstream of lagoon 5 could be considered to assess potential impact if a spill should occur.
Operation of lagoon 5									
OP01	Leakage of treated effluent from lagoon 5 to the underlying soil	Treated effluent infiltrates soil and shallow groundwater	Change in groundwater quality including increase in nutrients and decrease in salinity, impacting groundwater environmental values	Issues with the integrity/performance of the clay liner	Operation Environment Management Plan (OEMP) Clay liner is constructed in accordance with EPA Publication 1911.2 *Technical information for the Victorian guideline for water recycling*	Unlikely (D)	Significant (2)	High	Groundwater levels at the proposed lagoon 5 location are anticipated to be <1 to 2 mbgl. Additionally, groundwater quality is highly saline, thus the design of clay liner is of vital importance. Additional monitoring bore installations and monitoring is required to assess any changes to levels and groundwater quality.
OP02	Leakage of treated effluent from lagoon 5 to the underlying soil	Treated effluent infiltrates soil and shallow groundwater and migrates to creek	Impacts surface water quality and impacts ecosystem health of the waterway	As per OP-01	As per OP-01	Unlikely (D)	Significant (2)	High	As per OP-01 Additional surface water monitoring along Barr Creek should be considered upstream of lagoon 5 to assess potential impact of leakage.
OP03	Leakage of treated effluent from lagoon 5 to the underlying soil	Treated effluent infiltrates soil	Change to environmental value of land due to water logged soils	As per OP-01	As per OP-01	Unlikely (D)	Significant (2)	High	As per OP-01

ID	Activity	Potential event	Potential impact	Pathways for risk	Existing control	Likelihood	Consequence	Level of risk	Comment
OP04	Spillage from the storage and handling of hazardous materials	Hazardous material infiltrates the soil and shallow groundwater	Changes the groundwater quality of the water table aquifer impacting groundwater environmental values	Site vehicles not using designated roadways and/or insufficient procedures in place to manage spills	Operation Environment Management Plan (OEMP) Spill kits and response procedures	Unlikely (D)	Minor (4)	Low	There are a number of publications to assist with how to manage the handling of hazardous materials including: – EPA Publication 1698 Liquid storage and handling guidelines – Australian standard AS1940 – storage and handling of flammable and combustible liquid The OEMP should consider these publications and be used to inform management of spills and leaks. Installation of additional bores could be considered to assess potential impact if a spill should occur.
OP05	Spillage from the storage and handling of hazardous materials	Hazardous material infiltrates the soil and shallow groundwater	Impacts surface water quality and impacts ecosystem health of the waterway	As per OP-04 Groundwater flow transports the infiltrated material towards surface water body	As per OP-04	Unlikely (D)	Minor (4)	Low	As per OP-04 Additional surface water monitoring along Barr Creek should be considered upstream of lagoon 5 to assess potential impact if a spill should occur.
OP06	Overflow of wastewater from the lagoon	Lagoon reaches capacity and wastewater overflows from the lagoon to the surrounding environment	Change to environmental value of land	High rainfall event(s) WRP receives more wastewater for evaporation that capacity of the plant	Operation Environment Management Plan (OEMP) Design of lagoon takes into consideration climate conditions Maintaining freeboard full supply level to	Unlikely (D)	Moderate (3)	Medium	Groundwater levels at the proposed lagoon 5 location are anticipated to be <1 to 2 mbgl. Wastewater being discharged to land has the potential to temporarily raise the water table at the site. Additional monitoring bore installations and monitoring could assess any changes to levels and groundwater quality.

ID	Activity	Potential event	Potential impact	Pathways for risk	Existing control	Likelihood	Consequence	Level of risk	Comment
					embankment crest level				
OP07	Overflow of wastewater from the lagoon	Lagoon reaches capacity and treated effluent infiltrates soil and shallow groundwater	Change in groundwater quality including increase in nutrients and decrease in salinity, impacting groundwater environmental values	As per OP06	As per OP06	Unlikely (D)	Moderate (3)	Medium	Groundwater levels at the proposed lagoon 5 location are anticipated to be <1 to 2 mbgl. The wastewater is expected to be high in nutrients, affecting the environmental values of groundwater. Additional monitoring bore installations and monitoring is required to assess any changes to levels and groundwater quality.
OP08	Overflow of wastewater from the lagoon	Lagoon reaches capacity and the overflow runs-off of treated effluent to surface water bodies (Barr Creek)	Impacts surface water quality and impacts ecosystem health of the waterway	As per OP06	As per OP06	Unlikely (D)	Moderate (3)	Medium	Additional surface water monitoring along Barr Creek should be considered upstream of lagoon 5 to assess potential impact run-off to the creek.
OP09	Overflow of wastewater from the lagoon	Lagoon reaches capacity and treated effluent infiltrates soil and shallow groundwater and migrates to creek	Impacts surface water quality and impacts ecosystem health of the waterway	As per OP06	As per OP06	Unlikely (D)	Moderate (3)	Medium	As per OP07 As per OP08

8. Proposed monitoring locations

8.1 Monitoring locations

The risk assessment in section 7.3 identified three high risk items. To determine and demonstrate compliance with the licence conditions for the site in association with lagoon 5, further monitoring infrastructure is required. Table 22 summarises the proposed additions to the monitoring network including their intended purpose; all groundwater monitoring bores would be targeting the water table aquifer. The monitoring locations are described in Table 22 and shown in Figure 4;the final locations to be determined subject to detailed site assessment including an Assessment of Cultural Heritage.

Table 22 Proposed monitoring infrastructure

Site ID	Location	Purpose
BH16 – nested site	East of lagoon 5, placed in a triangular configuration with bores BH17 and BH18. BH16 would be northern bore close to lagoon.	**To assist in monitoring the risks associated with C01.** If groundwater is encountered during construction, dewatering from the basin may be required. Dewatering would likely lower groundwater levels, changing the groundwater flow regime which has the potential to impacts ecosystems dependent on groundwater by changing the surface water – groundwater interaction dynamics (during construction phase). Monitoring of groundwater levels during construction enables detection of groundwater flow regime changes. **To assist in monitoring the risks associate with OP01, OP02, OP03, OP06, OP07 and OP09** The integrity of clay liners can degrade overtime. Leakage of effluent to the groundwater has the potential to impact groundwater quality, raise groundwater levels causing water logging and also impact the water quality and ecosystem health of surface water bodies. Monitoring of groundwater quality and levels prior to construction and operation of the lagoon enables collection of baseline groundwater level data (the data collected prior to construction) which can be used as a comparison to detect leakages from the lagoon when in operation. **To assist in monitoring the risks associate with OP06, OP07 and OP09** If the lagoon reaches capacity and overflows, effluent can infiltrate to the groundwater, impacting groundwater quality and its environmental values. To assess the impact of an overflow from lagoon 5, additional monitoring bore installations and monitoring of levels and groundwater quality is required.
BH17– nested site	East of lagoon 5, placed in a triangular configuration with bores BH16 and BH18. BH17 would be southern bore close to lagoon.	As per BH16
BH18 – nested site	East of lagoon 5, placed in a triangular configuration with bores BH16 and BH17. BH18 would be close to Chuggs Rd monitoring gauge on Barr Creek	As per BH16 A bore close to Barr Creek would also enable an assessment of the surface water – groundwater dynamics prior to and during construction as well as during the operational phase.
BH19– nested site	West of lagoon 5, placed in a triangular configuration with bores BH20 and BH21. BH19 would be northern bore close to lagoon.	As per BH16

Site ID	Location	Purpose
BH20 – nested site	West of lagoon 5, placed in a triangular configuration with bores BH19 and BH21. BH20 would be southern bore close to lagoon.	As per BH16
BH21 – nested site	West of lagoon 5, placed in a triangular configuration with bores BH19 and BH20. BH21 would be further west.	As per BH16
Barr Creek at Cohuna – Leitchville Rd Bridge	Barr Creek should be considered upstream of lagoon 5. Approximate coordinates (MGA55, GDA94): E: 249,694 N: 6,029,809	**To assist in monitoring the risks associated with OP02.** If there is an issue with the integrity/performance of the clay liner and leakage of effluent to the groundwater occurs there is potential for it to migrate offsite and impact the water quality and ecosystem health of waterways. **To assist in monitoring the risks associated with OP08 and OP09.** If the lagoon reaches capacity and overflows there is potential for either run-off of treated effluent to surface water bodies (Barr Creek) or infiltrations and migration of the effluent offsite to surface water bodies. To assess impacts to surface water quality from leakage or overflows, monitoring data is needed upstream of lagoon 5 in order to compare it with water quality downstream of the site. The gauge at Chuggs Rd Bridge previously served as the upstream gauge but due to the proposed location of lagoon 5, it would no longer be upstream of the site; thus, an additional upstream location is needed.

8.2 Construction requirements

Table 23 specifies the proposed construction details of the bores listed in Table 22. The construction is based on targeting the water table aquifer at different depths. The final construction depths and details of the bores should be confirmed onsite by a qualified hydrogeologist and informed by conditions encountered during drilling. All bores should be installed by a licenced driller and constructed in accordance with NUDLC (2020) minimum requirements for water bores in Australia.

GHD (2023) developed a monitoring bore specification document for Coliban Water which should be followed for any future monitoring bores installed at the site. The document details requirements around:

- Headworks
- Bore protection (marker posts and bollards)
- Bore labelling and identification
- Security
- Bore registration
- Surveying
- Maintenance
- Construction

Concept monitoring bore construction diagrams have been presented in Appendix C. The timing of bore construction would be subject to confirmation of construction schedule.

8.3 Monitoring requirements

The proposed monitoring bores and surface water location should follow the extended monitoring program in terms of analytical suite, as outlined in section 5.5.3.2. Monitoring from the proposed bores should commence prior to the first water transfer to lagoon 5 to allow for the collection of baseline data. Ideally, one year of monitoring data should be collected prior to the first water transfer. However, it's understood that this may not be feasible. Given this, monitoring should be conducted at least monthly from the new monitoring bores leading up to the first water transfer.

GHD (2017) recommended additional QA/QC procedures to be implemented as part of groundwater monitoring for the site. These recommendations should be adopted for any future groundwater monitoring at the site.

Table 23 *Proposed monitoring bore construction summary*

Bore ID	BH16S	BH16D	BH17D	BH17D	BH18S	BH18D	BH19S	BH19D	BH20S	BH20D	BH21S	BH21D
Easting	248,316	248,316	248,272	248,272	248,607	248,607	247,878	247,878	247,848	247,848	247,611	247,611
Northing	6,030,905	6,030,905	6,030,579	6,030,579	6,030,974	6,030,974	6,030,952	6,030,952	6,030,659	6,030,659	6,030,824	6,030,824
Total depth (mbgl)	6	15	6	15	6	15	6	15	6	15	6	15
Screen from (mbgl)	3	12	3	12	3	12	3	12	3	12	3	12
Screen to (mbgl)	6	15	6	15	6	15	6	15	6	15	6	15
Gravel to (mbgl)	2	11	2	11	2	11	2	11	2	11	2	11
Bentonite from (mbgl)	1	10	1	10	1	10	1	10	1	10	1	10
Bentonite to (mbgl)	2	11	2	11	2	11	2	11	2	11	2	11
Cement bentonite grout	1 mbgl to surface	10 mbgl to surface	1 mbgl to surface	10 mbgl to surface	1 mbgl to surface	10 mbgl to surface	1 mbgl to surface	10 mbgl to surface	1 mbgl to surface	10 mbgl to surface	1 mbgl to surface	10 mbgl to surface
Casing (mm)	50	50	50	50	50	50	50	50	50	50	50	50
Joint	Threaded	Threaded	Threaded	Threaded	Threaded	Threaded	Threaded	Threaded	Threaded	Threaded	Threaded	Threaded
Material	Class 18	Class 18	Class 18	Class 18	Class 18	Class 18	Class 18	Class 18	Class 18	Class 18	Class 18	Class 18
Screen	Machine slotted	Machine slotted	Machine slotted	Machine slotted	Machine slotted	Machine slotted	Machine slotted	Machine slotted	Machine slotted	Machine slotted	Machine slotted	Machine slotted
Monument	Stick-up	Stick-up	Stick-up	Stick-up	Stick-up	Stick-up	Stick-up	Stick-up	Stick-up	Stick-up	Stick-up	Stick-up

9. Conclusions

Based on the review of current data available and the information provided in the location of lagoon 5, GHD makes the following conclusions:

- Generally, bores at the site have shown a seasonal response with the lowest levels occurring in the drier summer months and higher water levels during the wetter winter months (this is in line with the previous assessments)
- The bores closest to where lagoon 5 is to be constructed are BH1S, BH1D and BH09. The levels from these bores indicate that groundwater levels are likely to be <1 to 2 mbgl at the proposed location of lagoon 5
- The groundwater contours show groundwater is flowing radially from the lagoons, indicating groundwater mounding is occurring. These contours are similar to those produced by GHD (2020) which also showed mounding around the WRP lagoons
- Influent at the Cohuna WRP is characterised by low EC and TDS concentrations, and high nutrient concentrations
- Effluent at the Cohuna WRP is characterised by higher EC and TDS concentrations, and lower nutrient concentrations, relative to the influent
- Barr Creek Downstream of the Cohuna WRP is characterised by lower concentrations compared to the Upstream sample point for several analytes including EC, pH, Total Phosphorus, and Ammonia. This may be influenced by the lower average concentrations recorded in the summary data from Discharge Lagoon No. 3 (Effluent). If seepage from Discharge Lagoon No. 3 is occurring, this may be contributing to the lower downstream concentrations being seen
- Average Nitrate concentrations were approximately the same across the upstream, downstream and effluent points, all noted to be higher than the Influent average concentration (when older data was available)
- Background bore BH09, located south of the proposed lagoon 5, is characterised by high EC concentrations and low nutrient concentrations. The average salinity for BH09 is 21,440 mg/L TDS, groundwater quality needs to be maintained to protect all the environmental values as per Segment F of the ERS (2021)
- Groundwater quality data showed indications of effluent recharging groundwater around the existing lagoons based on:
  - Decreasing concentrations of EC at BH1S, BH1D, BH2S, BH2D, BH3S, BH3D, BH4S BH5S and BH5D
  - Bores BH3D, BH3S and BH5D generally had consistently higher concentrations of Ammonia post 2020 compared to earlier on in their records
  - Bores BH1D, BH1S, BH3D BH3S BH4D, BH4S, BH5D and BH8 generally had consistently higher concentrations of Total Phosphorous post 2020 compared to earlier on in their records
- There was insufficient data to comment on the surface water quality at Barr Creek and the dynamics of groundwater – surface water interaction
- No extractive uses of groundwater were identified within 5 km of the site
- The risk assessment identified high and moderate risks associated with the operation of lagoon 5
- Additional monitoring infrastructure around the proposed lagoon 5 and along Barr Creek was recommended to determine and demonstrate compliance with the licence conditions for the Cohuna WRP in association with lagoon 5

10. Recommendations

GHD recommends the following actions to be implemented at the Cohuna WRP in associated with the proposed lagoon 5.

Table 24 Cohuna WRP recommendations

Number	Recommendation
R1	Surface water monitoring should be conducted for both the upstream and downstream gauges as a minimum. The monitoring should include both water quality monitoring and reading of the gauge board.
R2	Water quality of the effluent should include major ions (calcium, chloride, magnesium, sodium, potassium, sulphate, carbonate and bicarbonate) to support hydrochemical analysis and identification of potential mixing of water sources
R3	The addition of 12 monitoring bores and one surface water monitoring site is recommended based on the risk assessment to determine and demonstrate compliance with the licence conditions. The monitoring bores are located to the east and west of lagoon 5 and the surface water monitoring site upstream of the site. All bores should be installed by a licenced driller and constructed in accordance with NUDLC (2020) minimum requirements for water bores in Australia and adhere to the Coliban Water monitoring bore specification document (GHD 2023).
R4	The proposed monitoring bores and surface water location should follow the extended monitoring program (in terms of analytical suite). Monitoring from the proposed bores should be completed prior to the first water transfer to the lagoon 5 to allow for the collection of baseline data. GHD (2017) recommended additional QA/QC procedures to be implemented as part of groundwater monitoring for the site. These recommendations should be adopted for any future groundwater monitoring at the site.
R5	The conceptual hydrogeological model should be updated after at least one year of monitoring following the installation of the recommended monitoring infrastructure.
R6	Record the locations of effluent and influent sampling points so that this information can be incorporated in future analysis and review of site data.

11. References

Bureau of Meteorology 2024, Groundwater Dependent Ecosystem Atlas, accessed 18 September 2024 <**http://www.bom.gov.au/water/groundwater/gde/** >

Coliban Water 2016, *Review of Groundwater – Water Monitoring Data from Bores at Water Reclamation Plants*

Coliban Water 2024, *Cohuna WRP Lagoon Upgrades – Project Description, Version 1.0, 26 March 2024*

EPA 2011, *Licence Assessment Guidelines – Guidelines for using a risk management approach to assess compliance with licence conditions*, Publication 1321.2, June 2011

EPA 2021, *Technical information for the Victorian guideline for water recycling,* EPA Publication 1911.2, March 2021

EPA 2022, *Groundwater Sampling Guidelines,* Publication 669.1, February 2022

FedUni 2015, *Visualising Victoria's Groundwater,* Centre for eResearch and Digital Innovation, Federation University Australia, Mt Helen, Ballarat, Victoria, retrieved 19 September 2024 < **https://www.vvg.org.au** >

Geotechnical Testing Services (GTS) 2024, *Cohuna Water Reclamation Plant, Chuggs Road, Cohuna – Geotechnical Investigation for Coliban Region Water Corporation,* Report 24C 0548, September 2024.

GHD 2017, *Draft Cohuna WWTP Hydrogeological Assessment*

GHD 2020, *Cohuna Water Reclamation Plan – Report on drilling and preliminary monitoring data review*

GHD 2023, *Monitoring bores – Specification*

CDM Smith 2022, *Revision of Groundwater Salinity and Yield Mapping for Victoria 2022,* 7 September 2022, prepared for the Department of Environment, Land, Water and Planning

Queensland Government 2024, *Scientific Information for Land Owners (SILO),* accessed 18 September 2024, **https://www.longpaddock.qld.gov.au/silo/**

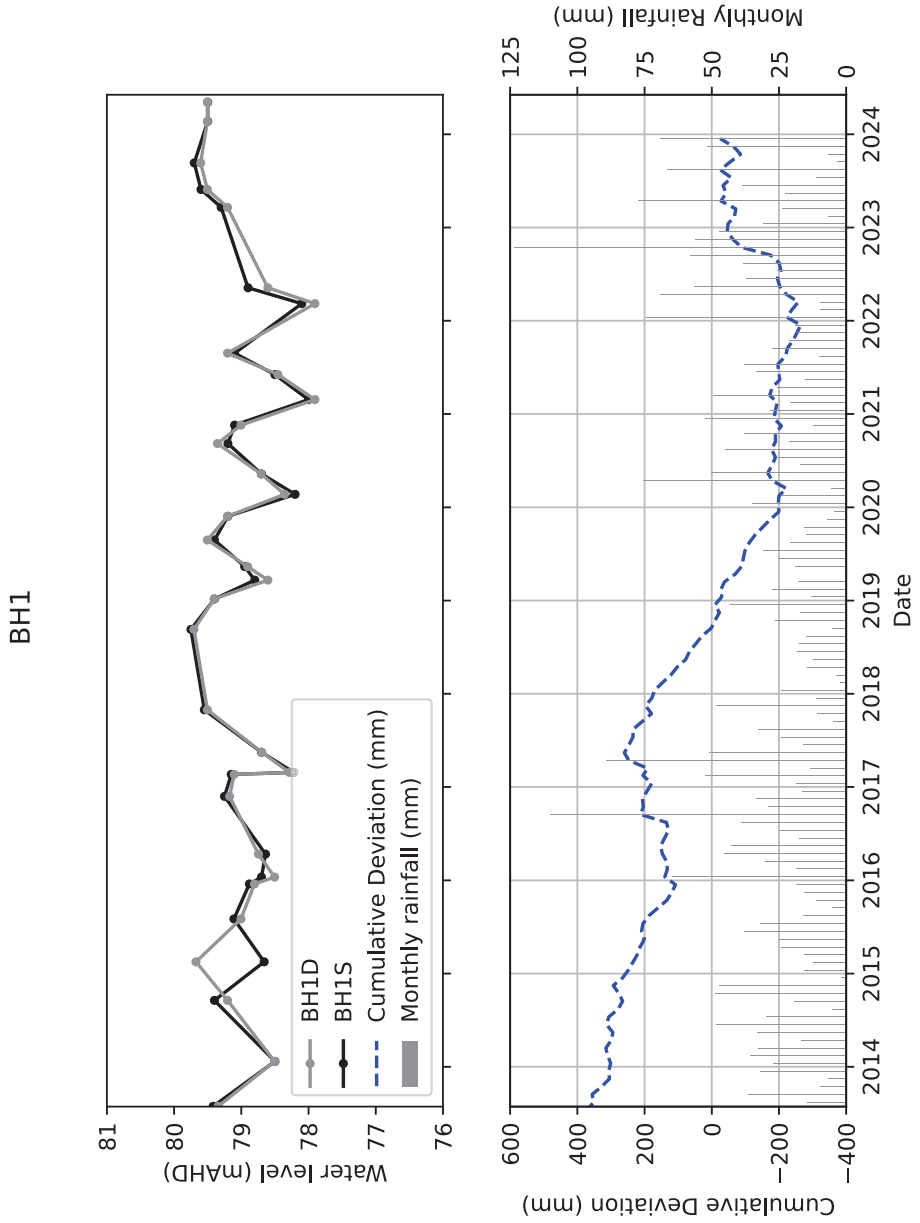
Victorian Government Gazette 2021, *Environment Reference Standard*, No.S 245, Wednesday 26 May 2021.

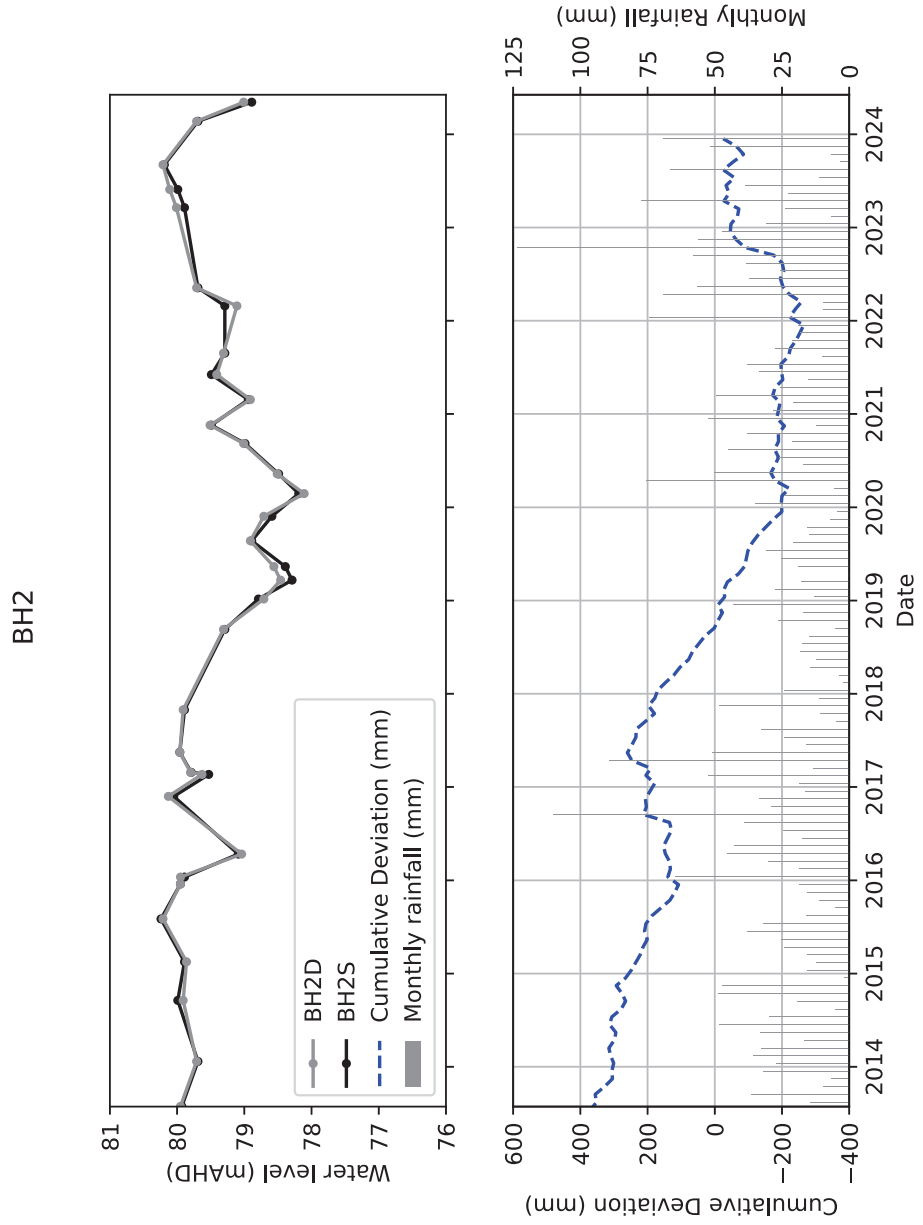
Williams R.M. and Wolley D., Department of Water Resources, 1992, *Deniliquin Hydrogeological Map (1:250,000 scale),* Australian Geological Survey Organisation, Canberra, Australia.

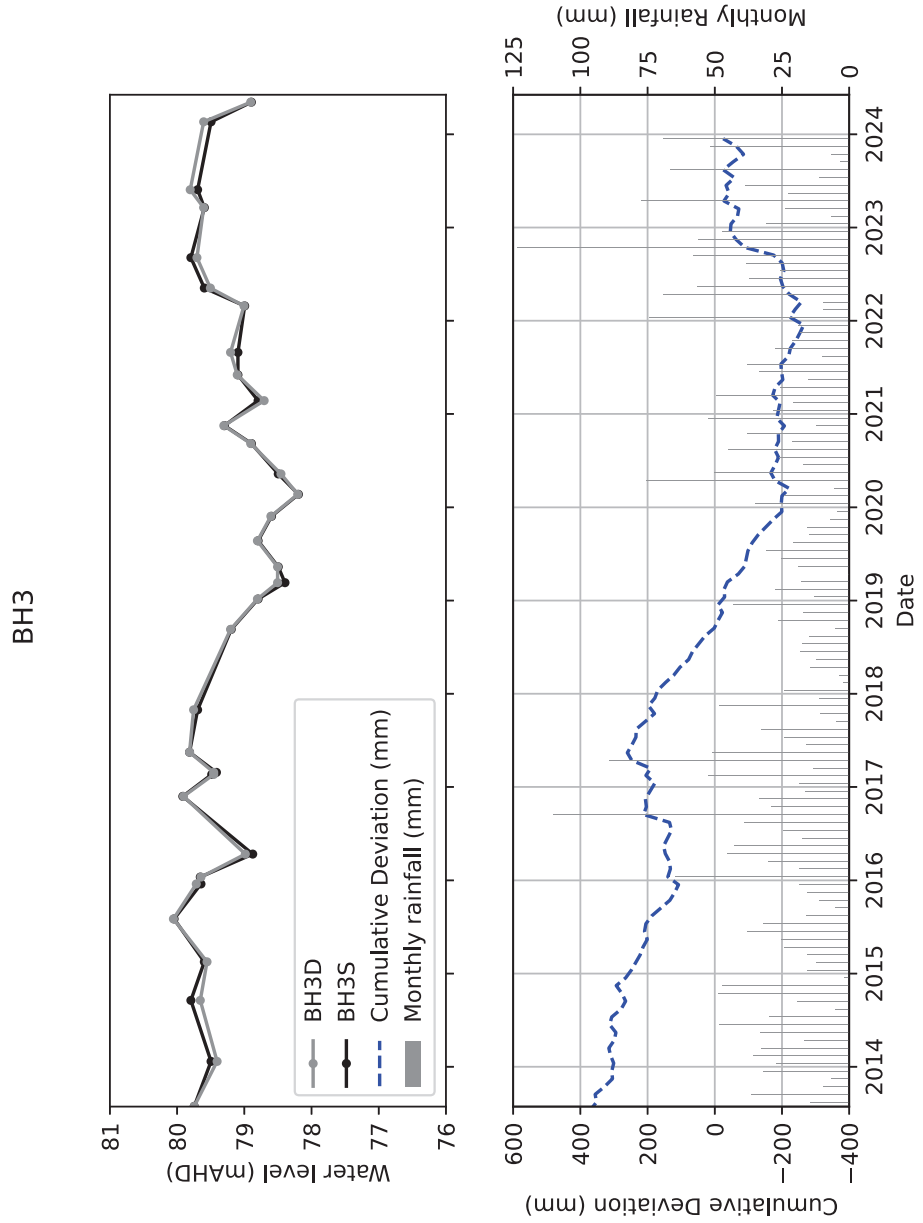
Appendices

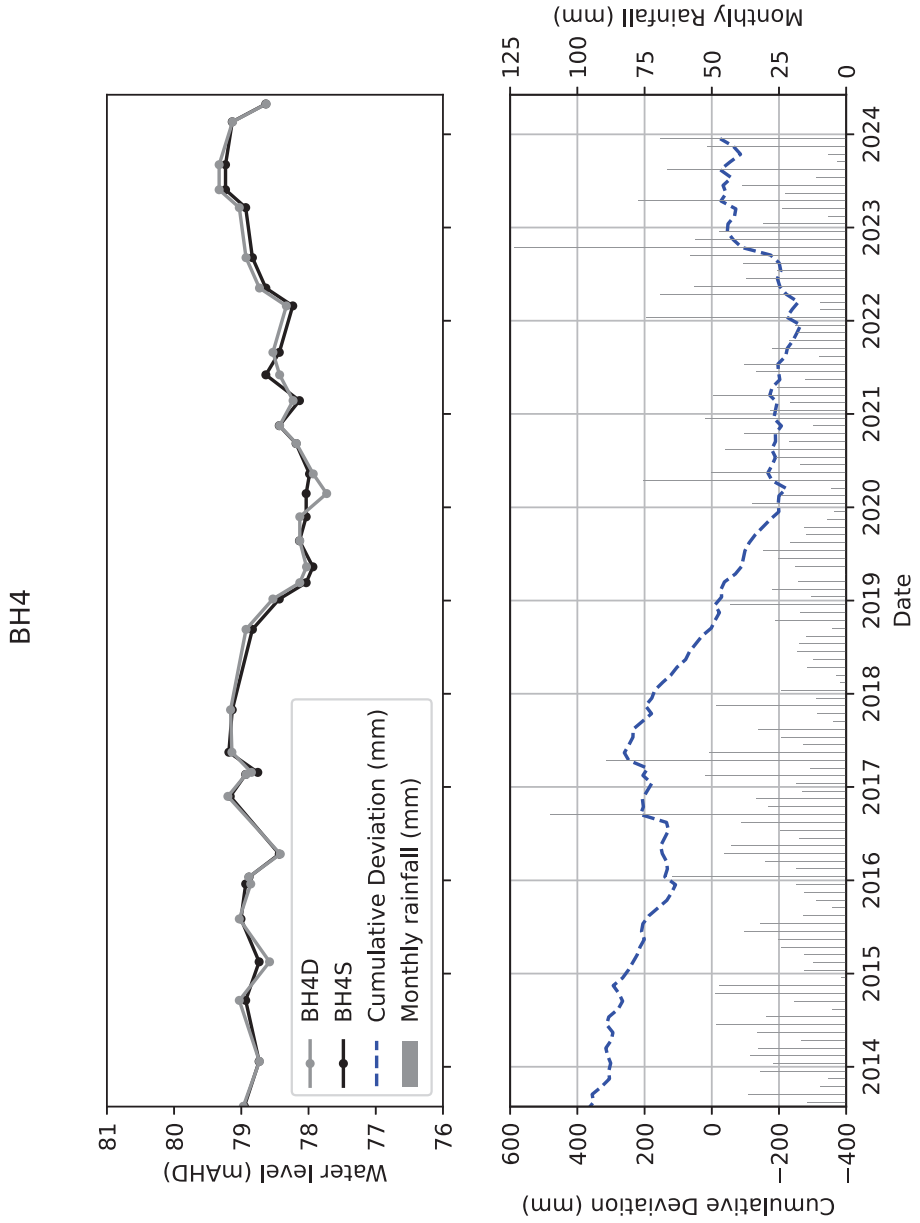
Appendix A

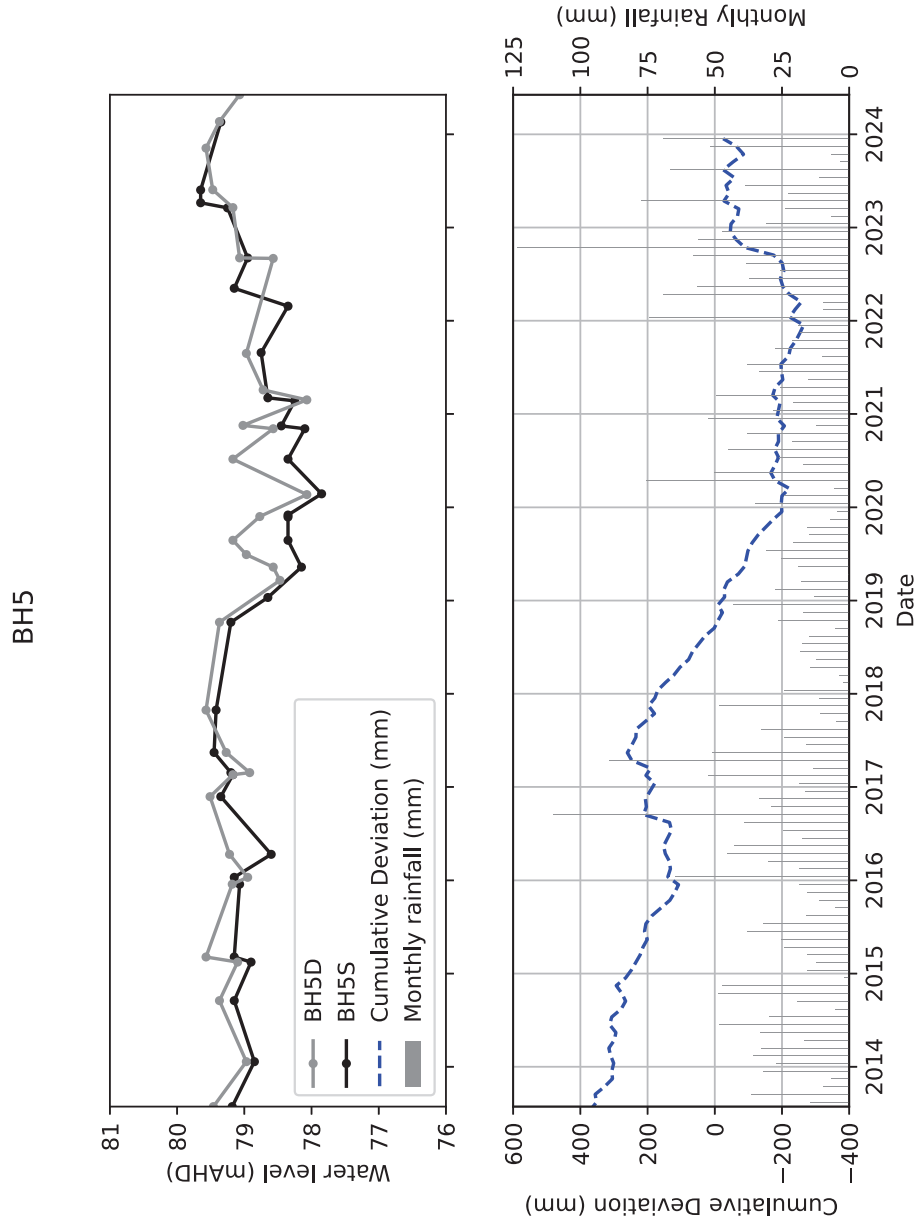
Groundwater level hydrographs

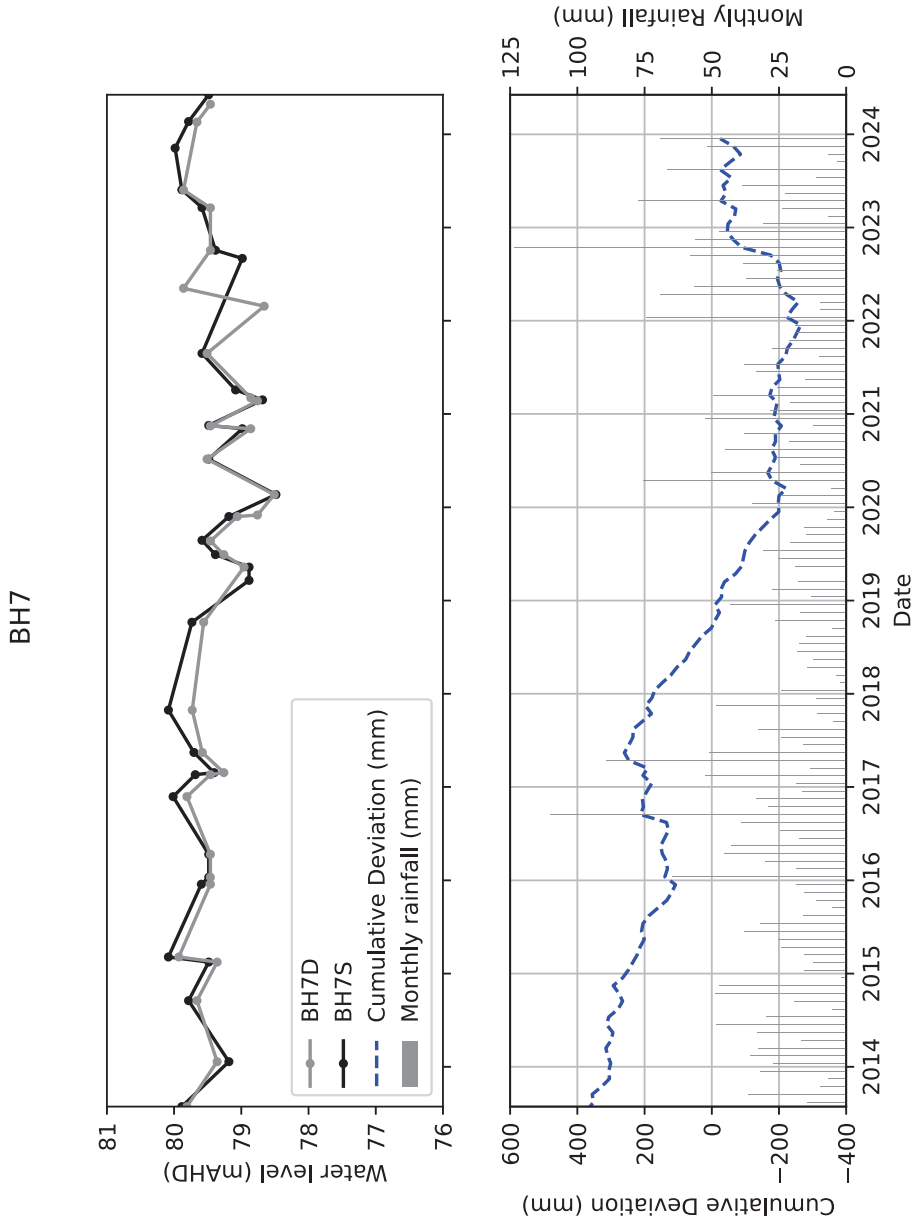

BH1
Water level (mAHD)
81
80
79
78
77
76
BH1D
BH1S
Cumulative Deviation (mm)
Monthly rainfall (mm)
Cumulative Deviation (mm)
600
400
200
0
−200
−400
Monthly Rainfall (mm)
125
100
75
50
25
0
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
Date

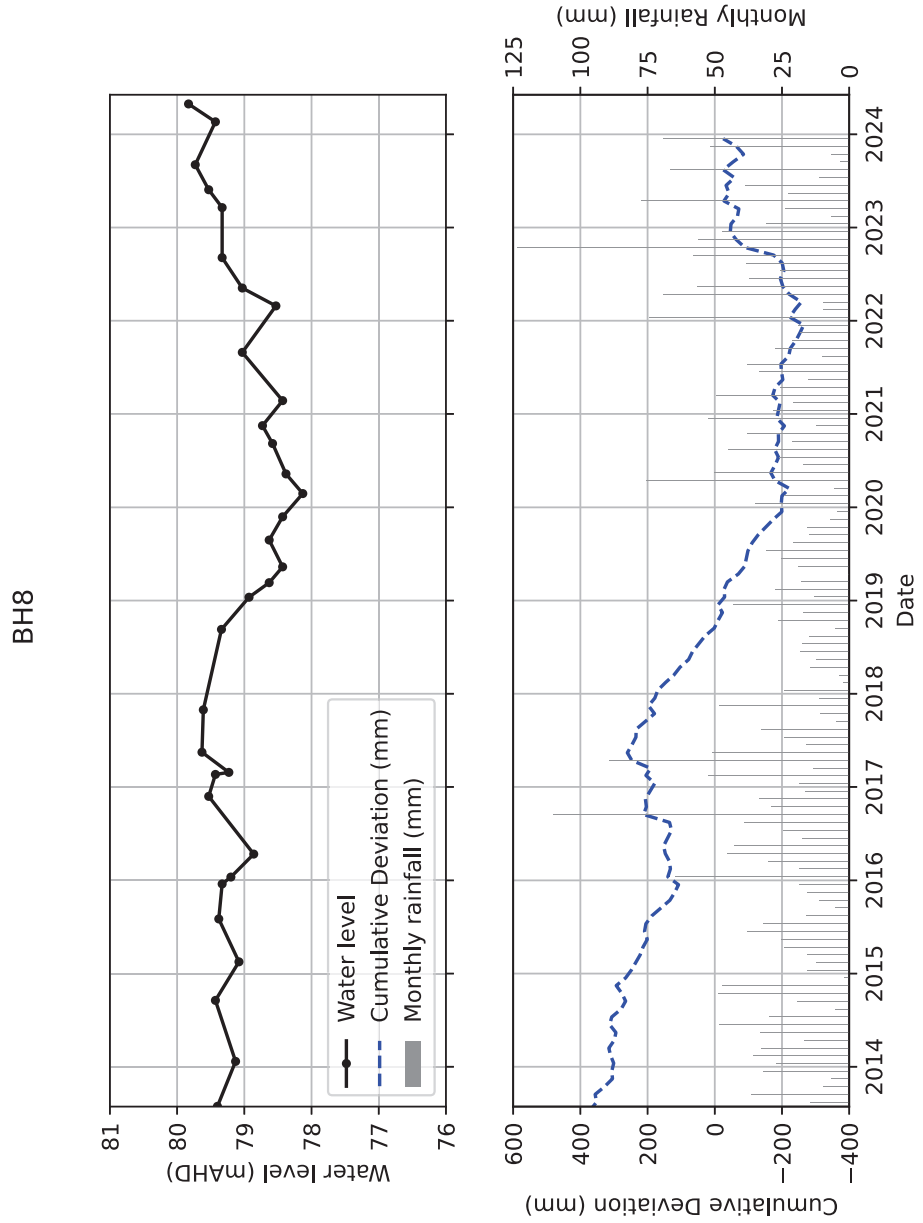

BH2
Water level (mAHD)
81
80
79
78
77
76
BH2D
BH2S
Cumulative Deviation (mm)
Monthly rainfall (mm)
Cumulative Deviation (mm)
600
400
200
0
−200
−400
Monthly Rainfall (mm)
125
100
75
50
25
0
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
Date

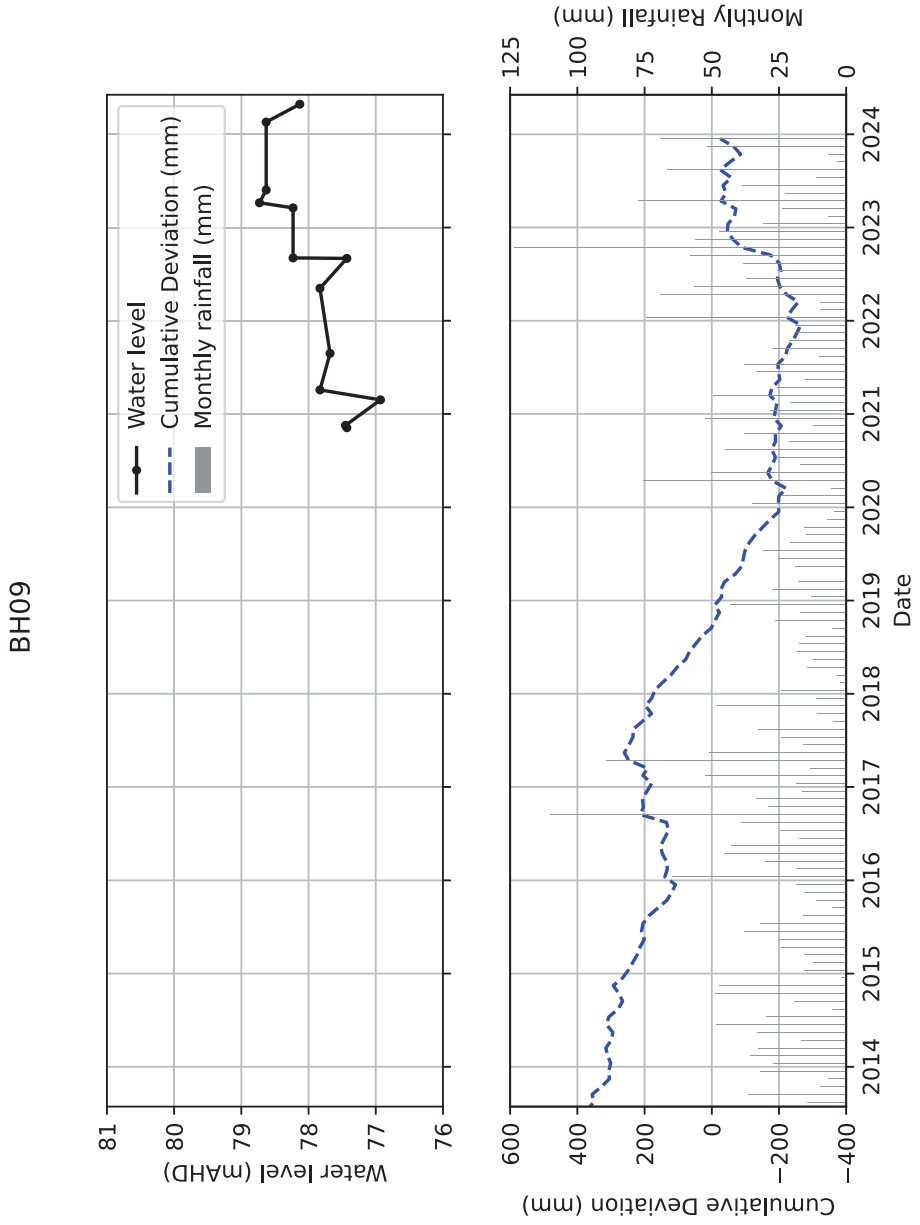

BH3
Water level (mAHD)
81
80
79
78
77
76
BH3D
BH3S
Cumulative Deviation (mm)
Monthly rainfall (mm)
Cumulative Deviation (mm)
600
400
200
0
−200
−400
Monthly Rainfall (mm)
125
100
75
50
25
0
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
Date

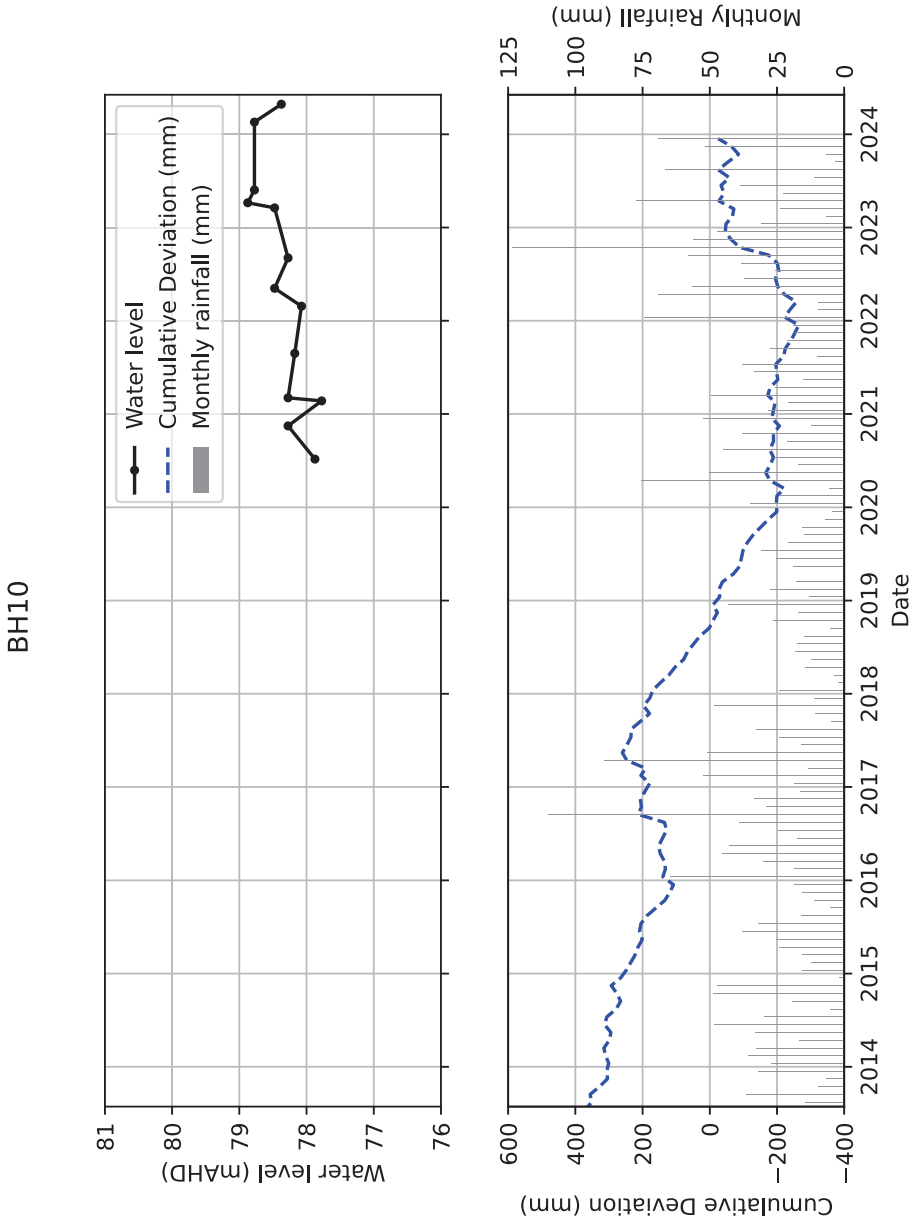

BH4
Water level (mAHD)
81
80
79
78
77
76
BH4D
BH4S
Cumulative Deviation (mm)
Monthly rainfall (mm)
Cumulative Deviation (mm)
600
400
200
0
−200
−400
Monthly Rainfall (mm)
125
100
75
50
25
0
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
Date

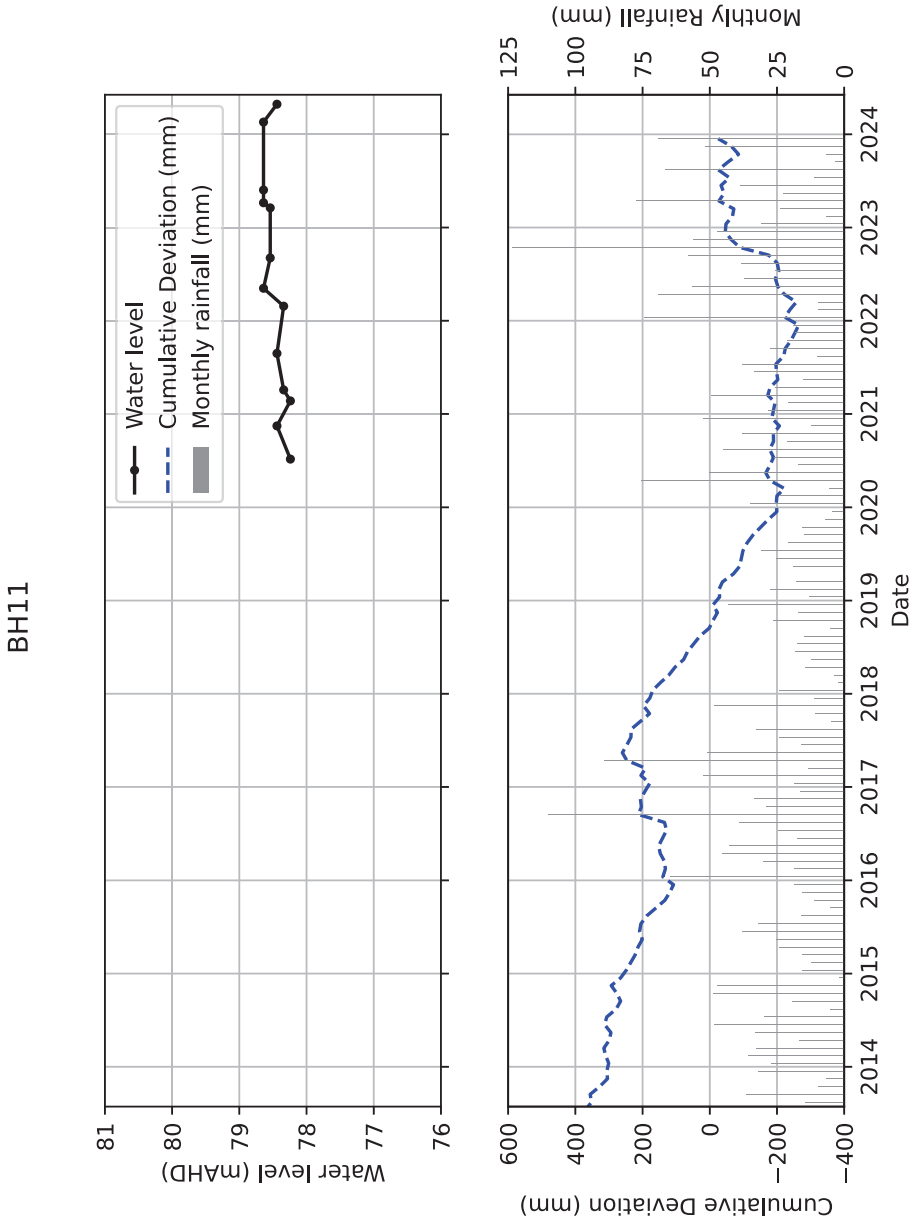

BH5
Water level (mAHD)
81
80
79
78
77
76
BH5D
BH5S
Cumulative Deviation (mm)
Monthly rainfall (mm)
Cumulative Deviation (mm)
600
400
200
0
−200
−400
Monthly Rainfall (mm)
125
100
75
50
25
0
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
Date

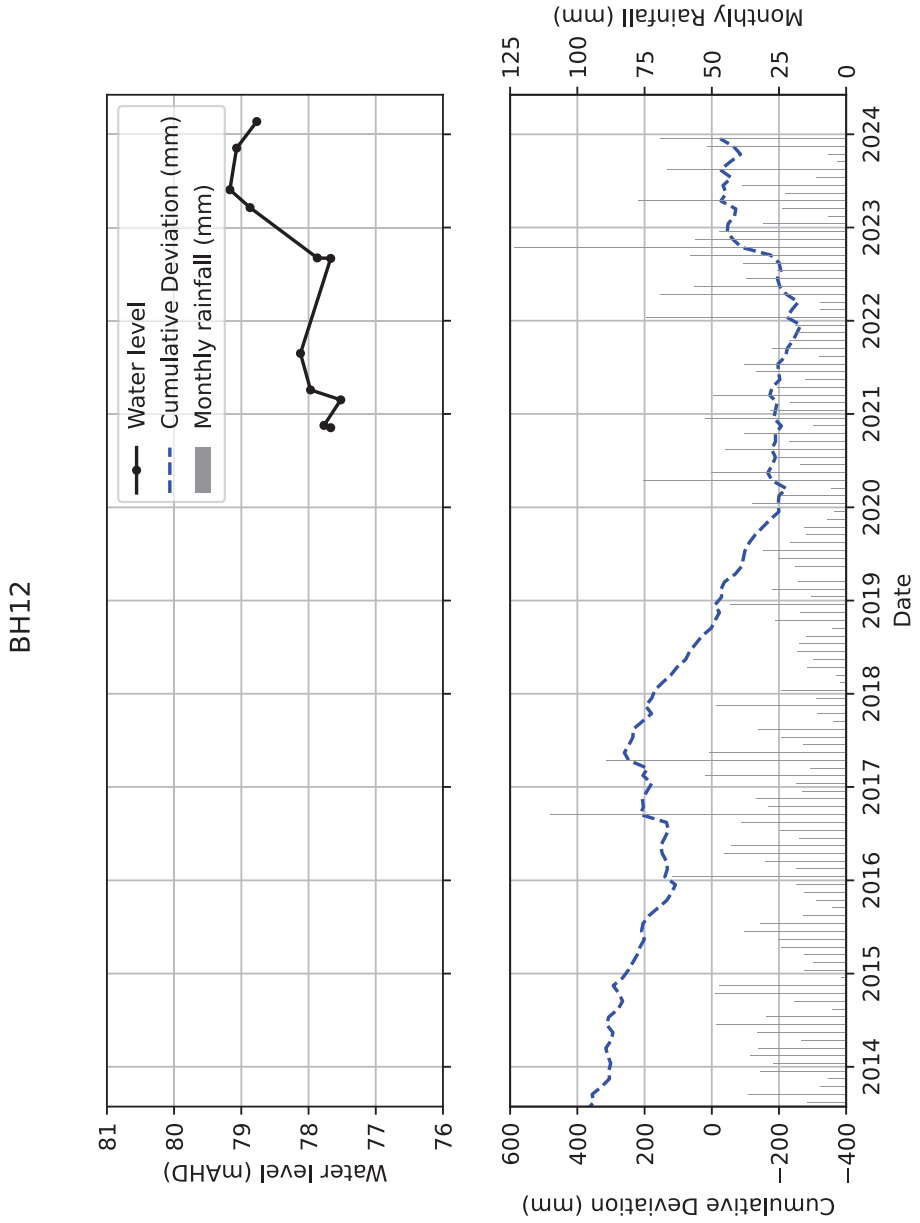

BH7
Water level (mAHD)
81
80
79
78
77
76
BH7D
BH7S
Cumulative Deviation (mm)
Monthly rainfall (mm)
Cumulative Deviation (mm)
600
400
200
0
−200
−400
Monthly Rainfall (mm)
125
100
75
50
25
0
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
Date

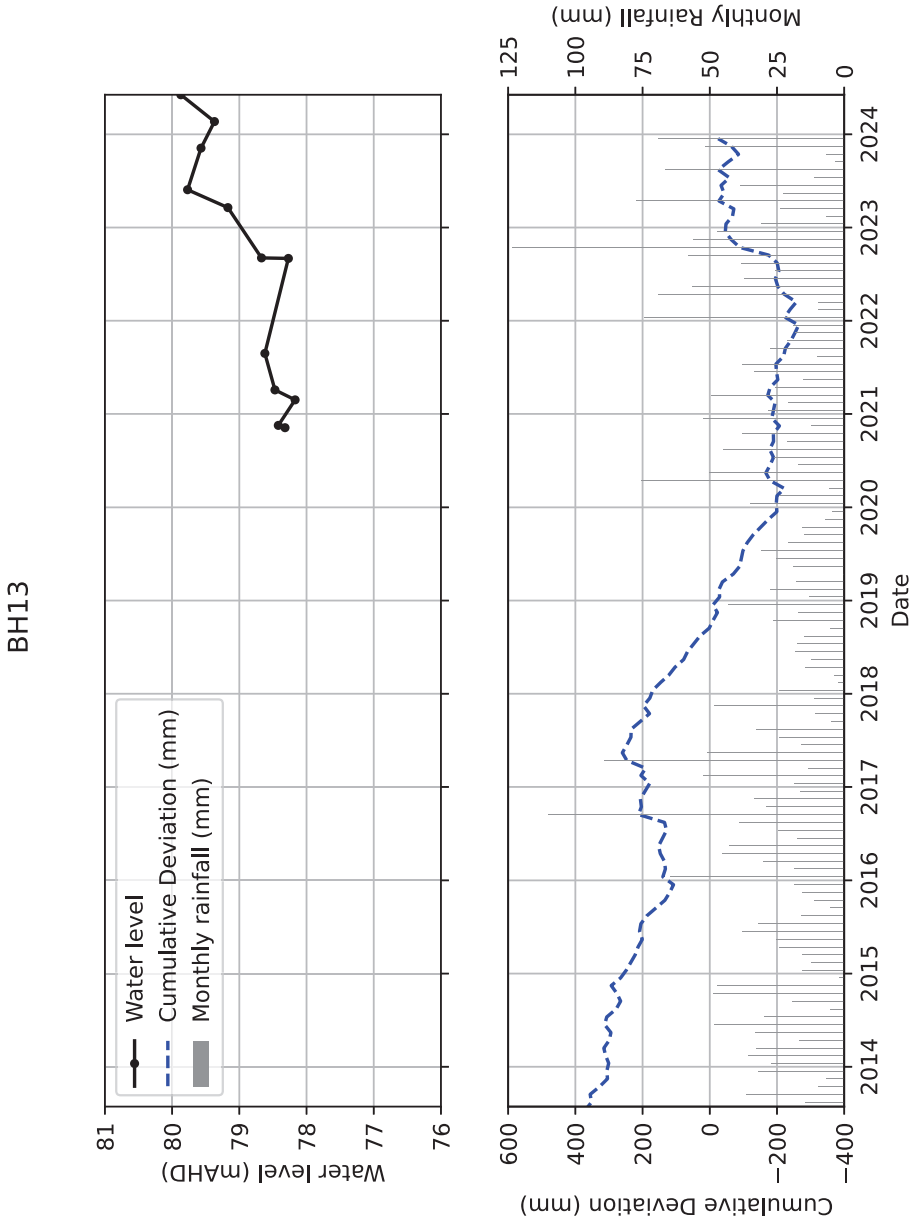

BH8
Water level (mAHD)
81
80
79
78
77
76
Water level
Cumulative Deviation (mm)
Monthly rainfall (mm)
Cumulative Deviation (mm)
600
400
200
0
−200
−400
Monthly Rainfall (mm)
125
100
75
50
25
0
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
Date

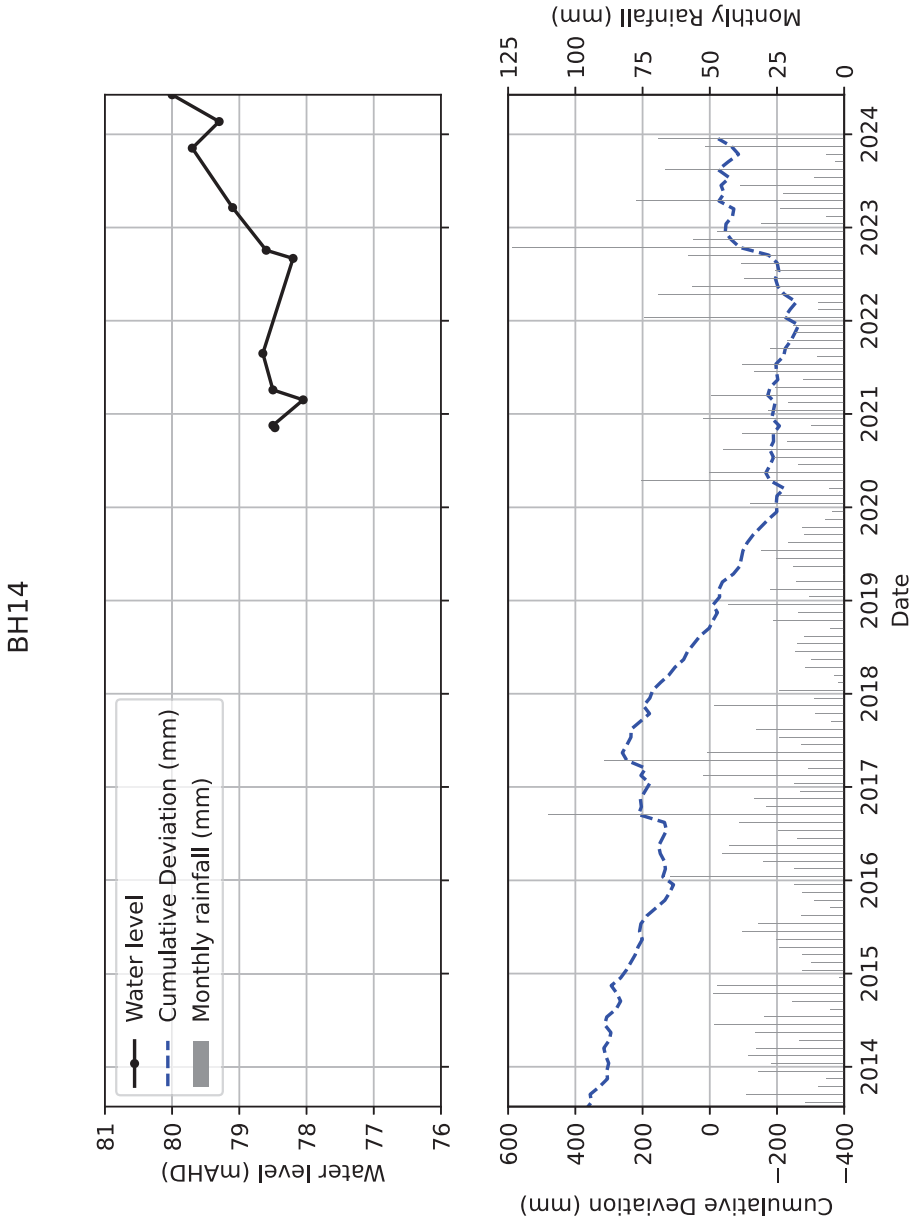

BH09
Water level (mAHD)
81
80
79
78
77
76
Water level
Cumulative Deviation (mm)
Monthly rainfall (mm)
Cumulative Deviation (mm)
600
400
200
0
−200
−400
Monthly Rainfall (mm)
125
100
75
50
25
0
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
Date

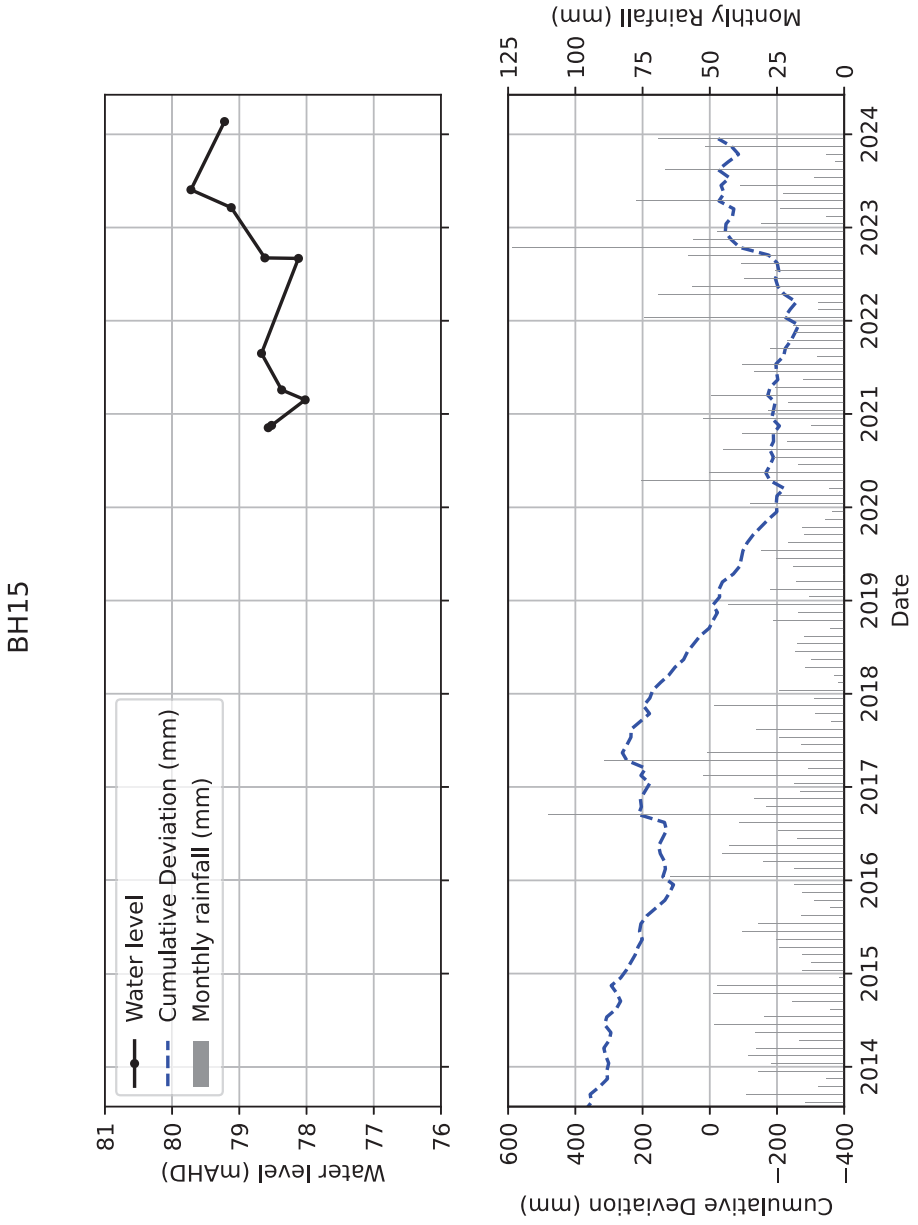

BH10
Water level (mAHD)
81
80
79
78
77
76
Water level
Cumulative Deviation (mm)
Monthly rainfall (mm)
Cumulative Deviation (mm)
600
400
200
0
−200
−400
Monthly Rainfall (mm)
125
100
75
50
25
0
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
Date


BH11
Water level (mAHD)
81
80
79
78
77
76
Water level
Cumulative Deviation (mm)
Monthly rainfall (mm)
Cumulative Deviation (mm)
600
400
200
0
−200
−400
Monthly Rainfall (mm)
125
100
75
50
25
0
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
Date


BH12
Water level (mAHD)
81
80
79
78
77
76
Water level
Cumulative Deviation (mm)
Monthly rainfall (mm)
Cumulative Deviation (mm)
600
400
200
0
−200
−400
Monthly Rainfall (mm)
125
100
75
50
25
0
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
Date


BH13
Water level (mAHD)
81
80
79
78
77
76
Water level
Cumulative Deviation (mm)
Monthly rainfall (mm)
Cumulative Deviation (mm)
600
400
200
0
−200
−400
Monthly Rainfall (mm)
125
100
75
50
25
0
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
Date

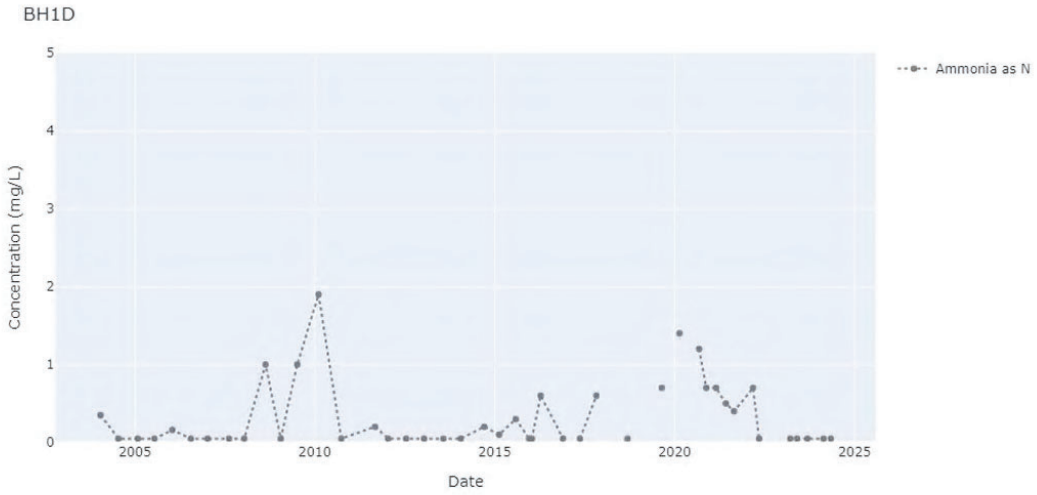

BH14
Water level (mAHD)
81
80
79
78
77
76
Water level
Cumulative Deviation (mm)
Monthly rainfall (mm)
Cumulative Deviation (mm)
600
400
200
0
−200
−400
Monthly Rainfall (mm)
125
100
75
50
25
0
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
Date

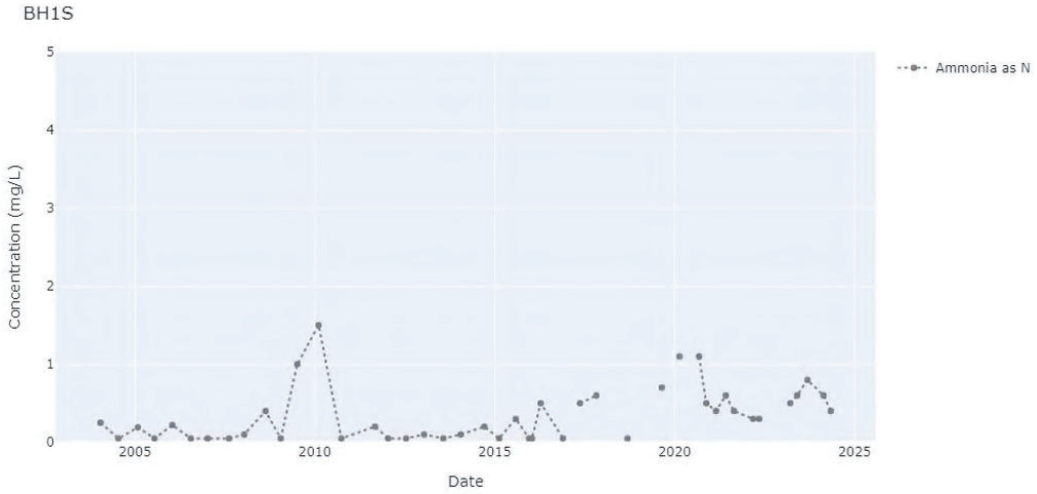

BH15
Water level (mAHD)
81
80
79
78
77
76
Water level
Cumulative Deviation (mm)
Monthly rainfall (mm)
Cumulative Deviation (mm)
600
400
200
0
−200
−400
Monthly Rainfall (mm)
125
100
75
50
25
0
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
Date

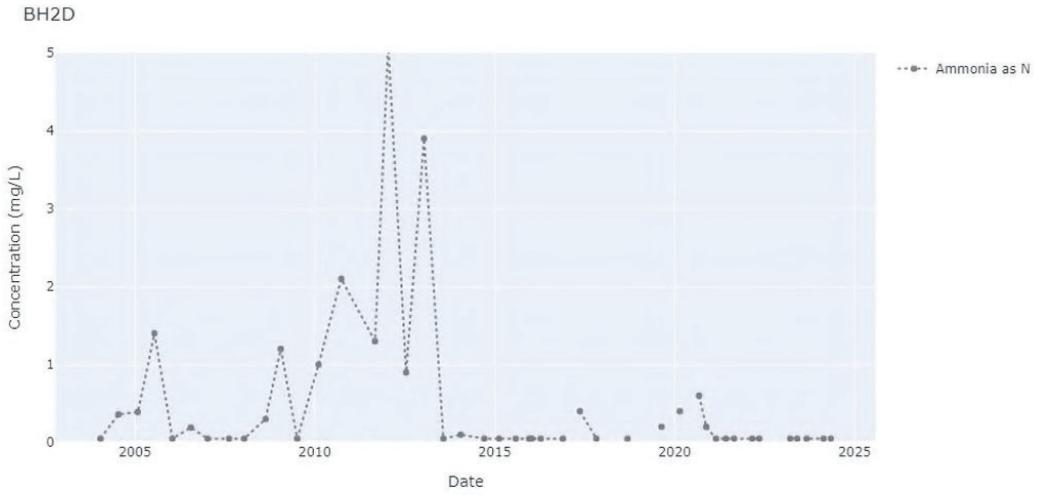
Appendix B

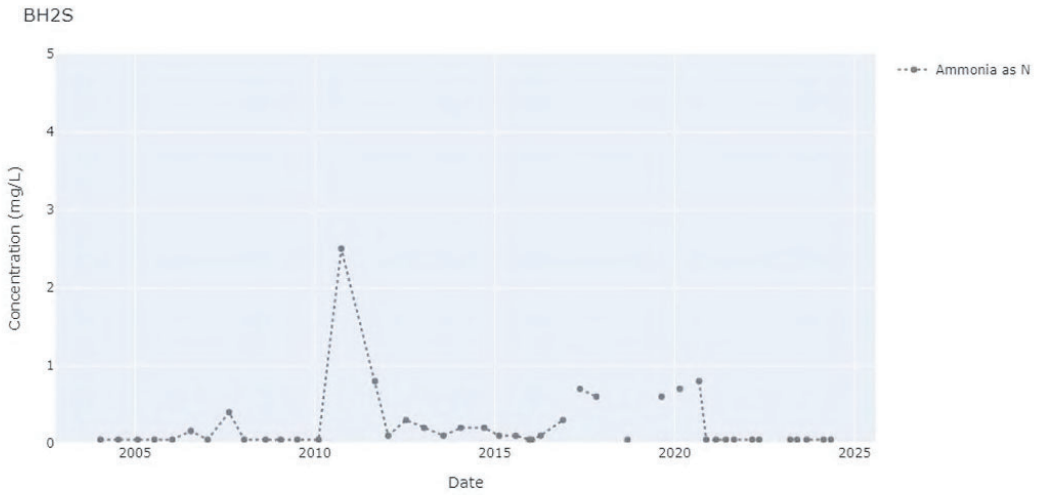
Groundwater quality plots

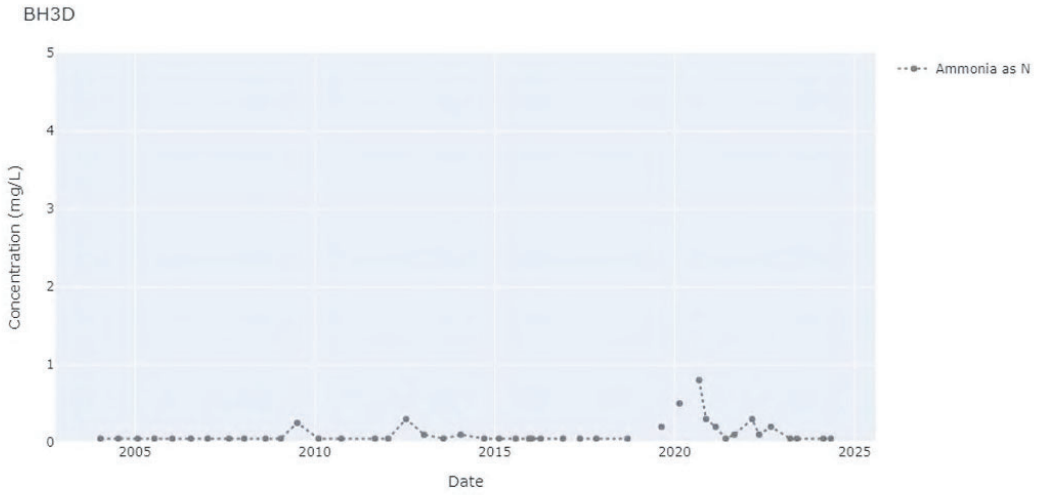
Ammonia

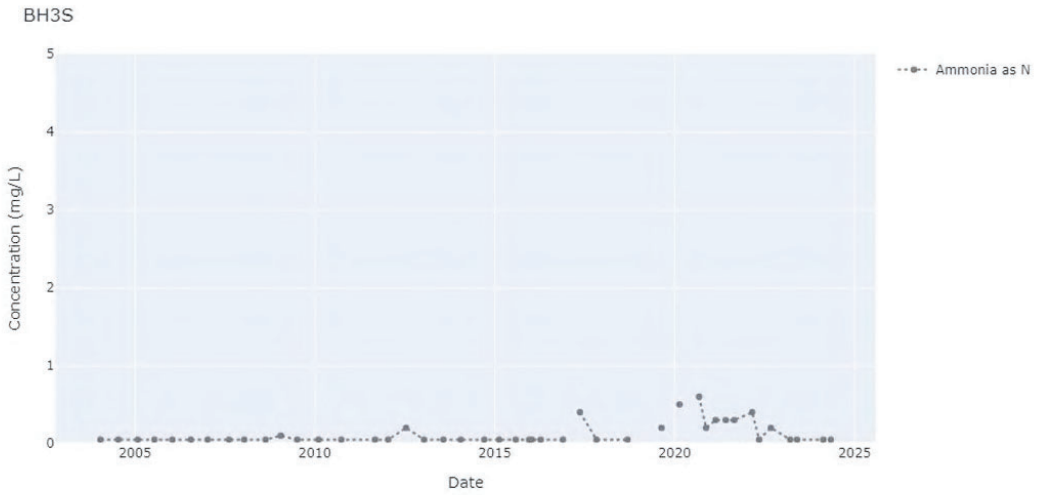

BH1D
Ammonia as N
Concentration (mg/L)
0
1
2
3
4
5
2005
2010
2015
2020
2025
Date

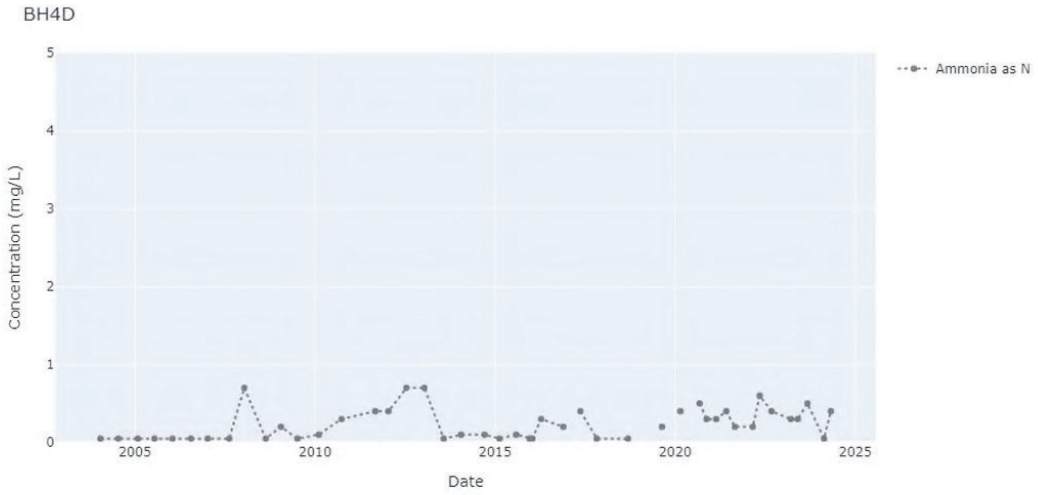

BH1S
Ammonia as N
Concentration (mg/L)
0
1
2
3
4
5
2005
2010
2015
2020
2025
Date

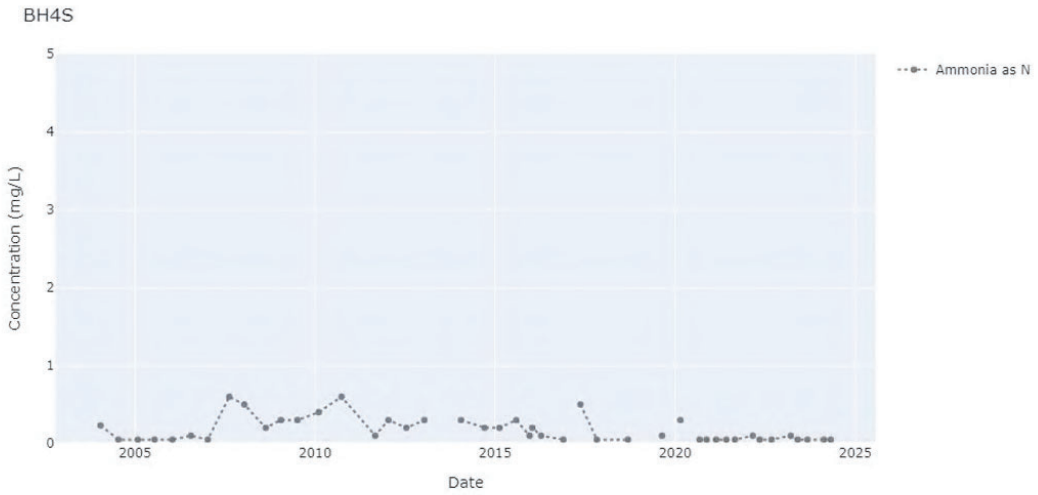

BH2D
Ammonia as N
Concentration (mg/L)
0
1
2
3
4
5
2005
2010
2015
2020
2025
Date

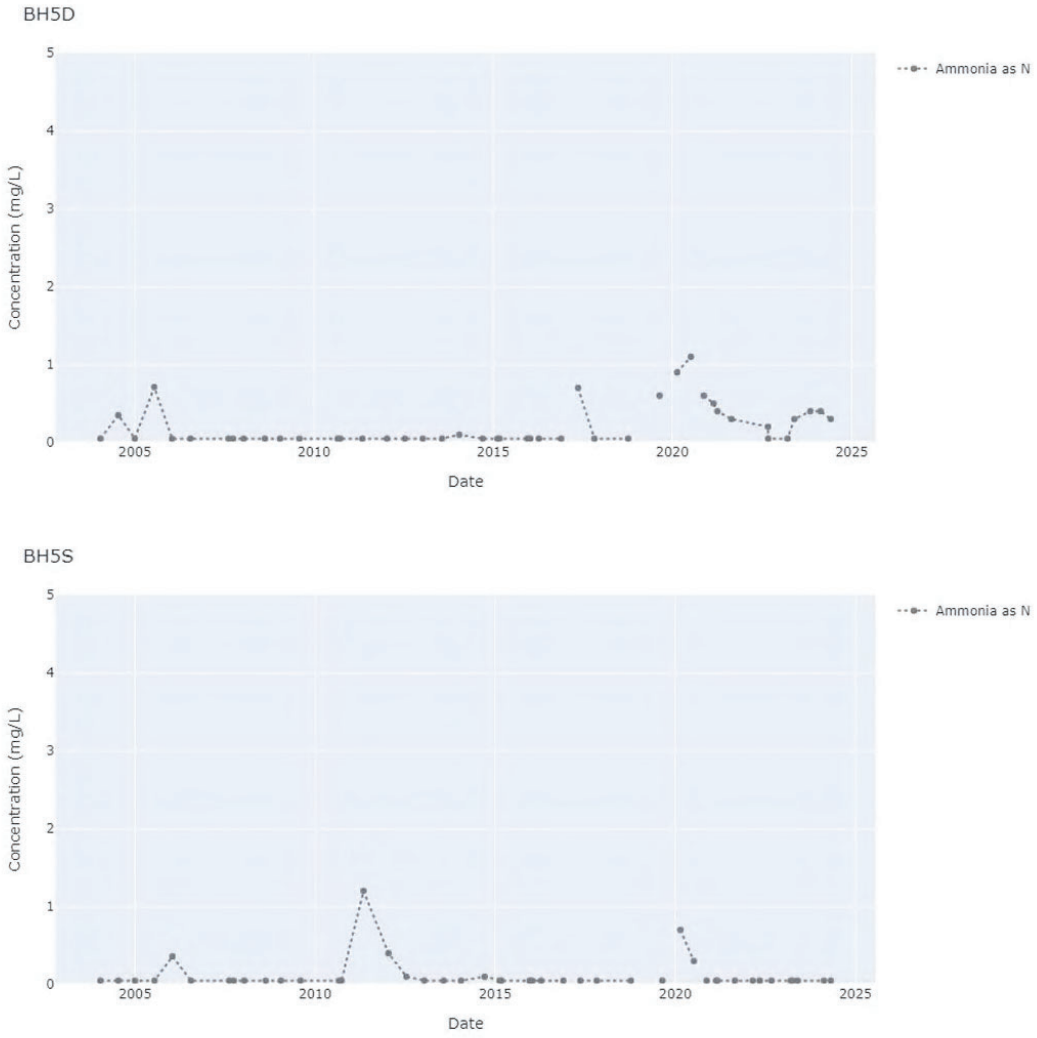

BH2S
Ammonia as N
Concentration (mg/L)
0
1
2
3
4
5
2005
2010
2015
2020
2025
Date

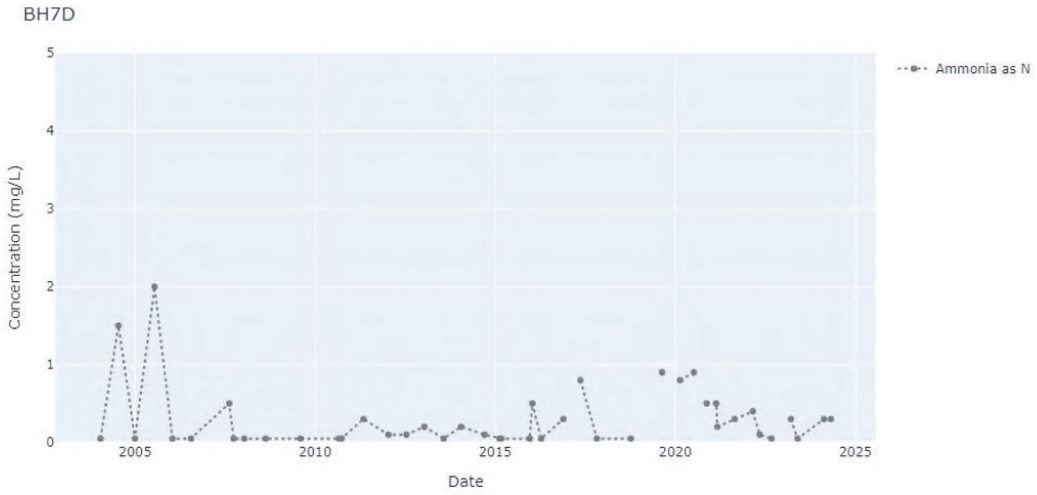

BH3D
Ammonia as N
Concentration (mg/L)
0
1
2
3
4
5
2005
2010
2015
2020
2025
Date

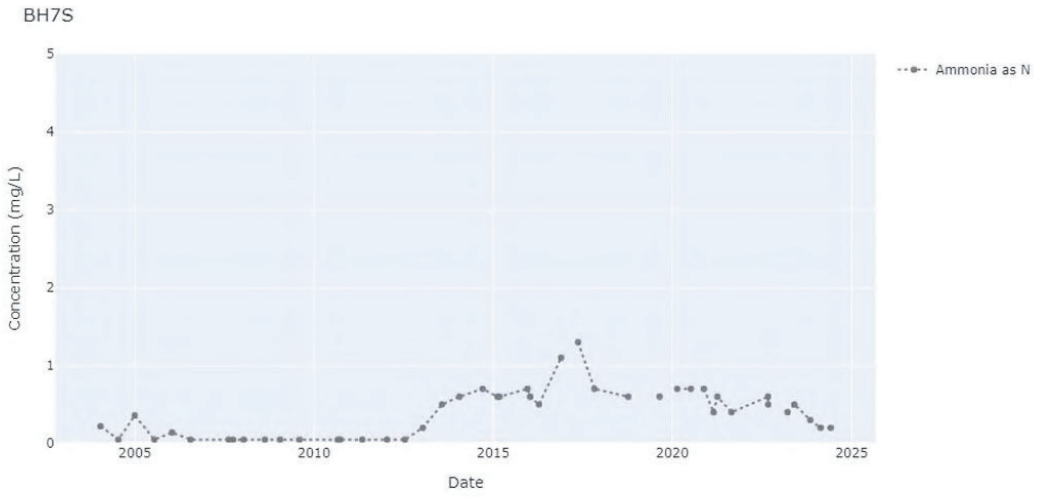

BH3S
Ammonia as N
Concentration (mg/L)
0
1
2
3
4
5
2005
2010
2015
2020
2025
Date

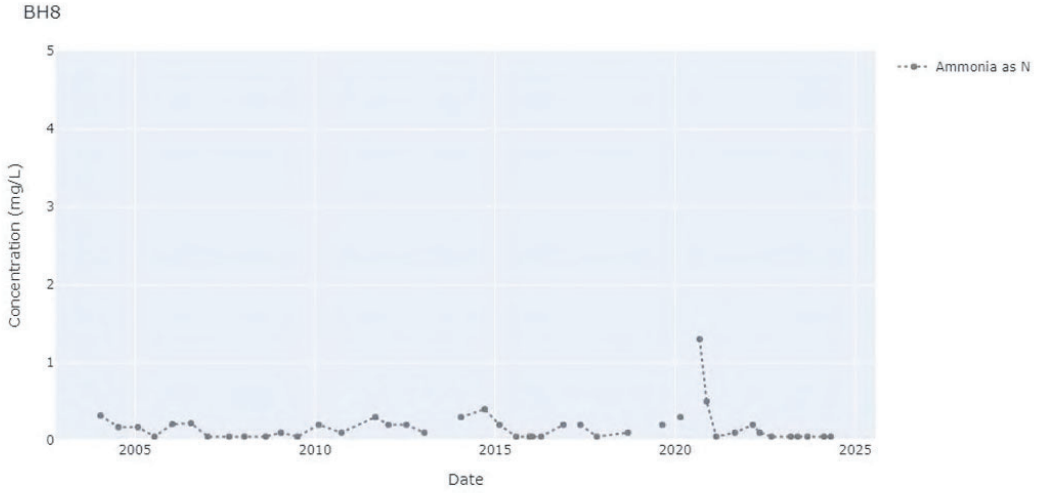

BH4D
Ammonia as N
Concentration (mg/L)
0
1
2
3
4
5
2005
2010
2015
2020
2025
Date

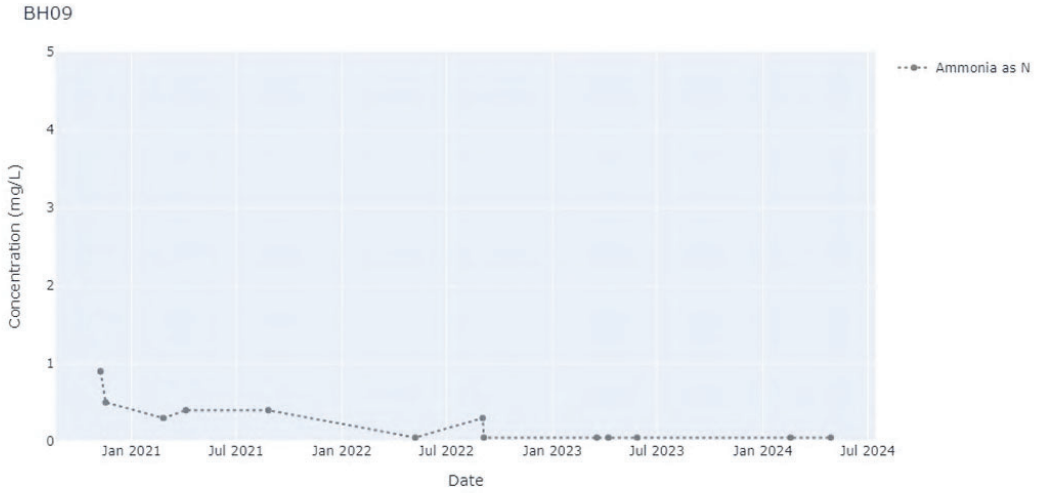

BH4S
Ammonia as N
Concentration (mg/L)
0
1
2
3
4
5
2005
2010
2015
2020
2025
Date

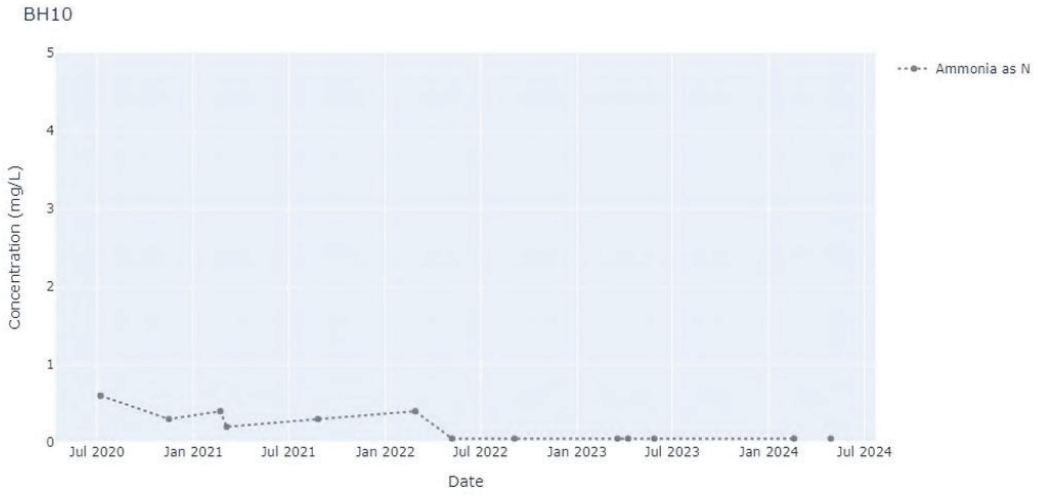

BH5D
Ammonia as N
Concentration (mg/L)
0
1
2
3
4
5
2005
2010
2015
2020
2025
Date
BH5S
Ammonia as N
Concentration (mg/L)
0
1
2
3
4
5
2005
2010
2015
2020
2025
Date

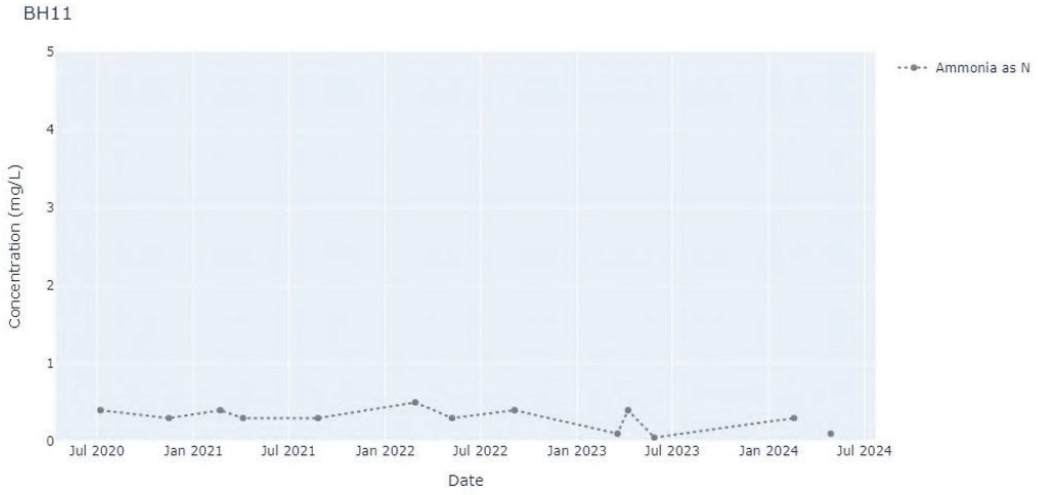

BH7D
Ammonia as N
Concentration (mg/L)
0
1
2
3
4
5
2005
2010
2015
2020
2025
Date

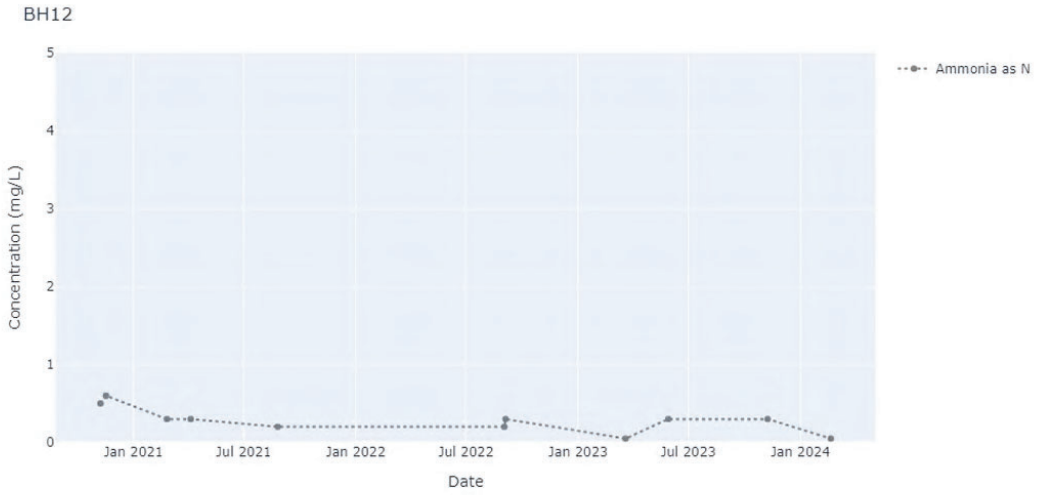

BH7S
Ammonia as N
Concentration (mg/L)
0
1
2
3
4
5
2005
2010
2015
2020
2025
Date

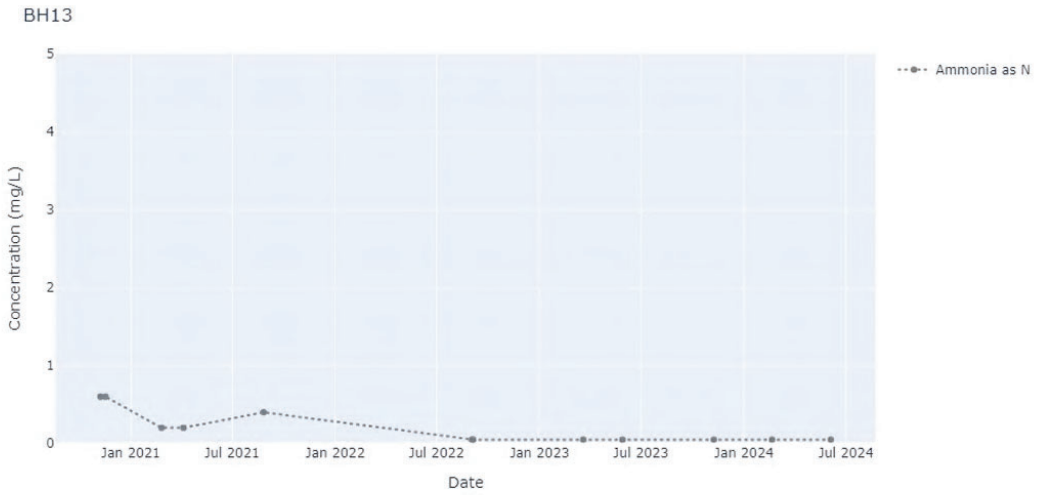

BH8
Ammonia as N
Concentration (mg/L)
0
1
2
3
4
5
2005
2010
2015
2020
2025
Date

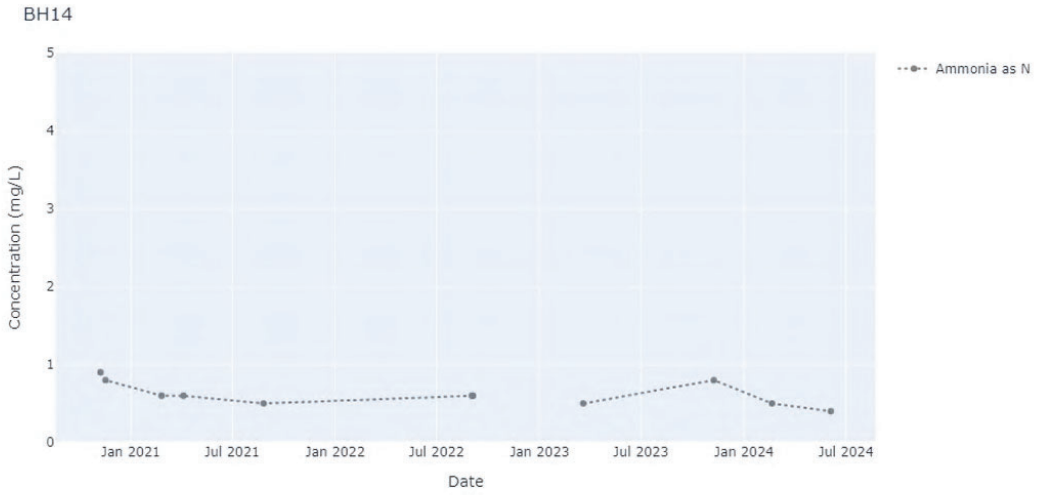

BH09
Ammonia as N
Concentration (mg/L)
0
1
2
3
4
5
Jan 2021
Jul 2021
Jan 2022
Jul 2022
Jan 2023
Jul 2023
Jan 2024
Jul 2024
Date

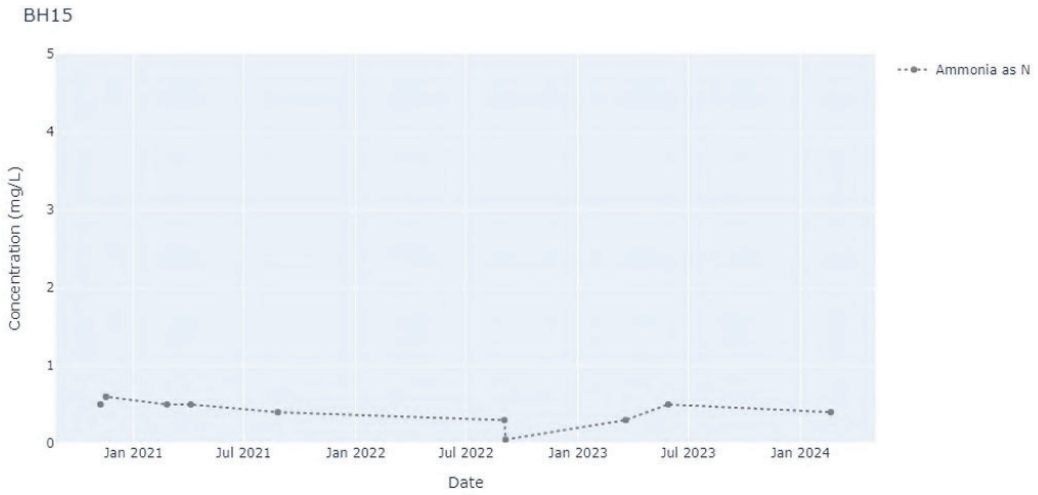

BH10
Ammonia as N
Concentration (mg/L)
0
1
2
3
4
5
Jul 2020
Jan 2021
Jul 2021
Jan 2022
Jul 2022
Jan 2023
Jul 2023
Jan 2024
Jul 2024
Date


BH11
Ammonia as N
Concentration (mg/L)
0
1
2
3
4
5
Jul 2020
Jan 2021
Jul 2021
Jan 2022
Jul 2022
Jan 2023
Jul 2023
Jan 2024
Jul 2024
Date

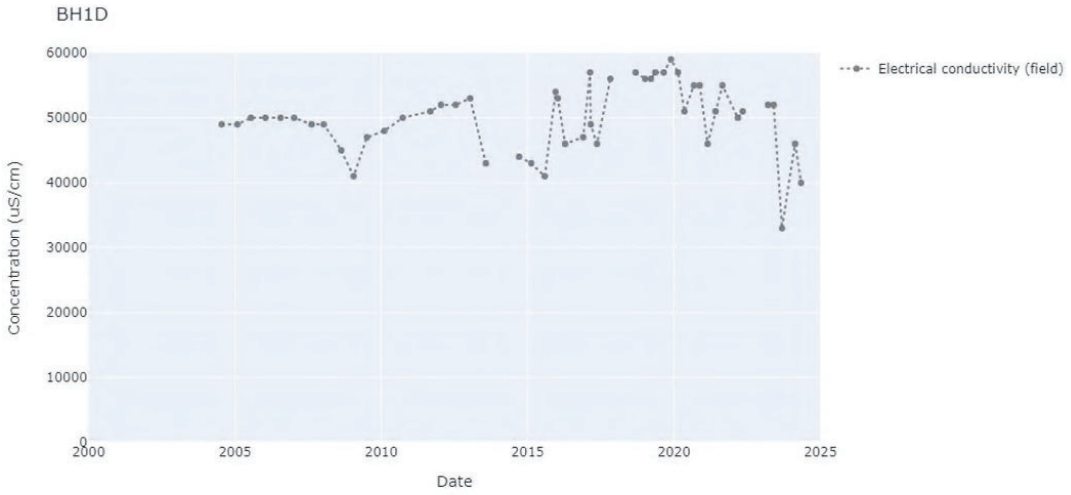

BH12
Ammonia as N
Concentration (mg/L)
0
1
2
3
4
5
Jan 2021
Jul 2021
Jan 2022
Jul 2022
Jan 2023
Jul 2023
Jan 2024
Date

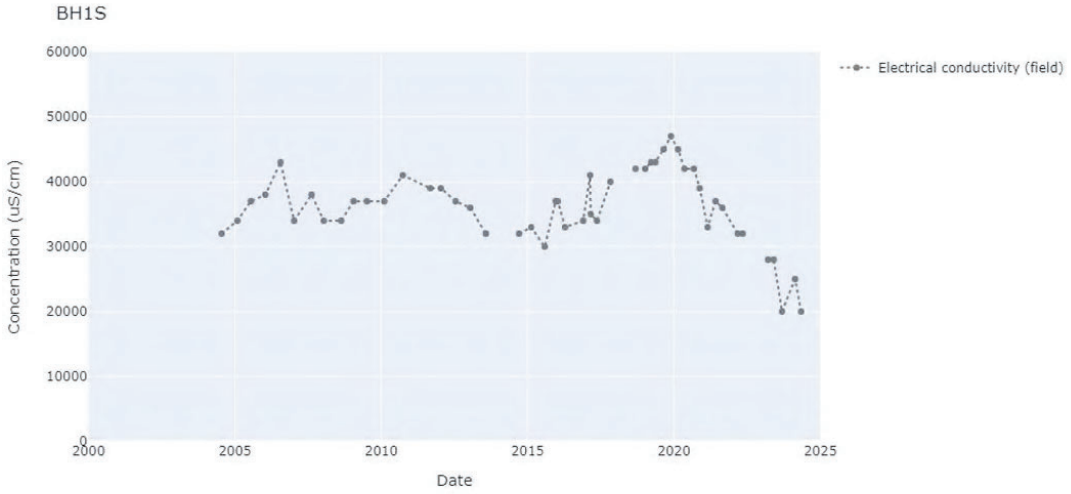

BH13
Ammonia as N
Concentration (mg/L)
0
1
2
3
4
5
Jan 2021
Jul 2021
Jan 2022
Jul 2022
Jan 2023
Jul 2023
Jan 2024
Jul 2024
Date

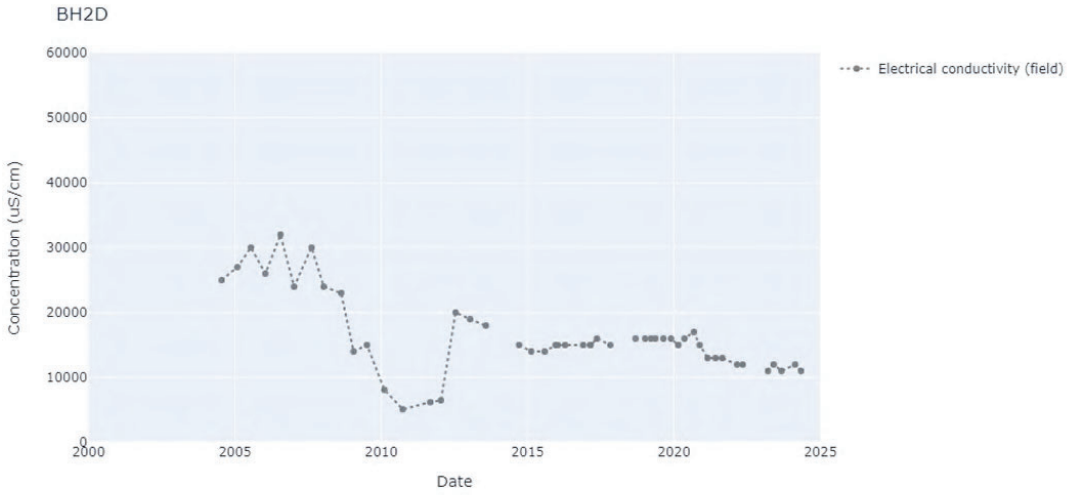

BH14
Ammonia as N
Concentration (mg/L)
0
1
2
3
4
5
Jan 2021
Jul 2021
Jan 2022
Jul 2022
Jan 2023
Jul 2023
Jan 2024
Jul 2024
Date

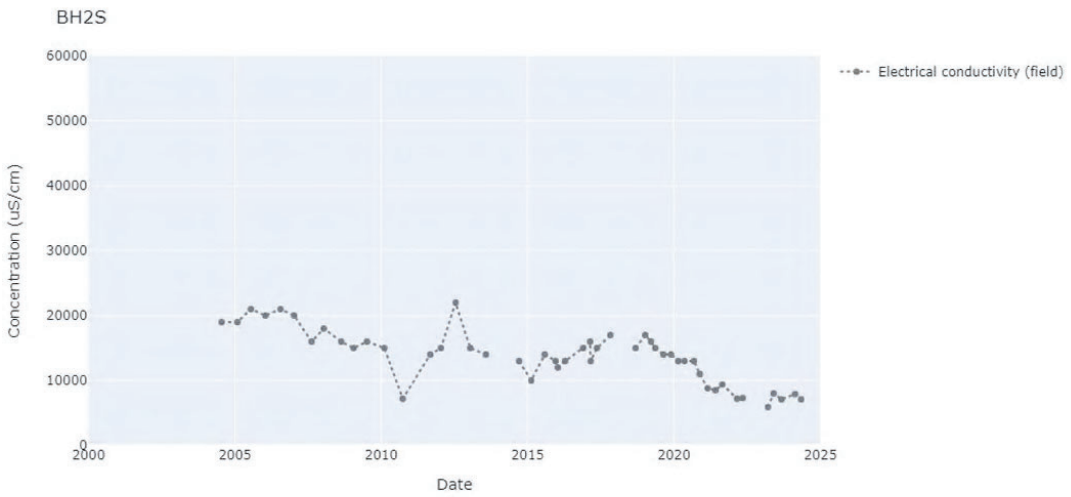

BH15
Ammonia as N
Concentration (mg/L)
0
1
2
3
4
5
Jan 2021
Jul 2021
Jan 2022
Jul 2022
Jan 2023
Jul 2023
Jan 2024
Date

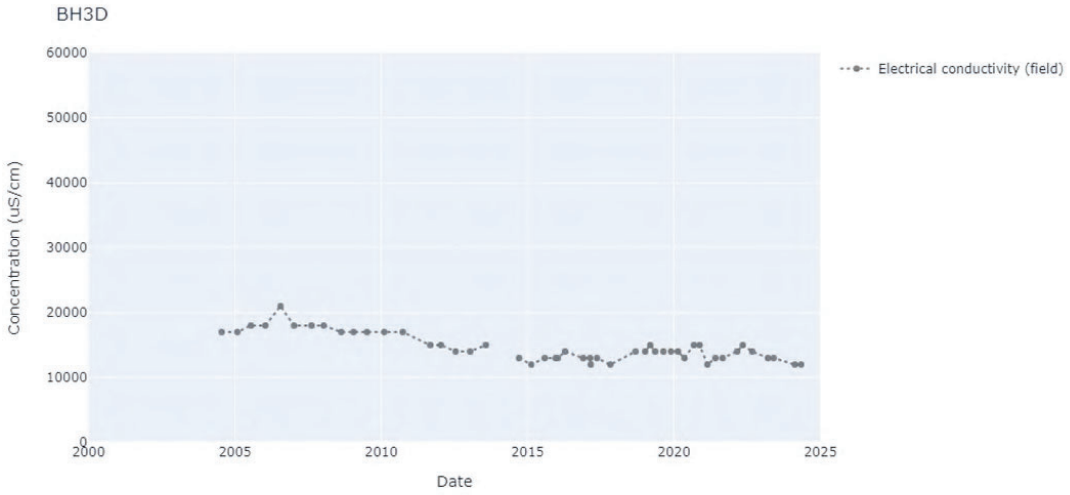
Electrical conductivity






BH2D
Electrical conductivity (field)
Concentration (uS/cm)
60000
50000
40000
30000
20000
10000
0
2000
2005
2010
2015
2020
2025
Date


BH2S
Electrical conductivity (field)
Concentration (uS/cm)
60000
50000
40000
30000
20000
10000
0
2000
2005
2010
2015
2020
2025
Date


BH3D
Electrical conductivity (field)
Concentration (uS/cm)
60000
50000
40000
30000
20000
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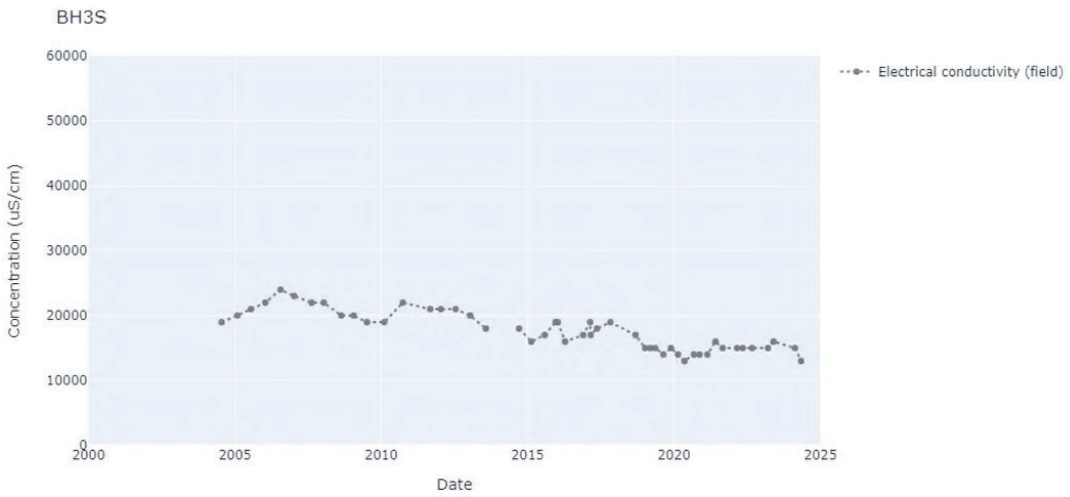
0
2000
2005
2010
2015
2020
2025
Date


BH3S
Electrical conductivity (field)
Concentration (uS/cm)
60000
50000
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30000
20000
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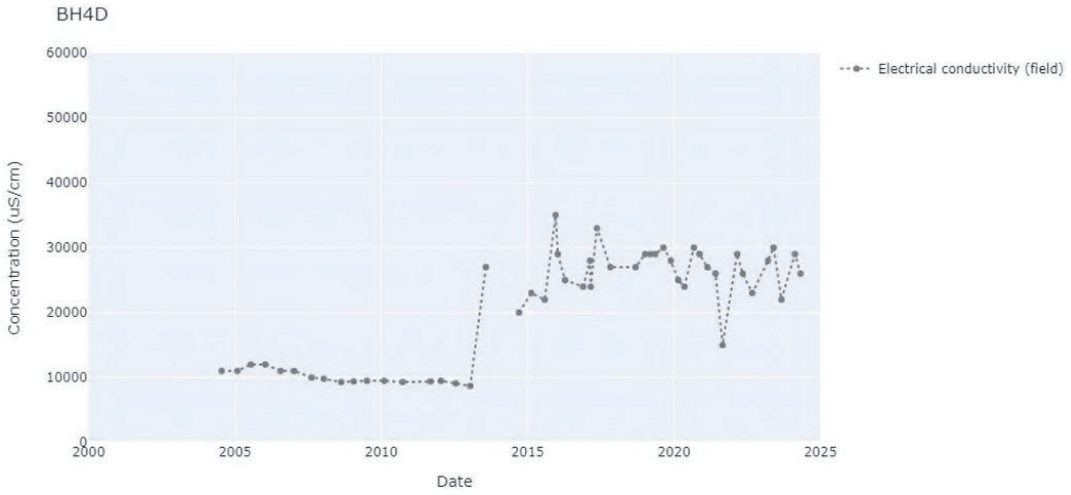
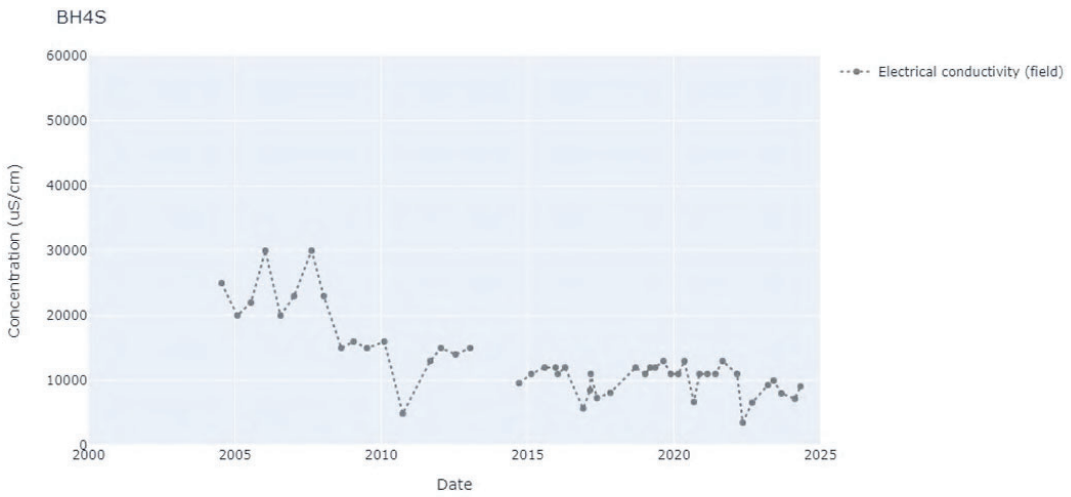
2010
2015
2020
2025
Date


BH4D
Electrical conductivity (field)
Concentration (uS/cm)
60000
50000
40000
30000
20000
10000
0
2000
2005
2010
2015
2020
2025
Date


BH4S
Electrical conductivity (field)
Concentration (uS/cm)
60000
50000
40000
30000
20000
10000
0
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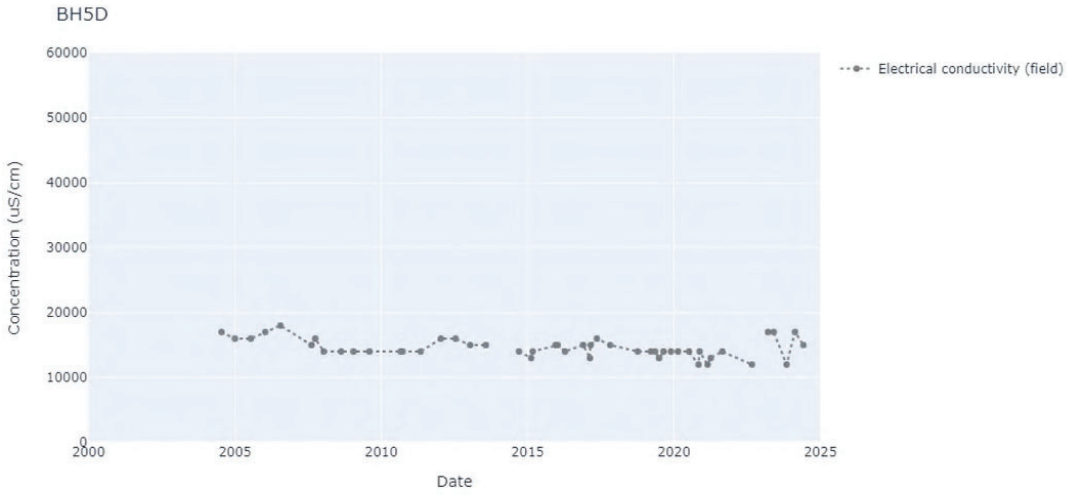
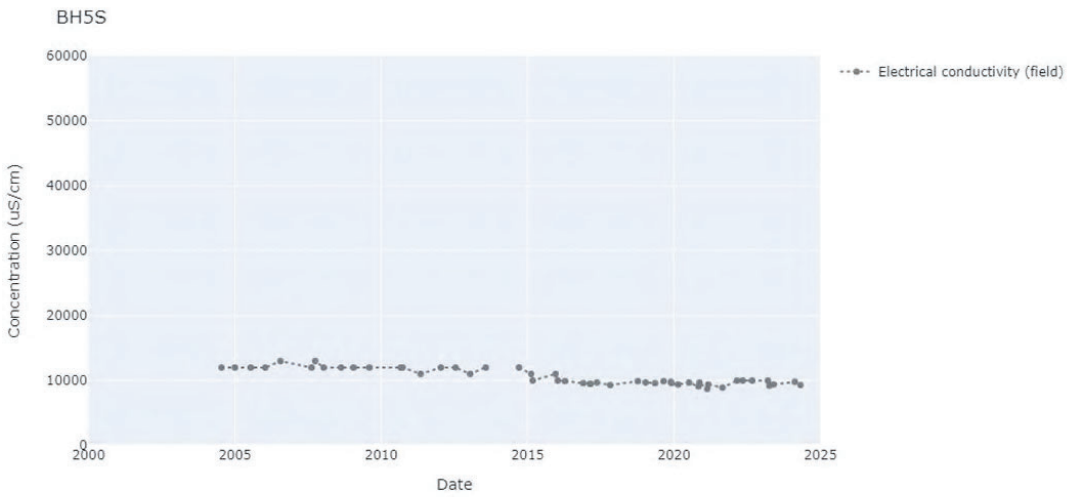
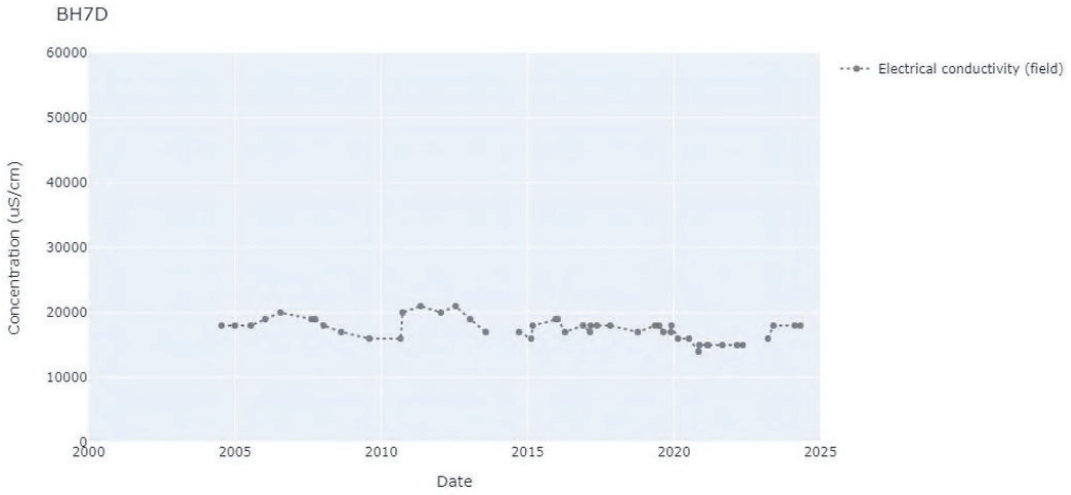
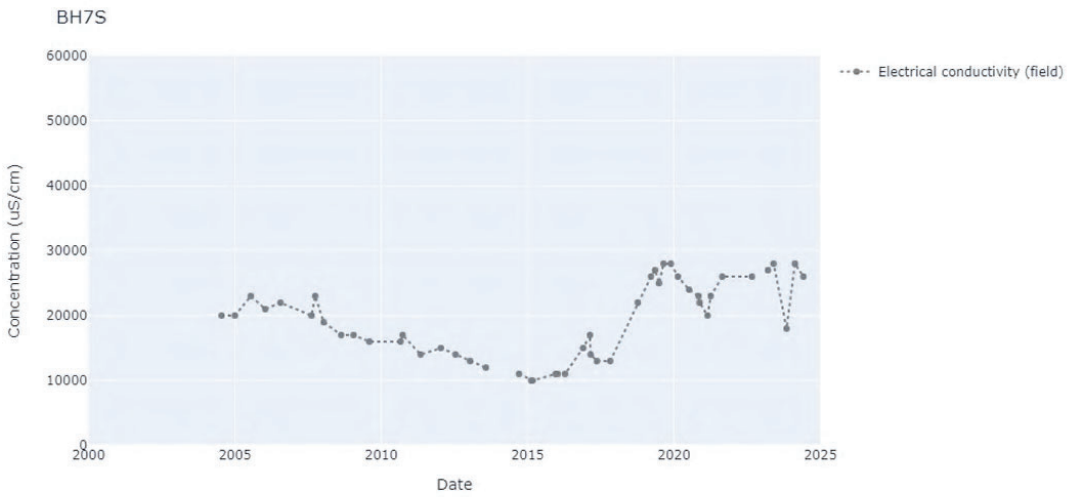
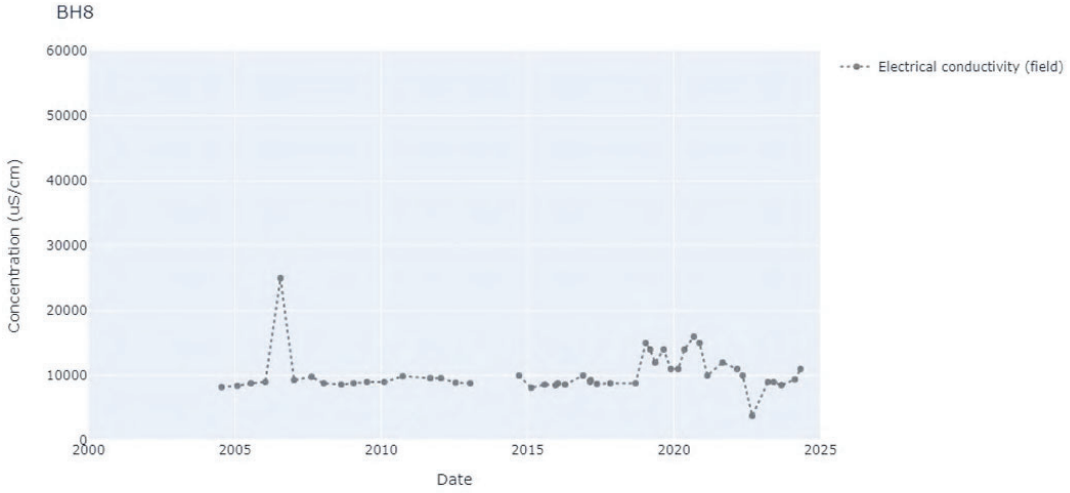
2005
2010
2015
2020
2025
Date

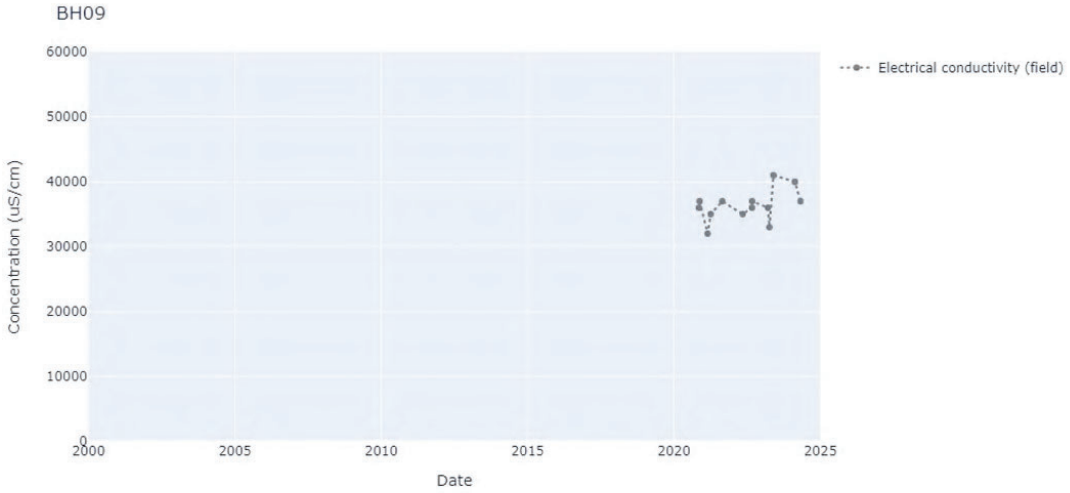

BH5D
Electrical conductivity (field)
Concentration (uS/cm)
60000
50000
40000
30000
20000
10000
0
2000
2005
2010
2015
2020
2025
Date

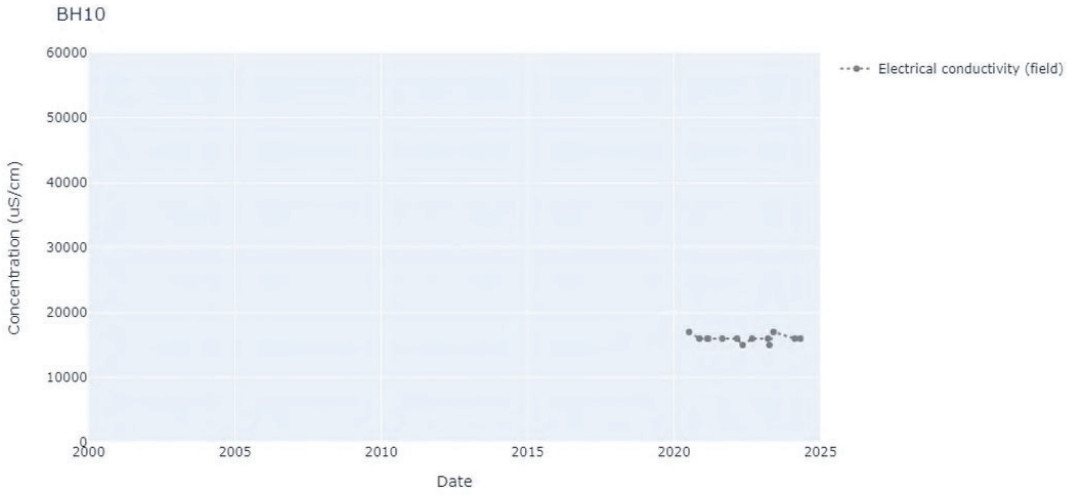

BH5S
Electrical conductivity (field)
Concentration (uS/cm)
60000
50000
40000
30000
20000
10000
0
2000
2005
2010
2015
2020
2025
Date

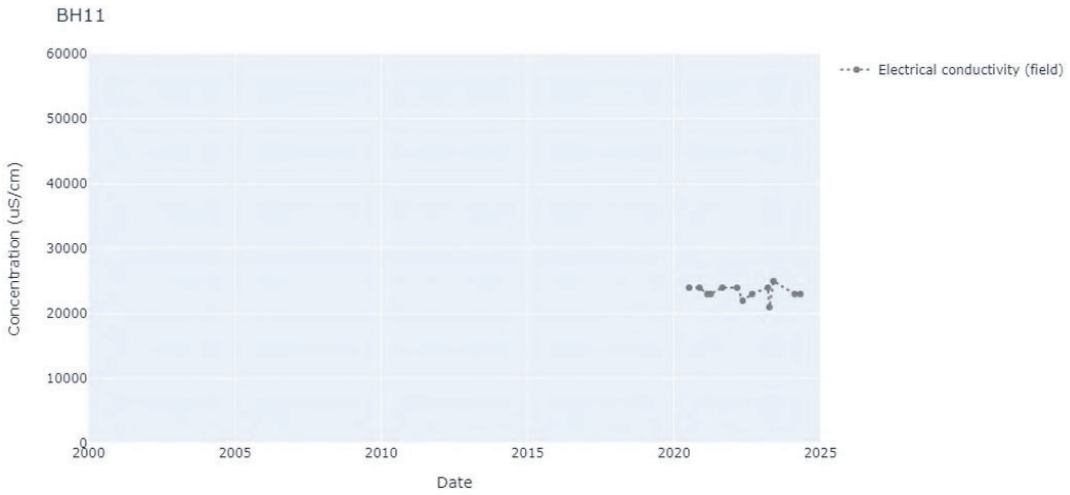

BH7D
Electrical conductivity (field)
Concentration (uS/cm)
60000
50000
40000
30000
20000
10000
0
2000
2005
2010
2015
2020
2025
Date

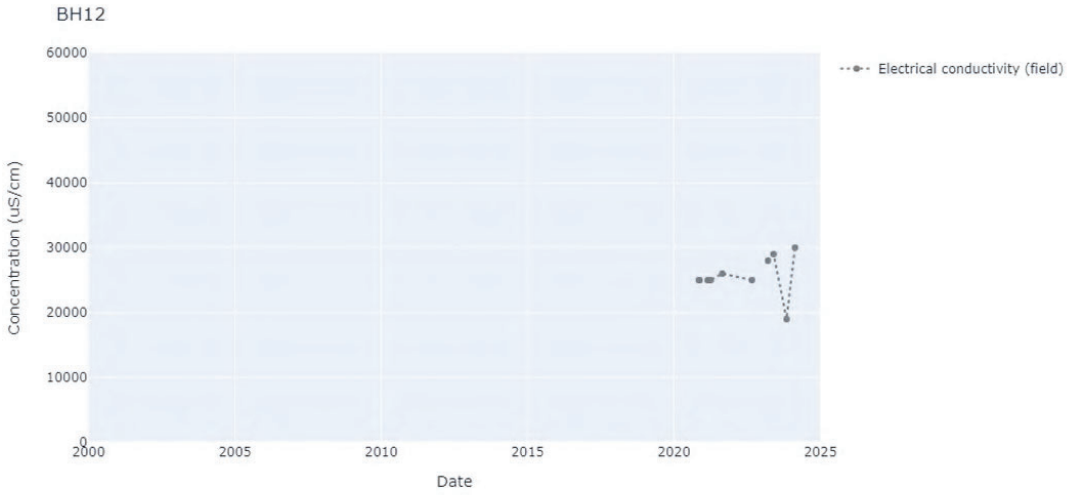

BH7S
Electrical conductivity (field)
Concentration (uS/cm)
60000
50000
40000
30000
20000
10000
0
2000
2005
2010
2015
2020
2025
Date

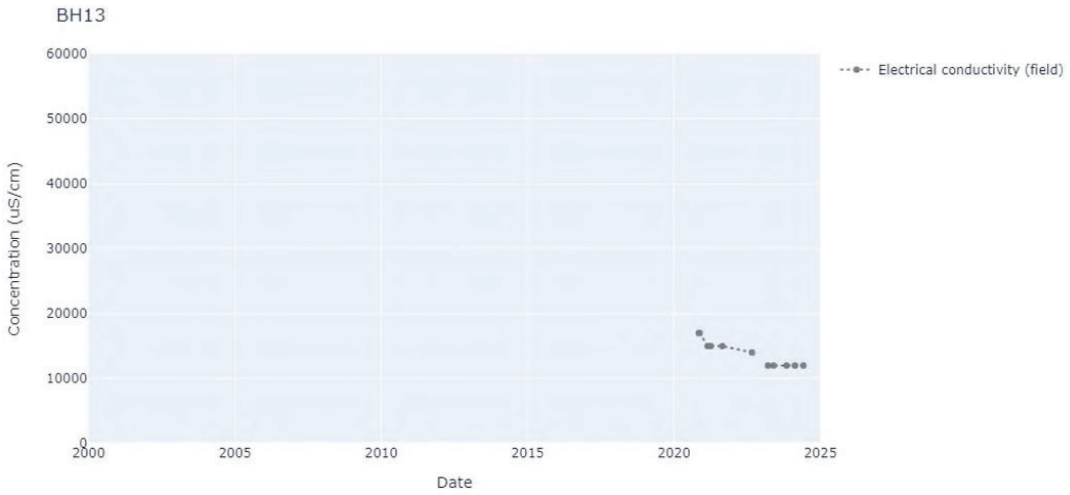

BH8
Electrical conductivity (field)
Concentration (uS/cm)
60000
50000
40000
30000
20000
10000
0
2000
2005
2010
2015
2020
2025
Date

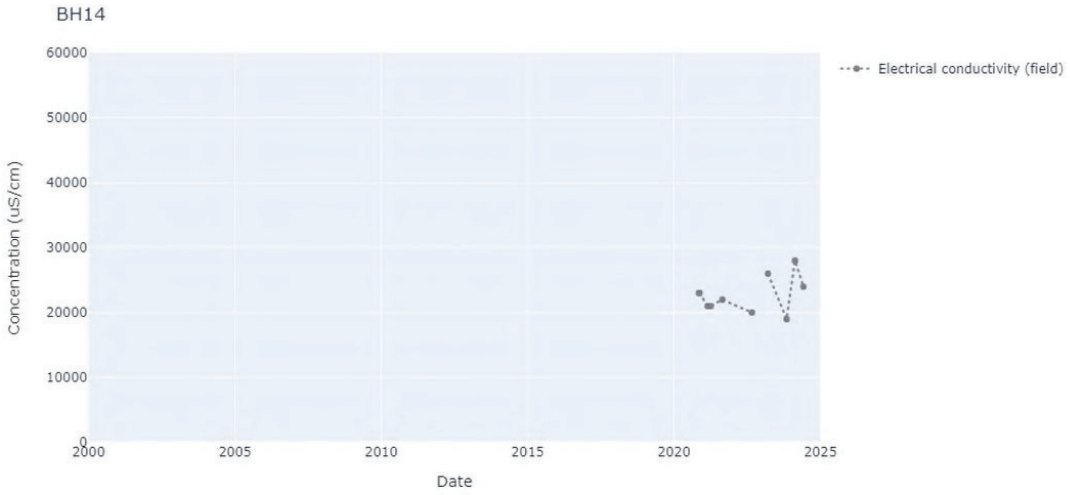

BH09
Electrical conductivity (field)
Concentration (uS/cm)
60000
50000
40000
30000
20000
10000
0
2000
2005
2010
2015
2020
2025
Date

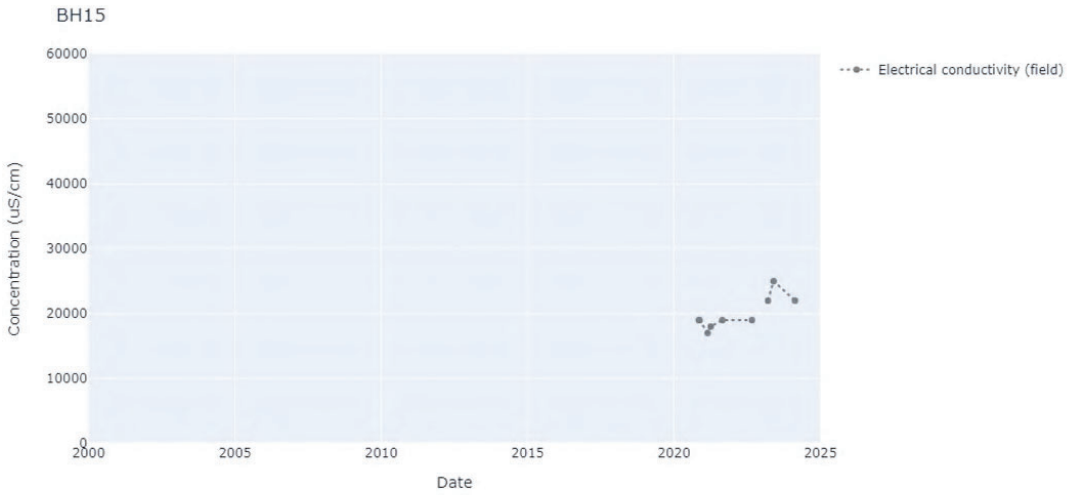

BH10
Electrical conductivity (field)
Concentration (uS/cm)
60000
50000
40000
30000
20000
10000
0
2000
2005
2010
2015
2020
2025
Date


BH11
Electrical conductivity (field)
Concentration (uS/cm)
60000
50000
40000
30000
20000
10000
0
2000
2005
2010
2015
2020
2025
Date

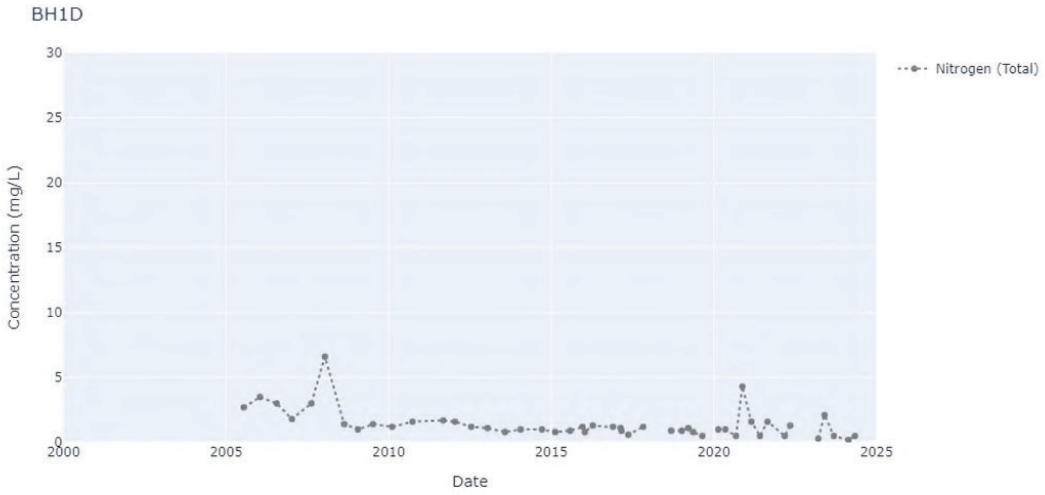

BH12
Electrical conductivity (field)
Concentration (uS/cm)
60000
50000
40000
30000
20000
10000
0
2000
2005
2010
2015
2020
2025
Date

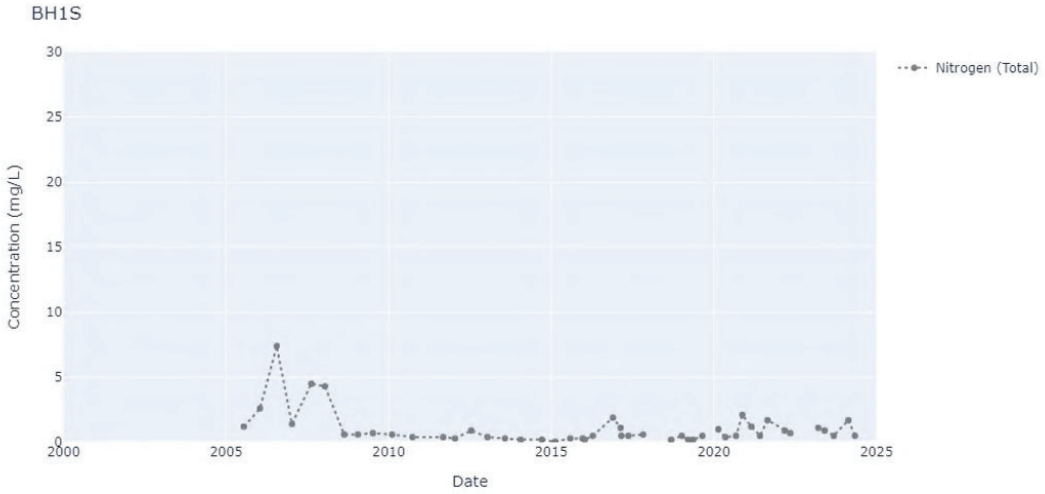

BH13
Electrical conductivity (field)
Concentration (uS/cm)
60000
50000
40000
30000
20000
10000
0
2000
2005
2010
2015
2020
2025
Date

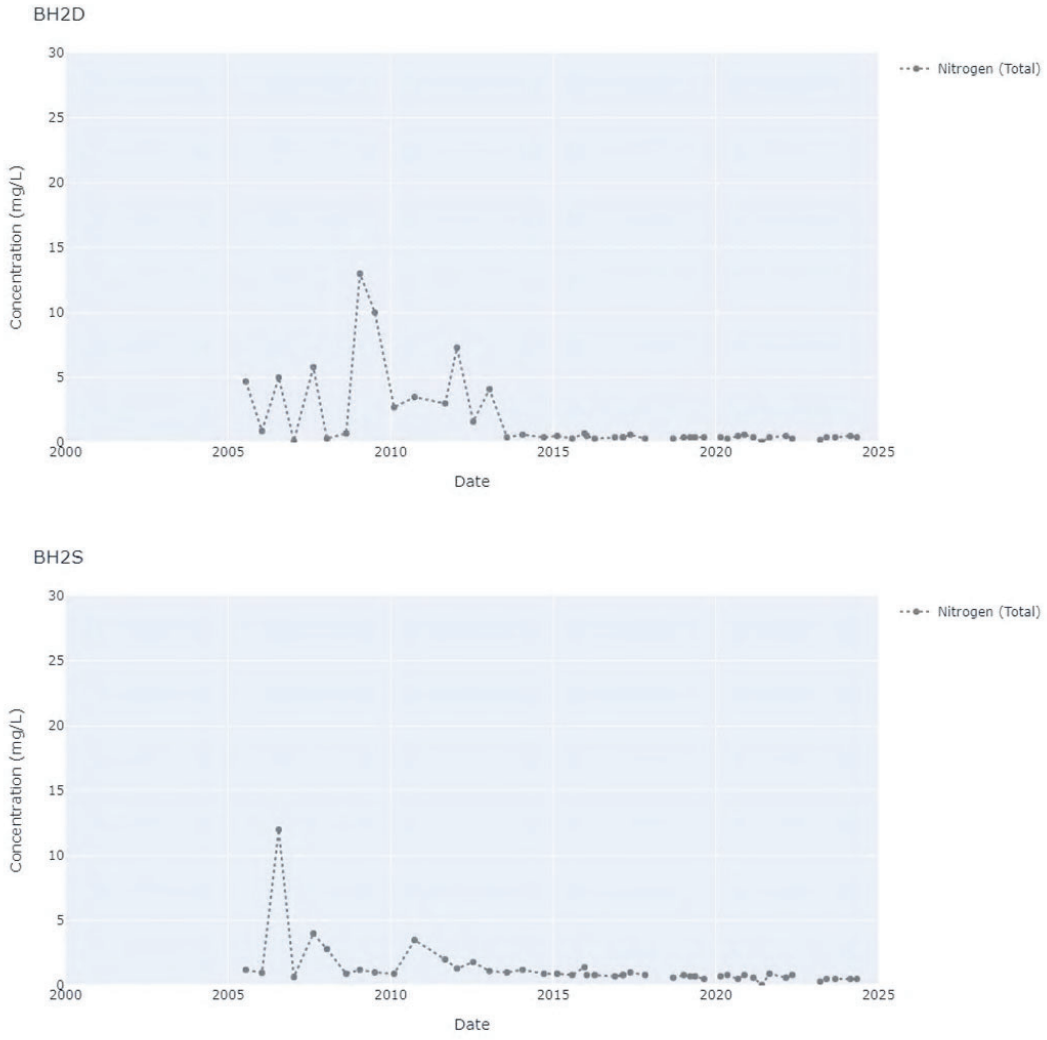

BH14
Electrical conductivity (field)
Concentration (uS/cm)
60000
50000
40000
30000
20000
10000
0
2000
2005
2010
2015
2020
2025
Date

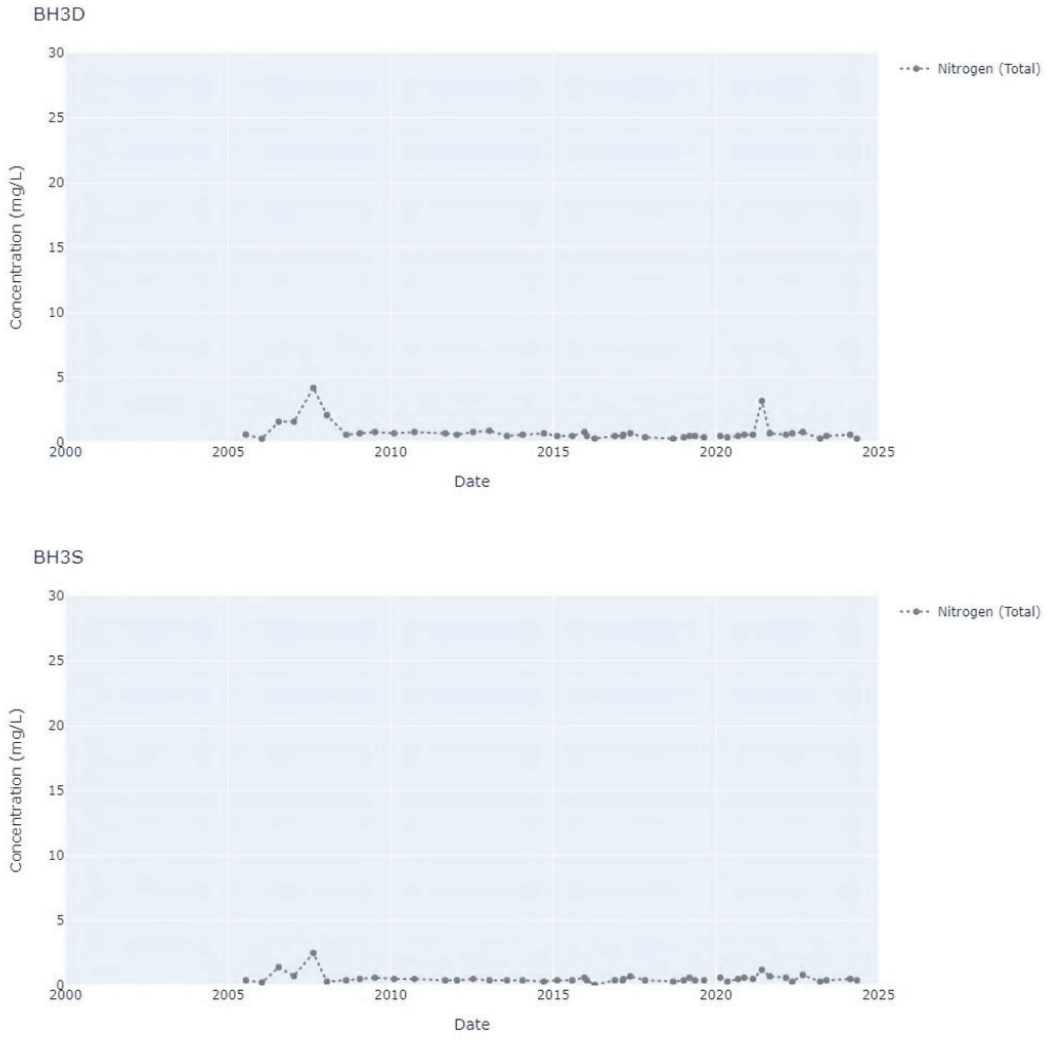

BH15
Electrical conductivity (field)
Concentration (uS/cm)
60000
50000
40000
30000
20000
10000
0
2000
2005
2010
2015
2020
2025
Date

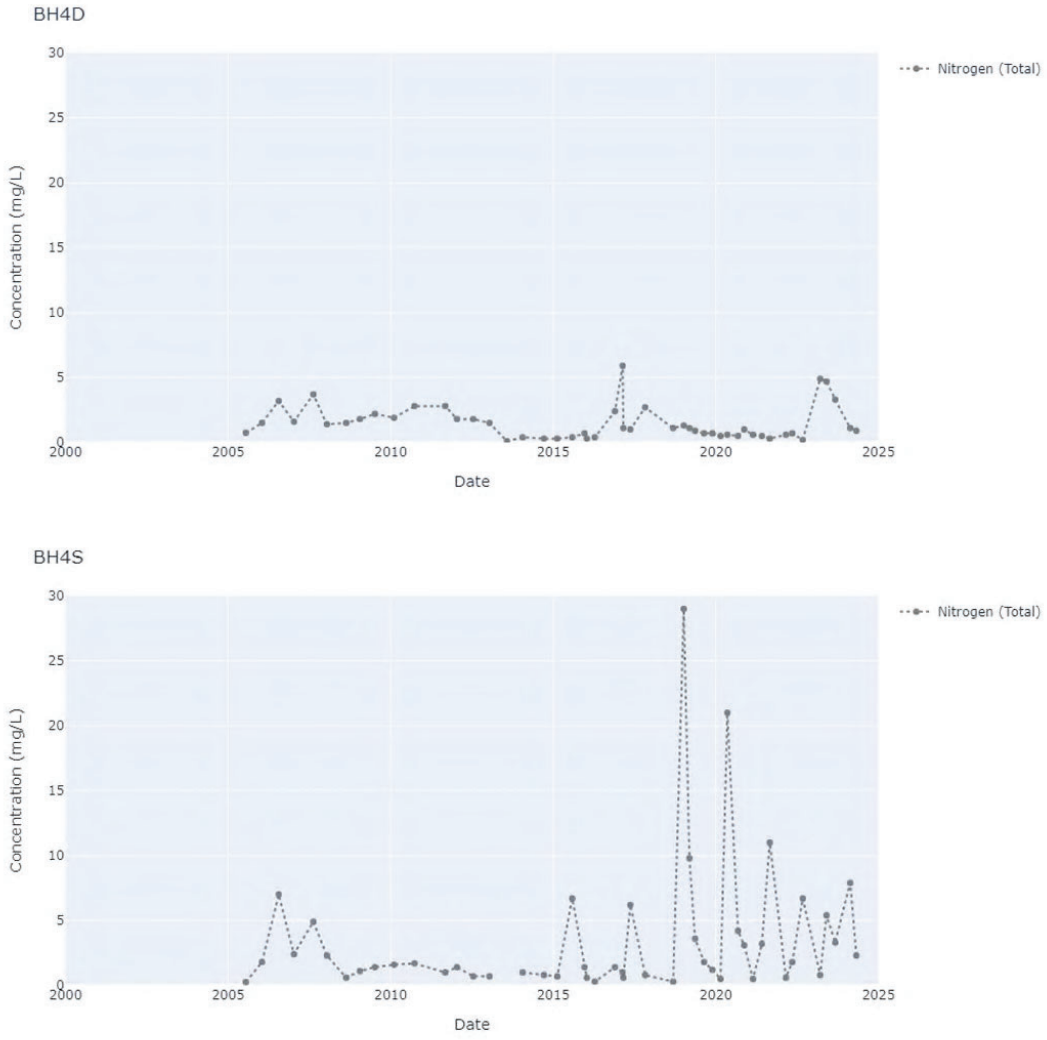
Total nitrogen

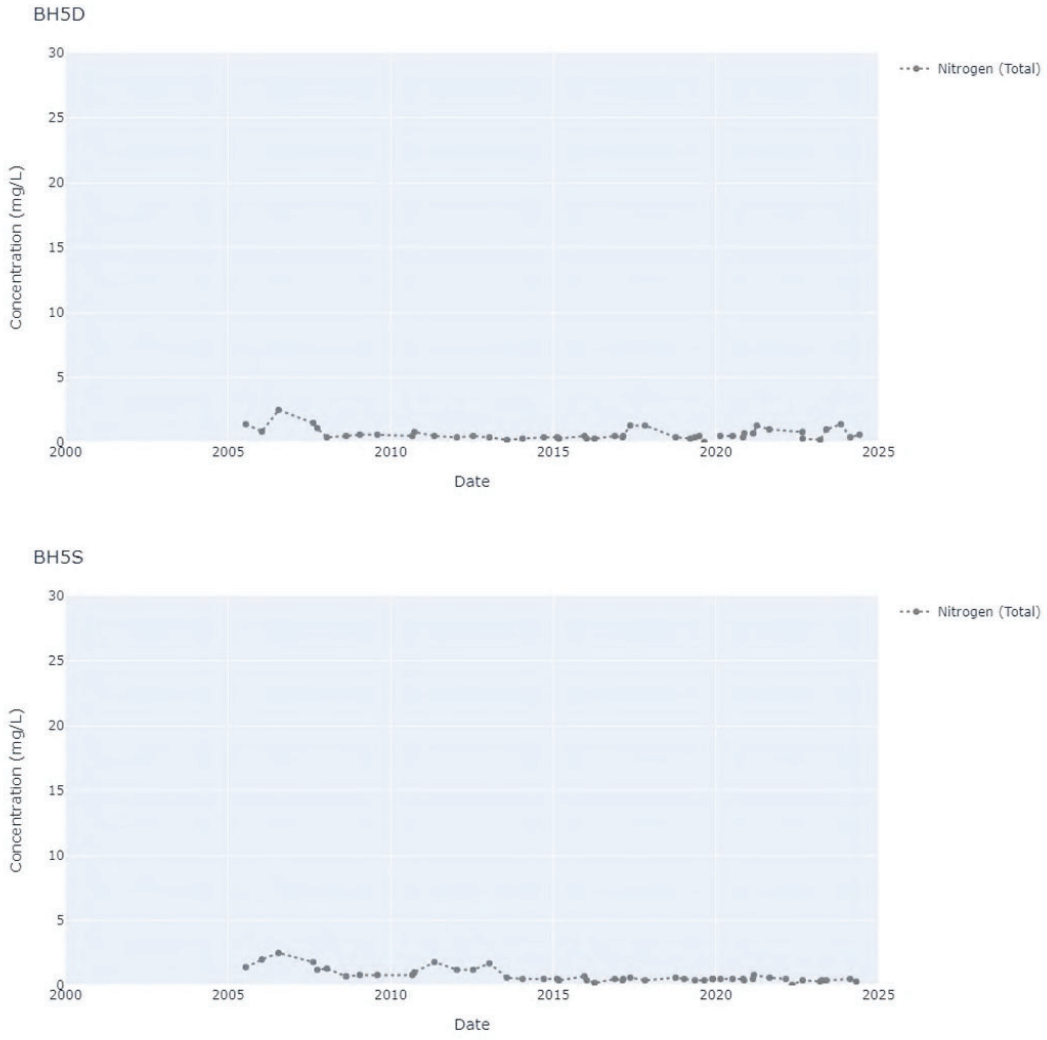


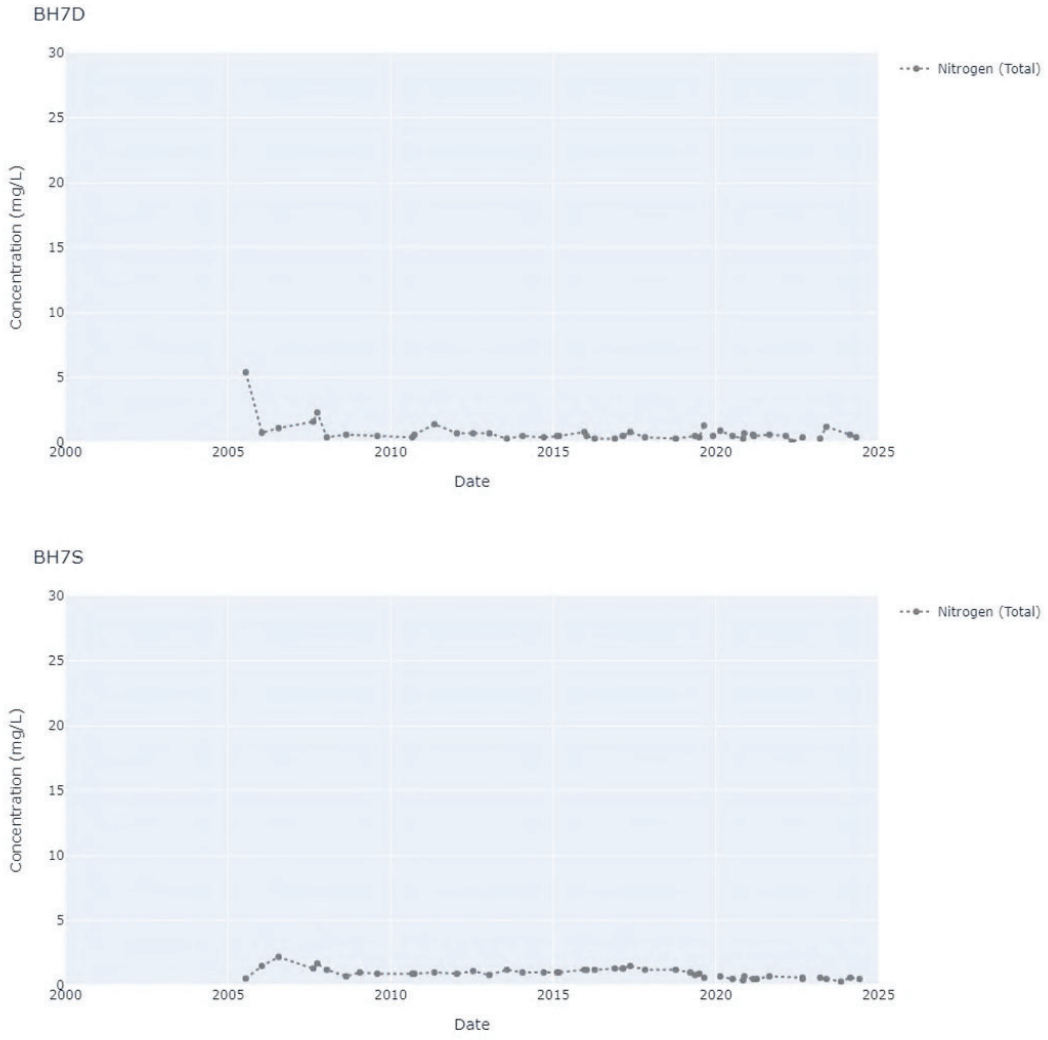


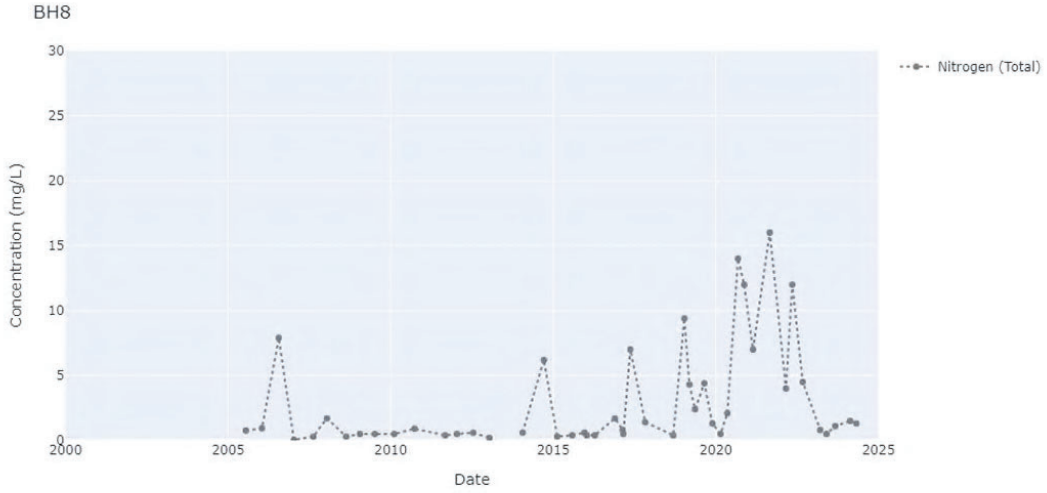

BH2D
Nitrogen (Total)
Concentration (mg/L)
30
25
20
15
10
5
0
2000
2005
2010
2015
2020
2025
Date
BH2S
Nitrogen (Total)
Concentration (mg/L)
30
25
20
15
10
5
0
2000
2005
2010
2015
2020
2025
Date

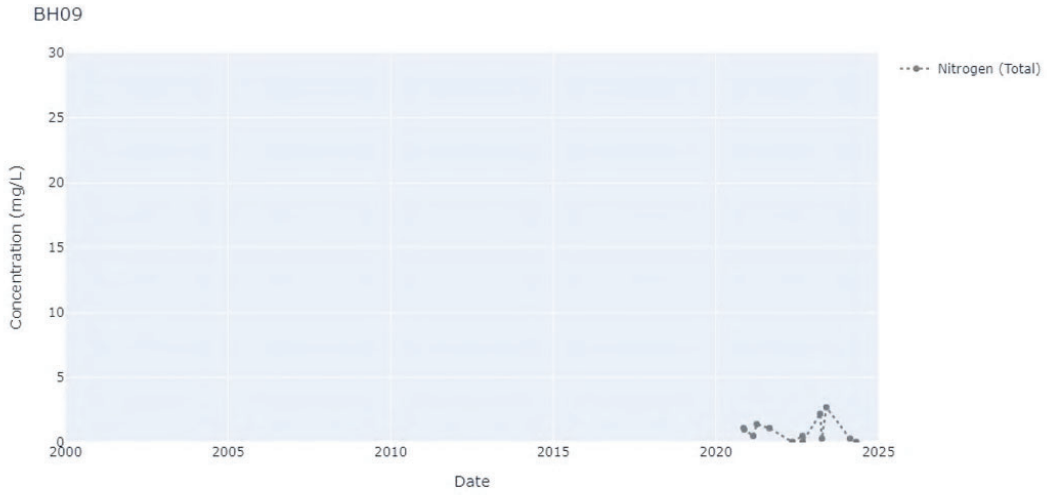

BH3D
Nitrogen (Total)
Concentration (mg/L)
30
25
20
15
10
5
0
2000
2005
2010
2015
2020
2025
Date
BH3S
Nitrogen (Total)
Concentration (mg/L)
30
25
20
15
10
5
0
2000
2005
2010
2015
2020
2025
Date

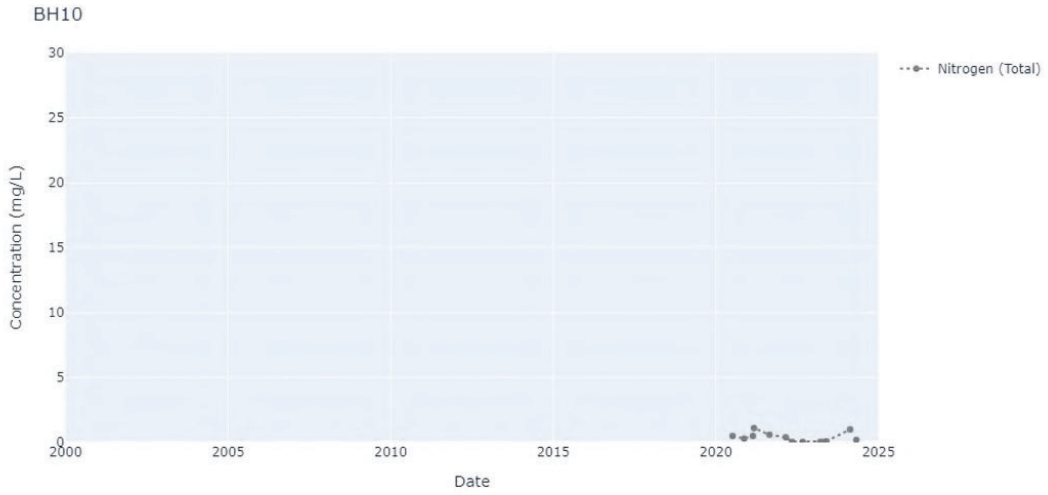

BH4D
Nitrogen (Total)
Concentration (mg/L)
Date
0
5
10
15
20
25
30
2000
2005
2010
2015
2020
2025
BH4S
Nitrogen (Total)
Concentration (mg/L)
Date

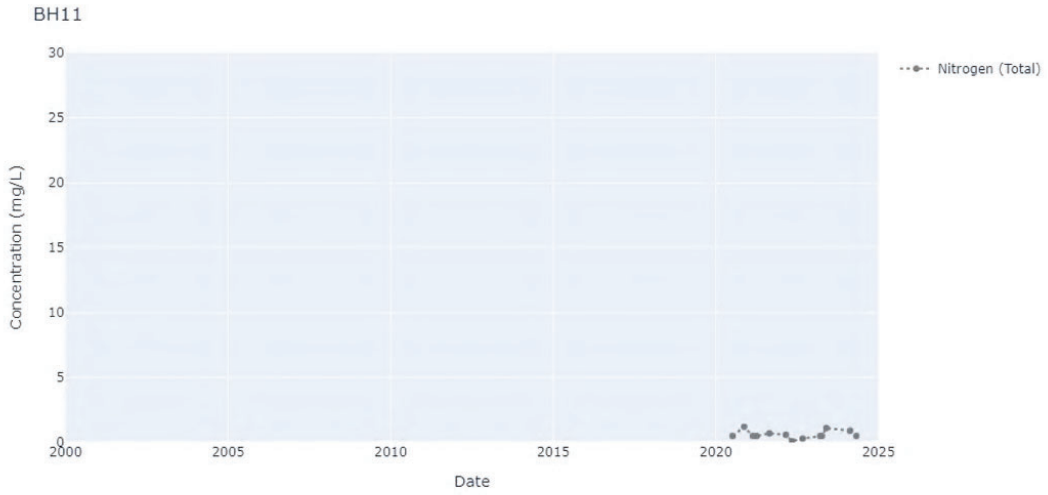

BH5D
Nitrogen (Total)
Concentration (mg/L)
30
25
20
15
10
5
0
2000
2005
2010
2015
2020
2025
Date
BH5S
Nitrogen (Total)
Concentration (mg/L)
30
25
20
15
10
5
0
2000
2005
2010
2015
2020
2025
Date

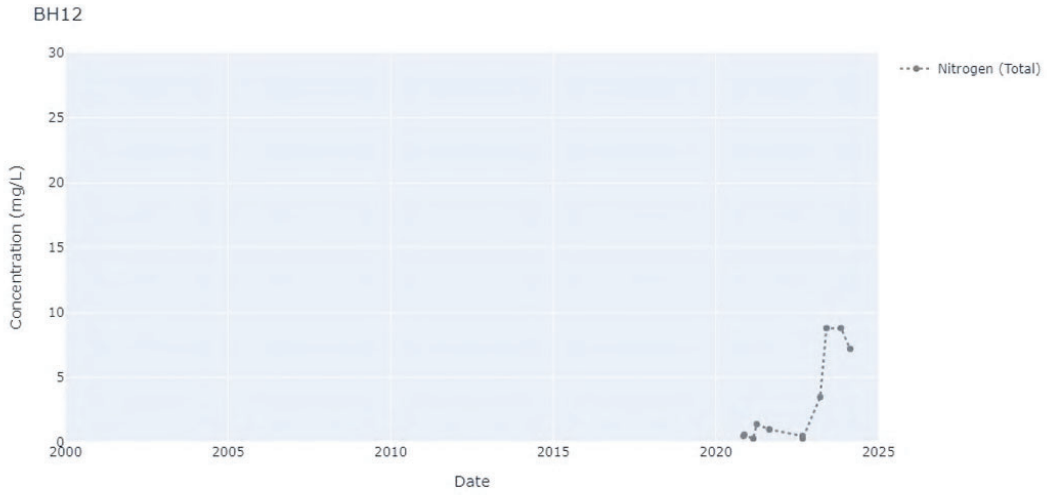

BH7D
Nitrogen (Total)
Concentration (mg/L)
30
25
20
15
10
5
0
2000
2005
2010
2015
2020
2025
Date
BH7S
Nitrogen (Total)
Concentration (mg/L)
30
25
20
15
10
5
0
2000
2005
2010
2015
2020
2025
Date

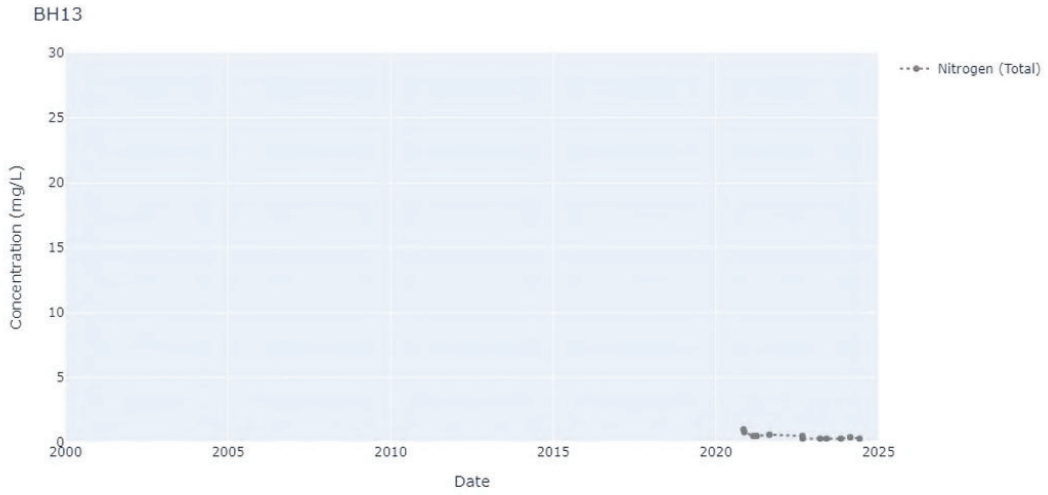

BH8
Nitrogen (Total)
Concentration (mg/L)
30
25
20
15
10
5
0
2000
2005
2010
2015
2020
2025
Date

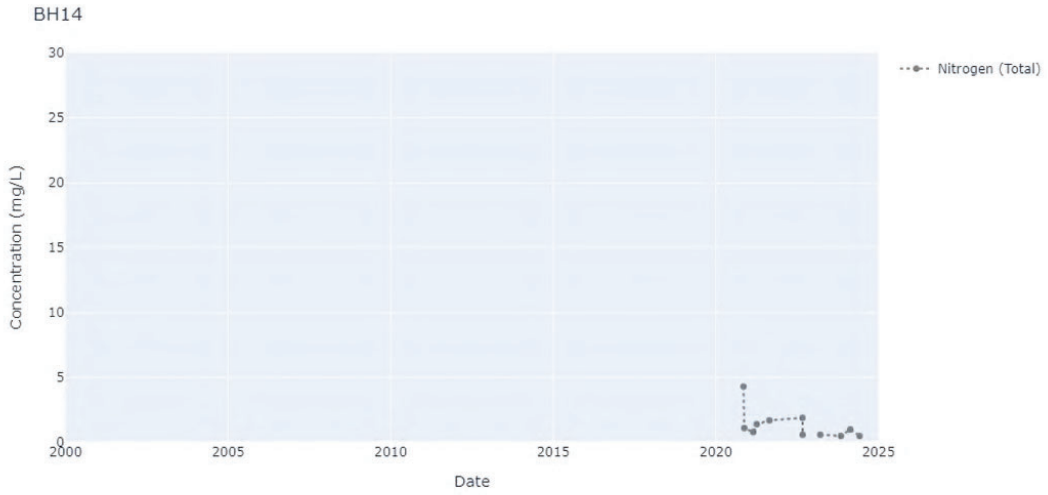

BH09
Nitrogen (Total)
Concentration (mg/L)
30
25
20
15
10
5
0
2000
2005
2010
2015
2020
2025
Date

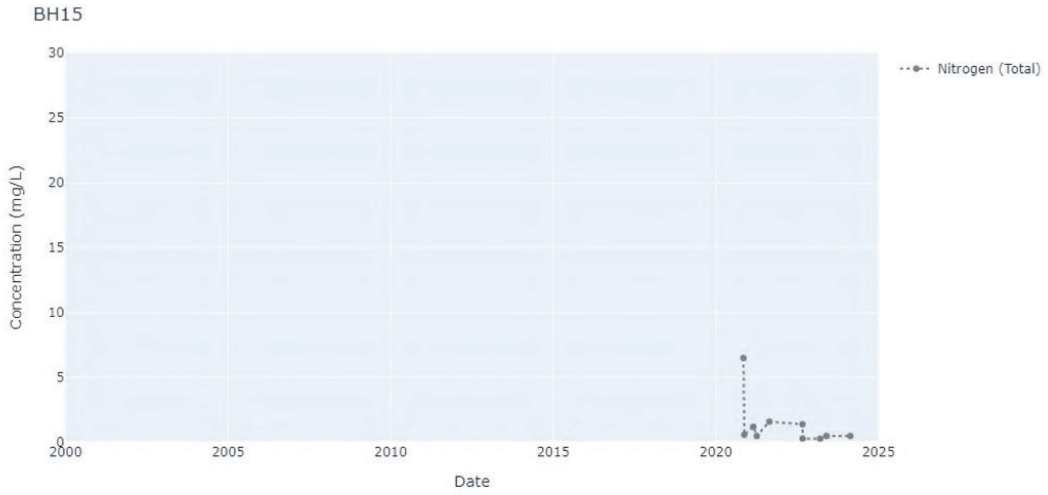

BH10
Nitrogen (Total)
Concentration (mg/L)
30
25
20
15
10
5
0
2000
2005
2010
2015
2020
2025
Date


BH11
Nitrogen (Total)
Concentration (mg/L)
30
25
20
15
10
5
0
2000
2005
2010
2015
2020
2025
Date

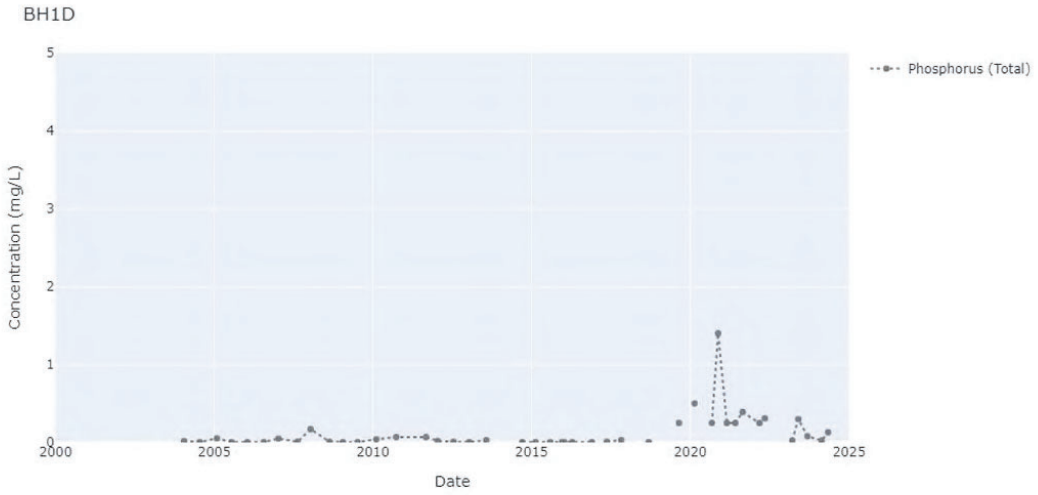

BH12
Nitrogen (Total)
Concentration (mg/L)
30
25
20
15
10
5
0
2000
2005
2010
2015
2020
2025
Date

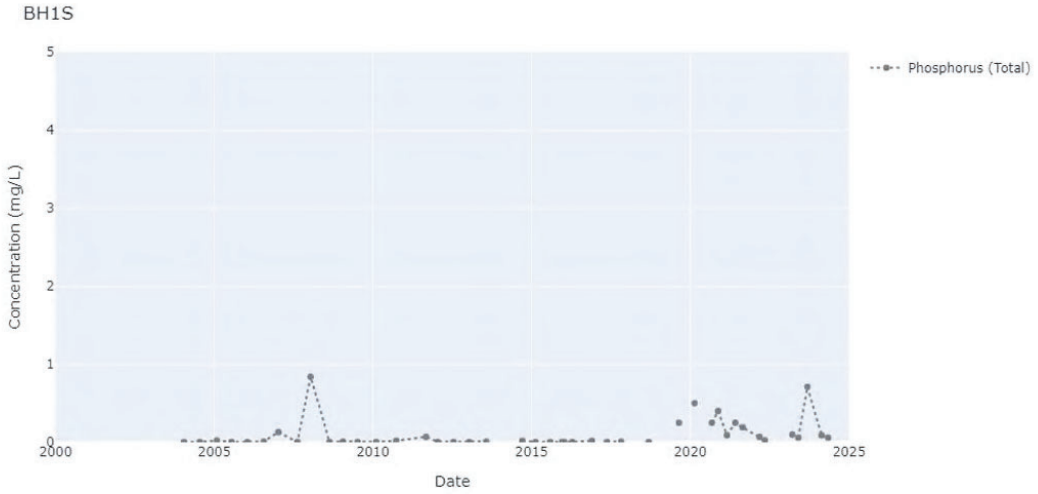

BH13
Nitrogen (Total)
Concentration (mg/L)
30
25
20
15
10
5
0
2000
2005
2010
2015
2020
2025
Date

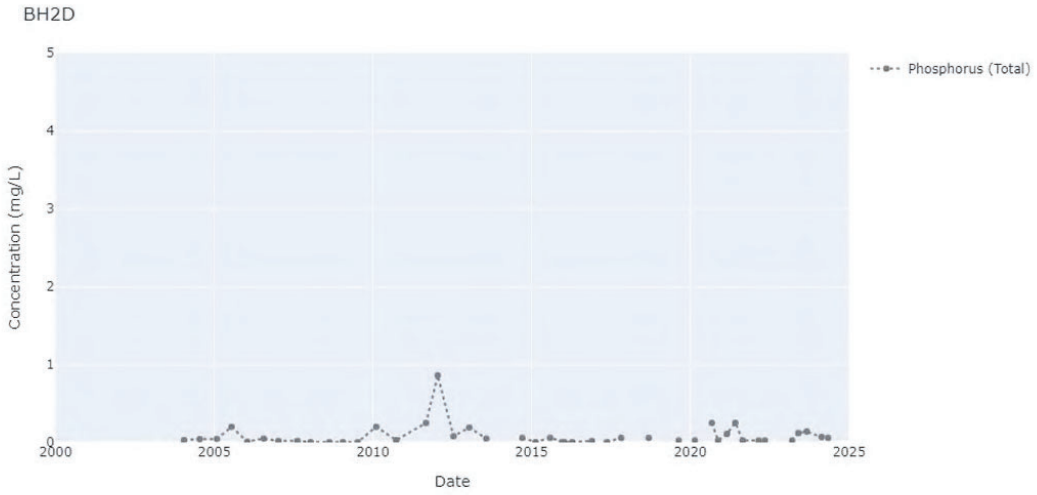

BH14
Nitrogen (Total)
Concentration (mg/L)
30
25
20
15
10
5
0
2000
2005
2010
2015
2020
2025
Date

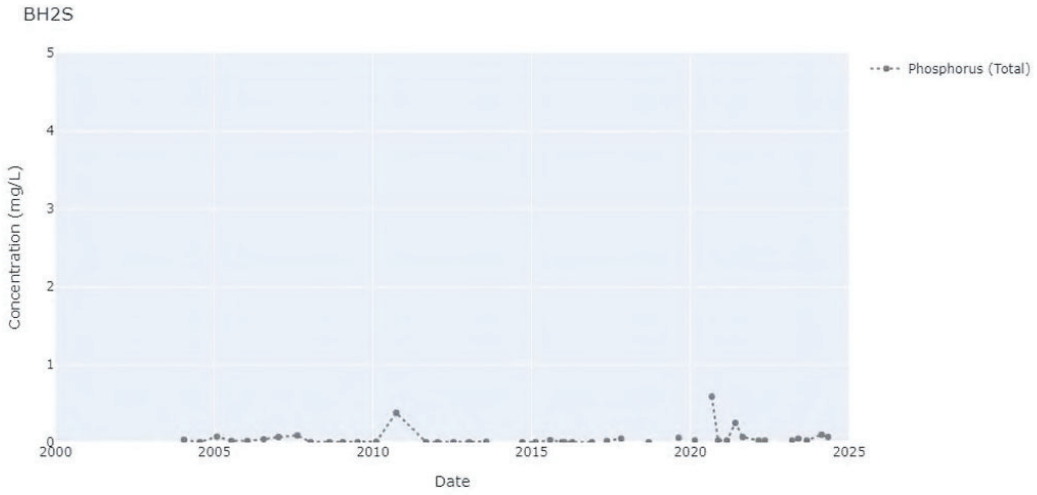

BH15
Nitrogen (Total)
Concentration (mg/L)
30
25
20
15
10
5
0
2000
2005
2010
2015
2020
2025
Date

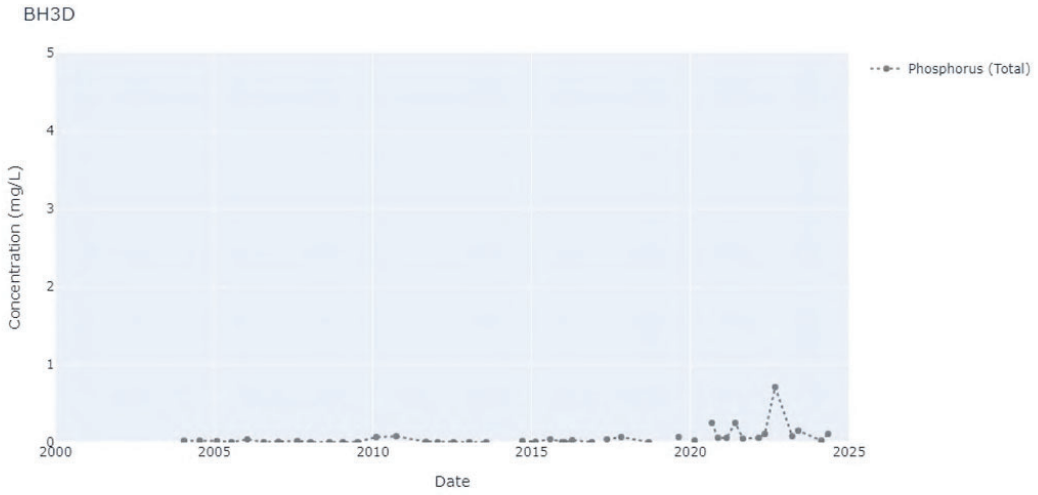
Total phosphorus

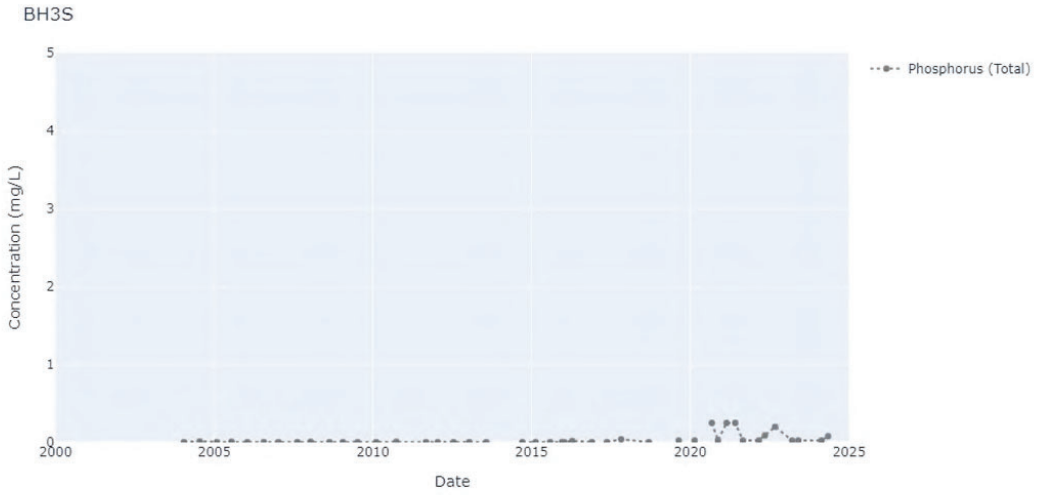


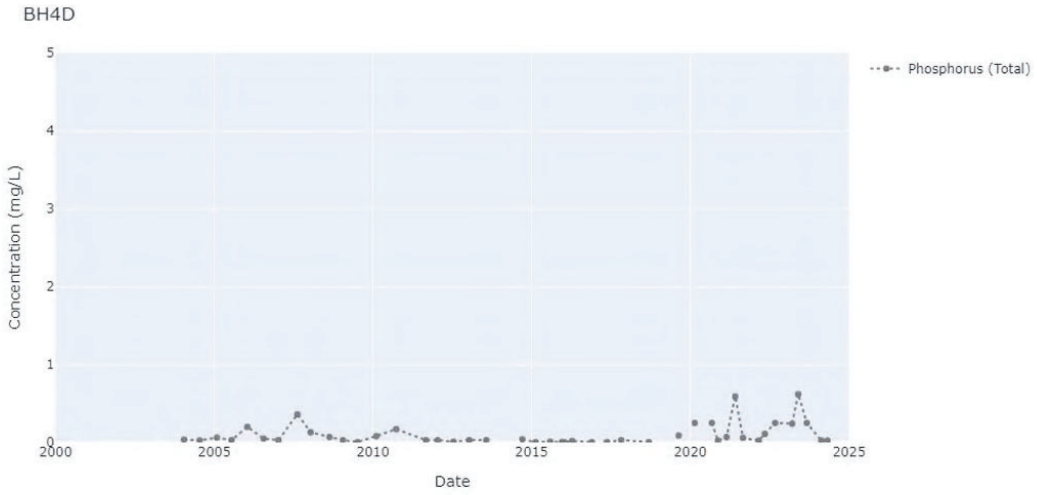


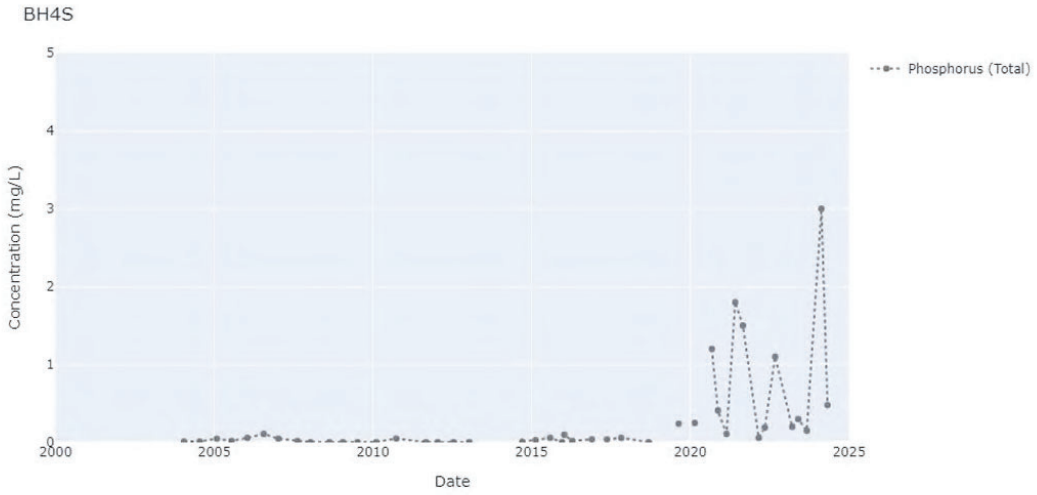

BH2D
Phosphorus (Total)
Concentration (mg/L)
0
1
2
3
4
5
2000
2005
2010
2015
2020
2025
Date

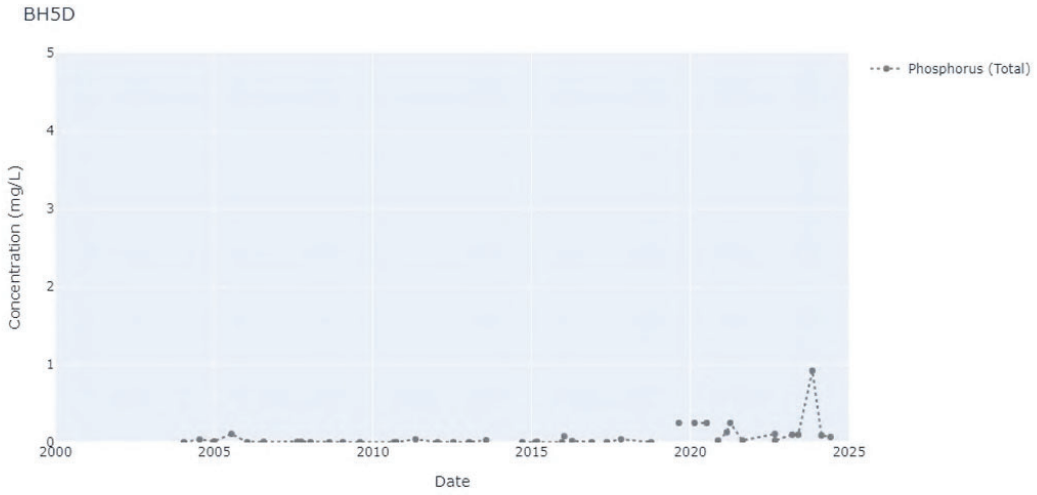

BH2S
Phosphorus (Total)
Concentration (mg/L)
0
1
2
3
4
5
2000
2005
2010
2015
2020
2025
Date


BH3D
Phosphorus (Total)
Concentration (mg/L)
0
1
2
3
4
5
2000
2005
2010
2015
2020
2025
Date


BH3S
Phosphorus (Total)
Concentration (mg/L)
0
1
2
3
4
5
2000
2005
2010
2015
2020
2025
Date


BH4D
Phosphorus (Total)
Concentration (mg/L)
0
1
2
3
4
5
2000
2005
2010
2015
2020
2025
Date


BH4S
Phosphorus (Total)
Concentration (mg/L)
0
1
2
3
4
5
2000
2005
2010
2015
2020
2025
Date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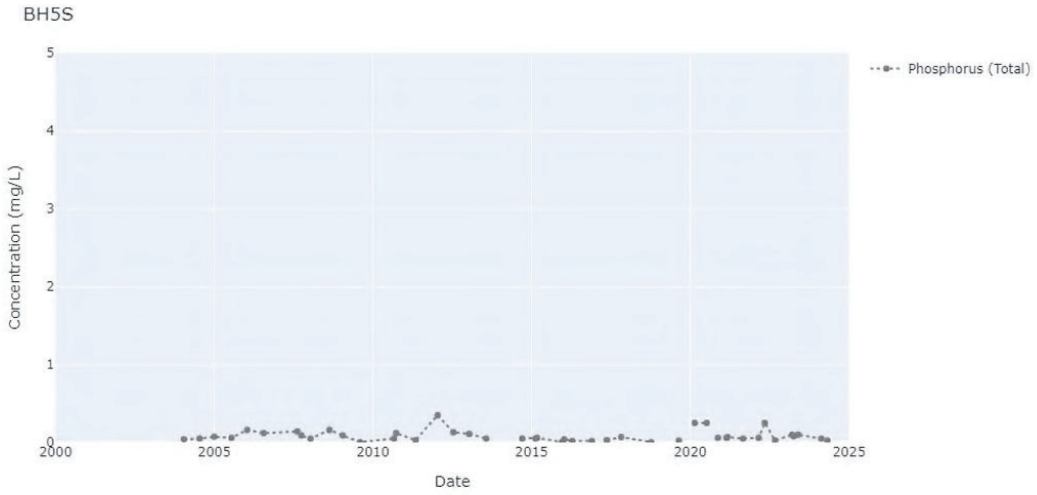
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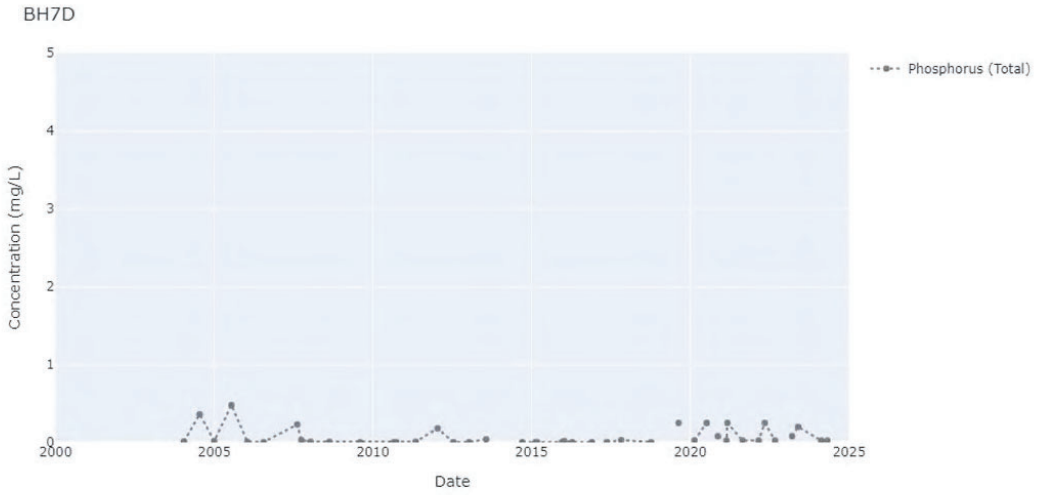
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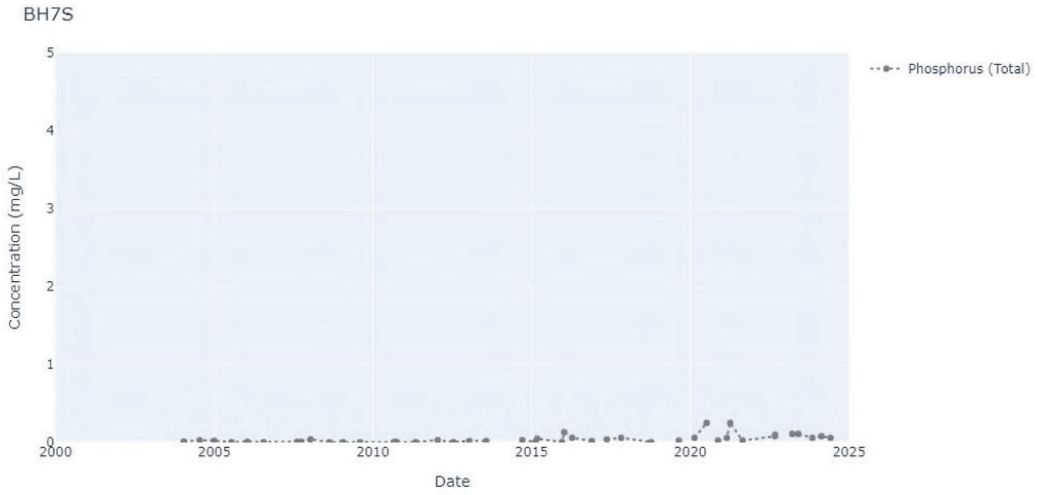
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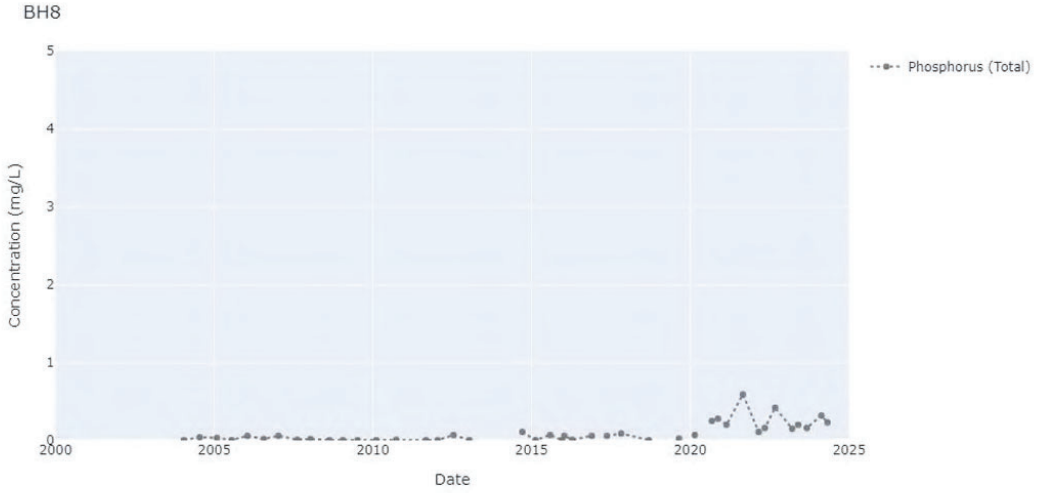
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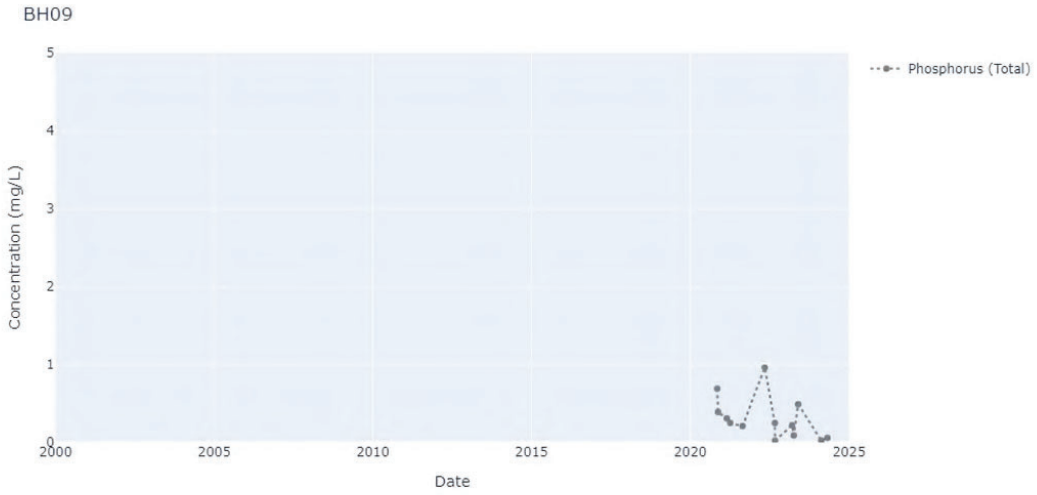
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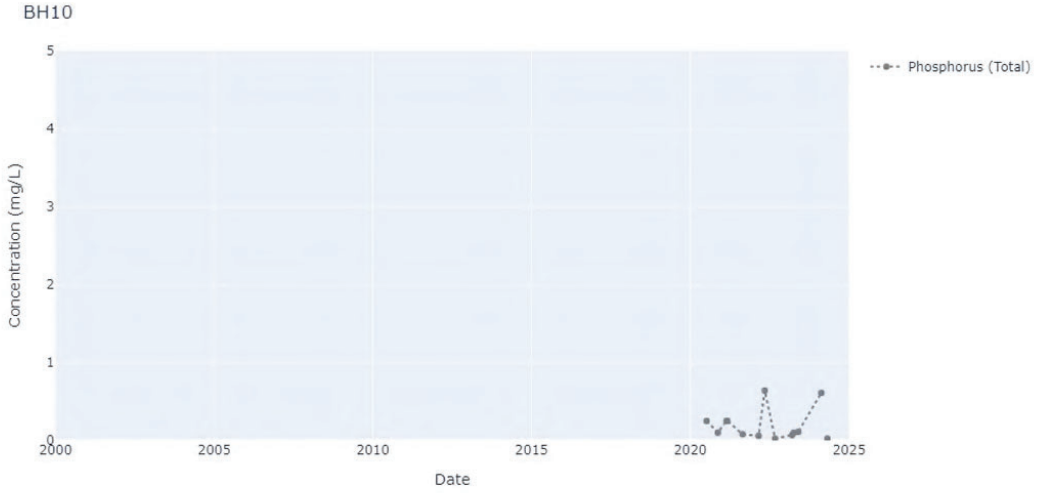
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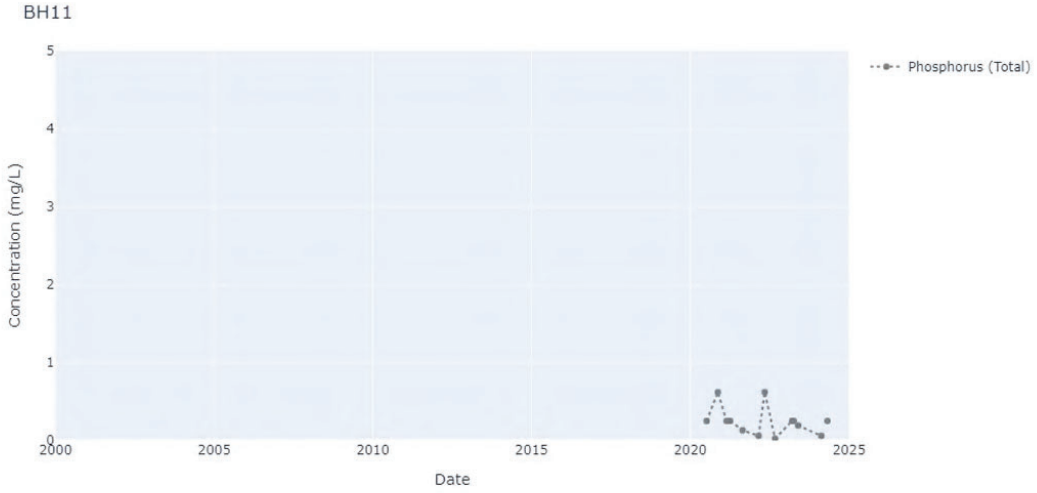
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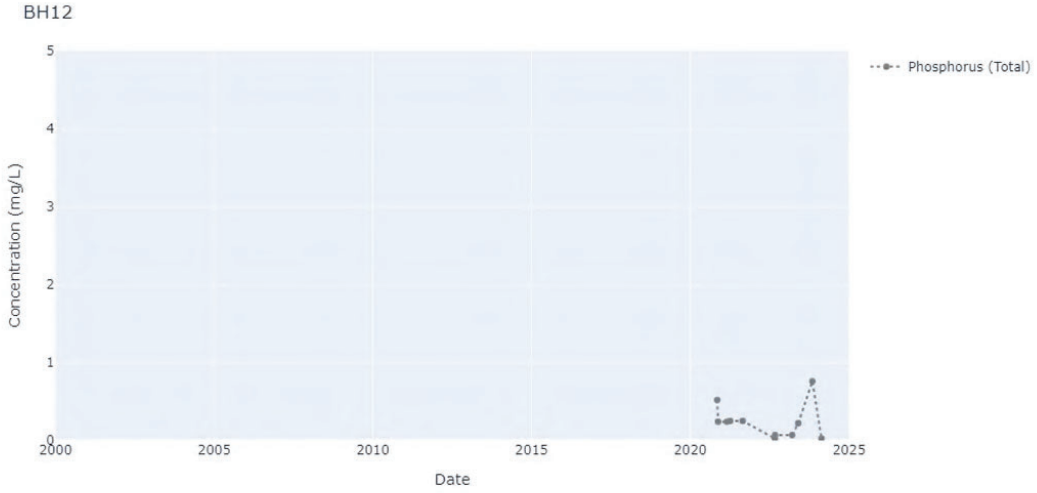
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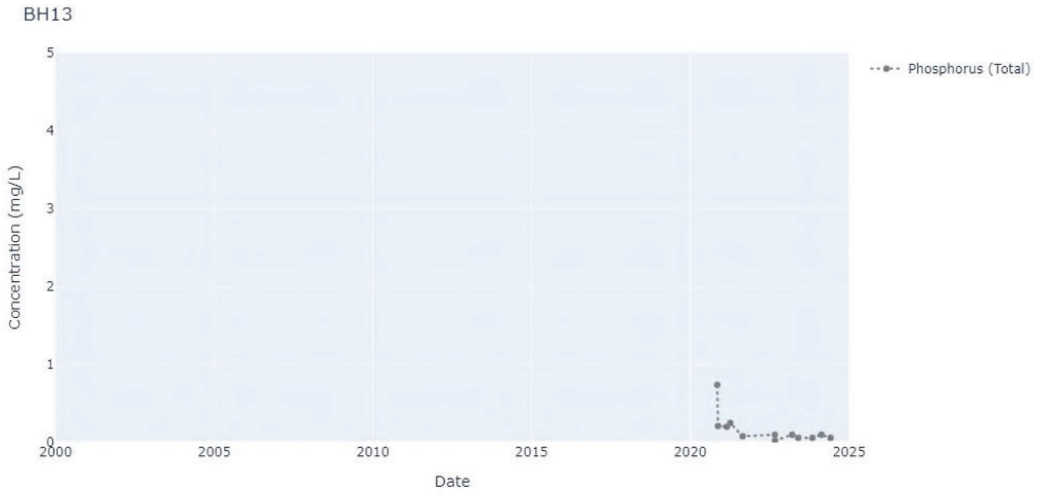
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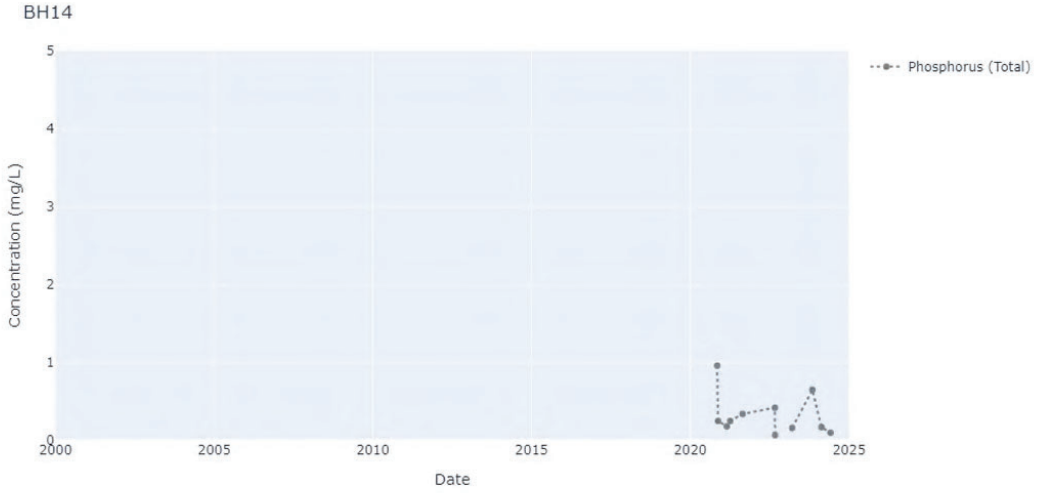
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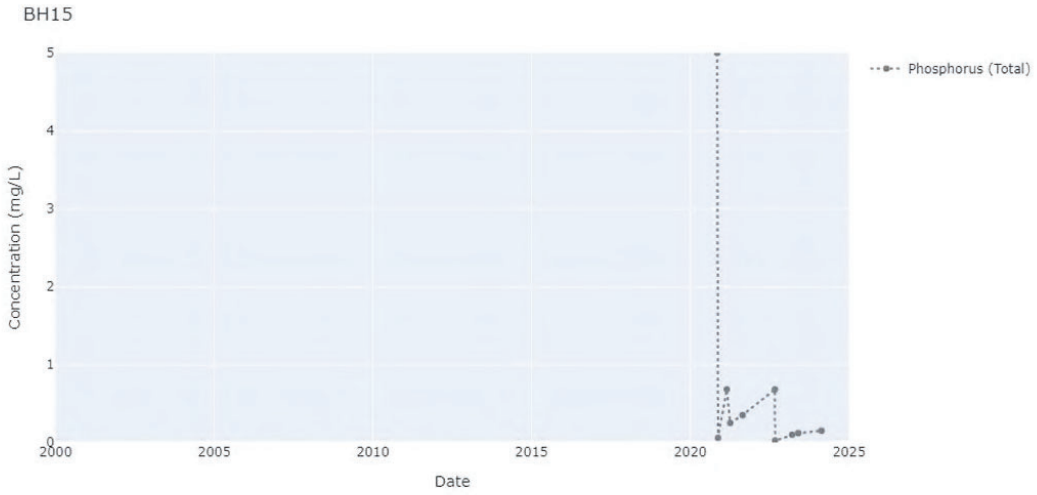
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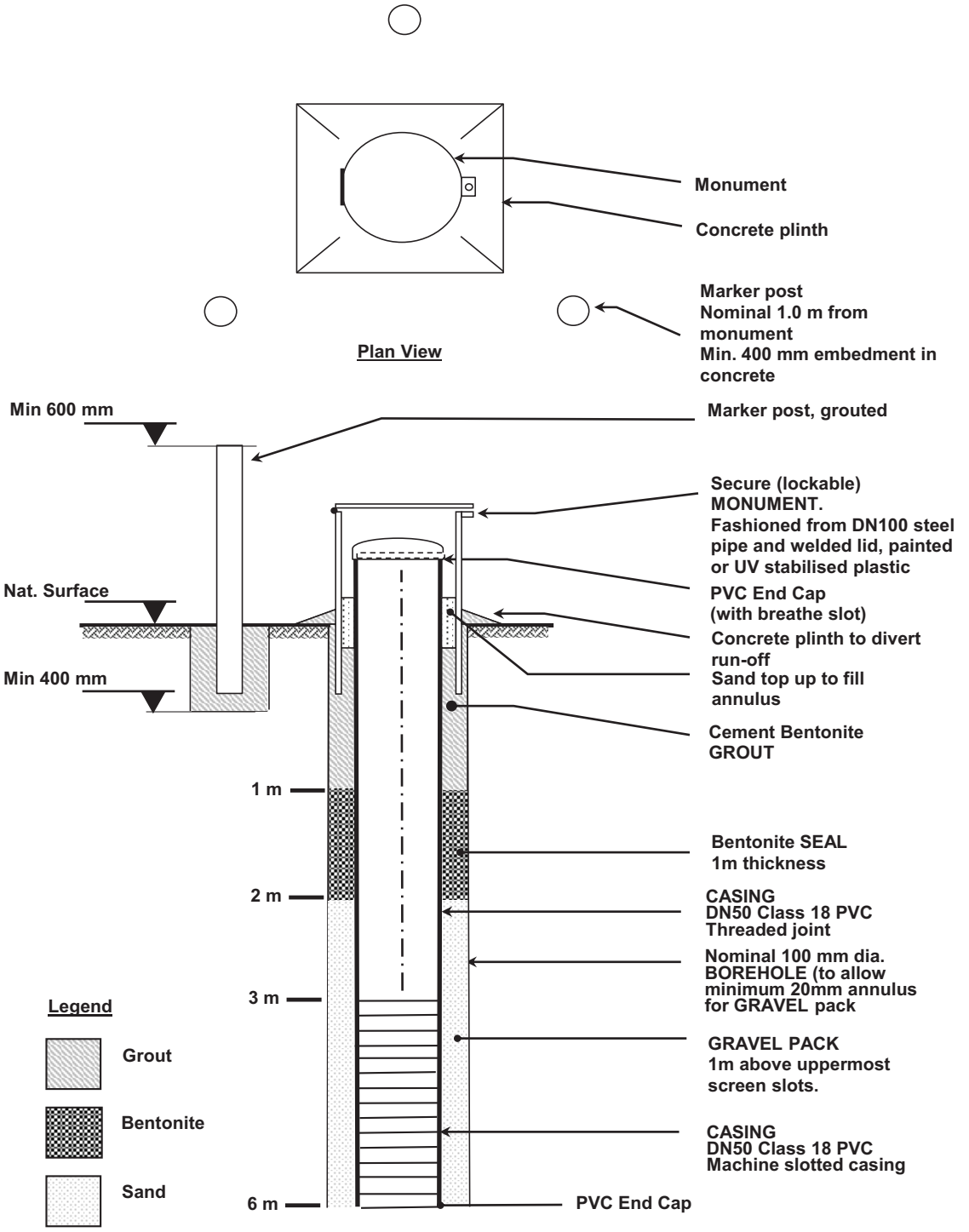
Appendix C

Concept monitoring bore construction diagrams



GHD

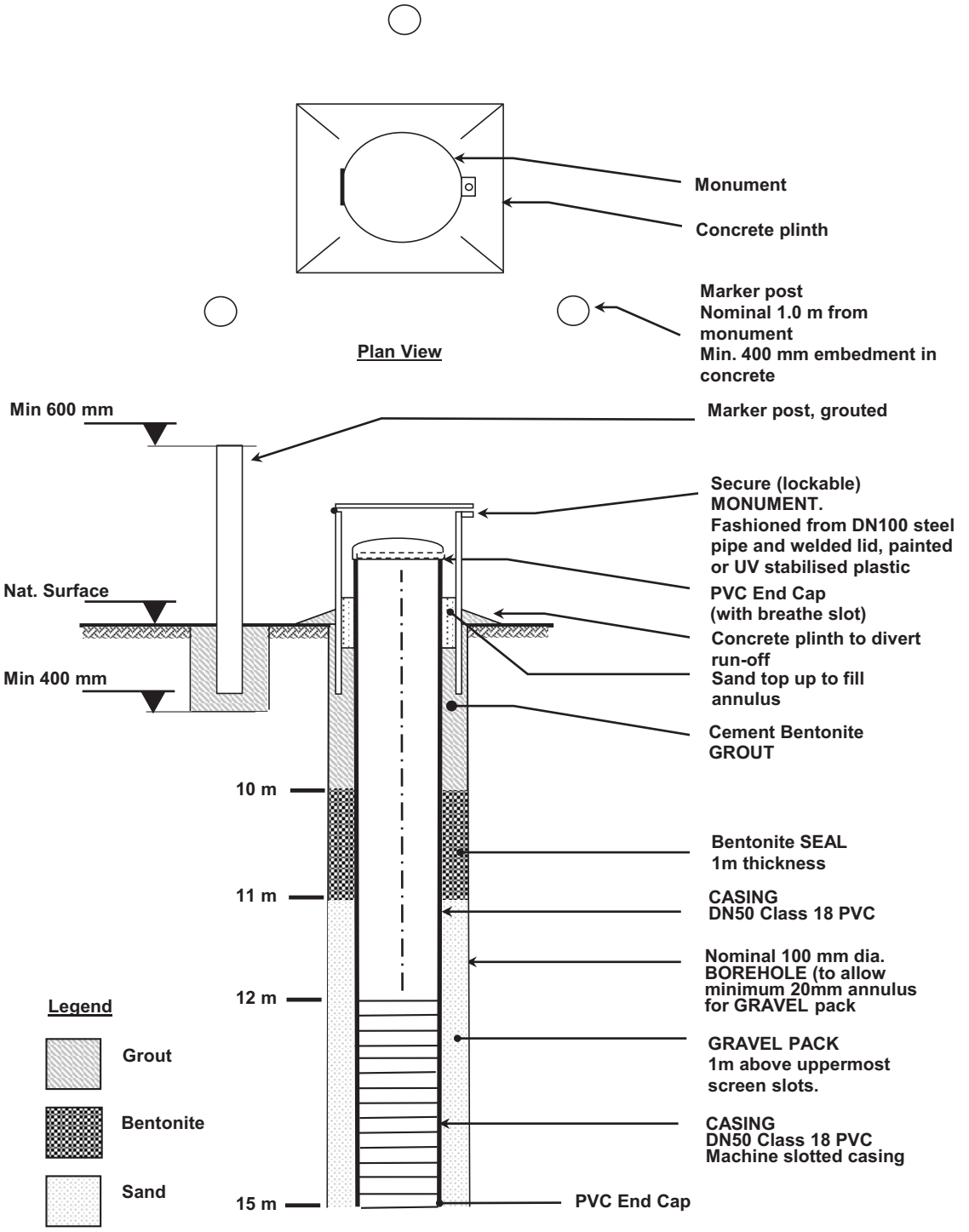
Coliban Water
Shallow (S)groundwater monitoring installations
Headworks: Monument (with bollards)

scale: NTS | date: 24 September 2024

job no. 12643136
report no. -
Rev no. A

© [redacted]

Figure C1



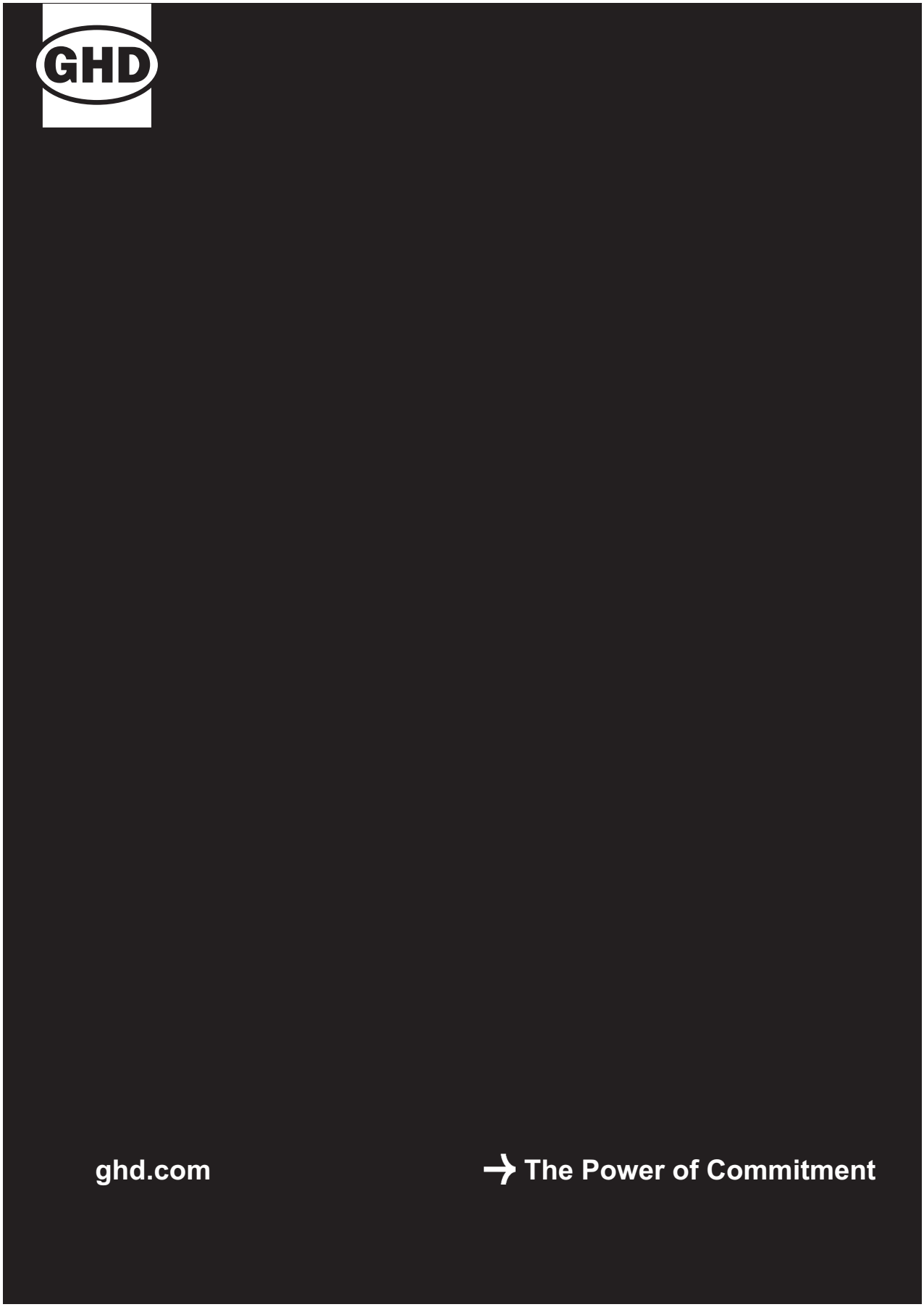
GHD

Coliban Water
Deep (D) groundwater monitoring installations
Headworks: Monument (with bollards)

scale: NTS | date: 24 September 2024

job no. 12643136
report no. -
Rev no. A

© Figure C2


GHD
ghd.com
The Power of Commitment

Appendix G

RMMP

Coliban WATER

Risk Management and Monitoring Program

Lagoon WRPs: Boort, Bridgewater, Cohuna, Dunolly, Elmore, Gunbower, Heathcote, Lockington, Pyramid Hill

EPA Operating Licences: OL000070638, OL000070226, OL000069534, OL000070810, OL00006988, OL000070729, OL000070664, OL000069875, OL000070651

1300 363 200 : www.coliban.com.au

Document Information

Version	Date	Author(s)	Reviewed	Comment
1	14 April 2023	Water, Land and Environment, Wastewater and Reuse Operations	[redacted]	Final documentation of risk management and monitoring program for Lagoon WRPs
2	2 November 2023	Water, Land and Environment, Wastewater and Reuse Operations	[redacted]	Update to include Dunolly WRP Development Licence Application components
3	9 January 2024	Water, Land and Environment, Wastewater and Reuse Operations	[redacted]	EPA comment: Dust and Odour Monitoring and Inspection Program inclusions (Section 8 and Appendices)

External Distribution List

Approved for Distribution	Organisation	Recipients
Live document – version 1 (April 2023)	Internal Teams: Water, Land and Environment, Wastewater and Reuse Operations, Service Stream O&M	[redacted]
Live document – version 2 (Dunolly WRP DLEX update) (November 2023)	Internal Teams: Water, Land and Environment, Wastewater and Reuse Operations, Service Stream O&M	[redacted]

Authorised officer of the Lagoon WRP declaration

Approved by	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]nature	[redacted]

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1. Introduction

Coliban Water manages, maintains and operates 16 Water Reclamation Plants (WRP). Under the *Environment Protection Act 1970*, 12 of Coliban Water's WRPs were covered by an Amalgamated Licence, two WRPs were exempt under the terms and conditions of the site planning permit and two WRPs are operated under a Build-Own-Operate-Transfer (BOOT) schemes.

The *Environment Protection Act 2017* (*EP Act 2017*), came into effect on 1 July 2021. Along with the new act a new permissions framework has been put in place to work alongside the general environmental duty (GED) (refer to Section 3.2) ensuring performance standards and conditions are met across a range of activities.

Every licence issued by Environment Protection Authority Victoria (EPA) requires the licence holder to have in place a risk management and monitoring program (RMMP) that enables the licence holder and EPA to determine compliance with the GED.

Water Reclamation Plants, including EPA permission tier:

1. Epsom WRP[1]
2. Castlemaine WRP[1]
3. Kyneton WRP[1] (under development)
4. **Boort WRP[2]**
5. **Bridgewater WRP[2]**
6. **Cohuna WRP[2]**
7. **Dunolly WRP[2]**
8. **Elmore WRP[2]**
9. **Gunbower WRP[2]**
10. **Heathcote WRP[2]**
11. **Lockington WRP[2]**
12. **Pyramid Hill WRP[2]**
13. Axedale WRP[3]
14. Wedderburn WRP[3]
15. Rochester WRP[4]
16. Echuca WRP[4]

Note 1: Coliban Water EPA operating licence premises that have individual RMMPs

Note 2: Coliban Water WRP operating licence premises covered by this RMMP

Note 3: Premises were below the previous capacity threshold that required an EPA permission, these sites will be transitioned to an A03 operating activity (refer to Section 12)

Note 4: Premises are managed and EPA operating licences are held by Pentair ETE under Build-Own-Operate-Transfer (BOOT) schemes

1.1 EPA Operating Licences

Coliban Water holds nine EPA operating licence for the lagoon WRP operated plants as A03 (Sewage treatment) prescribed permission activities as per Schedule 1 of the Environment Protection Regulations 2021:

- **Permission A03 -** Sewage treatment (defined in the EP Act as Treating, discharging or depositing sewage (including sullage), exceeding a design or actual flow rate of 5000 litres per day or on any day)
- **A01 Reportable Priority Waste Management:** the Elmore WRP also holds permission A01. Please note Dunolly WRP is in the final stages of including this activity through the Development Licence Exemption (DLEX) process

This RMMP outlines the monitoring and compliance for Coliban Waters Lagoon WRPs. The main document outlines the procedures and framework in place and Appendix A provides the site-based risk assessments and monitoring in place at each Lagoon WRP.

Table 1 outlines the EPA operating licences and conditions that apply to the Lagoon Water Reclamation Plants. A table of how this RMMP provides the documented compliance with each condition is presented in **Appendix B.**

Table 1: Lagoon WRP EPA Operating Licence conditions for RMMP Development

Coliban Water Wastewater Treatment Plant		Boort	Bridgewater	Cohuna	Dunolly	Elmore	Gunbower	Heathcote	Lockington	Pyramid Hill
Activity		A03	A03	A03	A03	A01, A03	A03	A03, A01	A03	A03
OL Permission ID		OL000070638	OL000070226	OL000069534	OL000070810	OL00006988	OL000070729	OL000070664	OL000069875	OL000070651
General conditions										
OL_G1	Copy of Licence	Y	Y	Y	Y	Y	Y	Y	Y	Y
OL_G2	EPA notification - incident management	Y	Y	Y	Y	Y	Y	Y	Y	Y
OL_G3	EPA notification - administrative change	Y	Y	Y	Y	Y	Y	Y	Y	Y
OL_G4a	Permission Information and Performance Statement (PIPS)	Y	Y	Y	Y	Y	Y	Y	Y	Y
OL_G4b	Document management (5 year)	Y	Y	Y	Y	Y	Y	Y	Y	Y
OL_G5	Risk management and monitoring program (RMMP)	Y	Y	Y	Y	Y	Y	Y	Y	Y
OL_G7	Decommissioning plan	Y	Y	Y	Y	Y	Y	Y	Y	Y
Standard conditions										
OL_DW2.8	"Discharge to Water" - wet weather conditions	Y	Y	Y	Y	Y	Y	Y	Y	Y
OL_RW11	Health and Environment Management Plan (HEMP)	Y	N/A	N/A	Y	Y	Y	Y	Y	Y
OL_WA01	App 4 Waste only accepted / 21-day temporary storage area	N/A	N/A	N/A	DLEX - K400-H / K400-NH	K400-H / K400-NH	N/A	N/A	N/A	N/A
OL_WA02	Waste treated and disposed in accordance with App 4	N/A	N/A	N/A	DLEX - 30,000 dry tonnes	24,000 dry tonnes	N/A	N/A	N/A	N/A
OL_WM01	K400-H storage	N/A	N/A	N/A	DLEX	Y	N/A	N/A	N/A	N/A
OL_WM11	Waste records	N/A	N/A	N/A	DLEX	Y	N/A	N/A	N/A	N/A
OL_WM14	Plant and equipment - maintenance	Y	Y	Y	Y	Y	Y	Y	Y	Y
OL_WM04	Waste not burned at site	N/A	N/A	N/A	DLEX	Y	N/A	N/A	N/A	N/A

Please note: Dunolly WRP is in the final stages of a Development Licence Exemption (DLEX) for the Dunolly Biosolids Handling Facility (DBHF). This will introduce the standard licence conditions to store sewage sludge at the premises similar to Epsom WRP.

1.2 EPA Licence Condition Compliance

1.2.1 General Conditions

Each WRP Operating Licence has the following general conditions:

- OL_G1 a copy of the licence is stored at the premise: Coliban Water have undertaken an audit of the sites and where practicable have stored a copy of the licence either in a shed or Electrical switchboard.
- OL_G2 EPA notification of discharge, emissions or deposit: refer to Section 9 for Coliban Water's Incident Management, including compliance with this condition.
- OL_G3 EPA notification of administrative changes: the Water, Land and Environment Team manages Coliban Water EPA Portal, including any administrative changes.
- OL_G4a and G4b Permission Information and Performance Statement (PIPS): the Water, Land and Environment Team manage information that relates to PIPS, data records, performance records and documentation (refer to Section 11.1).
- OL_G5 RMMP: this document has been prepared to ensure compliance with the lagoon based WRP EPA operating licences and the GED.
- OL_G7 Decommissioning Plan: Coliban Water's Asset Management Framework ensures compliance with this condition.

1.2.2 Standard Conditions

The following standard conditions do not apply to all WRP Operating Licence as presented in Table 1 above:

- OL_DW2.8 Discharge to water – wet weather conditions: this condition applies to all plants with each lagoon based WRP has been assessed for capacity (onsite reuse and discharge capacity). This assessment is used to inform plant upgrades and operational management to ensure peak weather flows can be contained within the 90% threshold.
- OL_RW11 Recycled water use: all WRPs except for Bridgewater and Cohuna have this condition. A Health and Environment Management Plan (HEMP) for Class B and C water is under development to ensure compliance with the new EPA publications. Transition for the Environment Improvement Plan framework is due by 30 June 2026.
- OL_WA01 Waste acceptance and 21-day temporary storage: Elmore (and Dunolly once approved) WRPs are licenced to lawfully store and treat K400-H and K400-NH (treated sewage solids and sludge / Biosolids).
- OL_WA02 Waste treatment and disposal: Elmore (and Dunolly once approved) WRPs manage Sewage sludge through delivery, processing, stockpiling and storage on site for a minimum period of 3 years.
- OL_WM01 Storage volume: this condition specifies that Elmore WRP can store up to 24,000 dry tonnes and Dunolly WRP will be able to accept up to TBC (DLEX Approval underway – 30,000) dry tonnes of K400-H waste at any time.
- OL_WM11 Waste record management: The Water, Land and Environment Team ensure that EPA's Waste Tracker is used for all reportable priority waste (K400-H and temporary storage) and K400-NH priority waste.
- OL_WM14 Plant and equipment maintenance: this applies to all lagoon based WRPs and part of Coliban Water's Asset Management Framework and Service Stream Operations Contract.
- OL_WM04 Waste not burned at site: Coliban Water compliance through waste management protocols and lawful place for waste followed (creation, transport to disposal).

1.3 Coliban Water Environmental Management System

The Coliban Water Environmental Management System (EMS) is certified to the international standard AS/NZS ISO 14001:2016 and provides a formalised framework to manage environmental performance.

The EMS is the primary vehicle through which Coliban Water plan, monitor, report and review the delivery of the intent of the Environment and Sustainability Policy Statement. In delivering water and wastewater services in north central Victoria, the risks associated with environmental aspects, compliance obligations and other identified issues (e.g. financial, IT) have been defined. Seven Significant Environmental Aspects have been identified through a critical risk identification process:

1. Aboriginal heritage damage
2. Threatened species & habitats
3. Bendigo, Castlemaine, Kyneton WRP discharges
4. Wastewater discharges
5. Extreme weather
6. Odour (WRP & sewer)
7. Dam Failure

Coliban Water's environmental risk management procedures follow the Risk Management Framework. The aim of the risk identification process is to generate a comprehensive list of things that potentially or actually cause risk to Coliban Water's ability to achieve its objectives or risk to the environment as a result of Coliban Water's operational activities. Identified risks are recorded in the Environmental risk register.

Site based environmental risk assessments have been undertaken to produce site-specific environmental risk registers of Coliban Water's operational assets and sites.

1.4 Purpose and scope of the Risk Management and Monitoring Program (RMMP)

This RMMP outlines the management process to identify and mitigate risk to the environment and human health so far as reasonably practicable for the Lagoon WRPs in accordance with the GED. Development of a RMMP is a condition of the operating licences of which condition OL_G5 states that licence holders must:

"1. Develop a risk management and monitoring program for your activities which:

(a) identifies all the risks of harm to human health and the environment which may arise from the activities you are engaging in at your activity site;

(b) clearly defines your environmental performance objectives;

(c) clearly defines your risk control performance objectives;

(d) describes how the environmental and risk control performance objectives are being achieved;

(e) identifies and describes how you will continue to eliminate or minimise the risks in 1(a) (above) so far as reasonably practicable (SFARP); and

(f) describes how the information collated in compliance with this clause, is or will be disseminated, used or otherwise considered by you or any other entity.

"2. The risk management and monitoring program must be:

a) Documented in writing

b) Signed by the duly authorised officer of the licenced entity; and

c) Made available to the Authority on request."

2. Glossary of Terms

AGWR	Australian Guidelines for Water Recycling
AMAF	Asset Management Accountability Framework
AMS	Asset Management System
ATAD	Autothermal Thermophilic Aerobic Digestion
BNR	Biological Nutrient Removal ()
CCP	Critical Control Point
DAF	Dissolved Air Flotation
EIP	Environment Improvement Plan
EMS	Environmental Management System
EPA	Environment Protection Authority
FSL	Full Supply Level
GED	General Environmental Duty
HACCP Plan	Hazard Analysis Critical Control Point Plan
HEMP	Health and Environment Management Plan
REIP	Regional Environment Improvement Plan
RMMP	Risk Management and Monitoring Program
RWQMP	Recycled Water Quality Management Plan
SAMP	Strategic Asset Management Plan
SFARP	So Far As Reasonably Practicable
SSERR	Site Specific Environmental Risk Registers
SSP	Sewage pump station
WRP	Water Reclamation Plant
WSAA	Water Services Association of Australia

3. EPA guiding documents and State of Knowledge

The following EPA guidance has been used to support Coliban Water's understanding of the risks the Lagoon WRPs may pose to human health and the environment and the reasonably practicable steps that can be undertaken to eliminate or reduce risks. The guidance documents below describe Coliban Water's State of Knowledge and how compliance with EPA's Operating Licences are delivered, monitored and recorded.

EPA may periodically update and release new publications relating to RMMP's. Future review of this Lagoon WRP RMMP will consider the additional guidance provided by such publications.

EPA Publication 1850.2 (DRAFT): Guidance for operating licences, July 2021

This draft publication documents the transition to the new operating licence conditions including RMMP, reporting, record keeping, notification, decommissioning and amended conditions.

EPA Publication 1322.9: Licence Management, December 2017

This guidance document is under review by EPA and provide information on licence compliance, The Discharge to Water (DW) condition information is used to ensure that the Lagoon WRPs are designed to retain water up to a 90th percentile wet year.

EPA Publication 1851.1: Implementing the general environmental duty: a guide for licence holders. Authorised and published by EPA Victoria. November 2020.

The EPA Publication 1851.1 has been used to document and structure the RMMP (licence condition OL_G5). The key document that has supported the RMMP development is the EMS (refer to Section 1.3) and the following associated documents: risk assessment records, environmental performance indicators, operational control procedures, work instructions, monitoring schedules, and monitoring records.

The key components of the RMMP include the conceptual site model, risk assessment, environmental performance objectives, operational procedures, roles and responsibilities, monitoring program, incident and emergency response, training, communications, reporting and review.

EPA Publication 1695.1: Assessing and controlling risk: A guide for business. Authorised and published by EPA Victoria. March 2019.

EPA's risk management framework has been applied for the Lagoon WRPs RMMP risk assessment, refer to Section 5.

EPA Publication 1910.2: Victorian guideline for water recycling, Mach 2021

This guideline promotes the use of the Australian Guidelines for Water Recycling (AGWR) Framework for management of recycled water quality and use. This document has been used to understand the regulatory and formal requirements for a recycled water scheme need to be identified, understood and documented. For the development of a recycled water scheme, EPA approval is required for the Health and Environment Management Plan (HEMP). As outlined in Section 1.2.2 the OL_RW11.1 condition to maintain a *HEMP* has been incorporated into this RMMP. The Class B and C HEMP is under development with timeframes for the new framework to meet the statutory timeframe of 30 June 2026.

EPA Publication 1911.2 Technical information for the Victorian guideline for water recycling

In addition to EPA publication 1910.2 this technical document provides information on how to complete HEMPs, guidance on how to classify risk, preparation of user site management plans, checklists for the RWQMP and human health and environmental risk assessments.

EPA Publication 1287.2 Guidance for environmental and human health risk assessment of wastewater discharges to surface waters

This publication provides step-by-step guidance to assess the environmental and human health risks associated with point-source wastewater discharges to surface waters. This guidance document has been used to support the development of the Lagoon WRP Conceptual Site Model (CSM), refer to Section 4.4.

OL_G7 Web based EPA Publication Decommissioning Guidelines for licences

https://www.epa.vic.gov.au/for-business/permissions/licences/operating-licences/decommissioning-guidelines

The purpose of the Coliban Water Strategic Asset Management Plan (SAMP) document is to provide the direction on how asset management is applied in Coliban Water. The document describes the processes, documents and improvements that are integral to managing assets efficiently and effectively through their life cycle.

Coliban Water is required to comply with the mandatory requirements of the Victorian Government Asset Management Accountability Framework (AMAF) which require the demonstration of effective planning, acquisition, operation, and disposal of assets to meet current and future service requirements (ISO 55000: Asset Management Standards).

A risk and criticality assessment has been completed for all Lagoon WRPs. The assessment involved an analysis of each 'maintainable' asset for each site. The analysis was based on Coliban Water's risk framework, operators' comprehensive operational knowledge and historical asset performance data.

Coliban Water's SAMP meets the requirements of licence condition: *OL_G7 develop and maintain a decommissioning plan that is in accordance with the current decommissioning guidelines published by the Authority.*

3.1 General Environmental Duty (GED)

The GED (section 25(4) of the *Environment Protection Act 2017*) requires risks to be minimised so far as reasonably practicable. The key elements of the GED that ensure compliance with the GED include:

a) use and maintain plant, equipment, processes and systems in a manner that minimises risks of harm to human health and the environment from pollution and waste

b) use and maintain systems for identification, assessment and control of risks of harm to human health and the environment from pollution and waste that may arise in connection with the activity, and for the evaluation of the effectiveness of controls

c) use and maintain adequate systems to ensure that if a risk of harm to human health or the environment from pollution or waste were to eventuate, its harmful effects would be minimised

d) ensure that all substances are handled, stored, used or transported in a manner that minimises risks of harm to human health and the environment from pollution and waste

e) provide information, instruction, supervision and training to any person engaging in the activity to enable those persons to comply with the GED.

Coliban Water is committed to ensuring the application of high-level control measures that minimise environmental risks, so far as reasonably practicable (refer to Figure 1). Coliban Water has a low appetite for this risk and is unwilling to accept risks that can result in poor environmental performance.

	Plant, equipment, processes and systems	Strategic Asset Management Plan (SAMP) AIMS/HANSEN - ISO 55000: Asset Management Standards Service Stream Operations - SOPs SCADA Monitoring systems (CCPs/QCPs)
	Systems for identification, assessment and control of risks	CW Risk Management Framework - *Australian Standard ISO31000:2018* Environmental Management System – Australian Standard ISO14001:2016 JSEA/SWMMS Risk Management and Monitoring Plans (site specific and related to activities)
	Minimise harmful effects	Environment Sustainability Policy Statement WQ Monitoring and exceedance reporting Emergency Management and Incident Response Reporting of pollution incidents to EPA Site audits Periodic review of risks
	Substances handled, stored used or transported	Australian Standards compliance Service Stream Operations - SOPs Waste framework – classification and lawful place for disposal
	Information, instruction, supervision and training	Environmental training for all staff (induction and 18 monthly reviews/updates) Service Stream competencies for wastewater treatment operators

Figure 1: Coliban Water's GED processes in place to minimise and respond to risks

This RMMP ensures compliance with the GED by periodically revisiting and undertaking risk assessments to ensure that all relevant risks associated with the Lagoon WRPs activities and processes are identified, noting that this must encompass risks of harm to both human health and the environment.

4. Lagoon Water Reclamation Plants (WRPs)

4.1 Lagoon WRP activities

Coliban Water's lagoon based WRPs are used for rural communities due to their lower maintenance requirements and higher energy efficiency compared to other wastewater treatment options. All of the lagoon WRPs sewage are domestic, and treatment includes a combination of aerobic or facultative and maturation lagoons (refer to Appendix A for site specific waste treatment process):

- Aerobic lagoons: shallow lagoons, less than 1 m depth, where dissolved oxygen is maintained throughout the entire depth, mainly by action of photosynthesis
- Facultative lagoons: one to 2.5 metres deep, which have an anaerobic lower zone, a facultative middle zone, and an aerobic upper zone maintained by photosynthesis and surface aeration
- Maturation lagoons: used for polishing effluents from other biological processes. Dissolved oxygen is furnished through photosynthesis and surface reaeration.
- Aerated lagoons: lagoon oxygenated through the action of surface aeration.

Desludging of lagoons is undertaken based on prioritisation and annual surveys. The desludging program ranges from every two years to twenty years depending on the site. Once the sludge is removed, it is transported to either Bendigo WRP, Elmore WRP or Dunolly WRP (under development licence application process).

The treatment processes are monitored to ensure that the quality targets established by the each Lagoon WRP are met. As the plant loads increase, the necessary plant upgrades will be implemented to ensure that the plant operations are compliant with the EPA Operating Licence.

4.2 Environmental setting

Coliban Water's Lagoon WRPs are located in rural settings, further information about site specifics aspects (e.g. plant setting, sensitive receptors, catchment) are provided in Appendix A.

Environmental aspects such as odour, effluent quality, and potential impacts on groundwater are assessed in the site-based risk assessment. Evaporation and sustainable irrigation are the key management tools used at each Lagoon WRPs water balance.

4.3 Interested parties

Coliban Water is committed to achieving a high standard of environmental performance across all of its operations. The objective for the Lagoon WRPs RMMP is to avoid any preventable impacts to Coliban Water staff and contractors, site neighbours and the surrounding environment. The internal and external parties are identified in Sections 4.3.1 and 4.3.2 respectively.

4.3.1 Internal parties

The following internal parties have been identified as having an interest in the management of the premises environmental performance and risks

Water, Land and Environment **Team**	Ensure compliance with EPA legislation, regulations and licence conditions.
Wastewater Treatment & Reuse Operations	Undertake day to day operations for the Lagoon WRP
Environment Management Group	Delivery on the Environment and Sustainability Policy Statement and Environment Management System.
Service Stream	Coliban Water has a contract with Lendlease – Service Stream for the operations and maintenance of its Lagoon WRPs and sewer distribution systems.

	Lendlease are contracted to provide operations and maintenance services as described in the Service Agreement contract (expiry in June 2027).
Executive Leadership Team	Ensure delivery of the Corporate Plan 2022-2027 and Strategy 2030
Coliban Water Board	Oversight of the strategic risk/s, including review of risk reports, approval of internal audit scopes, review of internal audit reports and monitoring of audit findings

4.3.2 External Parties

The following external parties have been identified as having an interest in the management of the premises environmental performance and risks

Environment Protection Authority (EPA)	Victoria's environmental regulator acting in accordance with the Environment Protection Act 2017 (the Act). Coliban Water and Service Stream must comply with the EP Act and regulations administered by EPA. This includes, but is not limited to, compliance with the GED and legal obligations in relation to prescribed permission activities.
Relevant Shire Council	Coliban Water need to ensure compliance with planning permit conditions.
Traditional Owners: Dja Dja Wurrung and Yorta Yorta Nation Aboriginal Corporations	Coliban Water developed Reflect: Reconciliation Action Plan which aims to strengthen relationships, communities and business and informing plans for the future.
North Central Catchment Management Authority (North Central CMA)	The natural resource management agency in north central Victoria for coordinating and monitoring NRM programs, including the delivery of the North Central Regional Catchment Strategy 2021-2027.
Landcare Groups	North central Victoria is home to many enthusiastic, capable and active community groups and individuals who are working to protect the region's natural environment. The North Central CMA region has approximately 160 Landcare and community natural resource management (NRM) groups, comprising of more than 4,000 volunteers.
Landholders	KNo offensive amenity impacts and reuse of recycled water for irrigation purposes
Individuals	No offensive amenity impacts.
Community Groups	Interested groups including Birdlife, Landcare, Friends of waterways and Waterwatch groups,

4.4 Conceptual site model (CSM)

A conceptual site model (CSM) aids in the understanding of environmental risks posed by the Lagoon WRP operations by outlining the potential **source, pathway** and **receptor** relationships of a potential environmental risk (such as impacts to groundwater). Broadly, the CSM seeks to identify and understand:

1. **Site activities and hazards**: sources of pollution that may pose a risk to the environment or human health
2. **Risk pathways**: migration pathways via sources of risk may reach environmental or human receptors
3. **Receptors**: environmental receptors (and their values) and human receptors

Environmental risks can potentially be realised when source-pathway-receptor linkages are complete (i.e. a hazard is generated and has a pathway to interact with a receptor). Without a complete linkage, the risk cannot be realised.

The potential source, pathways and potential impacts on environmental receptors are summarised in Figure 2. *EPA Publication 1287.2 Guidance for environmental and human health risk assessment of wastewater discharges to surface waters* has been used to help develop the CSM for Lagoon WRPs. This model has informed each site-based risk assessment provided in Appendix A.

Source →	Pathway →	Receptor
Sewerage system	Sewer Spills	Surface water
	Leaks	Groundwater
		Land
		Odour
Collection and treatment	Energy consumption	Climate
	Air emissions (CO2, H2S, CH4)	Air - odour
	Chemicals	Land
	Transport	Surface water
	Spills	Noise
Waste Management	Storage	Land
	Transport	Odour
Lagoon Management	Storage	Surface water
	Operating levels	Groundwater
	Recycle Water reuse	Odour
Wet weather discharges	Effluent discharge	Surface water
	Water quality	Groundwater
Biosolids	Storage	Land
	Transport	Surface water
	Beneficial reuse	Groundwater
		Odour

Figure 2: Lagoon WRP Conceptual Site Model

5. Risk assessment

5.1 Risk assessment Method

An assessment of the risks identified for each of the main activities associated with the Lagoon WRP operations at each operating licenced premises has been undertaken based on *EPA Publication 1695.1, Assessing and controlling risk: A guide for business*.

A risk assessment was undertaken in order to assess the key environmental and human health risks presented by the treatment and reuse of treated wastewater at each Lagoon WRP. The aim of the risk assessment was to:

1. Identify environmental aspects and impacts related to the treatment and reuse of wastewater
2. Assess the likelihood and consequence of these impacts occurring and then assign a risk rating to each impact (inherent risk)
3. Identify existing controls that may reduce the likelihood and consequence of these impacts, So Far As Reasonably Practicable (SFARP)
4. Assign a risk rating for each impact, considering the existing controls (i.e. the residual risk).

The Site-Specific Environmental Risk Registers (SSERR) can be found on QA Docs – "Site Specific Environmental Risk Registers" or via this link: Environmental Site Specific Risk Registers - WRP

Appendix A provides the high to very high residual risks from the site-based risk assessments undertaken for each Lagoon WRP.

The following tables provide the context for measuring risk on a consistent basis at Coliban Water through the Risk Management Framework in accordance with the Australian Standard ISO31000:2018.

Table 2: Risk Matrix

Level of Risk		Consequence				
		1. Insignificant	*2. Minor*	*3. Moderate*	*4. Major*	*5. Severe*
Likelihood	*5. Almost Certain*	8	17	20	23	25
	4. Likely	7	12	18	22	24
	3. Possible	4	9	13	19	21
	2. Unlikely	2	5	10	15	16
	1. Rare	1	3	6	11	14

Table 3: Description of risk likelihood

Rating	Frequency
Rare	Greater than 20 years
Unlikely	Between 5 to 20 years
Possible	Between 1 to 5 years
Likely	Between 1 to 12 months
Almost	Between 0 to 1 month

Table 4: Description of risk consequences

5. Catastrophic (Corporation will cease to exist in current form)	4. Major (May significantly challenge the business and take a considerable amount of time to recover)	3. Medium (Would challenge the business and require resources and time to recover)	2. Minor (Some impact on the business and dealt with under normal day to day operations).	1. Insignificant (Minimal impact on the business)
Human				
Multiple fatalities in the workplace or community that could have been avoided >2% cases of Gastroenteritis in service area (e.g. Bendigo = 1,800 people)	Single fatality in the community/staff that could have been avoided >0.2% cases of Gastroenteritis in service area (e.g. Bendigo = 180 people)	Incident causing serious harm >0.02% cases of Gastroenteritis in service area (e.g. Bendigo = 18 people)	Incident causing short term harm >0.002% cases of Gastroenteritis in service area (e.g. Bendigo = 2 people)	Incident causing no harm >0.0002% cases of Gastroenteritis in service area (e.g. Bendigo = 1 person)
Level of Service				
Service Delivery • No Water to 100% of any town greater than 2,000 connections, or 20,000 connection total for 48 hours. • No Water / Sewer causing production stoppage to major customer for more than 7 days. (including Hospitals) Business Continuity • Permanent loss of vital data[1] • Core function[2] offline for > 1 week Odour >100 odour complaints over 30 consecutive days from the same potential source	Service Delivery • No Water to 100% of any town greater than 2000 connections or to 20,000 connection total for 24 hours • No Water / Sewer causing production stoppage to a major customer for more than 5 days. (including Hospitals) Business Continuity • Partial (20%) loss of vital data[1] • Core function[2] offline for up to 1 week Odour >100 odour complaints over 5 consecutive days from the same potential source	Service Delivery • No Water to 100% of any town greater than 1000 connections or to 10,000 connection total for 12 hours • No Water / Sewer causing production stoppage to a major customer for more than 3 days. (including Hospitals) Business Continuity • Partial (5%) loss of vital data[1] • Core function[2] offline for up to 1 day Odour >20 odour complaints over 5 consecutive days from the same potential source	Service Delivery • No Water to 100% of any town greater than 500 connections or to 1,000 connection total for 4 hours • No Water / Sewer causing production stoppage to major customer for more than 1 days. (including Hospitals) Business Continuity • Partial (1%) loss of vital data[1] • Core function[2] offline for < 4 hours Odour >10 odour complaints over 3 consecutive days from the same potential source	Service Delivery • No Water to 100% of any town less than 500 connections or 100 connection total for 4 hours. • No Water / Sewer causing production stoppage to a major customer for more than 5 hours. (including Hospitals) Business Continuity • Partial (1%) loss of vital data[1] • Core function[2] offline for < 1 hour Odour > 4 odour complaints over 2 consecutive days from the same potential source

5. Catastrophic (Corporation will cease to exist in current form)	4. Major (May significantly challenge the business and take a considerable amount of time to recover)	3. Medium (Would challenge the business and require resources and time to recover)	2. Minor (Some impact on the business and dealt with under normal day to day operations).	1. Insignificant (Minimal impact on the business)
Environment				
> 10 year recovery to irreversible damage to: • Listed Species[3] • Ecosystems (loss of ecological communities or processes) • Communities (Including heritage) • Land • Ground and surface water	Up to 10 year recovery of damage to: • Listed Species[3] • Ecosystems (death of a population or large numbers of native fauna or flora) • Communities (Including heritage) • Land • Ground and surface water	Up to 5 year recovery of damage to: • Listed Species[3] • Ecosystems (small numbers of varying species of native fauna or flora) • Communities (Including heritage) • Land • Ground and surface water • Generation of scope one Greenhouse Gas emissions	Up to 1 year recovery of damage to: • Listed Species[3] • Ecosystems (single loss of native fauna or flora) • Communities (Including heritage) • Land • Ground and surface water • Generation of scope two Greenhouse Gas emissions	Negligible or promptly reversible damage to: • Listed Species[3] • Ecosystems (non-life threating damage to native fauna or flora) • Communities (Including heritage) • Land • Ground and surface water • Generation of scope two Greenhouse Gas emissions
Financial				
A financial loss/exposure greater than $10m	A financial loss/exposure between $5m and $10m	A financial loss/exposure between $2m and $5m	A financial loss/exposure between $500k and $2m	A financial loss/exposure less than $500k
Reputation				
Significant adverse national publicity, and significant impact to the Minister and Government leading to dismissal of the Board	Significant adverse publicity from public and national/state/local media outlets. Leads to additional financial stakeholder or regulatory impact	Adverse publicity from public and state/local media outlets	Adverse publicity from public and local media	Issue discovered and resolved without adverse publicity
Regulatory / Legal				
Regulatory outcome leading to cancellation of trading licenses. Criminal/Civil charges against Directors and Officers.	Serious regulatory outcome leading to regulatory sanctions and large fines.	Fines or sanction from regulatory body and requires immediate review of mitigation strategies.	Contact with regulators regarding a breach, requiring some action.	An internally reported incident, no external contact required.

6. Environmental performance objectives

Coliban Water's Environmental Objectives and Targets are identified in Strategy 2030, Corporate Plan 21-26, Environment and Sustainability Policy, Strategic Risk 3 – Environmental Performance Risk Report and other relevant business strategies. Objectives and Targets from these strategic documents are approved by Coliban Water's Board and/or Executive Leadership Team.

Additional objectives and targets are adopted on a risk-based approach and consider legal and other requirements, compliance issues, continuous improvement, Significant Environmental Aspects and the Reputations Register.

Objectives and Targets are collated in the Environmental Objectives and Targets Register maintained by the Environmental Systems Coordinator and stored on QA Docs. Table 5 provides the environmental performance objectives for the Lagoon WRPs.

Table 5: Lagoon WRP environmental performance objectives

Environmental aspect	Environmental performance objectives
Surface water	No discharges beyond the site boundary
Groundwater	No groundwater impacts from contaminated surface water.
Odour	No offensive odour beyond the site boundary.
Noise	No noise complaints from the Lagoon WRPs.
Land contamination	Water services that protect and enhance the natural environment
Greenhouse gas emissions	Aim to achieve zero carbon by 2030

7. Operational control procedures roles and responsibilities

Coliban Water has a contract with Service Stream for the operations and maintenance of its water reclamation plants and sewer distribution systems.

Coliban Water and their operations and maintenance contractor Service Stream have a range of operations and procedures that are performed on a regular basis. The Supporting Programs include hygienic working practices and design standards that are recognised within the water industry as good practice and are codified. In this way, the Supporting Programs include elements of good practice that are akin to the Good Manufacturing Practices (GMP) requirements of the food and pharmaceutical industries.

The purpose, scope and procedure for each operational control developed as part of this RMMP are provided in Table 6. Each Standard Operating Procedure documents information on the monitoring of controls, responsibilities and records the control description (CCP and QCPs), monitoring requirements, performance indicators, monitoring locations, failure indicators, failure response, control maintenance, records and responsibility.

Table 6: Lagoon WRPs Control Procedures

Document Reference	Standard Operating Procedure
CW-PL-TBC	Boort WRP Operations Management Plan
CW-PL-TBC	Bridgewater WRP Operations Management Plan
CW-PL-0090	Cohuna WRP Operations Management Plan
CW-PL-TBC	Dunolly WRP Operations Management Plan
	Dunolly Biosolids handling Facility Operational Plan
CW-PL-0076	Elmore WRP Operations Management Plan
	Elmore Biosolids handling Facility Operational Plan
CW-PL-TBC	Gunbower WRP Operations Management Plan
CW-PL-0055	Heathcote WRP Operations Management Plan
CW-PL-TBC	Lockington WRP Operations Management Plan
CW-PL-TBC	Pyramid Hill WRP Operations Management Plan
CW-SF-2515	Laboratory Manual

8. Monitoring program

Monitoring is an integral component of risk management. Coliban Water's wastewater quality monitoring program includes monitoring for water (i.e. influent, effluent, other process streams and groundwater), by products (i.e. biosolids) and soil quality. A range of parameters, which include microbiological, physical and chemical parameters, are monitored.

8.1 Water Quality Monitoring

Water quality monitoring is comprised of three key elements, including discharge to water monitoring, ground water monitoring and irrigation to land monitoring.

The sampling, testing and reporting is undertaken by ALS Environmental Division Water Resources Group (ALS) for Service Stream and Coliban Water. Periodic updating of the Wastewater Quality Monitoring Programs is coordinated by Coliban Water's Senior Water Quality Specialist, together with Service Stream's Manager Water Quality. The review is generally undertaken annually. Coliban Water will review individual monitoring plans as any future works are implemented.

Each water quality parameter tested can be broadly categorised into the following groups:

1. Microbiological parameters: Pathogenic (disease-causing) organisms of concern include bacteria, viruses and protozoa, e.g. *E. coli*, Enteric viruses, cryptosporidium
2. Physical parameters: the physical aspects of water quality tested to determine whether water is polluted or not (e.g. pH, dissolved oxygen, temperature, suspended solids and water table).
3. Chemical parameters: Wastewater contains a wide range of chemicals (organic and inorganic), therefore a certain proportion of those chemicals can be present in the treated water.
4. Cyanobacteria or Blue Green Algae: Blue Green Algae (BGA) or Cyanobacteria blooms could occur in the storage and treatment lagoons. The cyanobacteria blooms can impact the downstream treatment processes or assets. Certain species of cyanobacteria can produce potentially harmful toxins, which could pose health risks to humans and stock.

The Coliban Water **Reclaimed Water Risk Management Plan** is a document which outlines how the water quality, public health and environmental risks within the relevant sewerage systems are defined and then managed consistent with our obligations under the EPA operating licences, applicable planning permits and recycled water guidelines.

ALS report the results of every analysis of a sample according to the details specified in the service agreement contracts with Coliban Water and Service Stream. Generally, the analysis results are reported within one week after the sample is taken.

8.2 Soil Monitoring

Soil monitoring is undertaken to track the impact of recycled water irrigation on the health and productivity of soils in accordance with Environment Improvement Plan (EIP) requirements. Soil analysis is undertaken by ALS and NATA certified laboratories (under review).

8.3 Field Testing

Service Stream operators undertake analysis for some contractual parameters, operational purposes and to check the accuracy of the online analysers. Note that this analysis is not covered under this plan. The results for Coliban Water's and Service Stream's monitoring programs are available from Coliban Water's data warehouse.

8.4 Biosolids Monitoring

Biosolids monitoring is guided by Coliban Water's Regional Environmental Improvement Plan established in accordance with the EPA Guidelines for Environmental Management Biosolids Land Application. Analysis is undertaken by NATA accredited laboratories.

8.5 Dust and Odour Monitoring

The Dust and Odour Monitoring and Inspection Program for Dunolly and Elmore WRPs is outlined in the respective operational plans. The program seeks to proactively monitor dust and odour produced by the sewage sludge handling process and trigger the commencement of the reactive dust and odour mitigation operational plan.

Appendix A provides the site-based monitoring undertaken for each Lagoon WRP.

8.6 Online Monitoring

Coliban Water has reporting programs including Data Warehouse, Power BI and WRP Operational Exceedances daily reporting to monitor and control the operation and performance of mechanical plant, instrumentation, systems and processes. Refer to Table 7.

Table 7: Data Analysis and Interpretation Processes

Assessment	Data Source	Assessment Processes	Document Format
Groundwater Data Analysis	Laboratory Data and Field observations	Trend/statistical analysis, assessment using literature, assessment against the standards and guidelines, judgement and interpretation.	Report
Soil Data analysis	Laboratory Data and Field observations	Trend/statistical analysis, assessment using literature, assessment against the standards and guidelines, judgement and interpretation.	Report
Biological assessment of waterways	Laboratory Data and Field observations	Trend/statistical analysis, assessment using literature, assessment against the standards and guidelines, judgement and interpretation.	Report
Effluent quality assessment for waterway discharge	Laboratory Data	Trend/statistical analysis and assessment against the standards and guidelines.	Spreadsheets and weekly Report via email
Assessment of compliance with EIPs of WRPs (Axedale and Wedderburn)	Laboratory Data, SCADA data, Field observations and other data source (BoM rainfall data)	Trend/statistical analysis, assessment using literature, assessment against the standards and guidelines, judgement and interpretation.	Annual Reports
Treated Water (effluent) Storage analysis	SCADA data and other data source (BoM data and asset information)	Trend/statistical analysis, assessment using literature, assessment against the standards and guidelines and analytical tools.	Spreadsheets and report
Site inspections	Operators (Service Stream)	Dust and odour monitoring inspection	Inspection reports

9. Environmental incident and emergency response

The Coliban Water Emergency Management System is a living and breathing incident management system. It sets the guidelines for Coliban Water's response to incidents, and incorporates a four-phase response to any incident of Prepare, Respond, Recover and Review: **Emergency Management Plan Part 0**

The occurrence of an incident is initially managed by an on-site response. The response to the incident may be escalated depending on the impact of the incident. Service Stream will notify Coliban Water of any non-compliance to approved discharge requirements as soon as practicably possible. Service Stream include emergency discharge performance in their monthly reports. The Assets and Operations team prepare a monitoring program report and environmental risk assessment (ERA) at the completion of an environmental incident (causes, circumstances, response and lessons learnt).

9.1 EPA Notification

Coliban Water is required to immediately notify the EPA of non-compliance to operating licence conditions as per OL_G2 via the EPA Hotline 1300 372 842.

If EPA cannot be notified prior to emergency discharge, notification must be as soon as practicable (with 24 hours) of the emergency discharge occurring.

The Environmental Risk & Performance Manager (in collaboration with the Wastewater Treatment & Reuse Operations Team) will notify EPA

Following notification, The EPA will forward a template Notification Incident Form. The Environmental Risk & Performance Manager will complete the form and submit to EPA within 3 days of receipt of template. As a minimum, these shall include:

- Description of emergency and impacts if discharge is not approved or undertaken
- Identify if emergency is current or provide an estimated date of emergency
- Address of premises to discharge wastewater
- Name of receiving waterway
- Discharge flow rate
- Receiving waterway flow rate
- Discharge water quality
- Receiving waterway quality
- Expected impacts to receiving waterway quality
- Proposed monitoring program (including water sampling and inspections)
- Proposed discharge: receiving water dilution ratio
- Completed actions to minimise risk of emergency
- Summary of investigations into alternative options (e.g. reuse) and why they are not available
- Most current Environmental Risk Assessment (ERA) for discharge to waterway
- Management plan to avoid future emergency discharge
- Stakeholder engagement (GMW, NCCMA, Community)
- Premises plan and receiving waterways map(s)

Documentation relating to the application, approval and management of emergency discharges shall be stored in the Environmental Managements System SharePoint page: Our Environment - Home (sharepoint.com).

10. Training

The Operational Control Procedures outlined in Section 7 provide the capability and register of endorsements to undertake activities relating to the Lagoon WRPs. This ensures that all operators engaged in activities that may give rise to risk of human health and the environment are able to comply with the GED (outlined in Section 3.2).

In addition, all Coliban Water and Service Stream operational staff are trained in emergency response (Section 9) to ensure that they can manage potential incidents and emergencies effectively.

Table 8: Lagoon WRP RMMP training requirements

Training	Staff that require competency	Training lead	Register
SOP/ Operation Management Plans awareness and understanding	Service Stream operational staff Coliban Water Wastewater and Reuse Team	Service Stream: O&M Service Delivery Manager	Site office induction procedures
Individual roles and responsibilities in the RMMP	Service Stream operational staff Coliban Water Wastewater and Reuse Team	Coliban Water: Reuse Operations Manager	Document Control

11. Communications and reporting

Incident and emergency protocols should incorporate aspects relating to communication, including:

- the key people, agencies and other businesses that must be notified of the incident or emergency
- detailed notification forms including procedures for internal and external notification.

11.1 Permission Information and Performance Statement

Operating Licence condition OL_G4a outlines the requirement for: Permission Information and Performance Statement (PIPS) in the form determined by the Authority within 2 months of receiving notification in writing from the Authority. The PIPS may be released to the public (in whole or in part).

PIPS Document management

Storage of information relating to permission compliance is stored in the Our Environment SharePoint site: Our Environment - Home (sharepoint.com)

EPA Portal Access is managed by David Sheehan (Principal Specialist Water Quality)

11.2 Lagoon WRPs Contact List

The following table provides the contact details of those with key responsibilities in Lagoon WRP management:

Table 9: Lagoon WRP Operational Contact List (Coliban Water and Service Stream Personnel)

Organisation	Position	Name	Contact Details
Coliban Water	Managing Director	[redacted]	
Coliban Water	Chief Officer- Assets and Operations		
Coliban Water	General Manager Operations - Asset Management		
Coliban Water	Manager Wastewater Treatment & Reuse		
Coliban Water	Wastewater Reuse Coordinator		
Coliban Water	Biosolids Reuse Coordinator		
Coliban Water	Wastewater Treatment Manager		
Coliban Water	Principal Specialist – Water Quality **EPA Portal Access**		
Coliban Water	Manager Land, Water & Environment		
Coliban Water	Environmental Risk & Performance Manager Water Regulations		
Coliban Water	Incident Manager		
Service Stream	O&M Service Delivery Manager		
Service Stream	Asset Performance Manager	[redacted]	
Service Stream	Treatment Plant Performance Manager		
Service Stream	Water Quality Manager		
Service Stream	Senior Treatment Operator - Central		
Service Stream	Senior Treatment Operator - North		

Organisation	Position	Name	Contact Details
Service Stream	Senior Treatment Operator - South	[redacted]	
Service Stream	Treatment Operator - South		
Service Stream	Treatment Operator - Central		

12. Review

This RMMP will be updated and maintained to ensure it is a true and accurate record of the risk management and monitoring plan for the Lagoon WRPs. The initial review is scheduled to commence in April 2026 and once finalised a review will be undertaken at two yearly intervals. The RMMP will also be reviewed in the event of any amendment to or breach of EPA Licence conditions or occurrence of high consequence events.

A scheduled review of the environmental risk assessment and monitoring plan will be undertaken every two years or following any significant change to the treatment plant that may affect environmental risk. This review should include a re-evaluation of the risk scores, using previous noncompliance, high consequence events and monitoring data to inform the assessment of likelihood and consequences. The review should also consider the suitability and effectiveness of risk control measures and consider additional strategic planning for improved risk management

Table 10: RMMP Actions

#	Recommendation	Due date	Responsibility
1	Review monitoring results, records of incidents, audit results, maintenance records, correspondence and data management	Ongoing (compliance) and formally every three years	Water, Land and Environment and Wastewater Teams
2	RMMP review – however review will be undertaken earlier if compliance, risks or upgrades are occurring at the Lagoon WRPs. *Review Site Specific Risk Assessment – workshop and update RMMP*	Three yearly – next review scheduled for April 2026	Water, Land and Environment and Wastewater Teams
3	Class B and C Health and Environment Plan Development - Recycled Water Schemes: User Site Management Plans (USMPs) to replace Environment Improvement Plan Framework	Ongoing to statutory timeframe due date of 30 June 2026	Water, Land and Environment and Wastewater Teams
4	Transition Axedale WRP and Wedderburn WRP to A03 Operating Licences with RMMP developed for these sites	Mid to late 2024	Water, Land and Environment and Wastewater Teams
5	EPA update and release new publications relating to RMMPs. Future review of this RMMP should also consider the additional guidance provided by such publications.	Ongoing	Water, Land and Environment and Wastewater Teams

Appendix A: Lagoon WRP site specific RMMP components

A1: Boort WRP

The Boort WRP was commissioned in July 2003 and located approximately 3 km north of the Boort township on the Boort/Kerang Rd. The Boort WRP and land reuse system has been designed to treat domestic wastewater from the township of Boort with land irrigation of the treated effluent during summer, and storage over winter months. It consists of four clay-lined lagoons:

Total storage volume of the system is 43.2 ML. All storages have rock embankments for erosion control and cover a total area of 4 ha. Nineteen hectares of the site has been developed with a flood irrigation system. The reuse system will be operated by means of a manual pump and irrigation bays throughout the irrigation area.

Table A1_1: Boort WRP treatment process and setting

Capacity	161 kL/day	59 ML/year
Process	Two facultative lagoons (total volume 10ML)	
	One maturation lagoon (4.9 ML volume)	
	One winter storage lagoon (28.3 ML)	
Treated Water Quality	Class C recycled water is produced from the lagoons	
Water Reuse	Water is reused on adjacent land – flood irrigation (total reuse volume available 36 ML/year). Use of Class C recycled water at the Boort WRP is restricted to grazing for cattle and sheep.	
Biosolids	Treatment lagoons scheduled for desludging in November 2023 and is ongoing (desludging is approximately every 10 years)	
Sensitive receptors	Two regionally significant wetlands: Lake Lyndger Wildlife Reserve (2.5 km south) and Lake Boort Wildlife Reserve (4 Km south) Closest residential property is approximately 2.5 km south of the WRP	
Hydrogeology	Shepparton Formation Aquifer Watertable salinity 7000- 16000 mg/L TDS (Segment D) Depth to watertable – approx. 2-4 metres	
Odour control	Sludge removal program	
Cultural Heritage	Boort is a local Aboriginal word meaning "Smoke from the hill". The Boort WRP is located on Dja Dja Wurrung Country	
Responsible parties	**Site Operator:** Coliban Water is ultimately responsible for all activities at the site. It owns the land on which the treatment facility, winter storage and reuse scheme are situated. Under the O&M contract Service Stream provide these services. **Agricultural Licensee:** manages all grazing, cropping and sustainable management of land	

Boort WRP Site Specific Risk analysis

A site-specific risk assessment was completed for the Boort WRP in December 2021 and update in January 2023 with Coliban Water staff form the Water, Land and Environment and Wastewater teams and Service Stream O&M staff.

Table A1_2 below provides a summary of the highest environmental risks for the Boort WRP, those being the High, Very High and Extreme (H-VH-E) residual risks. The Boort WRP has two high residual risks.

Table A1_2: Summary of Boort WRP high to extreme residual risks

Risk ID	Component	Hazardous event (what could go wrong)	Risk description		Residual risk
			Hazard (the why/how or causative factor)	Outcome (what could eventuate)	Risk score
2021_BoWRP_034	Irrigation bays	Harbouring pest plants	Potential for weed growth around run-off capture dam	Noncompliance to land management obligations regarding control of prohibited weeds	HIGH
2021_BoWRP_036	Irrigation bays	Nutrient retainment	Stock grazing retaining nutrients on irrigation land	Nutrient saturation of soils	HIGH

The WRP wastewater quality surveillance monitoring program that monitors the operational control plans and compliance with the EPA licence conditions (refer to Table A1_3). The water quality sampling routine and testing are completed for Boort WRP as per internal quality standard CW-SF-2515 Laboratory Manual. Sampling sites are illustrated in Figure A1_1 and A1_2.

Table A1_3 Boort WRP Surveillance Monitoring Program

Boort WRP			Exceedance Report		Surveillance Monitoring	Treatment Unit
Discharge Method	Parameter	Regulatory Limit	Operational Limit	Regulatory Limit		
Winter storage lagoon – recycled water compliance point	pH	6-9	6-9	-	Twice Quarterly	Lagoons
	BOD (mg/L)	20	19	-	Twice Quarterly	Lagoons
	BOD - Filtered (mg/L)	20	19	-	Nil	Lagoons
	COD (mg/L)	-	-	-	Monthly	Lagoons
	TSS (mg/L)	30	29	-	Twice Quarterly[4]	Lagoons
	E.coli (Orgs/100mL)	1,000	1,000	4,000	Quarterly	Lagoons
	TDS (mg/L), Tot N (mg/L), TKN (mg/L), NO_3 (mg/L), Ammonia (mg/L), Tot P (mg/L), Cations (mg/L), Chloride (mg/L), SAR, BGA - Count				Monthy/Quarterly/ Bi-annual	Nil
	BGA - Biovolume	-	10	-	Twice Annually between November and February	Nil
Receiving Soil	Parameters tested: pH (Water), pH ($CaCl_2$), EC (dS/cm), Chloride (mg/kg), Tot N (mg/kg), TKN (mg/kg), Amm N (mg/kg), Nitrate (mg/kg), Tot P (mg/kg), Tot K (mg/kg), Olsen P (mg/kg), SAR, CEC, Cations	No limits set at this time. Results used to complete assessment in annual soil assessment report in line with EIP.			Annual	-
Groundwater - Plant	Parameters tested: pH (Water), BOD (mg/L), EC (µS/cm), Tot N (mg/L), NO_3 (mg/L), Tot P (mg/L), Chloride (mg/L), E.coli (Orgs/100mL), Water level (m)	No limits set at this time. Results used by Water Quality Performance Team to assess any marked change in groundwater quality indicating contamination.			Quarterly	-

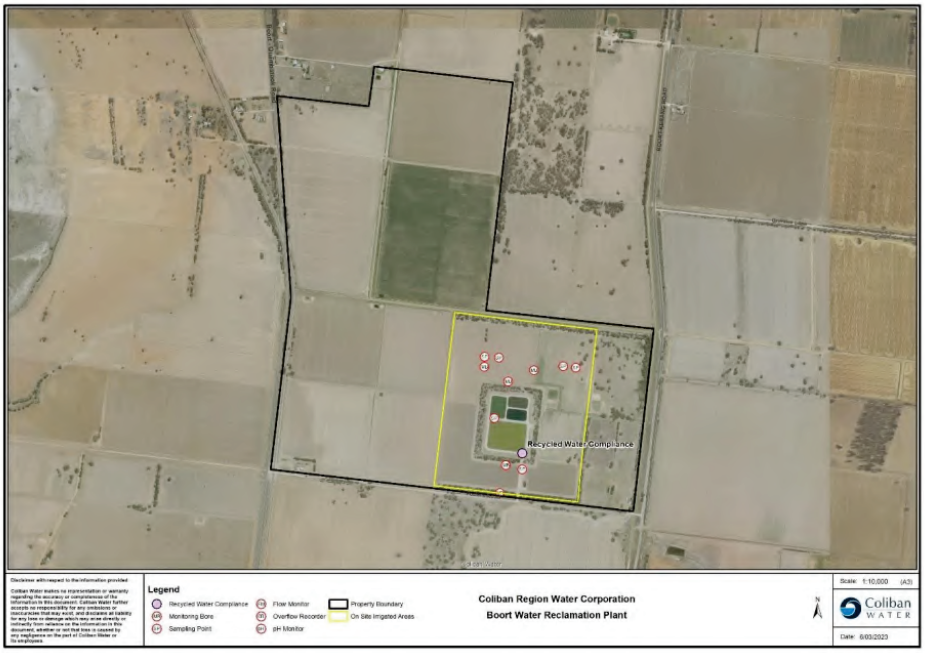
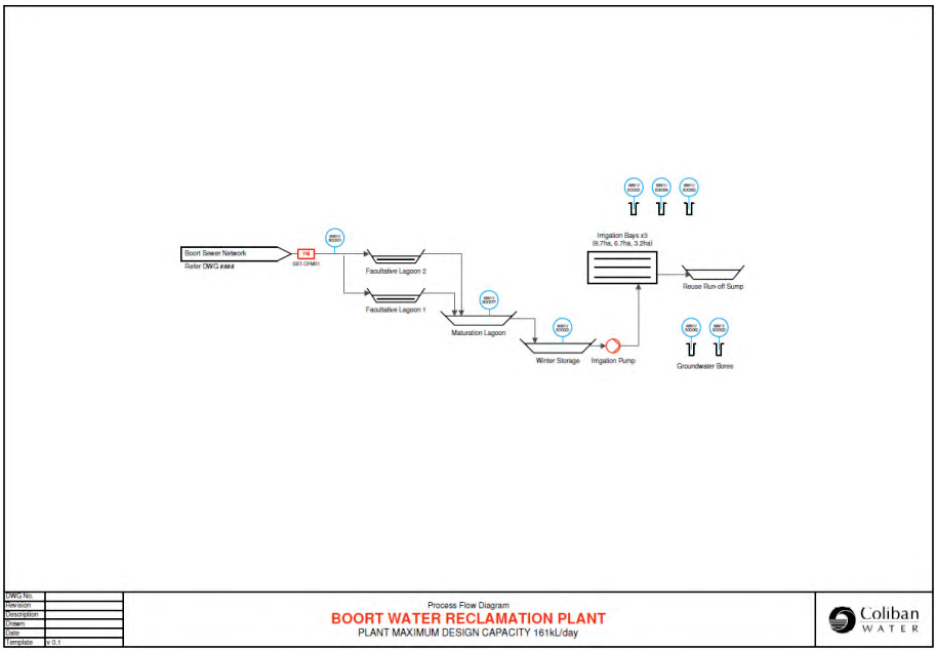


Figure A1_1: Boort WRP sampling locations

Figure A1_2: Boort WRP Process Flow Diagram



A2: Bridgewater WRP

The Bridgewater WRP is located 2 km northwest of Bridgewater and consists of two earthen lined lagoons, 4.2 ha in total, placed in series to treat Bridgewater and Inglewood's incoming wastewater. The first lagoon is facultative and holds approximately 40 ML converting the majority of the incoming organic load. The second storage is a combined maturation/winter storage and has a capacity of approximately 80 ML.

The plant is a simple lagoon system converting the bulk of the organic material in the microbial sludge layering at the bottom of the primary lagoon. Treated water is disposed of through evaporation or discharged onto the surrounding onsite farmland.

Table A2_1: Bridgewater WRP treatment process and setting

Capacity	0.2 ML/day	45-70 ML/year
Process	One facultative lagoon (total volume 40ML)	
	One maturation lagoon/winter storage (80 ML volume)	
Treated Water Quality	The plant is an evaporative system, producing no discharge	
Water Reuse	There is no reuse as treated sewerage is both evaporated from the lagoon system and seeps into the groundwater system	
Biosolids	Treatment lagoons are considered unlikely to require desludging in the program window (2018-2027)	
Sensitive receptors	Bullabull Creek, Loddon River Closest residential property is approximately 600 meters north east of the WRP	
Hydrogeology	Shepparton Formation Aquifer Watertable salinity 2900 – 10,000 mg/L TDS (Segment C) Depth to watertable – approx. 5.5 to 8.2 metres	
Odour control	Aerator on treatment lagoon. Sludge removal program – not a high priority	
Cultural Heritage	Bridgewater WRP is located on Dja Dja Wurrung Country	
Responsible parties	**Site Operator:** Coliban Water is ultimately responsible for all activities at the site. It owns the land on which the treatment facility and winter storage are situated. Under the O&M contract Service Stream provide these services.	

Bridgewater WRP Site Specific Risk analysis

A site-specific risk assessment was completed for the Bridgewater WRP in January 2022 and subsequent review in January 2023 with Coliban Water staff form the Water, Land and Environment and Wastewater teams and Service Stream O&M staff.

Table A2_2 below provides a summary of the highest environmental risks for the Bridgewater WRP, those being the High, Very High and Extreme (H-VH-E) residual risks. The Bridgewater WRP has two high residual risks.

Table A2_2: Summary of Bridgewater WRP high to extreme residual risks

Risk ID	Component	Hazardous event (what could go wrong)	Risk description		Residual risk
			Hazard (the why/how or causative factor)	Outcome (what could eventuate)	Risk score
2021_BrWRP_005	Influent	Uncontained waste	Inflow pit uncontained rag and	Uncontained movement of general rubbish, potentially off site.	HIGH

Risk ID	Component	Hazardous event (what could go wrong)	Risk description		Residual risk
			Hazard (the why/how or causative factor)	Outcome (what could eventuate)	Risk score
			general rubbish	Breach EPA Licence requirement - manage waste in accordance with Licence requirements	
2021_BrWRP_031	Irrigation bays	Harbouring pest plants	Potential for weed growth around run-off capture dam	Noncompliance to land management obligations regarding control of prohibited weeds	HIGH

The WRP wastewater quality surveillance monitoring program that monitors the operational control plans and compliance with the EPA licence conditions (refer to Table A2_3). The water quality sampling routine and testing are completed for Bridgewater WRP as per internal quality standard CW-SF-2515 Laboratory Manual. Sampling sites are illustrated in Figure A2_1 and A2_2.

Table A2_3 Bridgewater WRP Surveillance Monitoring Program

Bridgewater WRP			Exceedance Report		Surveillance Monitoring	Treatment Unit
Discharge Method	Parameter	Regulatory Limit	Operational Limit	Regulatory Limit		
Winter storage lagoon – recycled water compliance point	pH	6-9	6-9	-	Twice Quarterly	Facultative Lagoon
	BOD (mg/L)	20	19	-	Twice Quarterly	Facultative Lagoon
	BOD - Filtered (mg/L)	20	19	-	Nil	Facultative Lagoon
	COD (mg/L)[1]	-	-	-	Monthly	Facultative Lagoon
	TSS (mg/L)	30	29	-	Twice Quarterly	Facultative Lagoon
	E.coli (Orgs/100mL)	1,000	1,000	4,000	Quarterly	Facultative Lagoon
	TDS (mg/L), Tot N (mg/L), TKN (mg/L), NO_3 (mg/L), Ammonia (mg/L), Tot P (mg/L), Cations (mg/L), Chloride (mg/L), SAR, BGA - Count				Monthy/Quarterly/ Bi-annual	Nil
	BGA - Biovolume	-	10	-	Twice Annually between November and February	Nil
Groundwater - Plant	Parameters tested: pH (Water), BOD (mg/L), EC (µS/cm), Tot N (mg/L), NO_3 (mg/L), Tot P (mg/L), Chloride (mg/L), E.coli (Orgs/100mL), Water level (m)	No limits set at this time. Results used by Water Quality Performance Team to assess any marked change in groundwater quality indicating contamination.			Quarterly	-

Figure A2_1: Bridgewater WRP sampling locations

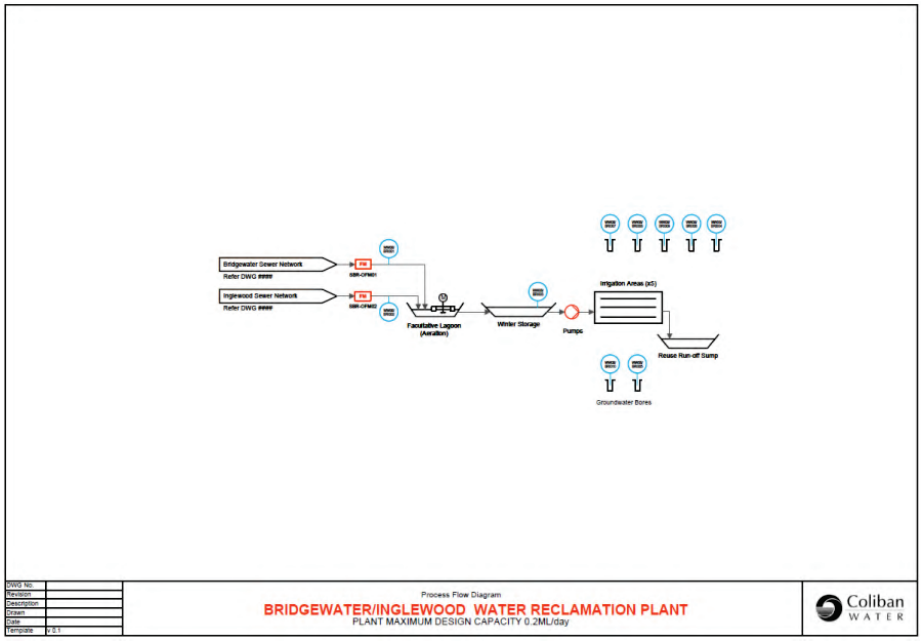


Figure A2_2: Bridgewater WRP Process Flow Diagram

A3: Cohuna WRP

Influent into the treatment plant is predominantly domestic sewage with some minor trade wastes and supernatant and alum sludge from the Cohuna Water Treatment Plant. The evaporative process is structured such that the four lagoons are in series:

1. Two Facultative Lagoons
2. One Maturation Lagoon (currently bypassed)
3. One Winter Storage Lagoon

The facultative lagoons break down the majority of the incoming organic load. Algal populations utilise nutrients and produce dissolved oxygen aiding in the conversion of organic material. If required any disposal of treated inorganic and organic solid matter is to land, within the premises. The final lagoon is designed to act as wet weather storage during Winter and an evaporative pond during Summer. This lagoon enables the plant to cater for peak flows.

Table A3_1: Cohuna WRP treatment process and setting

Capacity	0.5 ML/day	183 ML/year
Process	Two Facultative Lagoons	
	One Maturation Lagoon (offline since 2016 via bypass channel)	
	One Winter Storage Lagoon	
Treated Water Quality	The plant is an evaporative system, producing no discharge	
Water Reuse	There is no reuse as treated sewerage is both evaporated from the lagoon system and seeps into the groundwater system	
Biosolids	Biosolids are currently deposited and stored in the base of the facultative lagoon where anaerobic digestion and consolidation of solids occurs over time (quality C2 T3)	
	Groundwater monitoring undertaken at the site is also used an indicator for leaching or movement of biosolids material/nutrients from the stockpiled material	
Sensitive receptors	Barr Creek (300 m), Gunbower Bushland Reserve (4km) and Murray River Reserve (4km) (all East) Closest residential property is approximately 600 meters southeast of the WRP	
Hydrogeology	Shepparton Formation Aquifer Watertable salinity 5000 – 36,000 mg/L TDS (Segment D) Depth to watertable – approx. 0.5 to 2.5 metres	
Odour control	Odour is a significant risk for the biosolids and pre-treatment of the sludge in-situ is undertaken prior to desludging to manage this odour risk.	
Cultural Heritage	Cohuna WRP is located on Yorta Yorta Country	
Responsible parties	**Site Operator:** Coliban Water is ultimately responsible for all activities at the site. It owns the land on which the treatment facility and winter storage are situated. Under the O&M contract Service Stream provide these services.	

Cohuna WRP Site Specific Risk analysis

A site-specific risk assessment was completed for the Cohuna WRP in May 2021 and subsequent review in January 2023 with Coliban Water staff form the Water, Land and Environment and Wastewater teams and Service Stream O&M staff.

Table A3_2 below provides a summary of the highest environmental risks for the Bridgewater WRP, those being the High, Very High and Extreme (H-VH-E) residual risks. The Cohuna WRP has two very high and one high residual risks.

Table A3_2: Summary of Cohuna WRP high to extreme residual risks

Risk ID	Component	Hazardous event (what could go wrong)	Risk description		Residual risk
			Hazard (the why/how or causative factor)	Outcome (what could eventuate)	Risk score
2021_CoWRP_023	Winter Storage	Permeability of clay liner exceeds 1 x 10^{-9} regulation	Deterioration of clay liner	Contamination or mounding of localised groundwater	VERY HIGH
2021_CoWRP_024	Winter Storage	Permeability of clay liner exceeds 1 x 10^{-9} regulation	Damage to clay during desludging	Contamination or mounding of localised groundwater	VERY HIGH
2021_CoWRP_034	Site	Harbouring pest plant and animals	Dry or shallow lagoon beds supporting vegetation growth	Potential for prohibited weed growth and harbouring pest animals	HIGH

The WRP wastewater quality surveillance monitoring program that monitors the operational control plans and compliance with the EPA licence conditions (refer to Table A3_3). The water quality sampling routine and testing are completed for Cohuna WRP as per internal quality standard CW-SF-2515 Laboratory Manual. Sampling sites are illustrated in Figure A3_1 and A3_2.

Table A3_3 Cohuna WRP Surveillance Monitoring Program

Cohuna WRP			Exceedance Report		Surveillance Monitoring	Treatment Unit
Discharge Method	Parameter	Regulatory Limit	Operational Limit	Regulatory Limit		
Groundwater - Plant	Parameters tested: pH (Water), BOD (mg/L), EC (µS/cm), Tot N (mg/L), NO_3 (mg/L), Tot P (mg/L), Chloride (mg/L), E.coli (Orgs/100mL), Water level (m)	No limits set at this time. Results used by Water Quality Performance Team to assess any marked change in groundwater quality indicating contamination.			Quarterly	-

Figure A3_1: Cohuna WRP sampling locations

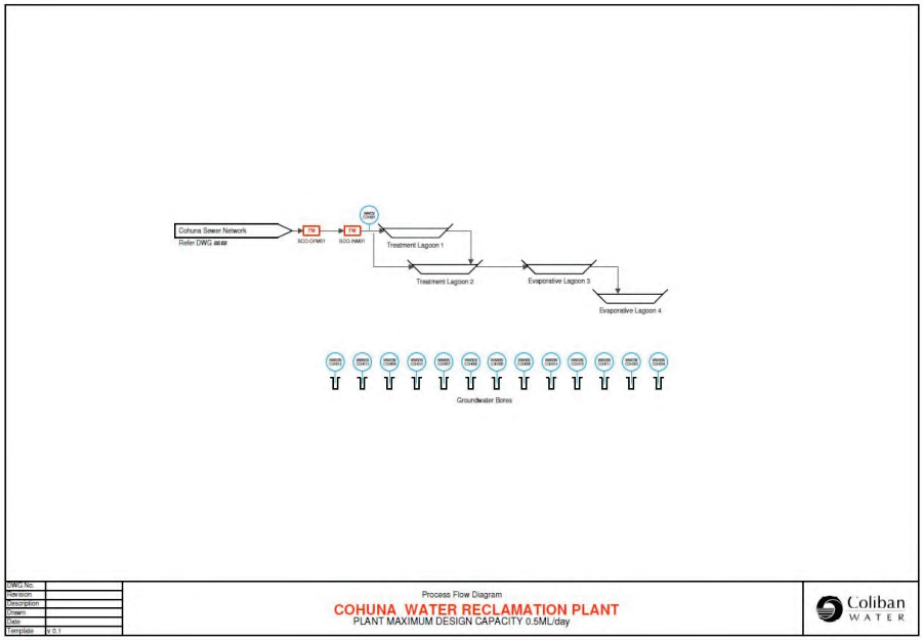


Figure A3_2: Cohuna WRP Process Flow Diagram

A4: Dunolly WRP

The Dunolly WRP is situated approximately 2km south of the Dunolly township. The plant was commissioned in 2005 and consists of two facultative lagoon and one winter storage. The plant was designed to reuse the effluent for irrigation and consist of 10ha flood irrigation area, with the potential to implement an extra 10ha with future development.

EPA Development Licence Application (EXM000300122)

The Dunolly Biosolids Handling Facility (DBHF) has been constructed in 2023 to store sewage sludge generated at Coliban Water WRP operations. The processing of sewage sludge at the DBHF at the Dunolly WRP includes the following key operational activities:

- Delivery of sewage sludge to the tipping point (sludge added to the glacier)
- Lay down of sewage sludge into windrows
- Turning windrows (during favourable weather conditions) on 3-4 occasions, or until the sludge is dry
- Sewage sludge sampling for dust and odour management, and verification that ensures the sludge meets EPA Publication 943's definition of biosolids
- Stockpiling of biosolids ready to supply for reuse

The addition of permission activity **A01 (Reportable Priority Waste Management)** is near completion as of 31 October 2023 and has been added to the RMMP Risk assessment. Refer to the *Dunolly Biosolids Handling Facility Operational Plan* for further information. Figure A4_1 below illustrates the key areas where the abovementioned activities will occur.

Figure A4_1: Dunolly WRP DBHE site layout

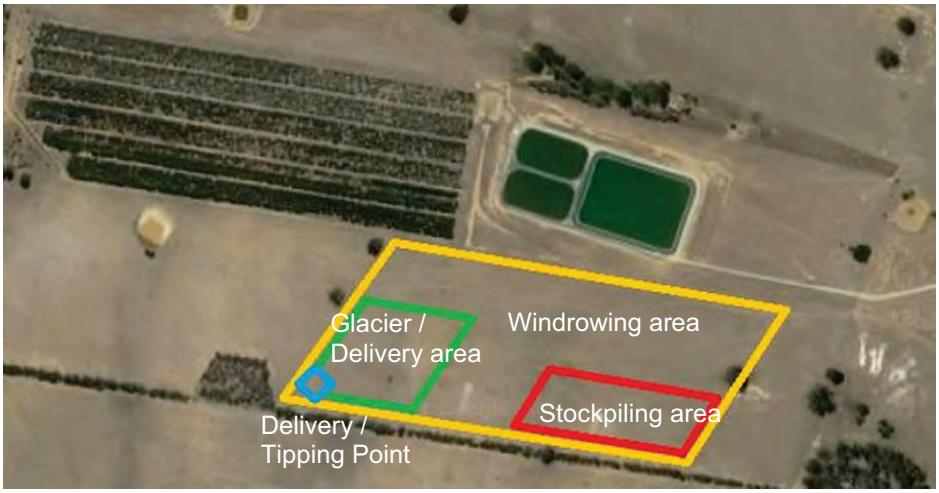


Table A4_1: Dunolly WRP treatment process and setting

Capacity	138 kL/day	50 ML/year
Process	Two facultative lagoons (total volume 8ML)	
	One winter storage lagoon (33.5 ML)	
Treated Water Quality	Class C recycled water is produced from the lagoons	
Water Reuse	The irrigation area is laid out for flood irrigation, with six bays approximately 1.6-1.7ha in area with River Red Gum, Yellow Gum and Flat Topped Yate	
Biosolids	Storage of up to 30,000 tonnes as a combination of K400-H and K400-NH at the activity site at any time. Samples collected from Coliban Water's WRPs and the DBHF will be used to verify the treatment grade and biosolids contamination grade (concentration) of the	

	biosolids once stockpiled. The samples will be tested for percentage of volatile solids, pathogens and biosolids contamination concentration, in accordance with EPA Publication 943
Sensitive receptors	Burnt Creek (southeast of the site) Closest residential property is approximately 514 metres east of the WRP
Hydrogeology	Ordovician Bedrock Aquifer Watertable salinity 6400- 17000 mg/L TDS (Segment D) Depth to watertable – approx. 11-18 metres
Odour control	The DBHF Dust and Odour Monitoring and Inspection Program
Cultural Heritage	The Dunolly WRP is located on Dja Dja Wurrung Country
Responsible parties	**Site Operator:** Coliban Water is ultimately responsible for all activities at the site. It owns the land on which the treatment facility, winter storage and reuse scheme are situated. Under the O&M contract Service Stream provide these services. **Agricultural Licensee:** manages all grazing sustainable management of land

Dunolly WRP Site Specific Risk analysis

A site-specific risk assessment was completed for the Dunolly WRP in November 2021 and update in October 2023 with Coliban Water staff form the Water, Land and Environment and Wastewater teams and Service Stream O&M staff.

Table A4_2 below provides a summary of the highest environmental risks for the Dunolly WRP, those being the High, Very High and Extreme (H-VH-E) residual risks. The Dunolly WRP has four high residual risks.

Table A4_2: Summary of Dunolly WRP high to extreme residual risks

Risk ID	Component	Hazardous event (what could go wrong)	Risk description		Residual risk
			Hazard (the why/how or causative factor)	Outcome (what could eventuate)	Risk score
2021_DWRP_005	Influent	Uncontained waste	Inflow pit uncontained rag and general rubbish	Uncontained movement of general rubbish, potentially off site. Breach EPA Licence requirement LI_G1 - manage waste in accordance with Licence requirements	HIGH
2021_DWRP_030	Irrigation bays	Harbouring pest plants	Significant weed growth observed on site	noncompliance to land management obligations regarding control of prohibited weeds	HIGH
2021_DWRP_032	Irrigation bays	Carbon sequestra-tion	Mismanagement of tree plantation	Opportunity loss, threat to strategic objectives and targets	HIGH
2021_DWRP_033	Irrigation bays	Sustainable timber plantation	Mismanagement of tree plantation	Opportunity loss, threat to strategic objectives and targets	HIGH

The WRP wastewater quality surveillance monitoring program that monitors the operational control plans and compliance with the EPA licence conditions (refer to Table A4_3). The water quality sampling routine and testing are completed for Dunolly WRP as per internal quality standard CW-SF-2515 Laboratory Manual. Sampling sites are illustrated in Figure A4_2 and A4_3.

Table A4_3 Dunolly WRP Surveillance Monitoring Program

Dunolly WRP			Exceedance Report		Surveillance Monitoring	Treatment Unit
Discharge Method	Parameter	Regulatory Limit	Operational Limit	Regulatory Limit		
Winter storage lagoon – recycled water compliance point	pH	6-9	6-9	-	Twice Quarterly	Lagoons
	BOD (mg/L)	20	19	-	Twice Quarterly	Lagoons
	BOD - Filtered (mg/L)	20	19	-	Nil	Lagoons
	COD (mg/L)	-	-	-	Monthly	Lagoons
	TSS (mg/L)	30	29	-	Twice Quarterly	Lagoons
	E.coli (Orgs/100mL)	1,000[2]	1,000	4,000	Quarterly	Lagoons
	TDS (mg/L), Tot N (mg/L), TKN (mg/L), NO_3 (mg/L), Ammonia (mg/L), Tot P (mg/L), Cations (mg/L), Chloride (mg/L), SAR, BGA - Count				Monthy/Quarterly/ Bi-annual	Nil
	BGA - Biovolume	-	10	-	Twice Annually between November and February	Nil
Receiving Soil	Parameters tested: pH (Water), pH ($CaCl_2$), EC (dS/cm), Chloride (mg/kg), Tot N (mg/kg), TKN (mg/kg), Amm N (mg/kg), Nitrate (mg/kg), Tot P (mg/kg), Tot K (mg/kg), Olsen P (mg/kg), SAR, CEC, Cations	No limits set at this time. Results used to complete assessment in annual soil assessment report in line with EIP.			Annual	-
Groundwater - Plant	Parameters tested: pH (Water), BOD (mg/L), EC (µS/cm), Tot N (mg/L), NO_3 (mg/L), Tot P (mg/L), Chloride (mg/L), E.coli (Orgs/100mL), Water level (m)	No limits set at this time. Results used by Water Quality Performance Team to assess any marked change in groundwater quality indicating contamination.			Quarterly	-
Dust and Odour	Wind direction and speed, temp, rainfall Dust and Odour Observation Points (8)	Any odour of Subtle of Obvious, i.e., S or O, at Dunolly WRP site boundary OPs (or location of complaint site) during the inspection.			Reactive Weekly (during drying season) Monthly (outside drying season)	-

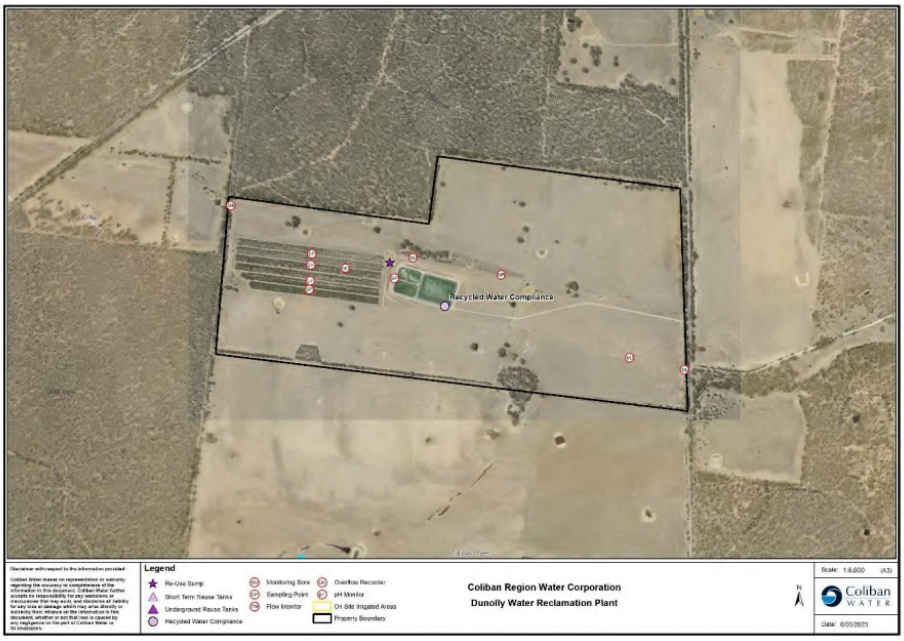


Figure A4_2: Dunolly WRP sampling locations

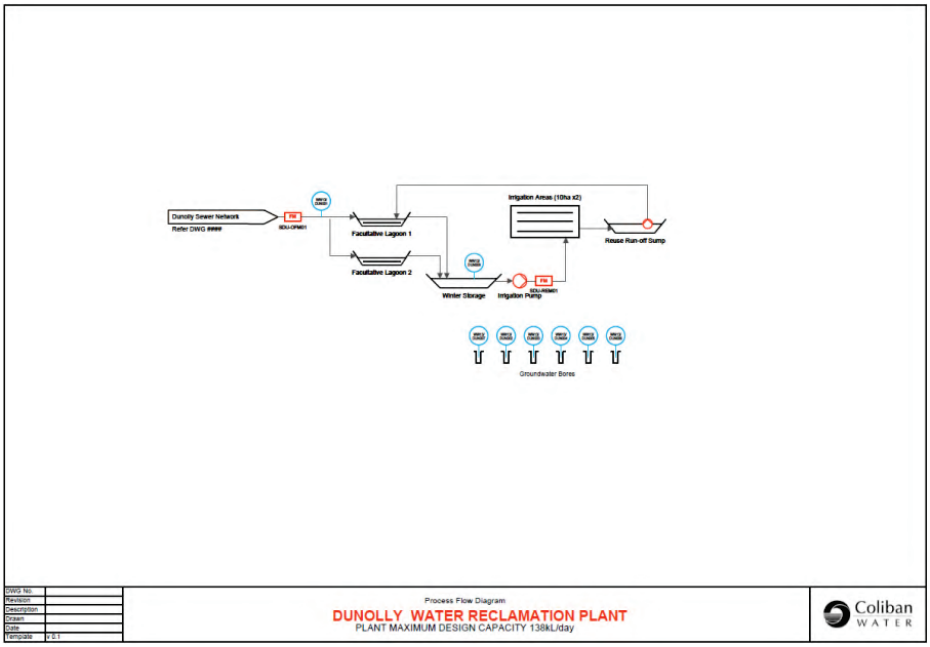


Figure A4_2: Dunolly WRP Process Flow Diagram

A5: Elmore WRP

The Elmore WRP consists of two facultative lagoons and one winter storage maturation lagoon. The plant was designed to reuse the effluent for irrigation and consist of 15.4 ha flood irrigation area. Table A5_1 shows the details of existing infrastructures. As per the inflow data from 2011 to 2015 the average inflow to the plant is in the order of 29 ML/year and never exceeded the annual design inflow.

Table A5_1: Elmore WRP treatment process and setting

Capacity	239 kL/day	87 ML/year
Process	Two facultative lagoons (total volume 20ML)	
	One winter storage lagoon (80 ML)	
Treated Water Quality	Class C recycled water is produced from the lagoons	
Water Reuse	Evaporation only, however infrastructure s in place for reuse with 15.4ha available for onsite flood irrigation	
Biosolids	Biosolids are currently deposited and stored in the base of the facultative lagoons where anaerobic digestion and consolidation of solids occurs over time (quality C2 T3)	
Sensitive receptors	Campaspe River (north west) Closest residential property is approximately 1.5 km north of the WRP	
Hydrogeology	Shepparton Formation Aquifer Watertable salinity 7200- 15000 mg/L TDS (Segment C) Depth to watertable – approx.. 2.5 to 4.5 metres	
Odour control	Sludge removal program and odour monitoring program	
Cultural Heritage	The Elmore WRP is located on Dja Dja Wurrung Country	
Responsible parties	**Site Operator:** Coliban Water is ultimately responsible for all activities at the site. It owns the land on which the treatment facility and winter storage are situated. Under the O&M contract Service Stream provide these services.	

Elmore WRP Site Specific Risk analysis

A site-specific risk assessment was completed for the Elmore WRP in May 2021 and review undertaken in January 2023 with Coliban Water staff form the Water, Land and Environment and Wastewater teams and Service Stream O&M staff.

Table A5_2 below provides a summary of the highest environmental risks for the Elmore WRP, those being the High, Very High and Extreme (H-VH-E) residual risks. The Elmore WRP has four high residual risks.

Table A5_2: Summary of Elmore WRP high to extreme residual risks

Risk ID	Component	Hazardous event (what could go wrong)	Risk description		Residual risk
			Hazard (the why/how or causative factor)	Outcome (what could eventuate)	Risk score
2022_ElWRP_05	Influent	Uncontained waste	Inflow pit uncontained rag and general rubbish	Uncontained movement of general rubbish, potentially off site. Breach EPA Licence requirement - manage	HIGH

Risk ID	Component	Hazardous event (what could go wrong)	Risk description		Residual risk
			Hazard (the why/how or causative factor)	Outcome (what could eventuate)	Risk score
				waste in accordance with Licence requirements	
2022_EIWRP_34	Irrigation bays	Harbouring pest plants	Potential for weed growth around run-off capture dam	Noncompliance to land management obligations regarding control of prohibited weeds	HIGH
2022_EIWRP_40	Biosolids Glacier	Native animal exposure	Open and exposed biosolids glacier	Potential harm to native animals exposed by accessing glacier	HIGH
2022_EIWRP_42	General site	General rubbish	Various sources	Litter, poor housekeeping, harbouring pest plant and animals	HIGH

The WRP wastewater quality surveillance monitoring program that monitors the operational control plans and compliance with the EPA licence conditions (refer to Table A5_3). The water quality sampling routine and testing are completed for Elmore WRP as per internal quality standard CW-SF-2515 Laboratory Manual. Sampling sites are illustrated in Figure A5_1 and A5_2.

Table A1_3 Elmore WRP Surveillance Monitoring Program

Elmore WRP			Exceedance Report		Surveillance Monitoring	Treatment Unit
Discharge Method	Parameter	Regulatory Limit	Operational Limit	Regulatory Limit		
Winter storage-recycled water compliance point	pH	6-9	6-9	-	Twice Quarterly	Lagoons
	BOD (mg/L)	20	19	-	Twice Quarterly	Lagoons
	BOD - Filtered (mg/L)	20	19	-	Nil	Lagoons
	COD (mg/L)	-	-	-	Monthly	Lagoons
	TSS (mg/L)	30	29	-	Twice Quarterly	Lagoons
	E.coli (Orgs/100mL)	1,000	1,000	4,000	Quarterly	Lagoons
	TDS (mg/L), Tot N (mg/L), TKN (mg/L), NO_3 (mg/L), Ammonia (mg/L), Tot P (mg/L), Cations (mg/L), Chloride (mg/L), SAR, BGA - Count				Monthy/Quarterly/ Bi-annual	Nil
	BGA - Biovolume	-	10	-	Twice Annually between November and February	Nil
Groundwater - Plant	Parameters tested: pH (Water), BOD (mg/L), EC (µS/cm), Tot N (mg/L), NO_3 (mg/L), Tot P (mg/L), Chloride (mg/L), E.coli (Orgs/100mL), Water level (m)	No limits set at this time. Results used by Water Quality Performance Team to assess any marked change in groundwater quality indicating contamination.			Quarterly	-
Dust and Odour	Wind direction and speed, temp, rainfall Dust and Odour Observation Points (7)	Any odour of Subtle of Obvious, i.e., S or O, at Elmore WRP site boundary OPs (or location of complaint site) during the inspection.			Reactive Weekly (during drying season) Monthly (outside drying season)	-

Figure A5_1: Elmore WRP sampling locations

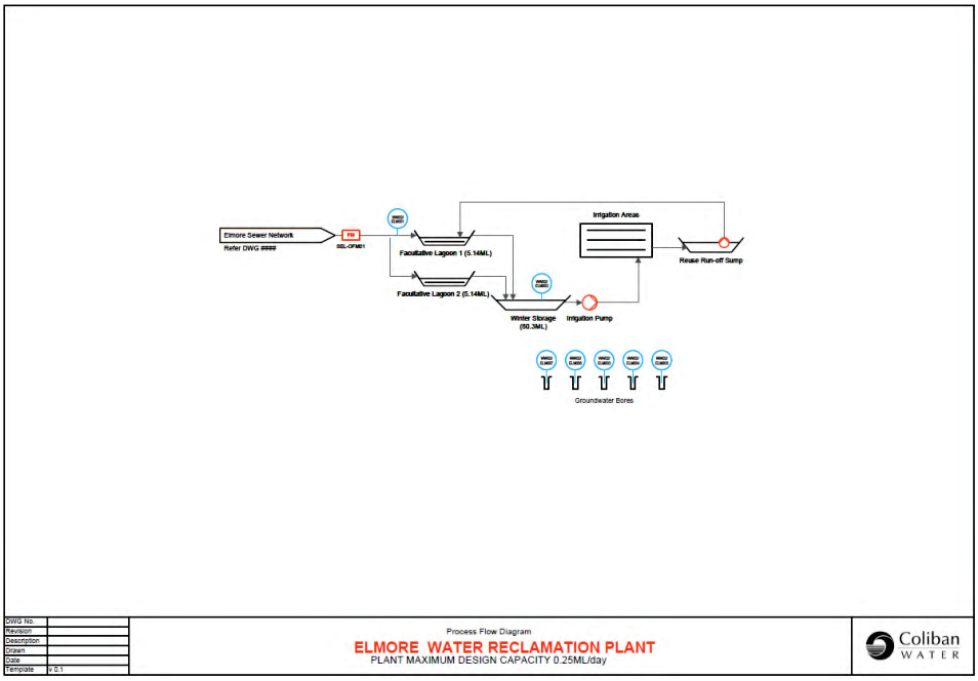


Figure A5_2: Elmore WRP Process Flow Diagram

A6: Gunbower WRP

The Gunbower WRP was commission in 2004 and is located approximately 4 km south of the Gunbower township. The treatment plant receives domestic sewage from both Leitchville and Gunbower. It consists of two facultative lagoons, one maturation lagoon and one winter storage. The plant was designed to reuse the effluent for irrigation and consist of 10.8 ha flood irrigation area. Table A6_1 shows the details of existing infrastructures.

A water balance assessment undertaken by Coliban Water determined that the plant would not be able to contain the inflows under all rainfall and evaporation conditions when the effluent is not reused for irrigation.

Table A6_1: Gunbower WRP treatment process and setting

Capacity	140 kL/day	51 ML/year
Process	Two facultative lagoons (total volume 9.6 ML)	
	One maturation lagoon (5.4 ML volume)	
	One winter storage lagoon (24.3 ML)	
Treated Water Quality	Class C recycled water is produced from the lagoons	
Water Reuse	Onsite irrigations up to 30ML/annum with 39ha of land available. It should be noted that irrigation with reclaimed water only occur occasionally to avoid lagoon overflow.	
Biosolids	Sludge is stored on-site primary (facultative lagoons). No current plans to undertake sludge removal in the lagoons.	
Sensitive receptors	Gow Swamp (renamed by Yorta Yorta, previously known as Know Swamp) Closest residential property is approximately 2.5 km south of the WRP	
Hydrogeology	Shepparton Formation Aquifer Watertable salinity 17000- 32000 mg/L TDS (Segment D) Depth to watertable – approx. 3.5 to 3.8 metres	
Odour control	Sludge removal program	
Cultural Heritage	The Gunbower WRP is located on Yorta Yorta Country	
Responsible parties	**Site Operator:** Coliban Water is ultimately responsible for all activities at the site. It owns the land on which the treatment facility, winter storage and reuse scheme are situated. Under the O&M contract Service Stream provide these services. **Agricultural Licensee:** manages all grazing, cropping and sustainable management of land	

Gunbower WRP Site Specific Risk analysis

A site-specific risk assessment was completed for the Gunbower WRP in May 2021 and review undertaken in January 2023 with Coliban Water staff form the Water, Land and Environment and Wastewater teams and Service Stream O&M staff.

Table A6_2 below provides a summary of the highest environmental risks for the Gunbower WRP, those being the High, Very High and Extreme (H-VH-E) residual risks. The Gunbower WRP has three high residual risks.

Table A6_2: Summary of Gunbower WRP high to extreme residual risks

Risk ID	Component	Hazardous event (what could go wrong)	Risk description		Residual risk
			Hazard (the why/how or causative factor)	Outcome (what could eventuate)	Risk score
2022_GUWRP_05	Influent	Uncontained waste	Inflow pit uncontained rag and general rubbish	Uncontained movement of general rubbish, potentially off site. Breach EPA Licence requirement LI_G1 - manage waste in accordance with Licence requirements	HIGH
2022_GUWRP_36	Irrigation bays	Nutrient retainment	Stock grazing retaining nutrients on irrigation land Irrigation used as discharge rather than sustainable reuse	Nutrient saturation of soils Transportation of nutrients from site	HIGH
2022_GUWRP_40	General site	General rubbish	Various sources	litter, poor housekeeping, harbouring pest plant and animals	HIGH

The WRP wastewater quality surveillance monitoring program that monitors the operational control plans and compliance with the EPA licence conditions (refer to Table A1_3). The water quality sampling routine and testing are completed for Gunbower WRP as per internal quality standard CW-SF-2515 Laboratory Manual. Sampling sites are illustrated in Figure A6_1 and A6_2.

Table A6_3 Gunbower WRP Surveillance Monitoring Program

Gunbower WRP			Exceedance Report		Surveillance Monitoring	Treatment Unit
Discharge Method	Parameter	Regulatory Limit	Operational Limit	Regulatory Limit		
Winter storage lagoon – recycled water compliance point	pH	6-9	6-9	-	Twice Quarterly	Lagoons
	BOD (mg/L)	20	19	-	Twice Quarterly	Lagoons
	BOD - Filtered (mg/L)	20	19	-	Nil	Lagoons
	COD (mg/L)[1]	-	-	-	Monthly	Lagoons
	TSS (mg/L)	30	29	-	Twice Quarterly	Lagoons
	E.coli (Orgs/100mL)	1,000	1,000	4,000	Quarterly	Lagoons
	TDS (mg/L), Tot N (mg/L), TKN (mg/L), NO_3 (mg/L), Ammonia (mg/L), Tot P (mg/L), Cations (mg/L), Chloride (mg/L), SAR, BGA - Count				Monthly /Quarterly/ Bi-annual	Nil
	BGA - Biovolume	-	10	-	Twice Annually between November and February	Nil

Gunbower WRP			Exceedance Report		Surveillance Monitoring	Treatment Unit
Discharge Method	Parameter	Regulatory Limit	Operational Limit	Regulatory Limit		
Receiving Soil	Parameters tested: pH (Water), pH ($CaCl_2$), EC (dS/cm), Chloride (mg/kg), Tot N (mg/kg), TKN (mg/kg), Amm N (mg/kg), Nitrate (mg/kg), Tot P (mg/kg), Tot K (mg/kg), Olsen P (mg/kg), SAR, CEC, Cations	No limits set at this time. Results used to complete assessment in annual soil assessment report in line with EIP.			Annual	-
Groundwater Plant bores	Parameters tested: pH (Water), BOD (mg/L), EC (µS/cm), Tot N (mg/L), NO_3 (mg/L), Tot P (mg/L), Chloride (mg/L), E.coli (Orgs/100mL), Water level (m)	No limits set at this time. Results used by Water Quality Performance Team to assess any marked change in groundwater quality indicating contamination.			Quarterly	-

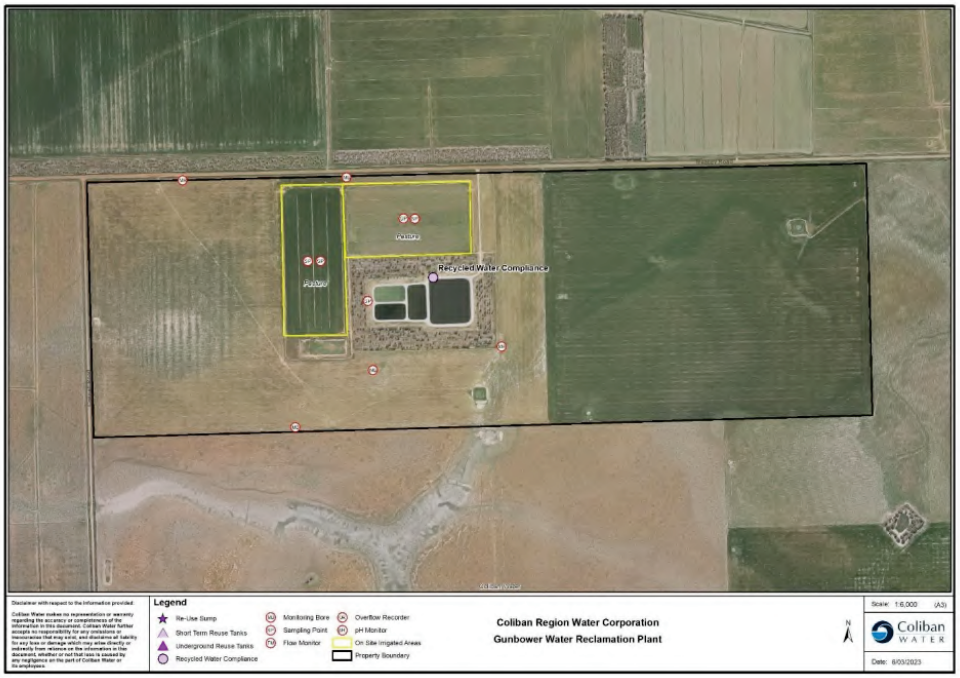


Figure A6_1: Gunbower WRP sampling locations

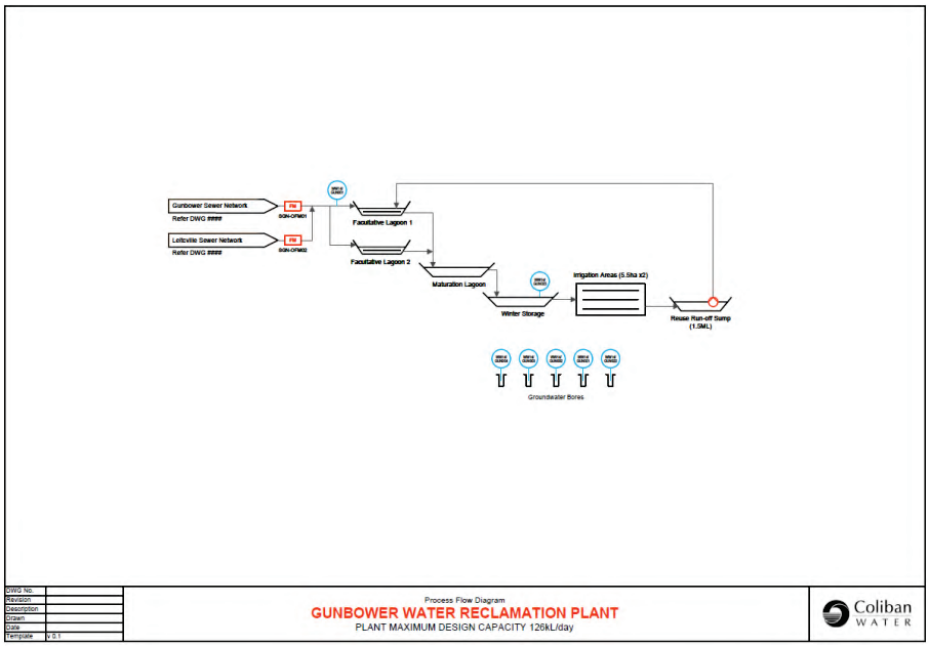


Figure A6_2: Gunbower WRP Process Flow Diagram

A7: Heathcote WRP

The Heathcote WRP is situated two kilometres north of the Heathcote township. It treats domestic waste from Heathcote, minor trade waste volumes from Heathcote and supernatant from the Heathcote Water Treatment Plant. The WPR has one primary lagoon and two facultative lagoons in series (refer to Table A7_1).

Table A7_1: Heathcote WRP treatment process and setting

Capacity	161 kL/day	59 ML/year
Process	One Primary and two facultative lagoons (total volume 30 ML)	
	One winter storage lagoon (120 ML)	
Treated Water Quality	Class C recycled water is produced from the lagoons	
Water Reuse	There is no onsite irrigation. Recycled water is used to irrigate the fairways and greens of Heathcote Golf Club's 18-hole golf course. Covering approximately 30 hectares. The Heathcote Golf Club reclaimed water storage is located to the north of the golf course boundary and receives Class C reclaimed water from Coliban Water's Heathcote WRP situated approximately 2 kilometres to the west.	
Biosolids	Treatment lagoons scheduled for desludging in January 2024	
Sensitive receptors	McIvor Creek (2.5 km east), Lake Eppalock (5.5 km northwest) Closest residential property is approximately 700 metres east of the WRP	
Hydrogeology	Shepparton Formation Aquifer Watertable salinity 7000- 16000 mg/L TDS (Segment D) Depth to watertable – approx.. 2-4 metres	
Odour control	There are two aerators installed on the primary lagoon to reduce organic loadings and odour production. Sludge removal program	
Cultural Heritage	The Heathcote WRP is located on Taungurung Country	
Responsible parties	**Site Operator:** Coliban Water is ultimately responsible for all activities at the site. It owns the land on which the treatment facility, winter storage and reuse scheme are situated. Under the O&M contract Service Stream provide these services. **Golf course Licensee:** manages all recycled water and management of land – Recycled Water User Agreement and EIP	

Heathcote WRP Site Specific Risk analysis

A site-specific risk assessment was completed for the Heathcote WRP in December 2021 and update in January 2023 with Coliban Water staff form the Water, Land and Environment and Wastewater teams and Service Stream O&M staff.

Table A1_2 below provides a summary of the highest environmental risks for the Heathcote WRP, those being the High, Very High and Extreme (H-VH-E) residual risks. The Hethcote WRP has one high residual risk.

Table A7_2: Summary of Heathcote WRP high to extreme residual risks

Risk ID	Component	Hazardous event (what could go wrong)	Risk description		Residual risk
			Hazard (the why/how or causative factor)	Outcome (what could eventuate)	Risk score
2022_HEWRP_39	General site	General rubbish	Various sources	litter, poor housekeeping, harbouring pest plant and animals	**HIGH**

The WRP wastewater quality surveillance monitoring program that monitors the operational control plans and compliance with the EPA licence conditions (refer to Table A7_3). The water quality sampling routine and testing are completed for Heathcote WRP as per internal quality standard CW-SF-2515 Laboratory Manual. Sampling sites are illustrated in Figure A7_1 and A7_2.

Table A7_3 Heathcote WRP Surveillance Monitoring Program

Heathcote WRP			Exceedance Report		Surveillance Monitoring	Treatment Unit
Discharge Method	Parameter	Regulatory Limit	Operational Limit	Regulatory Limit		
Winter storage lagoon – recycled water compliance point	pH	6-9	6-9	-	Twice Quarterly	Lagoons
	BOD (mg/L)	20	19	-	Twice Quarterly[4]	Lagoons
	BOD - Filtered (mg/L)	20	19	-	Nil	Lagoons
	COD (mg/L)	-	-	-	Monthly	Lagoons
	TSS (mg/L)	30	29	-	Twice Quarterly	Lagoons
	E.coli (Orgs/100mL)	1,000	1,000	4,000	Quarterly	Lagoons
	TDS (mg/L), Tot N (mg/L), TKN (mg/L), NO_3 (mg/L), Ammonia (mg/L), Tot P (mg/L), Cations (mg/L), Chloride (mg/L), SAR, BGA - Count				Monthy/Quarterly/ Bi-annual	Nil
	BGA - Biovolume	-	10	-	Twice Annually between November and February	Nil
Receiving Soil	Parameters tested: pH (Water), pH ($CaCl_2$), EC (dS/cm), Chloride (mg/kg), Tot N (mg/kg), TKN (mg/kg), Amm N (mg/kg), Nitrate (mg/kg), Tot P (mg/kg), Tot K (mg/kg), Olsen P (mg/kg), SAR, CEC, Cations	No limits set at this time. Results used to complete assessment in annual soil assessment report in line with EIP.			Annual	-
Groundwater - Plant	Parameters tested: pH (Water), BOD (mg/L), EC (µS/cm), Tot N (mg/L), NO_3 (mg/L), Tot P (mg/L), Chloride (mg/L), E.coli (Orgs/100mL), Water level (m)	No limits set at this time. Results used by Water Quality Performance Team to assess any marked change in groundwater quality indicating contamination.			Quarterly	-

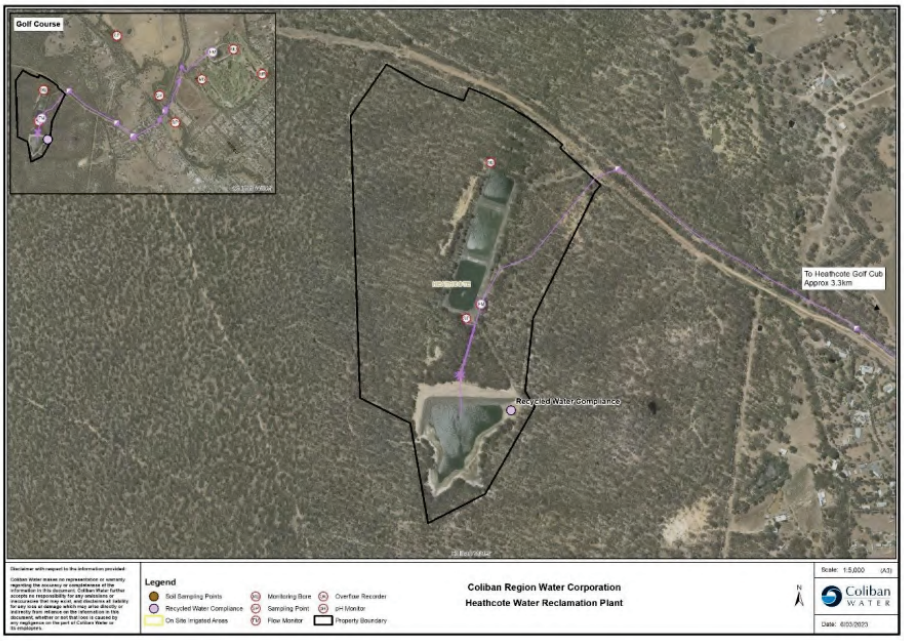


Figure A7_1: Heathcote WRP sampling locations

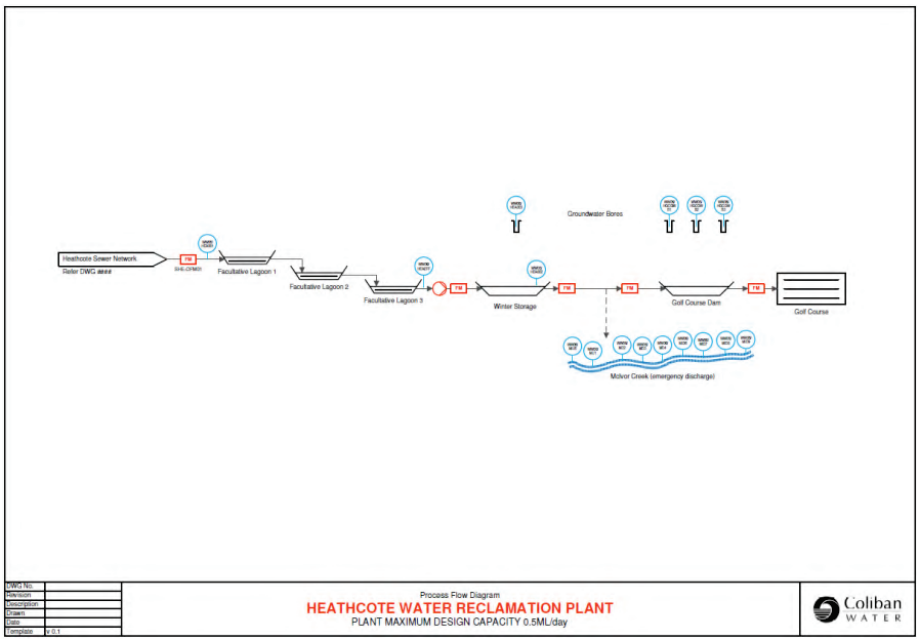


Figure A7_2: Heathcote WRP Process Flow Diagram

A8: Lockington WRP

The Lockington WRP is located approximately two kilometres east of the Lockington township. It treats domestic sewage from Lockington and the immediate surrounds and consists of two facultative lagoons and a winter storage. The plant was designed to reuse the effluent for irrigation and consist of 5.9 ha flood irrigation area. Table A8_1 shows the details of existing infrastructure.

Table A8_1: Lockington WRP treatment process and setting

Capacity	150 kL/day	55 ML/year
Process	Two facultative lagoons (parallel) (total volume 13.8 ML)	
	One winter storage lagoon (28.3 ML)	
Treated Water Quality	Class C recycled water is produced from the lagoons	
Water Reuse	Onsite irrigation is available, however there has been insufficient treated wastewater in the winter storage to commence irrigation.	
Biosolids	Treatment lagoons scheduled for desludging is ongoing (annual surveys)	
Sensitive receptors	Murray River (23 km north) and Campaspe River (17 km east) Closest residential property is approximately 600 metres south of the WRP	
Hydrogeology	Shepparton Formation Aquifer Watertable salinity 2300 to 19000 mg/L TDS (Segment B) Depth to watertable – approx. 4.5 to 5.5 metres	
Odour control	Sludge removal program, this WRP is scheduled for April 2024	
Cultural Heritage	The Lockington WRP is located on Dja Dja Wurrung Country	
Responsible parties	**Site Operator:** Coliban Water is ultimately responsible for all activities at the site. It owns the land on which the treatment facility, winter storage and reuse scheme are situated. Under the O&M contract Service Stream provide these services. **Agricultural Licensee:** N/A to date	

Lockington WRP Site Specific Risk analysis

A site-specific risk assessment was completed for the Lockington WRP in December 2021 and update in January 2023 with Coliban Water staff form the Water, Land and Environment and Wastewater teams and Service Stream O&M staff.

Table A1_2 below provides a summary of the highest environmental risks for the Lockington WRP, those being the High, Very High and Extreme (H-VH-E) residual risks. The Lockington WRP has one high residual risk.

Table A1_2: Summary of Lockington WRP high to extreme residual risks

Risk ID	Component	Hazardous event (what could go wrong)	Risk description		Residual risk
			Hazard (the why/how or causative factor)	Outcome (what could eventuate)	Risk score
2022_LOWRP_05	Influent	Uncontained waste	Inflow pit uncontained rag and general rubbish	Uncontained movement of general rubbish, potentially off site. Breach EPA Licence requirement - manage waste in accordance with Licence requirements	HIGH

The WRP wastewater quality surveillance monitoring program that monitors the operational control plans and compliance with the EPA licence conditions (refer to Table A8_3). The water quality sampling routine and testing are completed for Lockington WRP as per internal quality standard CW-SF-2515 Laboratory Manual. Sampling sites are illustrated in Figure A8_1 and A8_2.

Table A8_3 Lockington WRP Surveillance Monitoring Program

Lockington WRP			Exceedance Report		Surveillance Monitoring	Treatment Unit
Discharge Method	Parameter	Regulatory Limit	Operational Limit	Regulatory Limit		
Winter storage lagoon – recycled water compliance point	pH	6-9	6-9	-	Twice Quarterly	Lagoons
	BOD (mg/L)	20	19	-	Twice Quarterly	Lagoons
	BOD - Filtered (mg/L)	20	19	-	Nil	Lagoons
	COD (mg/L)[1]	-	-	-	Monthly	Lagoons
	TSS (mg/L)	30	29	-	Twice Quarterly	Lagoons
	E.coli (Orgs/100mL)	1,000	1,000	4,000	Quarterly[4]	Lagoons
	TDS (mg/L), Tot N (mg/L), TKN (mg/L), NO_3 (mg/L), Ammonia (mg/L), Tot P (mg/L), Cations (mg/L), Chloride (mg/L), SAR, BGA - Count				Monthy/Quarterly/ Bi-annual	Nil
	BGA - Biovolume	-	10	-	Twice Annually between November and February	Nil
Groundwater - Plant	Parameters tested: pH (Water), BOD (mg/L), EC (µS/cm), Tot N (mg/L), NO_3 (mg/L), Tot P (mg/L), Chloride (mg/L), E.coli (Orgs/100mL), Water level (m)	No limits set at this time. Results used by Water Quality Performance Team to assess any marked change in groundwater quality indicating contamination.			Quarterly	-

Figure A8_1: Lockington WRP sampling locations

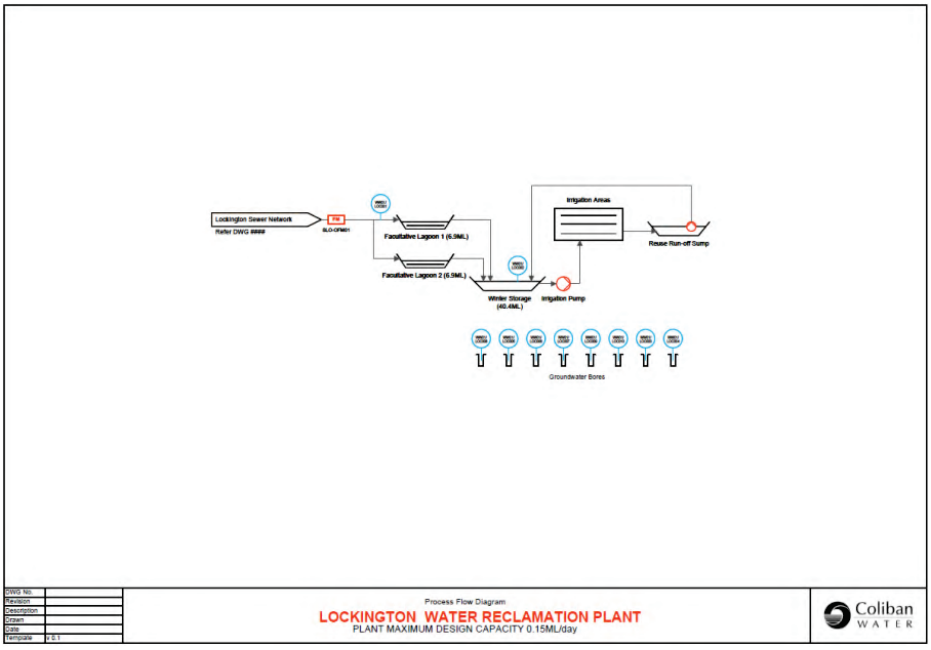


Figure A8_2: Lockington WRP Process Flow Diagram

A9: Pyramid Hill WRP

The Pyramid Hill WRP is located approximately two kilometres north of Pyramid Hill on Cohuna Road. The plant consists of two facultative lagoons, one maturation lagoon and one winter storage. The plant was designed to reuse the effluent for irrigation (8ha flood irrigation area). Table A9_1 shows the details of existing infrastructure.

Table A9_1: Pyramid Hill WRP treatment process and setting

Capacity	120 kL/day	43.8 ML/year
Process	Two facultative lagoons (total volume 8.3 ML)	
	One maturation lagoon (3.1 ML volume)	
	One winter storage lagoon (24.6 ML)	
Treated Water Quality	Class C recycled water is produced from the lagoons	
Water Reuse	Flood irrigation area of 8 ha with up to 10 ML per annum available. Effluent quality for irrigation needs to be assessed due to very high salinity. Therefore, effluent is not often used for irrigation.	
Biosolids	Treatment lagoons scheduled for desludging in late 2024 (lower priority)	
Sensitive receptors	Bullock Creek (1 km east), Blind Creek (2 km east), Gow Swamp (previously name Know Swamp) – 15 km east Closest residential property is approximately 1.5 km southwest of the WRP	
Hydrogeology	Shepparton Formation Aquifer Watertable salinity 25000 - 37000 mg/L TDS (Segment D) Depth to watertable – approx. 3 to 3.5 metres	
Odour control	Sludge removal program however, no sludge has been removed from the site to date with all sludge contained within the primary lagoons.	
Cultural Heritage	The Pyramid Hill WRP is located on Dja Dja Wurrung Country	
Responsible parties	**Site Operator:** Coliban Water is ultimately responsible for all activities at the site. It owns the land on which the treatment facility, winter storage and reuse scheme are situated. Under the O&M contract Service Stream provide these services. **Agricultural Licensee:** manages all grazing, cropping and sustainable management of land	

Pyramid Hill WRP Site Specific Risk analysis

A site-specific risk assessment was completed for the Pyramid Hill WRP in December 2021 and update in January 2023 with Coliban Water staff form the Water, Land and Environment and Wastewater teams and Service Stream O&M staff.

Table A9_2 below provides a summary of the highest environmental risks for the Pyramid Hill WRP, those being the High, Very High and Extreme (H-VH-E) residual risks. The Pyramid Hill WRP has two high residual risks.

Table A9_2: Summary of Pyramid Hill WRP high to extreme residual risks

Risk ID	Component	Hazardous event (what could go wrong)	Risk description		Residual risk
			Hazard (the why/how or causative factor)	Outcome (what could eventuate)	Risk score
2022_PHWRP_26	Winter Storage	High salinity treated water	Evaporation	Treated water not suitable for reuse	HIGH
2022_PHWRP_38	General site	General rubbish	Various diffuse sources	litter, poor housekeeping, harbouring pest plant and animals	HIGH

The WRP wastewater quality surveillance monitoring program that monitors the operational control plans and compliance with the EPA licence conditions (refer to Table A9_3). The water quality sampling routine and testing are completed for Pyramid Hill WRP as per internal quality standard CW-SF-2515 Laboratory Manual. Sampling sites are illustrated in Figures A9_1 and A9_2.

Table A9_3 Pyramid Hill WRP Surveillance Monitoring Program

Pyramid Hill WRP			Exceedance Report		Surveillance Monitoring	Treatment Unit
Discharge Method	Parameter	Regulatory Limit	Operational Limit	Regulatory Limit		
Winter storage lagoon – recycled water compliance point	pH	6-9	6-9	-	Twice Quarterly	Lagoons
	BOD (mg/L)	20	19	-	Twice Quarterly	Lagoons
	BOD - Filtered (mg/L)	20[2]	19	-	Nil	Lagoons
	COD (mg/L)	-	-	-	Monthly	Lagoons
	TSS (mg/L)	30	29	-	Twice Quarterly	Lagoons
	E.coli (Orgs/100mL)	1,000[2]	1,000	4,000	Quarterly	Lagoons
	TDS (mg/L), Tot N (mg/L), TKN (mg/L), NO_3 (mg/L), Ammonia (mg/L), Tot P (mg/L), Cations (mg/L), Chloride (mg/L), SAR, BGA - Count				Monthy/Quarterly/ Bi-annual	Nil
	BGA - Biovolume	-	10	-	Twice Annually between November and February	Nil
Receiving Soil	Parameters tested: pH (Water), pH ($CaCl_2$), EC (dS/cm), Chloride (mg/kg), Tot N (mg/kg), TKN (mg/kg), Amm N (mg/kg), Nitrate (mg/kg), Tot P (mg/kg), Tot K (mg/kg), Olsen P (mg/kg), SAR, CEC, Cations	No limits set at this time. Results used to complete assessment in annual soil assessment report in line with EIP.			Annual	-
Groundwater - Plant	Parameters tested: pH (Water), BOD (mg/L), EC (µS/cm), Tot N (mg/L), NO_3 (mg/L), Tot P (mg/L), Chloride (mg/L), E.coli (Orgs/100mL), Water level (m)	No limits set at this time. Results used by Water Quality Performance Team to assess any marked change in groundwater quality indicating contamination.			Quarterly	-

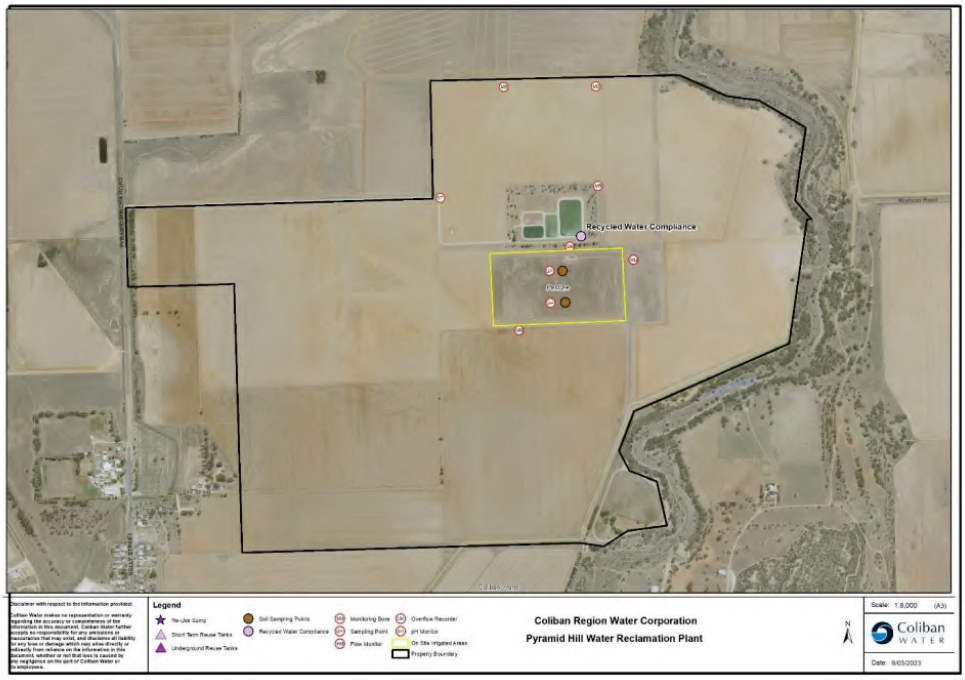


Figure A9_1: Pyramid Hill WRP sampling locations

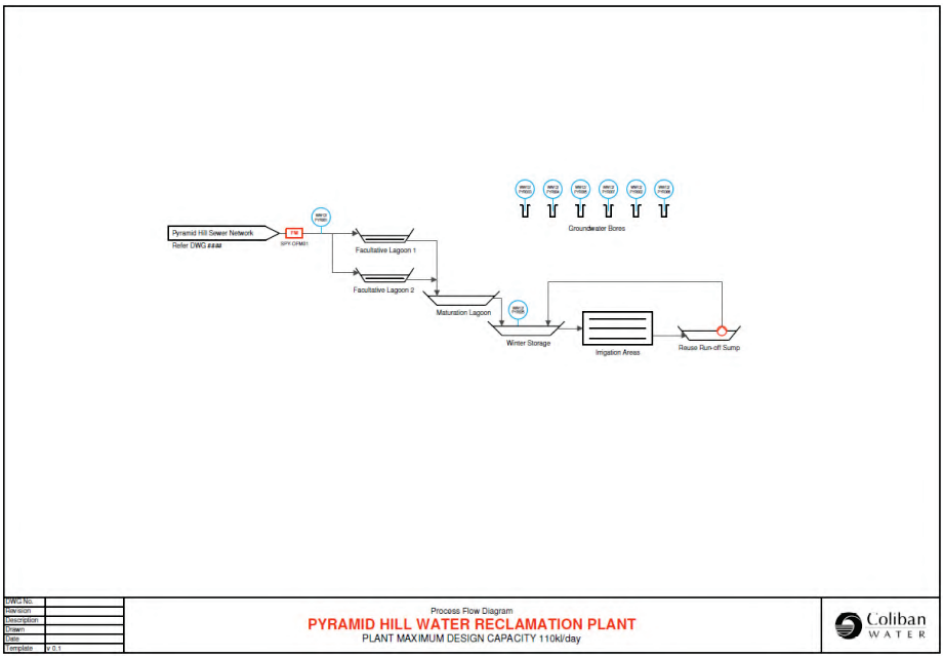


Figure A9_2: Pyramid Hill WRP Process Flow Diagram

Appendix B: Lagoon WRP Operating Licence General Condition Compliance

Reference	Condition detail	RMMP reference	Recommendations
OL_G1	A copy of this licence must be kept at the activity site and be easily accessible to persons who are engaging in an activity conducted at the activity site. Information regarding the requirements of the licence and the Act duties must be included in site induction and training information.	Section 11 - Documentation and demonstration of the GED	EPA Licence and RMMP to be stored at site office/ treatment operator vehicle
OL_G2	You must immediately notify the Authority by calling 1300 EPA VIC (1300 372 842) in the event of: a) A discharge, emission or deposit which gives rise to, or may give rise to, actual or potential harm to human health or the environment; b) A malfunction, breakdown or failure of risk control measures at the activity site which could reasonably be expected to give rise to actual or potential harm to human health or the environment; or c) Any breach of the licence.	Section 12 - Environmental incident and emergency response	There is an EPA Non-compliance and notification procedure drafted – this needs to be updated to new legislation and roles and responsibilities. Refer to Section 12
OL_G3	You must notify the Authority within 48 hours of the occurrence of any the following: (a) Any change to your name or address (including your registered address and activity site as applicable); (b) You become, or are likely to become, an insolvent under administration; (c) You become, or are likely to become, an externally administered company under the Corporations Act; or (d) A change to an officer (as defined in the Act). You must update your information in the EPA Interaction Portal if any other relevant administrative details for your business change.	Section 12.1 – EPA Notification	Refer to Section 11 of this RMMP
OL_G4a	You must provide to the Authority with a Permission Information and Performance Statement (PIPS) in the form determined by the Authority within 2 months of receiving notification in writing from the Authority. The PIPS may be released to the public (in whole or in part).	Section 11.1 – PIPS	EPA Portal and document management
OL_G4b	Information and monitoring records used for the preparation of, inclusion in, or support of, any reporting or notification that is required of you by the Authority (including data reporting, performance reporting, documents evidencing any risk and monitoring program) must be: a) retained for five years; and b) made available to the Authority on request.	Section 8 – Monitoring Program	The filing of APS reporting has been filed in L Drive – document management of this information is critical to ensure evidence of this condition is easily accessible
OL_G5	1. You must develop a risk management and monitoring program for your activities which: (a) identifies all the risks of harm to human health and the environment which may arise from the activities you are engaging in at your activity site; (b) clearly defines your environmental performance objectives; (c) clearly defines your risk control performance objectives; (d) describes how the environmental and risk control performance objectives are being achieved; (e) identifies and describes how you will continue to eliminate or minimise the risks in 1(a) (above) so far as reasonably practicable (SFARP); and (f) describes how the information collated	Develop RMMP with wastewater team, operators, planning, infrastructure and regulation team	Coliban Water to endorse the development of RMMPs for WRPs that have been transitioned to new operating licences (EP Act 2017) – this document

Reference	Condition detail	RMMP reference	Recommendations
	in compliance with this clause, is or will be disseminated, used or otherwise considered by you or any other entity. 2. The risk management and monitoring program must be: (a) documented in writing; (b) signed by a duly authorised officer of the licensed entity; and (c) made available to the Authority on request.		
OL_G7	You must: (a) develop and maintain a decommissioning plan that is in accordance with the current decommissioning guidelines published by the Authority; (b) provide the decommissioning plan to the Authority upon request; (c) supply to the Authority an updated detailed decommissioning plan 40 business days prior to commencement of decommissioning, if you propose to divest a section of the licensed site, cease part or all of the licensed activity or reduce the basis upon which the licence was granted to a point where licensing is no longer required; and (d) decommission the licensed site in accordance with the detailed decommissioning plan, to the satisfaction of the Authority and within any reasonable timeframe which may be specified by the Authority.	Section 3 - Decommissioning Plan to be developed (high level and link with Strategic Asset Management Plan (SAMP)	SAMP covers decommissioning for WRPs. Coliban Water to endorse the development of Decommissioning Plan for WRPs that have been transitioned to new operating licences (EP Act 2017)
OL_DW2.8	Discharge of treated wastewater during wet weather conditions must be in accordance with specifications in "Discharge to Water" section of EPA Publication 1322 'Licence Management Guidelines'.	Part of Section 9 Risk Assessment 1322.9: Licence Management | Environment Protection Authority Victoria (epa.vic.gov.au)	Section 8 and 9 – Monitoring and ensuring notification to EPA if breach of this condition occurs
OL_WM14	All plant and equipment must be maintained and operated in proper working condition, in accordance with the manufacturer's specifications.	Part of Section 9 Risk Assessment	Use the SAMP and Service Stream to ensure this is complied with – refer to Section 7 Operational Control Procedures

Appendix C: Lagoon WRP Operating Licences

All EPA Operating Licences are stored on the Coliban Water Our Environment SharePoint site:

Our Environment - EPA Operating Licences - All Documents (sharepoint.com)

Appendix H

Risk assessment extract

Appendix I

EPBC Protected Matters Search Results

Australian Government
Department of Climate Change, Energy, the Environment and Water

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 05-Jun-2025

Summary
Details
- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat
Acknowledgements

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	7
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	5
Listed Threatened Species:	40
Listed Migratory Species:	8

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	16
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	2
Regional Forest Agreements:	None
Nationally Important Wetlands:	1
EPBC Act Referrals:	6
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands) [Resource Information]

Ramsar Site Name	Proximity	Buffer Status
Banrock station wetland complex	300 - 400km upstream from Ramsar site	In feature area
Gunbower forest	Within Ramsar site	In feature area
Hattah-kulkyne lakes	150 - 200km upstream from Ramsar site	In feature area
Kerang wetlands	Within 10km of Ramsar site	In feature area
Nsw central murray state forests	Within 10km of Ramsar site	In feature area
Riverland	300 - 400km upstream from Ramsar site	In feature area
The coorong, and lakes alexandrina and albert wetland	300 - 400km upstream from Ramsar site	In feature area

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions	Endangered	Community may occur within area	In feature area
Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Endangered	Community may occur within area	In feature area
Natural Grasslands of the Murray Valley Plains	Critically Endangered	Community likely to occur within area	In feature area
Plains mallee box woodlands of the Murray Darling Depression, Riverina and Naracoorte Coastal Plain	Critically Endangered	Community may occur within area	In feature area

Community Name	Threatened Category	Presence Text	Buffer Status
Bioregions			
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community may occur within area	In feature area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat known to occur within area	In feature area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat known to occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat may occur within area	In feature area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat may occur within area	In feature area
Lophochroa leadbeateri leadbeateri Major Mitchell's Cockatoo (eastern), Eastern Major Mitchell's Cockatoo, Pink Cockatoo (eastern) [82926]	Endangered	Species or species habitat known to occur within area	In feature area
Melanodryas cucullata cucullata South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat likely to occur within area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Pedionomus torquatus Plains-wanderer [906]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Polytelis swainsonii Superb Parrot [738]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area
Stagonopleura guttata Diamond Firetail [59398]	Vulnerable	Species or species habitat known to occur within area	In feature area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area	In feature area
CRUSTACEAN			
Euastacus armatus Murray Crayfish [81537]	Vulnerable	Species or species habitat may occur within area	In feature area
FISH			
Bidyanus bidyanus Silver Perch, Bidyan [76155]	Endangered	Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Craterocephalus fluviatilis Murray Hardyhead [56791]	Endangered	Species or species habitat may occur within area	In buffer area only
Galaxias rostratus Flathead Galaxias, Beaked Minnow, Flat-headed Galaxias, Flat-headed Jollytail, Flat-headed Minnow [84745]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Maccullochella macquariensis Trout Cod [26171]	Endangered	Species or species habitat may occur within area	In buffer area only
Maccullochella peelii Murray Cod [66633]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
FROG			
Crinia sloanei Sloane's Froglet [59151]	Endangered	Species or species habitat may occur within area	In feature area
Litoria raniformis Southern Bell Frog, Growling Grass Frog, Green and Golden Frog, Warty Swamp Frog, Golden Bell Frog [1828]	Vulnerable	Species or species habitat likely to occur within area	In feature area
MAMMAL			
Nyctophilus corbeni Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat may occur within area	In feature area
PLANT			
Amphibromus fluitans River Swamp Wallaby-grass, Floating Swamp Wallaby-grass [19215]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Austrostipa wakoolica [66623]	Endangered	Species or species habitat likely to occur within area	In feature area
Lepidium aschersonii Spiny Peppercress [10976]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Lepidium monoplocoides Winged Pepper-cress [9190]	Endangered	Species or species habitat likely to occur within area	In feature area
Maireana cheelii Chariot Wheels [8008]	Vulnerable	Species or species habitat may occur within area	In feature area
Myriophyllum porcatum Ridged Water-milfoil [19919]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Pterostylis cheraphila Floodplain Rustyhood [56508]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Sclerolaena napiformis Turnip Copperburr [11742]	Endangered	Species or species habitat may occur within area	In feature area
Senecio behrianus Stiff Groundsel, Behr's Groundsel [14030]	Endangered	Species or species habitat likely to occur within area	In feature area
Swainsona murrayana Slender Darling-pea, Slender Swainson, Murray Swainson-pea [6765]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Swainsona plagiotropis Red Darling-pea, Red Swainson-pea [10804]	Vulnerable	Species or species habitat may occur within area	In feature area
REPTILE			
Aprasia parapulchella Pink-tailed Worm-lizard, Pink-tailed Legless Lizard [1665]	Vulnerable	Species or species habitat may occur within area	In feature area
Hemiaspis damelii Grey Snake [1179]	Endangered	Species or species habitat may occur within area	In feature area

Listed Migratory Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Migratory Terrestrial Species			
Motacilla flava			
Yellow Wagtail [644]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Calidris acuminata			
Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calidris melanotos			
Pectoral Sandpiper [858]		Species or species habitat likely to occur within area	In feature area
Gallinago hardwickii			
Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat may occur within area	In feature area
Tringa nebularia			
Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area	In feature area

Other Matters Protected by the EPBC Act

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat likely to occur within area overfly marine area	In feature area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat known to occur within area overfly marine area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat may occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area overfly marine area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat likely to occur within area overfly marine area	In feature area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area

Extra Information

State and Territory Reserves [Resource Information]

Protected Area Name	Reserve Type	State	Buffer Status
Cohuna B.R.	Natural Features Reserve	VIC	In buffer area only
Gunbower	National Park	VIC	In buffer area only

Nationally Important Wetlands [Resource Information]

Wetland Name	State	Buffer Status
Gunbower Island	VIC	In buffer area only

EPBC Act Referrals [Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
The Modified Operation of the Goulburn Murray Irrigation District	2009/5123	Controlled Action	Post-Approval	In feature area
Not controlled action				
Cohuna Solar Farm, Horfield, VIC	2018/8268	Not Controlled Action	Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Flooding Enhancement of Gunbower Forest	2005/1994	Not Controlled Action	Completed	In feature area
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
Not controlled action (particular manner)				
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data is available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on the contents of this report.

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions when time permits.

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded breeding sites; and
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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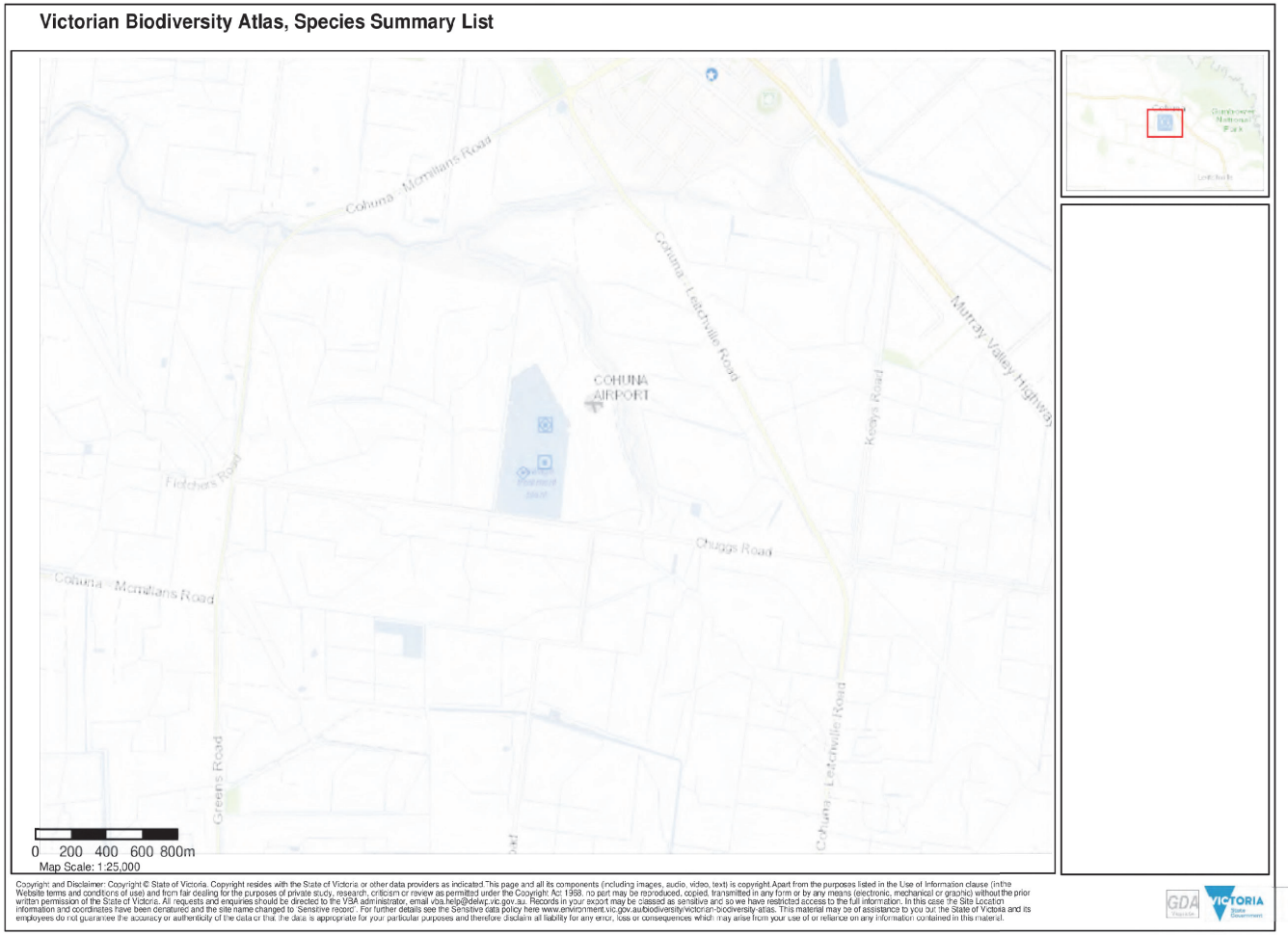
Appendix J

Victorian Biodiversity Atlas search results

Victorian Biodiversity Atlas, Species Summary List



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Selected Area

Type: User Polygon Value: POLYGON ((144.208944 -35.825802,144.210534 -35.825002,144.212757 -35.828069,144.212067 -35.832619,144.212034 -35.832905,144.213907 -35.833085,144.213258 -35.836371,144.207141 -35.836044,144.208944 -35.825802))

Common Filter

No common filter criteria.

Advanced Filter

No advanced filter criteria.

Total Records

95

Last Review Date:28 Apr 2025

Search Result

Taxon ID	Scientific Name	Common Name	FFG Status	Conservation Status	Discipline	Taxon Origin	Short Name	Count of Sightings	Last Record
10100	Microcarbo melanoleucos	Little Pied Cormorant			Terrestrial fauna			5	09/05/2000
10700	Cracticus nigrogularis	Pied Butcherbird			Terrestrial fauna			1	13/05/1999
10043	Ocyphaps lophotes	Crested Pigeon			Terrestrial fauna			14	11/04/2000
10049	Porzana fluminea	Australian Spotted Crake			Terrestrial fauna			2	13/01/1999
10055	Tribonyx ventralis	Black-tailed Native-hen			Terrestrial fauna			1	25/10/1999
10056	Gallinula tenebrosa	Dusky Moorhen			Terrestrial fauna			1	13/10/1998
10058	Porphyrio melanotus	Australasian Swamphen			Terrestrial fauna			3	10/03/2000
10059	Fulica atra	Eurasian Coot			Terrestrial fauna			6	13/01/2000

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10060	Podiceps cristatus	Great Crested Grebe			Terrestrial fauna	1	25/10/1999
10061	Tachybaptus novaehollandiae	Australasian Grebe			Terrestrial fauna	15	08/04/2000
10062	Poliocephalus poliocephalus	Hoary-headed Grebe			Terrestrial fauna	16	10/03/2000
10096	Phalacrocorax carbo	Great Cormorant			Terrestrial fauna	1	13/12/1999
10099	Phalacrocorax varius	Pied Cormorant			Terrestrial fauna, Coastal	2	08/04/2000
10101	Anhinga novaehollandiae	Australasian Darter			Terrestrial fauna	1	15/02/2000
10106	Pelecanus conspicillatus	Australian Pelican			Terrestrial fauna	2	11/06/1999
10110	Chlidonias hybrida	Whiskered Tern			Terrestrial fauna, Coastal	1	25/10/1999
10112	Hydroprogne caspia	Caspian Tern	Vulnerable	vu	Terrestrial fauna, Coastal	1	25/10/1999
10125	Chroicocephalus novaehollandiae	Silver Gull			Terrestrial fauna	15	11/04/2000
10132	Erythrogonys cinctus	Red-kneed Dotterel			Terrestrial fauna	5	13/12/1999
10133	Vanellus miles	Masked Lapwing			Terrestrial fauna	23	07/06/2000
10137	Pluvialis fulva	Pacific Golden Plover	Vulnerable	vu	Terrestrial fauna, Coastal	1	12/01/1999

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10143	Charadrius ruficapillus	Red-capped Plover			Terrestrial fauna	8	08/04/2000
10144	Elseyornis melanops	Black-fronted Dotterel			Terrestrial fauna	4	15/02/2000
10148	Recurvirostra novaehollandiae	Red-necked Avocet			Terrestrial fauna	2	12/10/1999
10158	Tringa nebularia	Common Greenshank	Endangered	EN en	Terrestrial fauna, Coastal	3	13/04/1999
10159	Tringa stagnatilis	Marsh Sandpiper	Endangered	en	Terrestrial fauna	9	11/04/2000
10162	Calidris ruficollis	Red-necked Stint			Terrestrial fauna	3	25/10/1999
10163	Calidris acuminata	Sharp-tailed Sandpiper		VU	Terrestrial fauna	6	15/02/2000
10179	Threskiornis molucca	Australian White Ibis			Terrestrial fauna	12	11/04/2000
10180	Threskiornis spinicollis	Straw-necked Ibis			Terrestrial fauna	14	07/06/2000
10181	Platalea regia	Royal Spoonbill			Terrestrial fauna, Coastal	2	25/10/1999
10182	Platalea flavipes	Yellow-billed Spoonbill			Terrestrial fauna	3	15/02/2000
10185	Egretta garzetta	Little Egret	Endangered	en	Terrestrial fauna, Coastal	1	14/02/1999
10188	Egretta novaehollandiae	White-faced Heron			Terrestrial fauna	10	07/06/2000
10189	Ardea pacifica	White-necked Heron			Terrestrial fauna	1	12/10/1999
10203	Cygnus atratus	Black Swan			Terrestrial fauna	23	07/06/2000

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10207	Tadorna tadornoides	Australian Shelduck			Terrestrial fauna	25	01/01/2006
10208	Anas superciliosa	Pacific Black Duck			Terrestrial fauna	25	20/02/2005
10210	Anas castanea	Chestnut Teal			Terrestrial fauna	5	13/12/1999
10211	Anas gracilis	Grey Teal			Terrestrial fauna	26	01/01/2006
10212	Spatula rhynchotis	Australasian Shoveler	Vulnerable	vu	Terrestrial fauna, Coastal	18	12/03/2017
10213	Malacorhynchus membranaceus	Pink-eared Duck			Terrestrial fauna	11	01/01/2006
10215	Aythya australis	Hardhead			Terrestrial fauna	15	01/01/2006
10216	Oxyura australis	Blue-billed Duck	Vulnerable	vu	Terrestrial fauna	2	13/01/1999
10217	Biziura lobata	Musk Duck	Vulnerable	vu	Terrestrial fauna	3	11/06/1999
10219	Circus approximans	Swamp Harrier			Terrestrial fauna	4	11/08/1999
10222	Accipiter cirrocephalus	Collared Sparrowhawk			Terrestrial fauna	1	12/09/1999
10224	Aquila audax	Wedge-tailed Eagle			Terrestrial fauna	5	08/04/2000
10225	Hieraaetus morphnoides	Little Eagle	Vulnerable	vu	Terrestrial fauna	8	15/02/2000
10228	Haliastur sphenurus	Whistling Kite			Terrestrial fauna	15	07/06/2000
10229	Milvus migrans	Black Kite			Terrestrial fauna	9	11/04/2000
10232	Elanus axillaris	Black-shouldered Kite			Terrestrial fauna	3	25/10/1999

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10237	Falco peregrinus	Peregrine Falcon			Terrestrial fauna	4	10/03/2000
10239	Falco berigora	Brown Falcon			Terrestrial fauna	11	11/04/2000
10240	Falco cenchroides	Nankeen Kestrel			Terrestrial fauna	8	08/04/2000
10269	Cacatua galerita	Sulphur-crested Cockatoo			Terrestrial fauna	5	11/04/2000
10271	Cacatua sanguinea	Little Corella			Terrestrial fauna	1	14/02/1999
10272	Cacatua tenuirostris	Long-billed Corella			Terrestrial fauna	10	07/06/2000
10273	Eolophus roseicapilla	Galah			Terrestrial fauna	24	07/06/2000
10322	Dacelo novaeguinea e	Laughing Kookaburra			Terrestrial fauna	6	07/06/2000
10326	Todiramphus sanctus	Sacred Kingfisher			Terrestrial fauna	2	11/04/2000
10357	Hirundo neoxena	Welcome Swallow			Terrestrial fauna	18	07/06/2000
10360	Petrochelidon ariel	Fairy Martin			Terrestrial fauna	1	25/10/1999
10361	Rhipidura albiscapa	Grey Fantail			Terrestrial fauna	1	13/05/1999
10364	Rhipidura leucophrys	Willie Wagtail			Terrestrial fauna	11	07/06/2000
10415	Grallina cyanoleuca	Magpie-lark			Terrestrial fauna	12	09/05/2000
10424	Coracina novaehollandi ae	Black-faced Cuckoo-shrike			Terrestrial fauna	1	13/05/1999
10443	Pomatostomu s temporalis	Grey-crowned Babbler	Vulnerable	vu	Terrestrial fauna	1	13/10/1998

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10448	Epthianura albifrons	White-fronted Chat	Terrestrial fauna	21	07/06/2000
10450	Epthianura aurifrons	Orange Chat	Terrestrial fauna	1	25/10/1999
10486	Acanthiza chrysorrhoa	Yellow-rumped Thornbill	Terrestrial fauna	2	25/10/1999
10508	Cincloramphus cruralis	Brown Songlark	Terrestrial fauna	5	25/10/1999
10522	Poodytes gramineus	Little Grassbird	Terrestrial fauna	1	25/10/1999
10524	Acrocephalus australis	Reed-Warbler	Terrestrial fauna	3	25/10/1999
10525	Cisticola exilis	Golden-headed Cisticola	Terrestrial fauna	1	25/10/1999
10529	Malurus cyaneus	Superb Fairy-wren	Terrestrial fauna	16	08/04/2000
10535	Malurus leucopterus	White-winged Fairy-wren	Terrestrial fauna	7	11/04/2000
10574	Zosterops lateralis	Silvereye	Terrestrial fauna	1	13/05/1999
10625	Ptilotula penicillata	White-plumed Honeyeater	Terrestrial fauna	3	07/06/2000
10641	Entomyzon cyanotis	Blue-faced Honeyeater	Terrestrial fauna	1	13/05/1999
10645	Philemon corniculatus	Noisy Friarbird	Terrestrial fauna	2	25/10/1999
10647	Anthus australis	Australian Pipit	Terrestrial fauna	12	07/06/2000
10648	Mirafra javanica	Horsfield's Bushlark	Terrestrial fauna	1	19/11/1998
10653	Taeniopygia guttata	Zebra Finch	Terrestrial fauna	6	11/04/2000
10705	Gymnorhina tibicen	Australian Magpie	Terrestrial fauna	25	07/06/2000

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10930	Corvus coronoides	Australian Raven		Terrestrial fauna		22	07/06/2000
10954	Corvus mellori	Little Raven		Terrestrial fauna		8	11/04/2000
10957	Columba livia	Domestic Pigeon	*	Terrestrial fauna	Introduced	5	08/04/2000
10976	Pardalotus striatus	Striated Pardalote		Terrestrial fauna		3	12/10/1999
10991	Turdus merula	Common Blackbird	*	Terrestrial fauna	Introduced	3	25/10/1999
10995	Passer domesticus	House Sparrow	*	Terrestrial fauna	Introduced	21	07/06/2000
10999	Sturnus vulgaris	Common Starling	*	Terrestrial fauna	Introduced	21	07/06/2000
528555	Himantopus leucocephalus	Pied Stilt		Terrestrial fauna		20	10/03/2000
528559	Carduelis carduelis	European Goldfinch	*	Terrestrial fauna	Introduced	3	25/10/1999
903268	Ardea alba	Great Egret		Terrestrial fauna, Aquatic fauna, Coastal		1	25/10/1999

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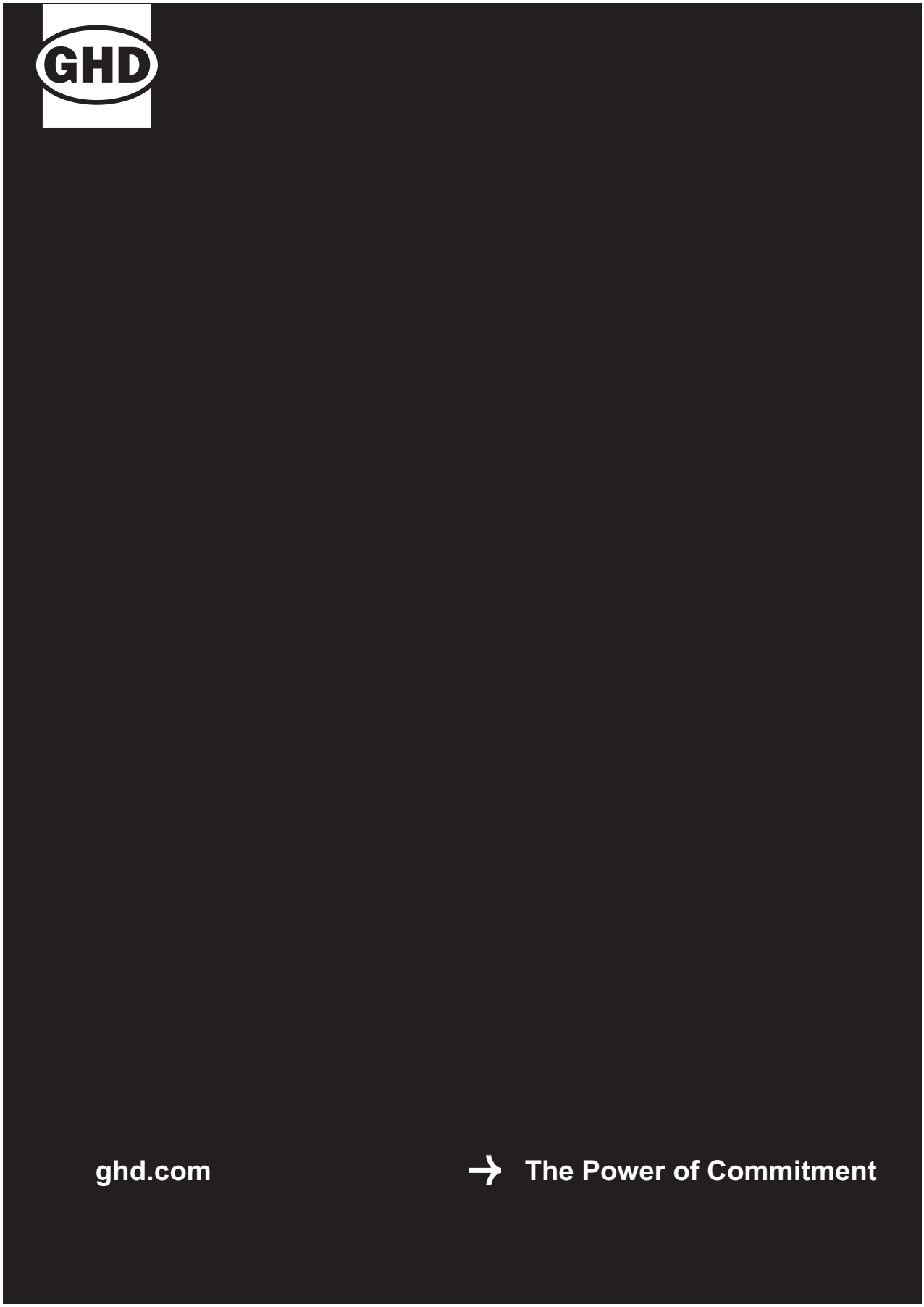
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The Power of Commitment

Development licence

Environment Protection Act 2017

Licence number	DL000300074
Issue date	14 October 2025
Last amended	-
Expiry date	17 April 2028
Licence holder	COLIBAN REGION WATER CORPORATION
ABN	96549082360
Activity site(s)	215 Chuggs Road, Cohuna, Victoria, 3568 COHUNA WRP LOT 12 CHUGGS RD, COHUNA, VIC, 3568, AU
Prescribed permission activities	A03 (Sewage treatment)

Issued under section 69(1)(a) of the *Environment Protection Act 2017* (the Act).

[redacted]

[redacted]
Team Leader, Development Licences
Delegate of Environment Protection Authority Victoria (EPA)

epa.vic.gov.au
Environment Protection Authority Victoria
GPO BOX 4395 Melbourne VIC 3001
1300 372 842

Development licence

Environment Protection Act 2017

Context

Environment Protection Authority Victoria (EPA) is Victoria's environmental regulator acting in accordance with the *Environment Protection Act 2017* (the Act). Our regulatory role is to work with community, industry and business to prevent and reduce the harmful effects of pollution and waste on Victoria's environment and people.

Why we issue development licences
A range of development activity types are prescribed in the Environment Protection Regulations 2021 (the Regulations) because they give rise to risks of harm to human health or the environment. We issue development licences so applicants can lawfully undertake prescribed development activities. Section 44 of the Act provides that a person must not engage in a prescribed development activity except as authorised by a development licence in respect of that activity.

When we issue development licences
EPA can issue a development licence under section 69(1) of the Act. When issuing a development licence, EPA takes into account a number of factors, including the measures an applicant has taken or proposes to take in order to comply with the Act when engaging in the prescribed permission activity.

EPA can amend, suspend or revoke a licence for a range of reasons. This can include in response to changes in activities, risks or licence holder performance. All development licence details are publicly accessible via the EPA Public Register.

Key information and obligations

Interpretation
For the purposes of this development licence "You" means the "licence holder" identified on the first page. Unless a contrary intention appears, words or terms used in the conditions of your licence have the same meaning as in the Act, and in any regulations made pursuant to the Act.

Compliance
Your licence is subject to conditions. These conditions confer legal obligations on you as the licence holder. Some of these are general in nature, while others require you to do (or not to do) specific things. The requirements of these conditions do not detract from each other in any way, nor do they affect any other duties or obligations with which you are required to comply by law. You must fulfil all duties and perform all obligations set out in this licence or otherwise required by law.

Strict penalties apply for non-compliance with any part of your development licence.

You must comply with the Act and regulations administered by EPA. This includes, but is not limited to, compliance with the general environmental duty (GED).

Development licence

Environment Protection Act 2017

Duties under the Act
Under the Act, you have legal obligations in relation to your prescribed and non-prescribed activities. These legal obligations exist to minimise risks of harm to human health and the environment from pollution and waste.

You may be committing an offence and be liable to a penalty under the Act if your actions or omissions constitute a breach of these legal obligations.

General environmental duty
The Act places the onus on you to understand the risks associated with your operation or activity and requires you to minimise the risk of harm. This is called the general environmental duty (GED).

Sections 6 and 25 of the Act provide the legal basis for the GED. These sections state that a person engaging in an activity which may give rise to risks of harm to human health or the environment from pollution or waste must eliminate or minimise those risks, as far as reasonably practicable.

Duty to notify EPA of notifiable incidents
A notifiable incident is a pollution incident that causes or threatens to cause material harm to human health or the environment or is a prescribed notifiable incident. Under section 32 of the Act, you have an obligation to notify EPA of a notifiable incident as soon as practicable after you become aware of the incident.

Duty to take action to respond to harm caused by pollution incident
Under section 31 of the Act, if a pollution incident has occurred as a result of an activity (whether by act or omission) and the pollution incident causes or is likely to cause harm to human health or the environment, a person who is engaging in that activity must, so far as reasonably practicable, restore the affected area to the state it was in before the pollution incident occurred.

Duty to notify of contaminated land
Under section 40(1) of the Act, a person in management or control of land must notify EPA if the land has been contaminated by notifiable contamination as soon as practicable after the person becomes aware of the notifiable contamination.

Notifiable contamination means contamination which is prescribed in the Regulations, or contamination for which the cost of action to remediate the land is likely to exceed $50,000, or any other prescribed amount.

Duties relating to industrial waste, priority wastes and reportable priority wastes
Under parts 6.4 and 6.5 of the Act, a person has obligations in relation to the generation, receiving, recording, managing, transporting, and disposal of industrial, priority wastes and reportable priority wastes. These duties include:

- Duties of persons depositing industrial waste.

- Duties of persons receiving industrial waste.
- Duty of persons involved in transporting industrial waste.
- Duties of persons managing priority waste.
- Duty to investigate alternatives to waste disposal.
- Duty to notify of transaction in reportable priority waste.
- Duty of persons transporting reportable priority waste.

For further information on waste classifications see schedule 5 of the Regulations.

Further information and resources

To aid compliance with the Act and the Regulations, Environment Reference Standards (ERS), Compliance Codes, Position Statements and Guidelines have been developed to address a range of environmental objectives, permitted and non-permitted activities and risks.

You should understand how the Victorian environment protection framework applies to you and your activity, operation or business by making yourself familiar with the Act, Regulations, Compliance Codes and other relevant guidance material.

To assist you with understanding your obligations refer to www.epa.vic.gov.au.

Amendment

You can apply at any time to EPA for an amendment to your licence under section 57 of the Act. EPA may also decide to amend a licence under its own initiative according to section 58 of the Act.

Transfer

A person may apply to EPA for the transfer of this licence to a new licence holder pursuant to section 56 of the Act.

Duration of licence and renewal

This development licence is subject to the expiry date identified on the first page of this licence. It will remain in force until that time unless it is first surrendered by the licence holder (with consent from EPA), or it is suspended or revoked by EPA. EPA may decide to extend the term of the licence under section 72 of the Act. Note that an application for a development licence renewal must be submitted to EPA before the licence expiry date.

Development licence

Environment Protection Act 2017

Development licence structure

Your development licence has multiple parts:

- Conditions
- Appendix 1 – locality plan
- Appendix 2 – activity plan
- Appendix 3 – contour plan
- Appendix 4 – waste acceptance table
- Appendix 5 – air discharge table
- Appendix 6 – water discharge table
- Appendix 7 – landfill cell table

Development licence

Environment Protection Act 2017

Conditions

General conditions

DL_G01	A copy of this licence must be kept at the site and be easily accessible to persons who are engaging in an activity conducted at the site. Information regarding the requirements of the licence and the Act duties must be included in site induction and training information.
DL_G02	The development activity must be developed in accordance with the listed approved plans and documents: (1) APP045760 - Application Details (2) 12670048-REP-0-Cohuna Water Reclamation Plant Development Licence Application (3) 12670048-LET-0_Coliban Water EPA RFI Response_signed .. In the event of any inconsistency between the approved documents and the conditions of this permission, the conditions of this permission shall prevail.
DL_G03	Subject to the following conditions, this development licence allows you to: construct and commission works and associated equipment for sewage treatment plant as per the application APP045760, specifically the remediation of Lagoons 3 & 4, construction of Lagoons 5 & 6, construction of pumping and piping infrastructure and associated earthworks including sequencing the commissioning of lagoons to ensure storage capacity is maintained at the premises.
DL_G04	This permission does not take effect until a copy of any planning permit or amendment to a planning scheme required under the Planning and Environment Act 1987 (Vic) and related planning schemes has been provided to the Authority by the applicant.
DL_G05	This permission expires: (a) on the issue or amendment of an operating licence or permit relating to all activities covered by this permission; (b) when the Authority advises in writing that all activities covered by this permission have been satisfactorily completed and the issue or amendment of an operating licence or permit is not required; or c) on the expiry date listed on the front page of this permission.
DL_G07	You must: (a) develop and maintain a decommissioning plan that is in accordance with the current decommissioning guidelines published by the Authority; (b) provide the decommissioning plan to the Authority upon request; (c) supply to the Authority an updated detailed decommissioning plan 90 business days prior to commencement of decommissioning, if you propose to divest a section of the licensed site, cease part or all of the licensed activity or reduce the basis upon which the licence was granted to a point where licensing is no longer required; and

Development licence

Environment Protection Act 2017

	(d) decommission the licensed site in accordance with the detailed decommissioning plan, to the satisfaction of the Authority and within any reasonable timeframe which may be specified by the Authority.

Standard conditions

DL_C01	Commissioning activities must be undertaken in accordance with the commissioning plan approved by the Authority.
DL_C02	You must immediately notify the Authority by calling 1300 EPA VIC (1300 372 842) in the event of: a) A discharge, emission or deposit which gives rise to, or may give rise to, actual or potential harm to human health or the environment; b) A malfunction, breakdown or failure of risk control measures at the site which could reasonably be expected to give rise to actual or potential harm to human health or the environment; or c) Any breach of the licence.
DL_C05	1. You must develop a risk management and monitoring program for your activities which: (a) identifies all the risks of harm to human health and the environment which may arise from the activities you are engaging in at your activity site; (b) clearly defines your environmental performance objectives; (c) clearly defines your risk control performance objectives; (d) describes how the environmental and risk control performance objectives are being achieved; (e) identifies and describes how you will continue to eliminate or minimise the risks in 1(a) (above) so far as reasonably practicable; and (f) describes how the information collated in compliance with this clause, is or will be disseminated, used or otherwise considered by you or any other entity. 2. The risk management and monitoring program must be: (a) documented in writing; (b) signed by a duly authorised officer of the licensed entity (c) made available to the Authority on request.
DL_C07	Within 45 business days of the completion of the approved activities, you must provide to EPA a written report that summarises the activities undertaken and includes: (1) Results of the commissioning monitoring program as required under condition DL_R01.
DL_W03	You must notify the Authority when the construction associated with the development activities covered by this approval has been completed.

Development licence

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Specific conditions

DL_C12	Waste from the activity site must not be discharged or disposed of to the environment except in accordance with this permission and with any other permission issued by the Authority that may relate to the activity site.
DL_R01	At least 15 business days before the commencement of any commissioning, you must provide to the Authority a commissioning monitoring report(s) and/or plan(s) with a detailed commissioning timeline and performance objectives that include(s): . (1) In respect to each lagoon (3, 4, 5 & 6), a verification report from a suitably qualified, experienced and independent (to the contractor who constructs the pond) person which details the implementation of the construction quality assurance plan (CQA plan) and meet requirements with condition DL_R04 (3). (2) An effluent management plan which includes but is not limited to: (a) predicting and monitoring cumulative volumes of effluent generated and to be managed including trigger levels, contingencies measures and remedial actions; (b) periodic water balance reviews; (c) spills and leaks management; (d) cleaning and desludging frequency; and (d) testing and monitoring frequency of lagoon liner integrity, bunds and embankment. (3) An odour monitoring program that includes odour surveillance conducted by an independent person(s), in accordance with EPA Publication 1881 Guidance for field odour surveillance and include: (a) procedures for addressing the odour source if a complaint is verified, including consideration of any mitigation measures or operational changes that might be required. (4) A noise monitoring program that demonstrate compliance with noise limits in accordance with EPA Publication 1826.4 Noise limit and assessment protocol. (5) An updated Groundwater Monitoring and Sampling Plan in accordance with EPA publication 669.1 which includes but is not limited to: (a) monitoring frequency, analytes and additional locations to be sampled; and (b) triggers, contingency measures, and remedial actions should contamination be detected. (6) A wet weather discharge management plan that documents considerations to the environmental values in the Environmental Reference Standards (ERS) including consideration of Traditional Owners cultural values and includes: (a) an updated surface water monitoring plan that incorporates the monitoring frequency, analytes and the new monitoring locations.

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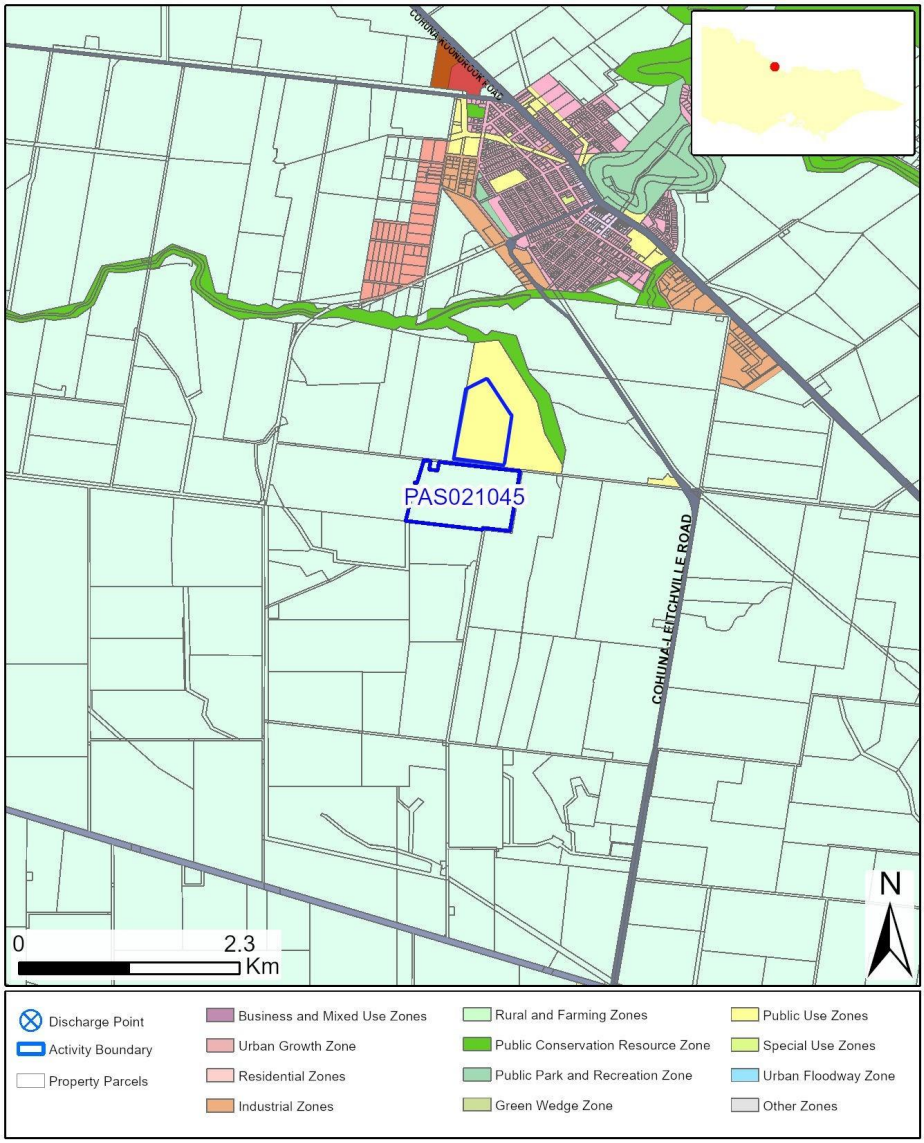
	(7) Items (1) to (6) above must be incorporated into the site Risk Management and Monitoring Program (as referred to in condition DL_C05) where applicable.
DL_R02	You must not commence commissioning of the operating components of the development activities until you have received the Authority's written approval of the report(s) and/or plan(s) which is required pursuant to condition(s) DL_R01.
DL_R04	At least 15 business days before the commencement of any construction, you must provide to the Authority report(s) and/or plan(s) that include(s): . (1) Construction and commissioning timelines including the sequencing of the development activity. (2) A Construction Environmental Management Plan (CEMP) in accordance with EPA Publications 1820 and 1834 and includes but is not limited to: (a) odour management plan including triggers and remedial actions; (b) dust management plan including triggers and remedial actions; and (c) noise management plan including triggers and remedial actions. (3) The plans, the technical specifications, and a construction quality assurance plan (CQA plan) for the relining and/or the construction of each lagoon verified by a suitably qualified person(s) and must include/meet: (a) details of the source material for lagoons; (b) the following specification, a 600mm thick clay liner that achieves permeability of less than 1 x 10-9 m/s; and (c) storage capacities and construction as per application APP045760.
DL_W13	During construction, you must ensure that all activities are carried out in accordance with the Construction Environmental Management Plan which is required pursuant to condition(s) DL_R04 (2).

Development licence

Environment Protection Act 2017

Appendices

Appendix 1 – locality plan



Before relying on the information in this map, carefully evaluate its accuracy, currency, completeness and relevance. Obtain appropriate professional advice before using this information.

Development licence

Environment Protection Act 2017

Appendix 2 – activity plan

Before relying on the information in this map, carefully evaluate its accuracy, currency, completeness and relevance. Obtain appropriate professional advice before using this information.

Development licence

Environment Protection Act 2017

Appendix 3 – contour plan

There is no contour plan for this licence.

Development licence

Environment Protection Act 2017

Appendix 4 - waste acceptance table

There is no waste acceptance for this licence.

Development licence

Environment Protection Act 2017

Appendix 5 – air discharge table

There are no air discharge points for this licence.

Development licence

Environment Protection Act 2017

Appendix 6 – water discharge table

There are no water discharge points for this licence.

Development licence

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Appendix 7 – landfill cells

There are no landfill cells for this licence.

7.3 PLANNING PERMIT APPLICATION P25022, 10 DALTON STREET, KOONDROOK.

Author: Fiona Gormann, Manager Planning and Regulatory Services
Authoriser: Wade Williams (Director Infrastructure & Development)

Applicant: Acre Town Planning
Owner: Gregery and Kaylene Bassett
Proposal: A three lot subdivision (re-subdivision) in accordance with the endorsed plan
Location: 10 Dalton Street, Koondrook

RECOMMENDATION

That Council approve Planning Application P25022 for a three-lot subdivision (re-subdivision) and issue a Notice of Decision to Grant a Permit at Lot 1 LP119887, CA 66 Parish of Murrabit, CA 19D Parish of Murrabit, Lot 2 LP95459 and CA 55 Parish of Murrabit, 10 Dalton Street, Koondrook subject to the following conditions:

Layout

1. **The Plan of Subdivision lodged with Council for certification must be in accordance with the endorsed plan and must not be modified except to comply with statutory requirements or conditions of this permit, without the written consent of the Responsible Authority.**

Statement of Compliance

2. **All conditions of this permit must be complied with prior to the issue of a Statement of Compliance for the subdivision.**

Easements to be created

3. **All existing and proposed easements and sites for existing and required utility services must be set aside in favour of the relevant authority for which the easement or site is to be created on the plan of subdivision submitted for certification under the *Subdivision Act 1988*.**

Drainage

4. **All stormwater and surface water discharging from the site, buildings and works must be retained on site to the satisfaction of the Responsible Authority.**

Sight Distance

5. **Prior to the development commencing, amended plans showing revised locations of vehicle access points for Lots 1 and 2 must be provided. These locations must consider minimum sight distances in accordance with Austroads guidelines, to the satisfaction of Council. Once approved, these plans will be endorsed and form part of the permit. Prior to issue of Statement of Compliance under the *Subdivision Act 1988*, the Developer/Applicant shall construct these access points to the satisfaction of Council.**

Vehicle Crossing

6. **Prior to any development on Lot 3, a review of the existing vehicle crossing must be undertaken, in consultation with Council, to ensure compliance with modern traffic standards.**
   Note: This crossing will need to be relocated to support future use.

Environmental Health Department

7. **An application to install an onsite wastewater management system must be submitted to Council in respect of each lots 1 and 2. In addition, the Land Capability Assessment submitted with the original 4-lot proposal must be revised to reflect the updated 3-lot subdivision layout and resubmitted to Council.**
8. **A secondary wastewater management system is required to be installed on each lots 1 and 2.**

Removal of Building

9. **The shed shown on the endorsed plan must be removed from the land prior to the issue of the Statement of Compliance.**

Residential Reticulated Gas Service Connection

10. **Any lot shown on the endorsed plan must not be connected to a reticulated gas service (within the meaning of clause 53.03 of the Gannawarra Planning Scheme). This does not apply to:**
    - **a lot that will not be used for, or include, a dwelling; or**
    - **a lot that contains an existing dwelling or apartment; or**
    - **a lot where a permit has been granted for a dwelling or apartment on the land in the lot.**

    This condition continues to have force and effect after a statement of compliance under the *Subdivision Act 1988* has been issued and the subdivision authorised by this permit has been completed

Public Open Space

11. **The applicant or owner must pay to the Responsible Authority a sum equivalent to 5% of the site value of all the land in the subdivision. This payment shall be made prior to the issue of a Statement of Compliance.**

Native Vegetation

12. **No native vegetation may be removed, destroyed or lopped unless in accordance with an exemption in clause 52.17-7 of the Gannawarra Planning Scheme.**

Building Envelope

13. **All buildings on Lots 1 and 2 must be within the building envelopes for those lots as shown on the endorsed plan, unless with the consent in writing of the Responsible Authority.**

Goulburn Murray Water

14. **Any Plan of Subdivision lodged for Certification must be referred to Goulburn Murray Rural Water Corporation pursuant to section 8(1)(a) of the *Subdivision Act 1988*.**

15. **Prior to Certification of the Plan, the applicant must either:**
    a. **make application to Goulburn Murray Water pursuant to sections 224 and 229 of the *Water Act 1989* to: terminate or transfer the delivery shares in relation to the property; make a declaration that the property cease to be a serviced property (to effect excision from the district); or alternatively**
    b. **demonstrate to Goulburn Murray Water reasonable satisfaction the means by which a Goulburn Murray Water water supply will be metered and delivered to the lots created by the subdivision, bearing in mind requirements for water use licences and annual use limits.**
16. **The Plan of Subdivision submitted for Certification must show:**
    a. **A building and works exclusion zone on Lot 1 and Lot 3 to prevent any future buildings or works being located within 30 metres of Goulburn Murray Water's No. 4 Channel.**
    b. **A wastewater exclusion zone on Lot 1 and Lot 3 to prevent any future wastewater disposal areas from being located within 30 metres of Goulburn-Murray Water's No. 4 Channel. This restriction must also identify that wastewater from Lot 1 and Lot 3 must be treated to a secondary standard.**

Lower Murray Water

17. **Detailed plans showing proposed driveways must be provided to Lower Murray Water to determine if the driveway/s will be clear of existing service connections and/or to inform any requirements for the protection of its existing assets and services, prior to commencement of any excavations or works required for construction of the driveway/s. Any costs associated with alterations to existing service connections or to Lower Murray Water assets as a result of new driveway/s must be met by the developer.**
18. **The plan of subdivision submitted for certification under the *Subdivision Act 1988* must be referred to Lower Murray Water pursuant to section 8 of that Act.**
19. **The requirements of Lower Murray Water must be met, regarding the provision of water supply to the land, including payment of all associated costs prior to the Corporation agreeing to the issue of a Statement of Compliance.**
20. **Developer to enter into a Developer Design & Construct Agreement with Lower Murray Water to extend the water reticulation, subject to LMW undertaking and the outcome of a hydraulic and financial viability assessment.**
21. **The subdivider/developer or authorised agent must supply Lower Murray Water with a copy of the approved and signed Engineering Plan, which has been endorsed for construction, prior to the commencement of construction.**
22. **The subdivider/developer or authorised agent must supply Lower Murray Water with a copy of the final services layout plan (Co-ordination plan), which has been fully signed by the Council and all relevant service authorities, prior to the commencement of construction of works.**
23. **A water main must be constructed across the full frontage of the lots with all costs to be met by the developer.**
24. **A New Customer Contribution for Water is applicable for proposed Lots 1 & 2.**

North Central Catchment Management Authority

25. **Prior to certification, a suitable restriction is to be placed on the title which specifies the minimum floor level of any new dwelling(s) on each new allotment. The minimum floor level must be no lower than 0.3 metres above the applicable 1% AEP flood level 77.5 metres AHD (i.e. no lower than 77.8 metres AHD).**

Note: Flood levels for the 1% AEP (100-year ARI) flood event have been estimated for this area under provisions of the Water Act 1989. The applicable 1% AEP flood level for the location described above is 77.5 metres AHD.
North Central CMA advises that in the event of a 1% AEP flood event it is possible that the property may be subject to inundation from Murray River. However, it is recommended that a licensed surveyor be engaged to determine the exact effect of the applicable flood level on the property.

Powercor

26. **The plan of subdivision submitted for certification under the *Subdivision Act 1988* shall be referred to the Distributor in accordance with section 8 of that Act.**
27. **The applicant shall provide an electricity supply to all lots in the subdivision in accordance with the Distributor's requirements and standards.**
Note: Extension, augmentation or rearrangement of the Distributor's electrical assets may be required to make such supplies available, with the cost of such works generally borne by the applicant.
28. ***The applicant shall ensure that existing and proposed buildings and electrical* installations *on the subject land are compliant with the Victorian Service and Installation Rules (VSIR).***
Note: Where electrical works are required to achieve VSIR compliance, a registered electrical contractor must be engaged to undertake such works.
Note: It is recommended that applications for electricity supply to each lot be submitted at the earliest opportunity so that the precise requirements of the Distributor can then be determined and accommodated. Applications for electricity supply shall be submitted via the Distributor's web portal, "mySupply" which can be accessed via the following link: https://customer.portal.powercor.com.au/mysupply/CIAWQuickCalculator

Telecommunications

29. **The owner of the land must enter into an agreement with:**
    a. **a telecommunications network or service provider for the provision of telecommunication services to each lot shown on the endorsed plan in accordance with the provider's requirements and relevant legislation at the time; and**
    b. **a suitably qualified person for the provision of fibre ready telecommunication facilities to each lot shown on the endorsed plan in accordance with any industry specifications or any standards set by the Australian Communications and Media Authority, unless the applicant can demonstrate that the land is in an area where the National Broadband Network will not be provided by optical fibre.**
30. **Before the issue of a Statement of Compliance for any stage of the subdivision under the *Subdivision Act 1988*, the owner of the land must provide written confirmation from:**
    a. **a telecommunications network or service provider that all lots are connected to or are ready for connection to telecommunications services in accordance with the provider's requirements and relevant legislation at the time; and**
    b. **a suitably qualified person that fibre ready telecommunication facilities have been provided in accordance with any industry specifications or any standards set by the Australian Communications and Media Authority, unless the applicant can demonstrate that the land is in an area where the National Broadband Network will not be provided by optical fibre.**

Expiry of Permit

31. **This permit as it relates to development (subdivision) will expire if one of the following circumstances applies:**
    a. **The plan of subdivision has not been certified under the *Subdivision Act 1988* within 2 years of the issued date of this permit.**
    b. **A statement of compliance is not issued within 5 years of the date of certification.**

    In accordance with section 69 of the *Planning and Environment Act 1987*, an application may be submitted to the responsible authority for an extension of the periods referred to in this condition.

Useful Information:

1. ***Any new or otherwise vehicular entrances to the subject land from the road, must be constructed at a location and of a size and standard satisfactory to the Responsible Authority. Consent for 'Works Within the Road Reserve' must be obtained from Council prior to carrying out any vehicle crossing works.***
2. ***Note that a small abattoir was formerly located on Lot 1 near the western boundary. The site is within the exclusion area 30 metres from GMW's No. 4 Channel.***

EXECUTIVE SUMMARY

This report is being presented to Council to determine a planning application for a three lot subdivision [re-subdivision from five lots], at 10 Dalton Street, Koondrook.

The application was advertised to surrounding property owners and occupiers and one written objection was received.

The proposal is considered to be appropriate for the site and consistent with the provisions of the Gannawarra Planning Scheme. The application has therefore been recommended for approval with conditions.

PURPOSE

To seek Council's decision on planning application P25022 for a three lot subdivision.

BACKGROUND INFORMATION

The parcels of land relevant to this application are Lot 1 LP119887, CA 66 Parish of Murrabit, CA 19D Parish of Murrabit, Lot 2 LP95459 and CA 55 Parish of Murrabit. These five parcels of land as a collective form part of 10 Dalton Street, Koondrook.

Lot 1 LP119887 comprises an area of approximately 2.32 acres, CA 66 Parish of Murrabit comprises an area of around 3.24 acres, CA 19D Parish of Murrabit comprises an area of roughly 2.78 acres, Lot 2 LP95459 comprises an area of about 3.91 acres and CA 55 Parish of Murrabit comprises an of approximately 4.90 acres.

The subject site as a whole is irregular in shape. Some parcels of land front View Street. Other parcels of land adjoin Burnett Street. Lot 1 LP119887 directly adjoins an open GMW irrigation channel to the west and an unmade road borders three of the parcels of land to the north.

The subject land is dual zoned with the south western proportion being zoned Low Density Residential Zone and the remainder of the property zoned, Industrial 3 Zone. The property is laid out for farming purposes and is clear of buildings aside from a shed which is constructed towards the south west corner of the site. Some planted vegetation is established towards the southern

property boundary and some gum trees are established to the western perimeter, a number of gum trees are also scattered across the site.

The property is located towards the edge of Koondrook's township. Land to the north comprises a mix of residential types including General Residential Zone and Low Density Residential Zone, most of which have been developed upon. Land to east/south east comprises more Industrial 3 Zone land. A pocket of General Residential Zone is also located to the east of the subject land, most of these residential lots and the industrial land to the east has been developed. Land to the south comprises vacant Low Density Residential Zone land. Land to the west is zoned Farming. While the farming land on the opposite side of the GMW channel is a well-established irrigable agricultural land the farm land on the south side of View Street, within 400m of the subject land, contains a number of semi-rural lifestyle properties.

This proposal seeks to undertake the re-subdivision of land with the existing five lots being modified to become three. The proposed subdivision will create two lots within the Low Density Residential Zone with the third parcel comprising entirely of Industrial 3 Zone Land.

Proposed Lot 1 comprises an area of 11,670m^2 with vehicular access to the lot to be provided from View Street. Proposed Lot 2 comprises an area of 7,899m^2 vehicular access to this lot is also proposed to be provided from View Street. Proposed Lot 3, the Industrial 3 Zone allotment, is 50,141m^2 in size. Access to this proposed lot is to be provided from the existing driveway provided to CA 19D Parish of Murrabit which is located near the intersection of Burnett Street and View Street. New or additional street access might be required in future to develop this lot for industrial use.

It should be noted that the planning application originally submitted to Council sought approval for a four lot subdivision whereby it was sought to create three lots within the Low Density Residential Zone and the remaining lot comprising the balance of Industrial 3 Zone Land. An amendment to the planning permit application pursuant to section 57A of the *Planning and Environment Act 1987* was received on 12 January 2026. The amendment sought to revise the lot layout with the number of lots created reducing from four to three.

This change in layout design was in part derived from the findings and recommendations of a Preliminary Site Investigation carried out upon the subject land.

As part of the initial assessment of the original planning application, Planning Officers requested that a PSI be undertaken for those lots proposed to be located within the Low Density Residential Zone. The purpose of the PSI was to identify any possible sources of land contamination. Whilst CA 66 Parish of Murrabit and the majority of Lot 1 LP119887 are currently zoned Low Density Residential Zone these lots are and have historically been used for agricultural purposes. Whilst most agricultural land is not likely to be contaminated it is necessary to consider whether specific contaminating activities may have occurred over time which may have impacted on the soil and land i.e. commercial use of pesticides, farm waste disposal, biosolids application to land etc. This is part of Council's decision making process for all planning applications with one of the matters which Council must consider per clause 65.01 of the Gannawarra Planning Scheme, before deciding upon an application, being any significant effects the environment including the contamination of land may have on the use or development. Results from the PSI showed no evidence of soil contamination however it was found that a former abattoir was present on the site. The report indicated that the small scale of the former abattoir and long-ago closure suggest only a medium contamination risk. Whilst the authors of the report were of the opinion that the historical agricultural use is unlikely to have resulted in contamination at the site it was their recommendation that an EPA-appointed Environmental Auditor be engaged to complete a Preliminary Risk Screen Assessment. Due to the substantive costs associated with preparing a PRSA the applicant sought to

revise their subdivision to reduce the number of lots within the Low Density Residential Zone from three to two. As no new additional lots, which provide an opportunity for further low density residential development, are sought as part of this proposed revised subdivision layout it has been considered that a PRSA is no longer required to be prepared.

With respect to Lot 2 LP95459, CA 19D Parish of Murrabit, CA 66 Parish of Murrabit and CA 55 Parish of Murrabit it should be pointed out the each allotment contains a covenant that prevents:

- Pigs or poultry being kept or maintained on any part of the land;
- Any part of the land being used in any manner so as to cause annoyance or nuisance or disturbance to the occupier/occupiers of Lot 1 on Plan of Subdivision 95459;
- The removal or destruction of trees within a radius or distance of 300 feet from the north-east corner of Lot 1 Plan of Subdivision 95459.
- Interference to any existing guy-wire fence between the property and Lot 1 Plan of Subdivision 95459.

The overall intention of the covenant is to protect the amenity of neighbouring parcel of residential land, Lot 1 of LP95459, however it does not preclude subdivision or development of the land.

CONSULTATION

The application originally submitted to Council was referred to Lower Murray Water, Goulburn Murray Water and Powercor pursuant to section 55 of the *Planning and Environment Act 1987* (the Act). LMW, GMW and Powercor offered no objection to the granting of a planning permit subject to conditions.

Notice of the application was given to NCCMA under section 52 of the Act. The authority offered no objection to the grant of a permit subject to conditions and the provision of flood level advice.

The application was referred internally to Council's Engineering and Environmental Health Department, neither department offered any objections. Both Departments provided conditions with respect to the proposed development.

It should be noted that the amended planning application submitted to Council on 12 January 2026 was re-referred to the above authorities. No objections were received to the revised re-subdivision layout with all servicing agencies providing conditions to be included alongside any approval granted.

Notice of the original planning permit application was given to adjoining property owners on 15 September 2025.

A written objection to the application was received. The key issues raised in the objection were:

- Question regarding whether any buffer zones or setbacks are proposed to be provided between the Industrial Zone 3 land and new proposed residential lots within Low Density Residential Zone land to reduce potential conflicts. Clarification was sought regarding the implication of any buffer distances to surrounding businesses already established within the Industrial Zone. The strategic importance of this area of industrial zoned land to the township of Koondrook was highlighted both in terms of future economic growth and employment opportunities.
- Concern regarding the section of road along View Street, which services the proposed subdivision, being unsealed. It was indicated that the increase in traffic from additional dwellings to the proposed new residential lots will intensify dust, erosion and general wear on the road. It was also commented that unsealed roads are harder to maintain and safety concerns may arise particularly during wet weather with more vehicles travelling along the

road to access the dwellings. The importance of providing adequate infrastructure to support the new lots was highlighted and as such it was requested that a condition be placed alongside the planning permit requiring the road to be sealed.

Following receipt of the objection a copy of the correspondence was forwarded to the permit applicant's representative for consideration/comment to which a response was received on 22 October 2025. In respect to the first matter raised it was advised that no changes to land zoning will occur as part of the current application, with the industrial land zoning that applies to the north eastern portion of the subject site remaining unchanged. It was also commented that as part of this planning application no development is proposed on the portion of the site zoned Industrial 3 and that buffer distances should be considered as part of any future development of the industrial portion of the subject site.

With regards to the second matter raised it was highlighted that the road which provides access to the subject site is a gravel all weather road which also provides access to a number of other residences to the west of the subject site. It was commented that the road is a similar condition to many other unsealed roads in Koondrook. Furthermore, it was implied that a requirement to seal the road as part of the subdivision would render the current proposal unfeasible given the small increase in the number of low density residential allotments proposed. It is the applicant's contention that the proposal will result in very minor overall increase in traffic movements. It was concluded by the permit applicants representative that any requirement to seal the road would be an unreasonable impost on the proponent particularly given the low scale of the development proposed and the large number of residents to the west of the subject site which already utilize View Street for access.

In considering the permit applicant's response to their objection and the concerns raised the objector indicated in their response dated 13 November 2026 that they remain concerned about the proposed increase in traffic from the new residential blocks and the impact to the road network along View Street in terms of safety, amenity and maintenance. It was once again requested that View Street be upgraded via road sealing.

It is noted that a copy of the amended planning permit application was forwarded to the permit objector to advise of the proposed change in subdivision layout. Particular attention was drawn to the fact that the proposal now only seeks approval for two low density residential lots and not three low density residential allotments as per the original design layout. Correspondence was received from the submitter on 30 March 2026 to which they indicated they wished to uphold their original objection.

No mediation session between the permit applicant and objector has occurred with the application being presented to Council for a decision.

ASSESSMENT

As mentioned previously the subject land as a whole comprises five separate parcels of land. CA 55 Parish of Murrabit, Lot 2 LP95459 and CA 19D Parish of Murrabit are zoned Industrial 3 Zone. CA 66 Parish of Murrabit is zoned Low Density Residential Zone. Lot 1 LP119887 is in two zones, the southern portion of the allotment is zoned Low Density Residential Zone and the northern proportion of the allotment is zoned Industrial 3 Zone.

One of the purposes of the Low Density Residential Zone (LDRZ) is 'To provide for low-density residential development on lots which, in the absence of reticulated sewerage, can treat and retain all wastewater.' Clause 32.03-3 of the Gannawarra Planning Scheme states that a permit is required to subdivide land in the LDRZ. Where lots are not connected to reticulated sewerage, the minimum

lot size each lot must be is at least 0.4 hectares (4,000m^2). Both Lot's 1 and 2, which are proposed low-density residential allotments, are located outside Lower Murray Water's Sewer District. The Conceptual Layout Plan dated 16 December 2025 indicates that both proposed lots exceed the minimum lot size requirement. Proposed Lot 1 comprises an area of 11,670m^2 and proposed Lot 2 comprises an area of 7,899m^2.

The Conceptual Layout Plan also specifies building offsets for both proposed residential allotments. The Plans indicate that no building is to be constructed within the following setbacks of proposed Lot 1:

- 30 meters of the western boundary;
- 5 meters of the northern boundary;
- 5 meters of the eastern boundary and
- 20 meters of the southern boundary (View Street frontage)

The Plans indicate that no building is to be constructed within the following setbacks of proposed Lot 2:

- 5 meters of the western boundary;
- 5 meters of the northern boundary;
- 5 meters of the eastern boundary and
- 20 meters of the southern boundary (View Street frontage)

To ensure compliance with the application requirements of clause 32.03-5 these building offsets are to be formalised as building envelopes and be shown on the plan of subdivision lodged for certification.

Whilst the Conceptual Layout Plan does not show the effluent disposal areas for proposed Lots 1 and 2, as required by clause 32.03-5, a Land Capability Assessment has been prepared and submitted in support of the planning application. It is acknowledged that the Land Capability Assessment is required to be revised to reflect the updated 3 lot subdivision layout and be re-submitted to Council, however the conclusions derived from the original assessment are likely to remain unchanged in that sustainable onsite wastewater management is feasible with appropriate mitigation measures.

In accordance with the application requirements of clause 32.03-5 the Conceptual Layout Plan has also shown for each proposed lot the driveway access point. The access point to both proposed Lot 1 and 2 is provided directly off View Street.

One of the purposes of the Industrial 3 Zone is 'To provide for industries and associated uses in specific areas where special consideration of the nature and impacts of industrial uses is required or to avoid inter-industry conflict.' Another purpose of the Industrial 3 Zone is 'To ensure that uses do not affect the safety and amenity of adjacent, more sensitive land uses.' Clause 33.03-3 of the Gannawarra Planning Scheme states that a permit is required to subdivide land in the IN3Z. There are no specific application requirements or minimum lot size requirements for an application which seeks to subdivide land in the IN3Z.

All of the five parcels of land are covered wholly by the Environmental Significance Overlay Schedule 4 (ESO4). One of the purposes of the ESO is 'To identify areas where the development of land may be affected by environmental constraints.' One of the Environmental objectives sought to be achieved by the ESO4 is 'To ensure that any development maintains the free passage and temporary storage of floodwaters, minimises flood damage, is compatible with the flood hazard and with local drainage conditions and will not cause any significant rise in flood levels or flow velocity.' Pursuant

to clause 42.01-2 a permit is required to subdivide land covered by the ESO4, no permit exemption is provided within Schedule 4 to the Environmental Significance Overlay.

Each parcel of land is also covered by the Specific Controls Overlay Schedule 2. The purpose of the Specific Controls Overlay is 'To apply specific controls designed to achieve a particular land use and development outcome in extraordinary circumstances.' This Overlay is not relevant to the assessment of this planning application.

PLANNING POLICY FRAMEWORK (PPF)

- Clause 11.01-S (Settlement): The objective is 'To facilitate the sustainable growth and development of Victoria and deliver choice and opportunity for all Victorians through a network of settlements.'
- Clause 11.01-1L-03 (Koondrook): One of the strategies listed is 'Ensure that areas for new residential development are capable of being connected to reticulated services. '
- Clause 12.01-1S (Protection of Biodiversity): The objective is 'To protect and enhance Victoria's biodiversity.'
- Clause 12.03-1S (River and riparian corridors, waterways, lakes, wetlands and billabongs): The objective is 'To protect and enhance waterway systems including river and riparian corridors, waterways, lakes, wetlands and billabongs.'
- Clause 13.02-1S (Bushfire Planning): The objective is 'To strengthen the resilience of settlements and communities to bushfire through risk-based planning that prioritises the protection of human life.'
- Clause 13.03-1S (Floodplain Management): One of the objectives is 'To assist the protection of life, property and community infrastructure from flood hazard, including coastal inundation, riverine and overland flows.'
- Clause 13.04-1S (Contaminated and potentially contaminated land): The objective is 'To ensure that contaminated and potentially contaminated land is used and developed safely.'
- Clause 13.07-1S (Land use compatibility): The objective is 'To protect community amenity, human health and safety while facilitating appropriate commercial, industrial, infrastructure or other uses with potential adverse off-site impacts.'
- Clause 14.02-1S (Catchment Planning and Management): The objective is 'To assist the protection and restoration of catchments, waterways, estuaries, bays, water bodies, groundwater, and the marine environment.'
- Clause 14.02-2S (Water quality): The objective is 'To protect water quality.'
- Clause 15.01-1S (Urban Design): The objective is 'To create urban environments that are safe, healthy, functional and enjoyable and that contribute to a sense of place and cultural identity.'
- Clause 15.01-2L (Building Siting – Gannawarra): One of the strategies listed is 'Support development that responds to the streetscape of the neighbourhood and the location of adjacent dwellings and other buildings in the Low Density Residential Zone and the Township Zone.'
- Clause 15.01-3S (Subdivision Design): The objective is 'To ensure the design of subdivisions achieves attractive, safe, accessible, diverse and sustainable neighbourhoods.'
- Clause 15.01-5S (Neighbourhood Character): The objective is 'To recognise, support and protect neighbourhood character, cultural identity, and sense of place.'
- Clause 16.01-1S (Housing Supply): The objective is 'To facilitate well-located, integrated and diverse housing that meets community needs.'

- Clause 18.02-4L (Roads-Gannawarra): One of the strategies listed is 'Ensure use and development does not detrimentally affect the service and safety functions of declared roads within towns for through traffic.'
- Clause 19.03-2L (Infrastructure and Design Provision): The strategy listed is 'Provide a consistent approach to the design and construction of infrastructure across the municipality.'

PARTICULAR PROVISIONS

- Clause 52.17 (Native Vegetation): Whilst planning approval is not sought as part of this application to remove native vegetation, Council must consider whether the proposed development is likely to involve, or lead to, the consequential removal of native vegetation should a planning permit be granted to subdivide the land.

  It is possible that some of the trees located towards the southern boundary of CA 66 Parish of Murrabit will be removed in order to construct a boundary fence between proposed Lots 1 and 2. These trees are planted vegetation with aerial imagery indicating that this row of trees was planted a minimum of 13 years ago. This vegetation is exempt from the requirement to obtain a permit per clause 52.17-7.

  One of the gum trees near the shared boundary of proposed Lot 1 and 3 may also sought to be removed in order to construct a boundary fence between these two proposed lots. It is important to not the Fences exemption at clause 52.17-7 may only be able to be relied upon once one of the lots is sold and transferred into separate ownership.

  Planning approval would almost certainly be required to remove any of the other native vegetation located on the subject land. Given all three proposed lots exceed an area of 0.4 hectares (4,000m2) the Site Area exemption at clause 52.17-7 can not be relied upon.

  It is important to ensure that native vegetation can be removed, destroyed or lopped only in accordance with an exemption in clause 52.17-7 or in accordance with a planning permit.

- Clause 52.37 (Canopy Trees): The provision of this clause does not apply to this planning application. Permit requirements pertaining to the removal, destruction or lopping of a canopy tree only apply to land zoned Mixed Use Zone, Township Zone, Residential Growth Zone, General Residential Zone, Neighbourhood Residential Zone, and Housing Choice and Transport Zone.
- Clause 53.01 (Public Open Space Contribution and Subdivision): A person who proposes to subdivide land must make a contribution to the council for public open space in an amount specified in the schedule to the clause (being a percentage of the land intended to be used for residential, industrial or commercial purposes, or a percentage of the site value of such land, or a combination of both). If no amount is specified, a contribution for public open space may still be required under section 18 of the *Subdivision Act 1988*.

  Matters which Council consider in determining whether a public open space requirement is required to be made as a result of a subdivision is set out under part 18(1A) of the *Subdivision Act 1988*.

- Clause 53.02 (Bushfire Planning): One of the purposes of the clause is 'To ensure that the development of land prioritises the protection of human life and strengthens community resilience to bushfire.' As all parcels of land are in a designated bushfire prone the provisions of clause 53.02-6 apply to this planning application.

It is noted that this planning application was received by Council prior to the introduction of Amendment VC248. However as there are no transitional provisions, Council as the responsible authority, must consider as appropriate the decisions guidelines of clause 53.02-6 (Bushfire Prone Areas).

Clause 53.02-6 includes guidelines for consideration where proposed subdivisions are located in a designated Bushfire Prone Area. The guidelines include considering the bushfire risk and the distance from any bushfire hazard.

The bushfire risk is regarded as low, with only scattered vegetation on land to the north and west. The two low-density residential lots to be created each have good road access and a reticulated water supply.

- Clause 53.03 (Residential Reticulated Gas Service Connection): The purpose of this clause is 'To prohibit residential reticulated gas connections to new dwellings, new apartment developments and new residential subdivisions.' The clause applies to application for a permit under any provision of this scheme that is for or includes the subdivision of land where the subdivision provides for or is for one or more purposes that include residential development.
- Clause 53.18 (Stormwater Management in Urban Development): The purpose of this clause is 'To ensure that stormwater in urban development, including retention and reuse, is managed to mitigate the impacts of stormwater on the environment, property and public safety, and to provide cooling, local habitat and amenity benefits.' The provision of this clause applies in part to this planning application this is given the application includes industrial land. The three lots are each large enough to retain and absorb stormwater as required by Condition 4.

THE DECISION GUIDELINES OF CLAUSE 65:

The Decision Guidelines have been considered by officers in evaluating this application.

The proposal is considered generally consistent with clauses 65.01 and 65.02.

RELEVANT PLANNING SCHEME AMENDMENTS:

Nil.

DISCUSSION

The proposed subdivision (re-subdivision), in part, ultimately seeks to consolidate the IN3Z parcels of land into one large holding. The proposal will largely result in no physical changes on ground to proposed Lot 3 other than the likely provision of boundary fencing separating this allotment from proposed Lots 1 and 2. The change resulting from the proposed subdivision will predominately be reflected on title. Any proposal to further subdivide or develop this allotment would be subject to separate planning approval, with any application received assessed on its merits.

With respect to proposed Lots 1 and 2 it is noted that both lots will be required to be provided with telecommunication services, reticulated water supply and electricity supply in accordance with servicing agencies requirements. In terms of drainage provisions, the Engineering Department have considered that the allotments are a sufficient size to adequately retain all stormwater and surface water runoff onsite. Given both allotments are located outside Lower Murray Water's sewer district and as no extension to connect to reticulated sewer is proposed each property must install an onsite wastewater management system in accordance with the Environmental Health Department's regulations and requirements. Whilst the OWMS's may not be installed onsite until after the subdivision is finalised and once the lots are sought to be developed upon the Land Capability

Assessment prepared as part of the initial planning application submitted to Council indicates that sustainable onsite wastewater management is feasible with appropriate mitigation measures, as outlined within the report.

Whilst some native vegetation has been identified throughout the property the majority of this vegetation will not be impacted as a consequence of the grant of a planning permit, this is given each proposed lot exceeds a site area of more than 4,000m^2. Should any native vegetation sought to be removed in order to construct a boundary fence between the properties once new titles are issued and the land is held in separate ownerships, vegetation may only be removed in the manner described in the Fences Exemption, listed at clause 52.17-7 otherwise planning permission will be required to be sought.

Results from the Preliminary Site Investigation undertaken, to assess potential soil contamination due to historical farming activities, showed no evidence of soil contamination. A former small scale private abattoir was identified as being present on the site which was operational until approximately the 1980s, this is the building located towards the south west of Lot 1 LP119887. It was commented by authors of the report that whilst the presence of a former abattoir typically indicates a high potential for contamination, the small scale of the facility and the considerable time since its closure suggest that the contamination risk is more appropriately classified as medium. It was recommended that a Preliminary Risk Screen Assessment be carried out to the western portion of the site by an EPA Victoria-appointed Environmental Auditor to identify if the land is suitable for intended site development or if it requires an audit. However, the western portion of lot 1 is outside the building envelope so no buildings are permitted in this area. The wastewater fields are also not permitted in this area. For this reason, no further assessment of the land seems necessary. Land outside the building envelope can be used for driveway access, gardening and the like.

Consideration has been given to the potential impact of the proposed subdivision upon the passage of overland flows and the compatibility with flood hazard. The application was referred to NCCMA, the key agency in flood planning and management, with no objections to the proposed development being provided by NCCMA.

The whole of the property is located within a designated bushfire prone area. Recent amendments introduced by the State Government to all Planning Schemes across Victoria, viaAmendment VC248, now requires an application under any provision of the planning scheme to subdivided land in a bushfire prone area to consider the provisions of clause 53.02-6. It is considered that the proposed subdivision adequately responds to bushfire hazard with reticulated water required to be provided to both low density residential lots and appropriate road access from View Street.

Council Officers have considered the concerns raised by the objector regarding the impact the proposed subdivision may have on the condition of the road network specifically in terms of View Street. It is important to point out that notice of this planning application was sent to Council's Engineering Department, and they offered no objections to the proposal. In considering the proposal Council's Engineering Department would have had regard to potential impacts of increased traffic volumes on the local road network as a result of the proposed re-subdivision. This has not been raised as a concern by the Engineering Team with the existing street network considered able to accommodate the anticipated increase in daily traffic movements without requiring any sealing or upgrades. It is important to note that only two new additional vehicular entrances are to be provided to View Street as a result of this proposal, this is unlikely to result in a significant increase in traffic volumes.

It is important to reiterate that CA 66 Parish of Murrabit and the majority of Lot 1 LP119887 are already zoned Low Density Residential Zone. Whilst a dwelling could be established as of right as it presently stands on CA 66 Parish of Murrabit, subject to relevant planning requirements being met,

the proposed re-subdivision provides for an extra lot capable of low density residential development. Noting that the existing lot layout of Lot 1 LP119887 constrains its ability to be developed for residential purposes given its proximity to Goulburn Murray Water's open channel. The proposed lot sizing and provision of building envelopes to proposed Lots 1 and 2 will ensure the semi-rural/lifestyle characteristics which is prevalent to the west of the site are maintained. The proposal recognises the transition from the fringe of Koondrook's urban settlement to the neighbouring rural agricultural landscape.

OPTION ANALYSIS

Council has two options in relation to this report:

1. To approve Planning Application P25022 and issue a Notice of Decision to grant a planning permit subject to appropriate conditions. The objector has the opportunity to appeal to Council's decision at VCAT.
2. To refuse Planning Application P25022 and issue a Notice of Refusal stating the grounds of refusal. The permit applicant has the opportunity to appeal Council's decision at VCAT.

RISK IMPLICATIONS

There are no risk implications to Council.

FINANCIAL IMPLICATIONS

No significant financial impacts anticipated for Council.

CONCLUSION

The proposed development is considered to be appropriate for this site.

The application was advertised to adjoining property owners, and one written objection was received.

It is considered that the proposal is generally consistent with the Gannawarra Planning Scheme, in particular clauses 32.03 and 56.

Given the above, it is recommended that the application be approved subject to conditions as outlined earlier in this report.

COUNCIL PLANS AND POLICIES

Goal 2: Growth - Grow the Gannawarra through a diverse and broad economy.
3. Plan land use to enable growth and expand housing opportunities.

TRANSPARENCY OF COUNCIL DECISIONS

This report will be considered in an open Council Meeting.

CONFLICT OF INTEREST

The officer preparing this report declares that they have no conflict of interest in this matter.

ATTACHMENTS

1. PA Application Form P 25022 Redacted [**7.3.1** - 4 pages]
2. 10 Dalton - Report - VIC Redacted [**7.3.2** - 26 pages]
3. 22057 C P 01 C 6 Redacted [**7.3.3** - 2 pages]
4. Updated S 1444 LCA V 2 Redacted [**7.3.4** - 18 pages]

5. Scaada Report Redacted reduced [**7.3.5** - 145 pages]
6. 2 on P S 95459 - title Redacted [**7.3.6** - 1 page]
7. 2 on P S 95459 - title plan [**7.3.7** - 2 pages]
8. Lot 1 on 119887 - title Redacted [**7.3.8** - 1 page]
9. Lot 1 on 119887 - title plan [**7.3.9** - 2 pages]
10. C A 19 D - title Redacted [**7.3.10** - 1 page]
11. C A 19 D - title plan [**7.3.11** - 2 pages]
12. CA 55 and 56 - title Redacted [**7.3.12** - 1 page]
13. CA 55 and 56 - title plan [**7.3.13** - 2 pages]

GANNAWARRA Shire Council

Office Use Only		Fee:	
Application No.:		Receipt No.:	
Date Lodged:	19/05/2025	Ward:	
Date Allocated:		Zone(s):	
Allocated to:		Overlays(s):	

Planning Enquiries
Phone: (03) 5450 9333
Web: www.gannawarra.vic.gov.au

Application for

Planning Permit

Use this form to make an application for a planning permit and to provide the information required by section 47 of the *Planning and Environment Act 1987* and regulations 15 and 38 of the Planning and Environment Regulations 2005.

Supplementary information requested in this form should be provided as an attachment to your application. ▨ Please print clearly or complete the form electronically (refer to How to complete the Application for Planning Permit form).

Privacy notice

Information collected with this application will only be used to consider and determine the application. It will be made available for public inspection in accordance with section 51 of the *Planning and Environment Act 1987.*

Need help with the application?

If you need help to complete this form, read *How to complete the Application for Planning Permit form*. For more information about the planning process, refer to *Planning: a Short Guide*. These documents are available from your local council, the Planning Information Centre (Ph: 03 9637 8610, 8 Nicholson Street, Melbourne), or www.dse.vic.gov.au/planning.

Contact council to discuss the specific requirements for this application and obtain a planning permit checklist. Insufficient or unclear information may delay your application.

① Has there been a pre-application meeting with a council officer?

☐ Yes ☐ No

If yes, with whom?: Date:

The Land

② Address of the land. Complete the Street Address and one of the Formal Land Descriptions.

Street Address

Street No.: 10	Street Name: Dalton Street
Suburb/Locality: Koondrook	Postcode: 3580

Formal Land Description
⚠This information can be found on the certificate of title.

☐ ○ Lodged Plan ○ Title Plan ○ Plan of Subdivision ☐

OR

③ Title Information

④ Describe how the land is used and developed now.

eg. single dwelling, three dwellings, shop, factory, medical centre with two practitioners, licensed restaurant with 80 seats.

☐ ☑ Attach a full, current copy of title information for each individual parcel of land, forming the subject site.

Vacant farmland with shed in south-western corner

☐ ☑ Attach a plan of the existing conditions. Photos are also helpful.

The Proposal

⚠ You must give full details of your proposal and attach the information required to assess the application. If you do not give enough detail or an adequate description of the proposal you will be asked for more information. This will delay your application.

⑥ For what use, development or other matter do you require a permit?

Read How to complete the Application for Planning Permit form if you need help in describing your proposal.

Subdivision (5 lots into 4)

⑦ Encumbrances information about the proposal.

Contact council or refer to council planning permit checklists for more information about council's requirements.

☑ Attach additional information providing details of the proposal, including:

☐ Any information required by the planning scheme, requested by council or outlined in a council planning permit checklist.

☐ Plans showing the layout and details of the proposal.

☐ If required, a description of the likely effect of the proposal (eg. traffc, noise, environmental impacts).

⑧ Encumbrances on title.

Encumbrances are identified on the certificate of title.

Is the land affected by an encumbrance such as a restrictive covenant, section 173 agreement or other obligation on title such as an easement or building envelope?

Attach a copy of the document (instrument) specifying the details of the encumbrance.

Does the proposal breach, in any way, the encumbrance on title?

No, go to 9.

Yes, contact council for advice on how to proceed before continuing with this application.

⚠ **Note**

Council must not grant a permit that authorises anything that would result in a breach of a registered restrictive covenant (sections 61(4) and 62 of the Planning and Environment Act 1987).

Contact council and/or an appropriately qualified person for advice.

Costs of buildings and works/permit fee

Most applications require a fee to be paid. Where development is proposed, the value of the development affects the fee. Contact council to determine the appropriate fee.

⑨ Estimated cost of development for which the permit is required.

Cost $240,000.00

⚠ You may be required to verify this estimate.

Write 'NIL' if no development is proposed (eg. change of use, subdivision, removal of covenant, liquor licence)

⑩ Do you require for the permit fee?

☐ Yes ☐ No

Contact, applicant and owner details

Provide details of the contact, applicant and owner of the land.

Contact

The person or organisation (who is not the applicant) that Council will be communicating with about the application

Name: [redacted]

Organisation (if applicable): Acre Town Planning

Postal address:

Postcode:

Contact phone: [redacted] ☐

Mobile phone: ☐

Email: [redacted] ☐

Fax: ☐

Indicate preferred contact method

Applicant

The person or organisation who wants the permit.

☐ Same as contact. If not, complete details below.

[redacted]

Organisation (if applicable):

Postal address:

Postcode:

Owner

The person or organisation who owns the land.

☐ Same as contact. ☐ Same as applicant

Where the owner is different from the applicant or contact, provide the name of the person or organisation who owns the land.

Name: (if applicable): [redacted]

Organisation (if applicable):

Postal address:

Postcode:

Owner

☐ Same as contact. ☐ Same as applicant

The person or organisation who owns the land.

Where the owner is different from the applicant or contact, provide the name of the person or organisation who owns the land.

Name: (if applicable): [redacted]

Organisation (if applicable):

Postal address:

Postcode:

Checklist

Declaration

This form must be signed by the applicant*

⚠ Remember it is against the law to provide false or misleading information, which could result in a heavy fine and cancellation of the permit

I declare that I am the applicant; and that all the information in this application is true and correct and the owner (if not myself) has been notified of the permit application.

Signature: [redacted]

Date:19 May 2025

day / month / year

This application has been lodged online. The declaration has been electronically signed.

Lodgement

Lodge the completed and signed from and all the documents with:

Gannawarra Shire Council
Patchell Plaza, 47 Victoria Street Kerang VIC 3579
Telephone:
Fax:

For help or more information

Email: council@gsc.vic.gov.au

TOWN PLANNING REPORT

10 Dalton Street, Koondrook

Subdivision (five lots into four lots)

This report was prepared by

[redacted] Senior Town Planner
[redacted]

Acre Town Planning
PO Box 11, Barham NSW 2732
www.acretp.com.au

[redacted]

Issue	Date	Prepared by	Checked by
Draft	17/04/2025	EN	KO
Rev 1	19/05/2025	EN	

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Executive Summary

This report is prepared in support of a planning permit application at 10 Dalton Street, Koondrook. The permit application seeks consent from Gannawarra Shire Council for the subdivision of land from five lots into four lots. The subdivision will create three lots within the Low Density Residential and a balance lot within the Industrial 3 Zone.

The requirement for a planning permit is triggered under the provisions of:

- Clause 32.03-3 – Subdivision of land in the Low Density Residential Zone
- Clause 33.03-3 – Subdivision of land in the Industrial 3 Zone
- Clause 42.01-2 – Subdivision of land within the Environmental Significance Overlay Schedule 4

This report describes the proposal and provides an assessment against the relevant provisions of the Gannawarra Planning Scheme, including the Low Density Residential Zone (clause 32.03), the Industrial 3 zone (clause 33.03-3) and the Environmental significance overlay (clause 42.01).

The report concludes that the proposal is an appropriate outcome at the site. The proposal will increase the supply of low density residential lots on suitably zoned land whilst also creating a single industrial lot that can be further subdivided and developed in future. The proposal is considered a logical development outcome and is worthy of Council approval, subject to reasonable and appropriate conditions.

Introduction

Table 1 below provides a summary of the site and a high level overview of the proposal submitted to Council for assessment.

TABLE 1: SITE AND APPLICATION SUMMARY

ADDRESS	10 Dalton Street, Koondrook
TITLE DESCRIPTION	• 66\PP3230 • 1\LP119887 • 55\PP3230 • 2\LP95459 • 19D\PP3230
RESPONSIBLE AUTHORITY	Gannawarra Shire Council
PLANNING SCHEME	Gannawarra Planning Scheme
ZONE	LDRZ – Low Density Residential IN3Z – Industrial 3 Zone
OVERLAYS	ESO4 - Environmental Significance Overlay SCO2 - Specific Controls Overlay
EXISTING USE	Farmland with shed in south-west corner
PROPOSED USE	No change of use is proposed. The proposal will create three low density residential lots and a balance lot zoned industrial 3 zone.
PROPOSED BUILDINGS AND WORKS	Nil
PLANNING PERMIT TRIGGERS	Clause 32.03-3 – subdivide land within the Low Density Residential Zone Clause 33.03-3 – subdivide land within the Industrial 3 Zone Clause 42.01-2 – subdivide land within the Environmental Significance Overlay Schedule 4
PROPONENT	Kaylene and Greg Bassett
APPLICANT CONTACT DETAILS	C/- Acre Town Planning Eliza Noakes 0447 315 359 e.noakes@acretp.com.au

Site Description

The Site is identified at figures 1-4 below. Table 2 provides a summary of the key attributes of the site and surrounding locality.

TABLE 2: SITE ATTRIBUTES

SITE AREA	Total site area is 19,676sqm and comprised of 5 allotments: • 66\PP3230 • 1\LP119887 • 55\PP3230 • 2\LP95459 • 19D\PP3230
SITE DIMENSIONS	Site is irregular in shape with a max depth of 366m and a frontage to View Street of 184.1m.
CURRENT USE AND IMPROVEMENTS	Farmland with shed in south-western corner
TITLE RESTRICTIONS	The title for Crown allotment 55, 66 and 19D contains a covenant that prevents: • pigs or poultry being kept or maintained on any part of the land • any part of the land be used in any matter so as to cause annoying or nuisance or disturbance to the occupiers of Lot 1 Plan of Subdivision 95459 • Removal of destruction of trees within a distance of 300 feet from the north-east corner of Lot 1 Plan of Subdivision 95459 • Interference with any guy-wire fence between the property and Lot 1 Plan of Subdivision 95459 The covenant has no implications for the subject application.
TOPOGRAPHY	The subject site is relatively flat with a gentle fall towards the south-western corner.
VEGETATION & WATERWAYS	The subject site is largely clear of vegetation except for some established gums to the western perimeter of the site and several scattered trees across the site which are not proposed for removal. A Goulburn Murray Water Irrigation channel immediately adjoins the site to the west.
AVAILABILITY OF SERVICES	Reticulated water is currently present on the Penglase Street Intersection (400m away) and is proposed to be extended to service the proposed low density residential allotments. Electricity and telecommunications are located within the View Street road reserve and will require augmentation to service the proposal. Sewer is located to the east of the site near the Burnett Street intersection.

ACCESS AND PARKING	Access is currently from View Street via a gate in the south-western corner of the site.
HERITAGE CONSIDERATIONS	The site is not affected by a heritage overlay nor identified as an area of cultural heritage significance.
SURROUNDING LAND USES AND ZONING	The subject land is dual zoned, with the south-western portion being zoned LDRZ – Low Density Residential and the remainder zoned IN3Z – Industrial 3 Zone. The IN3Z extends to the east and southeast of the subject land. Due south of the property is further LDRZ land. To the west is land zoned farming. The land due south and to the west is farming land and undeveloped. On the adjacent side of View Street to the west are a series of lifestyle semi-rural properties. Immediately to the west of the subject land is an irrigation channel (No 4 Main Channel).

Figure1 – The Site (boundaries of existing parcels shown)

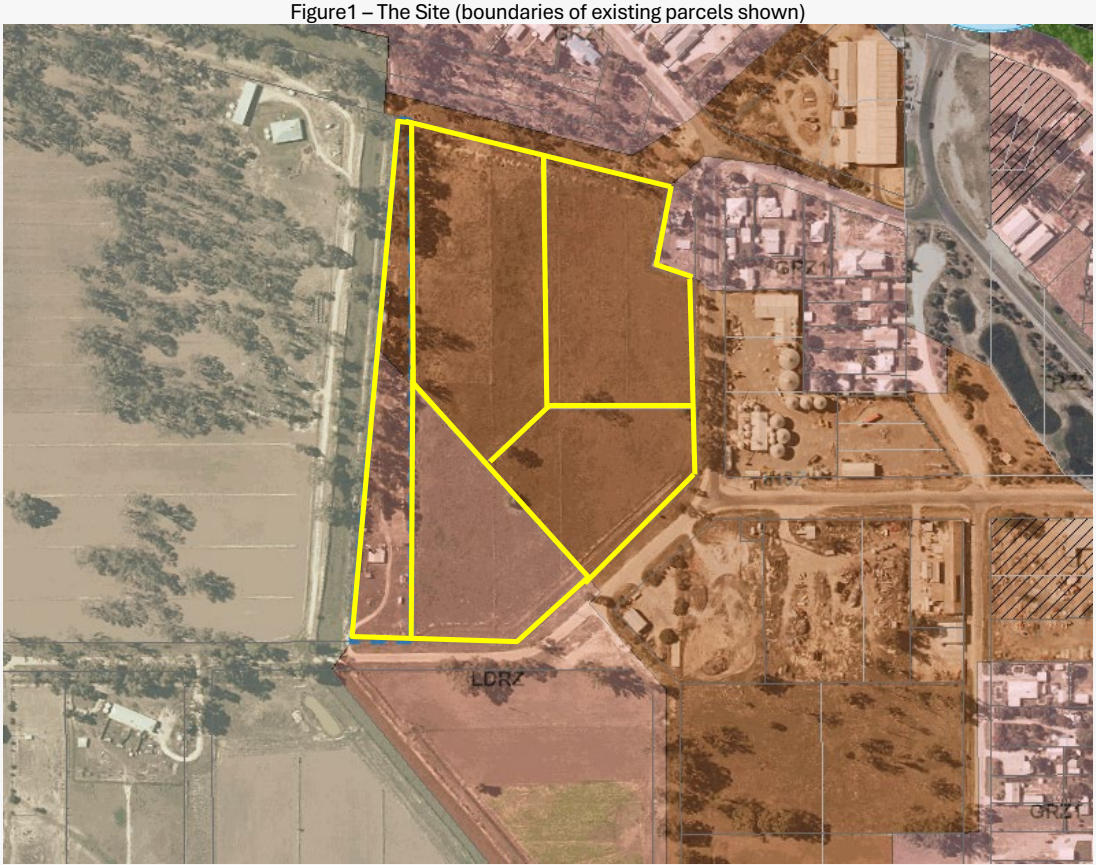


Figure 2 – Site Context

Figure 3 – Site Analysis

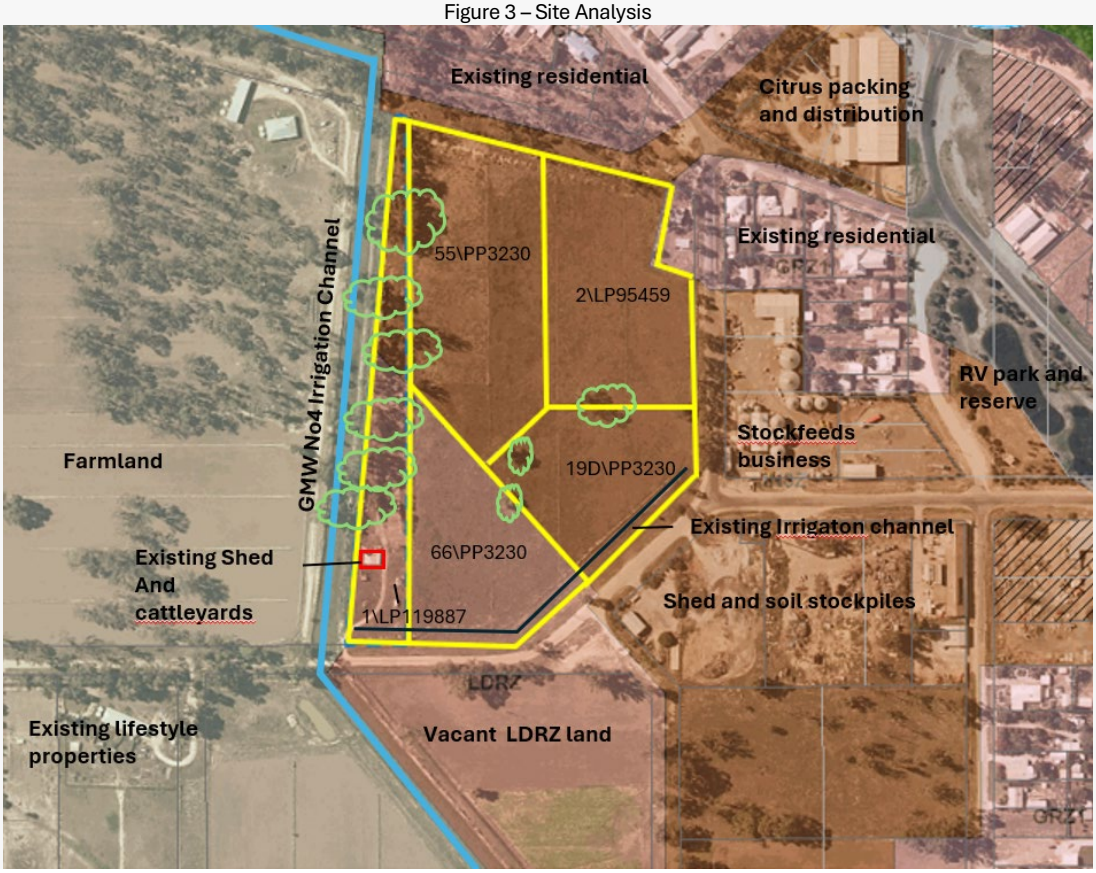


Figure 4 – Existing cattle shed and stockyards

Figure 5 – View Street facing north

Figure 6 – View Street frontage (facing north-west)

Figure 7 – The site (Irrigation channel visible just inside fence line)

Figure 8 – Adjoining Stockyards Business

Proposal

The proposal involves subdivision of five existing lots into four lots at 10 Dalton Street, Koondrook. The subdivision seeks to create three residential lots in the Low Density Residential Zone (LDRZ) and consolidates the balance land, which is zoned Industrial 3 Zone (IN3Z) into one parcel.

Proposed Lot 1 is slightly irregular rectangular shape with the following features:

- 7,326 square metres in size
- 73.6m frontage to View Street
- Depth of 105m on the western boundary and 104.6m on the eastern side
- A northern (rear) boundary of 63.7m
- A 30m building and waste water offset (secondary treatment system) from the GMW channel to the west
- 20m building offset from View Street and 5m building envelope from eastern and rear boundaries

Proposed Lot 2 is an irregularly shaped lot with the following features:

- 5,760 square metres in size
- 95.6m frontage to View Street
- Depth of 104.6m on the western side and 94.4m on the eastern side
- A northern (rear) boundary of 18.7m
- 20m building offset from View Street and 5m building envelope from eastern, western and rear boundaries

Proposed Lot 3 is an irregularly shaped battle-axe lot with the following features:

- 6,590m2 square metres in size
- 14.9m frontage to View Street, for the battleaxe handle
- The battle-axe handle has a total length of 94.4m
- The proposed lot has a total length of 219.6m on its eastern boundary and 102.4m on its western boundary
- A 30m building and waste water offset (secondary treatment system) from the GMW channel to the west
- 5m building envelope from eastern, southern and rear boundaries

Proposed Lot 4 is the remaining industrial land consolidated to facilitate a more logical lot layout. The balance lot will have the following features:

- 50,141sqm in size
- Frontage to both View Street (104.8m) and Burnett Street (140.1m)
- Overall depth of 219.6m on the south-west boundary, and 163.7m on the western boundary
- 7.5m building envelope from Burnett Street

Planning Summary

ZONE		The subject land is dual zoned, with part of the land being zoned IN3Z – Industrial 3 Zone and the south-western corner (subject to this application) being zoned LDRZ – Low Density Residential.
ENVIRONMENTAL OVERLAY	**SIGNIFICANCE**	The development site is subject to the ESO4 overlay – "Areas of poor drainage or potentially subject to inundation". Preliminary flood advice from NCCMA advised that the 1% AEP flood level is 77.5m AHD at this location and there is a requirement for a habitable floor level of 77.8m AHD (300mm above) and safe vehicle access to each lot with flood depths not exceeding 300mm. Preliminary indicative site levels observed on site suggest that the natural ground levels are somewhere within the range of 76.9-77.2 AHD across the site.

Policy context

The Planning Policy Framework and Municipal Planning Strategy provide the strategic basis for Council's decision making in relation to land use and development. Key policies relevant to the proposal are summarised and addressed in the table below.

TABLE 4: RELEVANT POLICY

15.01-2L – BUILDING SITING GANNAWARRA Policy guidelines: This policy requires the following setbacks in the low-density residential zone: Distance from roads – 20m Distance from other boundaries – 5m	The application complies with the requirements of this clause, as it has proposed that each lot have a building envelope 20m from View Street and 5m from side and rear boundaries. The industrial zoned portion of the land will also be provided with a building envelope ensuring a 7.5m setback from Burnett Street.
15.01-3S – SUBDIVISION DESIGN Objective: To ensure the design of subdivisions achieves attractive, safe, accessible, diverse and sustainable neighbourhoods.	The proposal seeks to create 3 lots on the land zoned low-density residential, and consolidation of the balance industrial land. The proposal addresses a market demand for housing, being lifestyle blocks at the edge of the Koondrook township. The proposal is unlikely to have an unreasonable impact on the amenity and services available Koondrook.
16.01-3S – RURAL RESIDENTIAL DEVELOPMENT Objective: To identify land suitable for rural residential development.	The proposal is for low-density residential housing blocks on land already zoned low-density residential. The proposal is therefore in line with the structure plan of Gannawarra Shire and is an appropriate use of the land. All required services are available, and the proposed lots are large enough to accommodate on-site septic disposal.
16.01-3L – RURAL HOUSING Objective: To manage rural residential development in agricultural areas.	The proposal is on appropriately zoned low-density residential land. The subdivision provides an appropriate buffer of 30m from GMW's open irrigation channel along the western perimeter of the site. This building envelope will also assist in minimising any potential land use conflict with the agricultural land to the west of the site.

32.03-3 – Subdivision

A permit is required to subdivide land.

Each lot must be at least the area specified for the land in a schedule to this zone. Any area specified must be at least:

- *0.4 hectare for each lot where reticulated sewerage is not connected. If no area is specified each lot must be at least 0.4 hectare.*
- *0.2 hectare for each lot with connected reticulated sewerage. If no area is specified each lot must be at least 0.2 hectare.*

A permit may be granted to create lots smaller than 0.4 hectare if the subdivision:

- *Excises land which is required for a road or a utility installation.*
- *Provides for the re-subdivision of existing lots and the number of lots is not increased.*

A permit must not be granted which would allow a separate lot to be created for land containing a small second dwelling.

Complies.

Reticulated sewer is not proposed to be connected to the site as this would impact the feasibility of the subdivision. Each proposed lot is in excess of 0.4ha providing sufficient area for on-site effluent disposal. The 30m building envelope from the GMW channel ensures any secondary treatment system achieves adequate separation from the channel.

Clause 32.03-5 Decision Guidelines

Application requirements - Subdivision

An application must be accompanied by a site analysis, documenting the site in terms of land form, vegetation coverage and the relationship with surrounding land, and a report explaining how the proposed subdivision has responded to the site analysis. The report must:

- *In the absence of reticulated sewerage, include a Land Capability Assessment on the risks to human health and the environment of an on-site wastewater management system constructed, installed or altered on the lot in accordance with the requirements of the Environment Protection Regulations under the Environment Protection Act 2017.*
- *Show for each lot:*

- *A building envelope and driveway to the envelope.*
- *Existing vegetation.*
- *In the absence of reticulated sewerage, an effluent disposal area.*

- *Show how the proposed subdivision relates to the existing or likely use and development of adjoining and nearby land.*
- *If a staged subdivision, show how the balance of the land may be subdivided.*

Complies.

A Site Analysis plan is provided at Figure 3 which shows the sites relationship with surrounding land uses, vegetation and the key attributes of the site.

To the west of the site is farming land. Being low density residential, with a required setback from the drainage channel, there is ample separation to prevent conflict between the two uses. It is understood that the LDRZ land is intended as a transition between the urban land and the farming land, and therefore this subdivision is an appropriate use of the site.

A portion of the industrial land has been identified in the Gannawarra Urban Growth Strategy for potential rezoning to Low Density Residential Zone (LDRZ). By consolidating the Industrial 3 Zone (IN3Z) into a single allotment this will ensure that any future rezoning or development is assessed holistically, rather than being developed in isolated stages.

32.03-6 - Decision Guidelines

General

Before deciding on an application, in addition to the decision guidelines in Clause 65, the responsible authority must consider, as appropriate:

- *The Municipal Planning Strategy and the Planning Policy Framework.*

Refer assessment earlier in this report.

Subdivision

- *The protection and enhancement of the natural environment and character of the area including the retention of vegetation and faunal habitat and the need to plant vegetation along waterways, gullies, ridgelines and property boundaries.*

No vegetation removal is proposed as part of the subdivision.

- *The availability and provision of utility services, including sewerage, water, drainage, electricity and telecommunications.*

Reticulated water is currently present on the Penglase Street Intersection (400m away) and is proposed to be extended to service the site.

Electricity is within proximity and will require augmentation to service the proposal. Lot 1 will require augmentation from 1\LP14102 across View Street. Proposed lots 2 and 3 will require augmentation from the southern side of View Street via underground lines.

On-site septic disposal is proposed in accordance with the Land Capability Assessment included in this application by Price Merrett Consulting and dated 31 March 2023.

NBN is available on the northern side of View Street.

- *In the absence of reticulated sewerage:*
    - *The capability and suitability of the lot to treat and retain all wastewater as determined by a Land Capability Assessment on the risks to human health and the environment of an on-site wastewater management system constructed, installed, or altered on the lot in accordance with the requirements of the Environment Protection Regulations under the Environment Protection Act 2017.*
    - *The benefits of restricting the size of lots to generally no more than 2 hectares to enable lots to be efficiently maintained without the need for agricultural techniques and equipment.*

On-site septic disposal is proposed in accordance with the Land Capability Assessment included in this application by Price Merrett Consulting and dated 31 March 2023.

This report concludes:

> *"As a result of our investigations, we conclude that sustainable onsite wastewater management is feasible with appropriate mitigation measures, as outlined, for 10 Dalton Street, Koondrook."*

- *The relevant standards of Clauses 56.07-1 to 56.07-4 .*

Refer table on following page.

56.07-1 – DRINKING WATER SUPPLY OBJECTIVES The supply of drinking water must be: • Designed and constructed in accordance with the requirements and to the satisfaction of the relevant water authority. • Provided to the boundary of all lots in the subdivision to the satisfaction of the relevant water authority.	Complies. Reticulated water is currently present on the Penglase Street Intersection (400m away) and is proposed to be extended to service the site.
56.07-2 – REUSED AND RECYCLED WATER OBJECTIVE Reused and recycled water supply systems must be: • Designed, constructed and managed in accordance with the requirements and to the satisfaction of the relevant water authority, Environment Protection Authority and Department of Health. • Provided to the boundary of all lots in the subdivision where required by the relevant water authority.	The provision of reused and recycled water is not proposed at this stage however the application will respond to any requirements of GMW.
56.07-3 - WASTE WATER MANAGEMENT OBJECTIVE **WASTE WATER SYSTEMS MUST BE:** • Designed, constructed and managed in accordance with the requirements and to the satisfaction of the relevant water authority and the environment protection authority. • Consistent with a domestic waste water management plan adopted by the relevant council. Reticulated waste water systems must be provided to the boundary of all lots in the subdivision where required by the relevant water authority.	It is not proposed to connect Councils reticulated waste water system to the site. On-site septic disposal is proposed in accordance with the Land Capability Assessment included in this application by Price Merrett Consulting and dated 31 March 2023. This report concludes: ***"As a result of our investigations, we conclude that sustainable onsite wastewater management is feasible with appropriate mitigation measures, as outlined, for 10 Dalton Street, Koondrook."*** Refer below this table for more details regarding separation from the irrigation channel to the west of the site.

56.07-4 – STORMWATER MANAGEMENT OBJECTIVES	The lots are sufficiently sized so as to maintain large areas of permeable surfaces as part of future development. Stormwater management will be in accordance with any requirements of Councils Engineering team.

Section 8(1)(a) of the Subdivision Act

Section 8(1)(a) of the Subdivision Act states that any plan of subdivision lodged for certification must be referred to Goulburn-Murray Rural Water Corporation (GMW). As such, pre-lodgement advice has been sought from GMW. GMW provided the following response:

> *If onsite wastewater management is required, the wastewater disposal area must be located a minimum of 60m from Goulburn-Murray Water irrigations drains and channels, and from any dams, and at least 20m from any bores. Where wastewater is treated to at least a secondary standard, the distance may be reduced in accordance with the current EPA Code of Practice – Onsite Wastewater Management. However where possible setback distances must be maximised. If treated to secondary all wastewater must be located 30m from GMW channel No.4.*

To accommodate this requirement, proposed lots 1 and 3 will have a secondary waste treatment system and therefore only a 30m buffer from the Channel applies. Council could enforce this through a section 173 agreement on proposed lots 1 and 3 requiring a secondary treatment system in accordance with the recommendations of the LCA.

Below are the requirements of a secondary treatment system as detailed in the Price Merrett Consulting Land Application Survey. The lots are sufficiently sized to enable the required irrigation area for a secondary treatment system.

Number of Bedrooms (Q)	Primary treatment system* (W=1m) with reln drain disposal	Secondary Treatment system With subsurface drip irrigation
3	45m	128m^2
4	60m	171m^2
5	75m	214m^2
6	90m	257m^2

33.03-3 – Subdivision Industrial 3 Zone

Decision guidelines

Before deciding on an application, in addition to the decision guidelines in Clause 65, the responsible authority must consider, as appropriate:

- *The Municipal Planning Strategy and the Planning Policy Framework.*
- *Any natural or cultural values on or near the land.*
- *Streetscape character.*
- *Landscape treatment.*
- *Interface with non-industrial areas.*

Currently the industrial portion of the land contains four separate allotments (including one allotment that is dual zoned LDRZ and IN3Z). The proposal seeks to consolidate all land within the industrial zone 3 to a single allotment. This will create a more logical lot arrangement and provide greater flexibility for future rezoning, use and development. It will also ensure a more considered and cohesive streetscape character as the land will ultimately be developed as a single title. The consolidation does not have any adverse implications for natural or cultural values near the land.

SCHEDULE 4 TO CLAUSE 42.01 ENVIRONMENTAL SIGNIFICANCE OVERLAY

AREAS OF POOR DRAINAGE OR POTENTIALLY SUBJECT TO INUNDATION

5.0 - Decision guidelines

The following decision guidelines apply to an application for a permit under Clause 42.01, in addition to those specified in Clause 42.01 and elsewhere in the scheme which must be considered, as appropriate, by the responsible authority:

- *Any comments of the floodplain management authority.*

The development site is within the ESO4 overlay, which identifies areas of poor drainage or potential flooding.

Advice was received from NCCMA, dated 30 May 2023, which indicates that the 1% Annual Exceedance Probability (AEP) flood level for this site is 77.5m Australian Height Datum (AHD).

To achieve suitable flood protection, all dwellings must have a floor level of at least 77.8m AHD, which is 300mm above the 1% AEP flood level. Additionally, safe vehicle access must be provided with flood depths not exceeding 300mm. Further, the advice states that any new dwelling must be constructed on an earthen fill pad at least 0.3m above the 1% AEP flood level and must extend a minimum of 2 metres beyond the footprint of the proposed dwelling.

Given the time that has passed since NCCMA's earlier advice, the application will be re-referred for comment during the assessment process. It is anticipated that any specific NCCMA requirements will be able to be addressed through conditions on the approval or as a section 173 agreement on title.

Conclusion

The proposed subdivision at 10 Dalton Street, Koondrook, represents a logical and appropriate use of land within the Low Density Residential Zone, consistent with the strategic direction of the Gannawarra Planning Scheme. The proposal provides for three well-sized residential lots that meet all relevant planning requirements, including building setbacks, infrastructure provision, and environmental considerations. The remaining land will be consolidated to create one large industrial lot.

The subdivision design aligns with the objectives of Clause 15.01-3S by offering low-density residential opportunities at the edge of the Koondrook township (on suitable zoned land), contributing to housing diversity and responding to demand for lifestyle allotments. Importantly, the design incorporates appropriate setbacks and buffers, including a 30m setback from the adjacent irrigation channel, mitigating any potential for land use conflict with nearby agricultural land and preserving local character.

All lots have been demonstrated to be capable of sustainable onsite wastewater management as confirmed by a detailed Land Capability Assessment, while reticulated water and electricity are available or can be feasibly extended to service the site. Flood risk has been considered and it is expected that the proposal can comply with any requirements from NCCMA, including floor level and access requirements.

In summary, the application is consistent with the zone purpose, overlay requirements, and applicable policy directions. It represents a sustainable and orderly development outcome that supports the township's growth while respecting its environmental and rural context. The proposal is considered worthy of Council approval subject to any requirements from Council, referral authorities or service authorities.

LEGEND

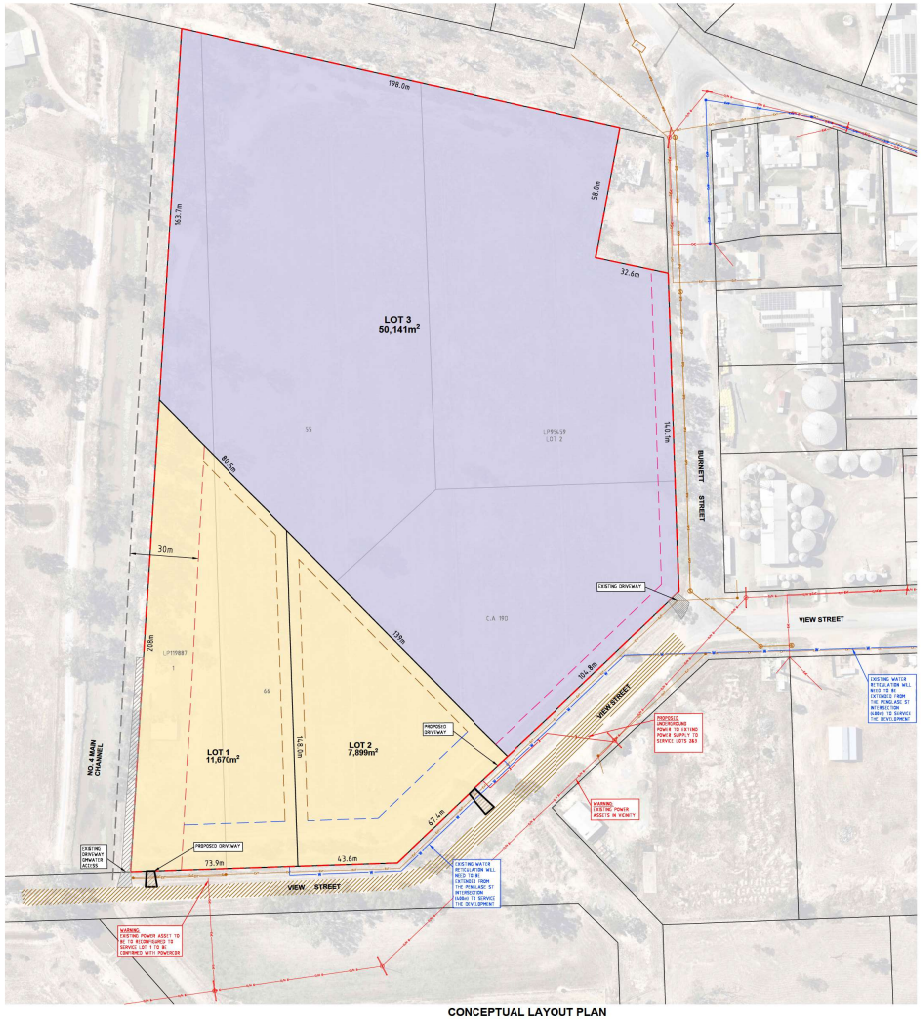
- DEVELOPMENT BOUNDARY
- LDRZ – LOW DENSITY RESIDENTIAL ZONE
- EXISTING TITLE BOUNDARY
- EXISTING O/H ELECTRICITY
- EXISTING TELSTRA
- EXISTING SEWER
- EXISTING POTABLE WATER
- EXISTING STORMWATER DRAINAGE
- PROPOSED NEW LOT BOUNDARIES
- WATER EDGE

LDRZ

- 30m BUILDING AND WASTE WATER OFFSET (SECONDARY TREATMENT SYSTEM)
- 20m BUILDING OFFSET
- 5m BUILDING OFFSET

IN3Z

- 7.5m BUILDING OFFSET



CONCEPTUAL LAYOUT PLAN
SCALE: 1:1000

[redacted]

DRAWING NO. 22057_CP01
SHEET NO. 1 of 1

REVISION NO. C6
A3
CAD: 22057_CP01.dwg

LOT 1
LOT 2
VIEW STREET
NO PERMANENT SIGHT OBSTRUCTIONS ALLOWED
LINE OF SIGHT
CONFLICT POINTS
40m
40m (MEASURED ALONG CENTRELINE)
SIGHT DISTANCE PLAN - LOT 2
SCALE 1:500
LEGEND
DEVELOPMENT BOUNDARY
EXISTING TITLE BOUNDARY
LDRZ - LOW DENSITY RESIDENTIAL ZONE
SIGHT LINE
GRAVEL DRIVEWAY ACCESS
SIGHT DISTANCE REQUIREMENTS AT ACCESS DRIVEWAYS IN ACCORDANCE WITH AS 2890.1 2004 - SECTION 3). ASSUMPTION OF 50km/h SUBJECT TO TRAFFIC IMPACT ASSESSMENT.
FRONTAGE ROAD SPEED (km/hr) | SIGHT DISTANCE ALONG ROAD (m)
40 | 30
50 | 40
60 | 55
70 | 70
80 | 95
110 | 300
DRAWING NO. 22057_SDP01
SHEET NO. 1 of 1
REVISION NO
A3
CAD: 22057_SDP01.dwg

pricemerrett CONSULTING

Land Capability Assessment

10 Dalton Street, KOONDROOK VIC

S1444

[redacted]

SURVEYING

ENGINEERING

IRRIGATION

PROJECT MANAGEMENT

Document History

Revision	Description	Author	Review	Date
1	Issued to client	[redacted]		31/03/2023
2	Issued to planner			16/05/2025

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1 Introduction

Price Merrett Consulting has been engaged to undertake a Land Capability Assessment (LCA) for a proposed 3 lot subdivision located at 10 Dalton Street, Koondrook on Allotment 66\PP3230 & Lot 1 LP119887. An irrigation channel runs along the western border of the property and View Street runs along the southern and eastern boundary in the Lot Density Residential Zone. Irrigated farming land lies to the north of the subject site.

This LCA has been prepared to support the proposed subdivision of the site and as such no specific dwelling or lot layout has been considered, rather the Soil Category and relative DIR/DLR has been provided to ascertain the appropriate system design.

This document provides information about the site and soil conditions. It also provides a detailed LCA for the proposed development site and includes a conceptual design for a suitable onsite wastewater management system, including recommendations for monitoring and management.

2 Description of the Development

Table 1 Site Description

Site Address:	Allotment 66\PP3230 & Lot 1\LP119887 10 Dalton Street, Koondrook
Owner/Developer:	Greg & Kaylene Bassett
Contact:	Email: kate@acretp.com.au Phone: 0405 723 515
Postal Address:	PO Box 11, BARHAM VIC NSW
Local Government Area:	Gannawarra Shire
Zoning:	Low Density Residential
Overlays:	ESO4
Allotment Size:	Min 4000m^2
Domestic Water Supply:	Collected rainwater tank
Anticipated Wastewater Load (Q):	150 l/day per person (for full water reduction fixtures) X (Number of proposed bedrooms plus 1)
Availability of Sewer:	Not available.

3 Site and Soil Assessment

A desktop soil investigation has been undertaken by PMC to determine soil type and relative permeability to ascertain the Dose Loading Rate (DLR) in order to design the appropriate waste water treatment system.

The site at 10 Dalton Road, Koondrook is generally flat and the existing shed is on the property with irrigated pasture being the prior land use. At the time of the investigation, the surface of the site was dry with moderate seeded grass covering. There is no evidence of surface rock or surface cracking. No groundwater seepage There are several small to large trees scattered throughout the site

Table 2 summarises the key features in relation to effluent management at the site.
Note:

- The site is not in a special water catchment area;
- The site experiences negligible stormwater run-on from surrounding land;
- Regional groundwater levels are expected to be greater than 10m below ground level; and
- The risk of effluent transport off site is low.

Table 2: Key Site Features

Feature	Description	Level of Constraint	Mitigation Measures
Aspect	The land is well exposed to sun and wind.	Minor	NN
Climate	Typically characterised by a hot dry summer, cool wet winter, and a moderate Mediterranean-like spring and autumn. The low annual rainfall and high annual evaporation is beneficial to on-site effluent disposal, although the system will not be as efficient in a wet winter when evaporation is low. Mean annual rainfall is 372 mm for Barham. Mean evaporation is between 1600 and 1800mm per annum. (Reference: BoM Website).	Minor	NN
Erosion and Landslip	No evidence of sheet or rill erosion; the erosion hazard is low. No evidence of landslip and landslip potential is low. There was visual evidence of surface cracking throughout.	Minor	NN
Fill (imported)	No fill material is visible on the surface	Nil	NN
Flooding	The site is not prone to flooding	Nil	NN

Groundwater	No indication of shallow water tables to 1.5m depth. There are no known groundwater bores within 250m of the proposed effluent management area. Closest monitored groundwater bore 82754 indicates water table at 4.71m (20/08/2020).	Minor	NN.
Land suitability	Considering all the constraints and buffers, the site has acceptable suitable land area for application of treated effluent.	Minor	NN
Landform	The site has an existing buildings and trees. Block generally flat and is surrounded by agricultural land	Minor	NN
Rocks and Rock Outcrops	No rock is visible at surface.	Nil	NN
Setback distances	All relevant buffer distances in Table 5 of the Code (2016) are achievable from the proposed effluent management area.	Minor	Achievable
Site Drainage	The slope is minimal and so surface drainage is not expected to greatly impact neighbouring property.	Nil	NN
Stormwater run-on & runoff	No visible signs of surface dampness, spring activity or hydrophilic vegetation in the proposed effluent management area or surrounds.	Minor	NN
Slope	Generally flat	Nil	NN
Surface Water	The Murray River is 500m from the proposed 4 lot subdivision. The proposed disposal areas on each lot will be constructed more than 100m from the river. Number 4 main channel west of property. 60m setback for primary waste water, 30m for secondary treated waste water.	Minor	Minimum setback distance maintained
Vegetation	Grasses in and around the lot, large trees on and around the property	Nil	NN
Buildings	Vacant	Nil	NN
Site History and Land Use	Irrigated pasture	Nil	NN

*NN= Not needed

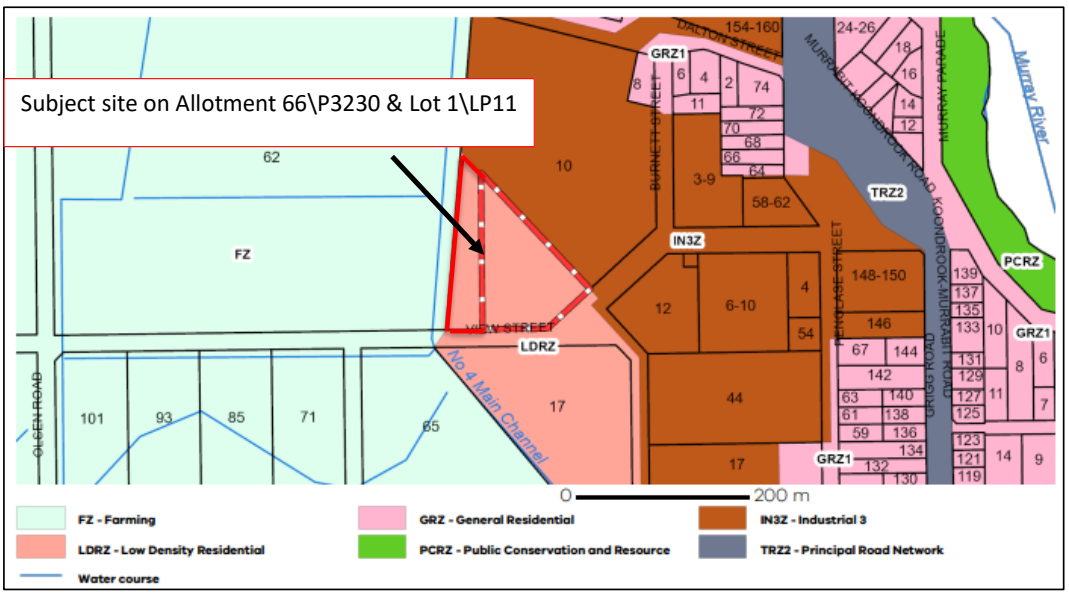


Figure 1: LDRZ Zoning

4 Key Soil Features

***Soil Survey and Analysis*:**

As determined from Price Merrett soil inspection and analysis and the report - Soils and Landuse in the Torrumbarry Irrigation District Victoria. May 1979. Sargent, Newell, Walbran, the region soils are shown to be Clay Loams at the site. See Figure 2 below.

DESKTOP ANALYSIS
According to the Torrumbarry Irrigation District Victoria mapping the subject site is in an area of Reedy Lake Clay loam. These are inherently a Group 4 soil type of generally a low saturated permeability and varied salinity hazard. The soils of the Reedy Lake association are predominantly flood plain deposits of the prior streams.

All occurrences are to the north and east of the Pyramid Creek, and to the east of the Loddon River north of Kerang. The soils generally have a shallow hard-setting surface and a subsoil of low permeability. Subsoils at 0.5m depth are a greyish yellowish brown mottled with light grey light clay or fine sandy clay; generally with light amounts of hard and soft calcium carbonate; gradual transition to mottled yellow-brown and grey-brown fine sandy clay to medium clay.

Reedy Lake Clay loams (Soils and Landuse in the Torrumbarry Irrigation District Victoria. May 1979. Sargent, Newell, Walbran) These clays are generally identified as Clay Loams in Table 5.2 of AS NZS 1547:2012, in the zone of waste water dispersion.

Figure 2 below shows Torrumbarry Irrigation District Soil Maps (Map 8) with site location marked by arrow.

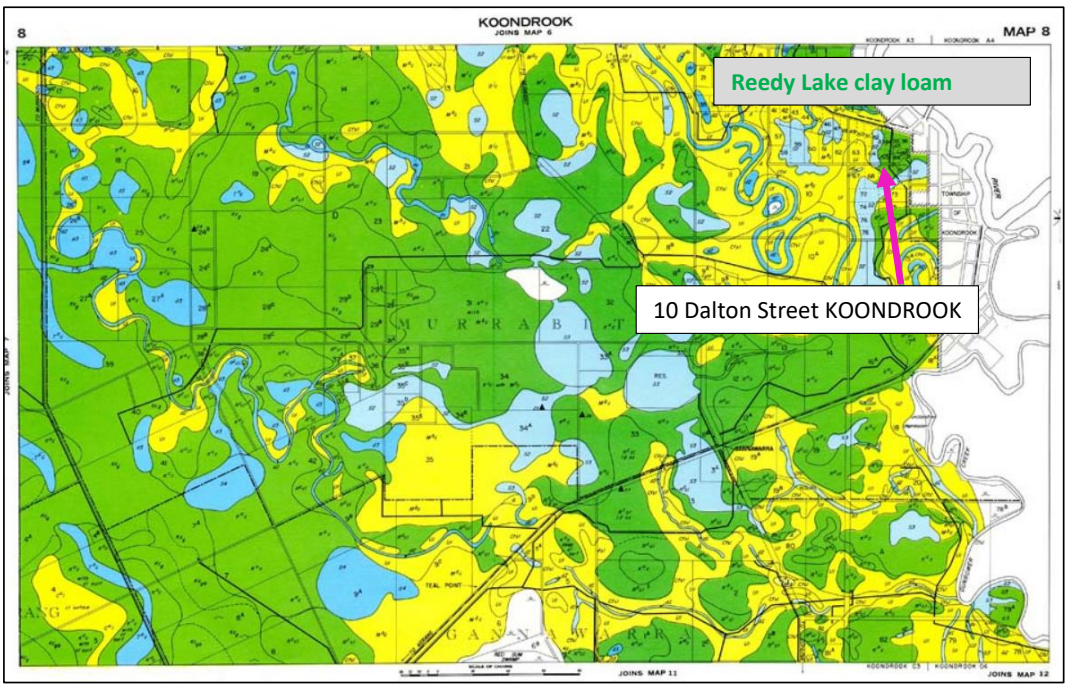


Figure 2: Reedy Lake Clay loam at the site.

Price Merrett Consulting completed soil testing to confirm soil type for this LCA. Soil was sampled at 0.5m and the results were determined as follows.

- CLAY Loam, medium plasticity, dark brown 7.5YR 2.5/2, very stiff, soils were dispersive at 0.5m.

These results generally comply with the findings of the desktop analysis.

***Soil Profile Determination*:**

For the purposes of assessing this sites capability to receive and treat on-site domestic waste water, the site and its soils have been analysed and categorized according to the relevant guidelines, the Australian Standard for On-Site Domestic Wastewater Treatment (*AS1547:2012*), and the EPA Septic Tank Code of Practice (*891.4:2016*).

The Australian Standard on Onsite Domestic Wastewater Management – (*AS1547: 2012)* - clearly and deliberately takes a conservative approach to calculating system specifications, such as Design Loading Rates. By its nature, the Australian Standard establishes minimum requirements on a nation-wide basis to provide improved environmental outcomes, but it does not provide the best available solution to any specific situation or location. It is a generic standard in that it is based on promoting certain outcomes, and its charter is not to proscribe certain types of septic systems or parts thereof. *AS1547: 2012* allows for some flexibility and moderation of its conservative bias were supported by local knowledge of site and soil characteristics.

Estimated Soil Category:

The soil texture at this site of clay loams and is a Soil Category 4. A conservative 10 mm/day DLR has been chosen for this site as determined from Table 5.2 AS NZS 1547:2012. As determined from the Standard ASNZS 1547 clay-dominated soils having dispersive (sodic) or shrink/swell behaviour, specialist soil advice

and special design techniques will be required to enable their use for land application systems. Generally, these soils will have poor soil drainage. This consideration has determined that a septic tank and reln drains with gypsum applied to increase the permeability of the soil.

For the system designed for these soils the effluent absorption rate shall be based on soil type and AS/NZ 1547:2012 indicates that Table L1 notes corelate to these permeabilities and special design requirements may be required. In this instance the application of gypsum to the base of the trenches is recommended at a rate of 1kg/m2 in trenches 1m wide and 1m spacings.

This site has been assigned a Soil Category 4 rating for effluent disposal for Clay Loams.

Slaking and Dispersion:
Use of household detergents and other domestic products that are low in sodium salts can significantly extend the life of the land-application field to which the domestic wastewater is to be applied. If the soils become more saline or sodic as a result of the long-term application of saline wastewater, they may fail as a result of reduced permeability. Environmental and human health threats could result as a consequence of waterlogging, and a new land-application field and/or onsite domestic wastewater management system would need to be installed. Please note that many laundry detergents, particularly some powdered brands, are high in sodium salt, which is used as 'filler', and plays no active role in the washing process.

Permeability:
Saturated Hydraulic Conductivity has been interpreted from *Table L1 in ASNZ 1547:2012* in relation to the soil test results from Price Merrett Consulting and GTS. Testing involved measurement at 2 sites over the block for a site classification pursuant to *AS2870-2011*. The geometric average saturated hydraulic conductivity for brown Silty clays at the depth of nutrient infiltration is considered to be 0.12-0.5 m/day for weakly structured Clay loams.

***Estimated Soil Category*:**
As determined by GTS the natural soil types found at the site are soft brown Clays overlaying Silty Clays, typical of the area's geology. Top soil is generally loose disturbed sandy clays to a depth of 200mm. The soil texture at this site of Clay Loams is potentially suitable for effluent disposal, and is Soil Category 4.

The geometric mean saturated hydraulic conductivity to be inferred from these results and *Table L1 of AS/NZ 1547:2012* at this site is expected to be in the range of 0.12-0.5 m/day. It indicates a weakly structured Clay Loam, Soil Category 4.

5 Wastewater Management System

The following sections provide an overview of a suitable onsite wastewater management system, with sizing and design considerations and justification for its selection. The local area is not serviced by a public sewerage system.

Reference has been made to *AS NZS 1547:2012* in recommending DLR for various land-application options available for on-site domestic wastewater management. Based on site conditions and the soils recorded a Primary Treatment effluent type with reln drains system is suitable due to the large lot size.

5.1 Design & Specifications

The design capacity of the treatment system should cater for the expected peak daily load of the house (AS 1547:2012), namely:

TABLE J1
ALL-WASTE SEPTIC TANK OPERATIONAL CAPACITIES

Population equivalent (persons)	**Number of bedrooms**	**Design flow** (L/day)	**Tank capacity** (L)
1 – 5	1 – 3	1000	3000
6 – 7	4	1000 – 1400	3500
8	5	1400 – 1600	4000
9 – 10	6	1600 – 2000	4500

The waste water treatment system should have adequate capacity for testing the flow of wastewater and have sufficient storage for solids that build up before removal. Wastewater systems are required to do the following:

- Hold the normal flow of domestic wastes from a range of population equivalents up to 10 people;
- Allow for normal peak flows;
- Allow for short term unusual/overload production of wastes; and
- Allow for sludge and scum build up.

Land Application Area:
The design daily flow, Q*, has been calculated according to the relevant guidelines in ASNZ:1547 and is used to calculate the sites system specifications based on the potential number of occupants. Based on the volumes of water estimated by the proponent and *Health Protection Guideline On-site Sewage Management for Single Households,* the Dose Loading Rate (DLR) would be **10mm/day (3.5mm/day DIR)** for this site and the soil conditions. See Table 5.2 of AS 1547:2012 on next page.

*The number of bedrooms must include potential bedrooms that may be media rooms, studies and rumpus rooms which are constructed with a closable door.

Disposal area for a Primary Treatment System (eg Septic plus reln drains):
Suitable for Lot 2 only
DLR = 10mm
Q = 150 x (number of proposed bedrooms plus 1)
W = width of trench (m)

Length = Q/DLR x w

Irrigation area for an Aerated Waste Treatment System AWTS (Secondary):
Suitable for Lots 1, 2 & 3
Similarly for a secondary type treatment system producing waste water of a higher quality and subsurface drip irrigation.
DIR = 3.5 (for soil category 4)
Q = 150 x (number of proposed bedrooms plus 1)

Area = Q/DIR

Number of Bedrooms (Q)	Primary treatment system* (W=1m) with reln drain disposal	Secondary Treatment system With subsurface drip irrigation
3	45m	128m²
4	60m	171m²
5	75m	214m²
6	90m	257m²

*Equal reserve area required

The design, construction and installation requirement of a subsurface irrigation system is presented in AS 1547:2012. The system shall also be installed with appropriate setback, or buffer distances, required by the regulatory authority.

To achieve the standard 20/30 effluent, the size of the disposal field can be estimated by *using (AS 1547:2012).*

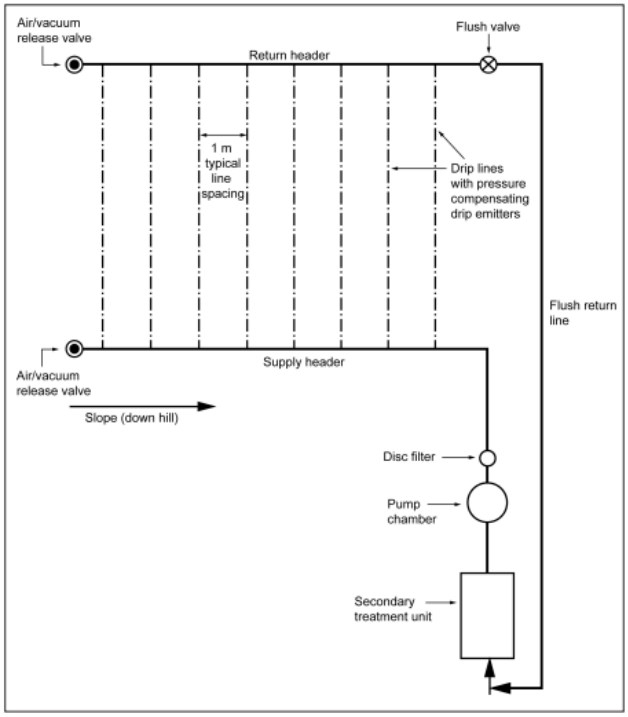
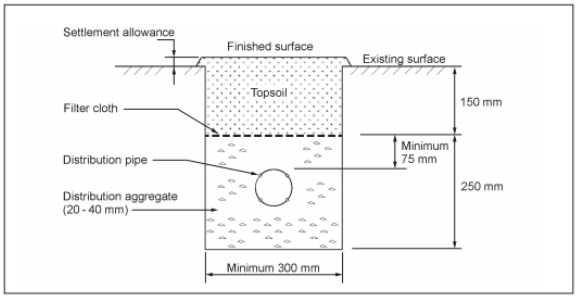


FIGURE M1 DRIP IRRIGATION SYSTEM – EXAMPLE LAYOUT OF COMPONENTS



NOTE: LPED lines can be used to replace distribution pipes when dose loading effluent into trenches.

FIGURE L1 CONVENTIONAL PIPED TRENCH

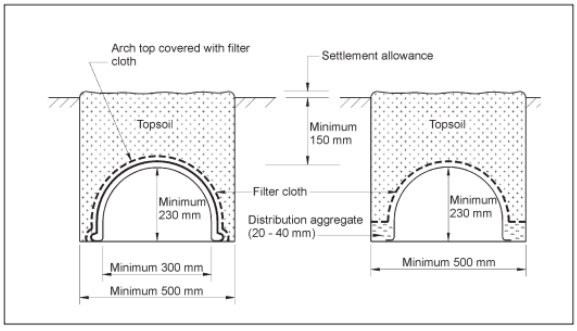


FIGURE L2 SELF-SUPPORTING ARCH TRENCH

TABLE 5.2

SOIL CATEGORIES AND RECOMMENDED DESIGN IRRIGATION/LOADING RATES (DIR/DLR) FOR LAND-APPLICATION SYSTEMS

Soil Category	Soil texture	Structure	Indicative permeability (K_{sat}) (m/d)	Design irrigation/loading rate (DIR/DLR) (mm/day)						
				Trenches and beds (see Table L1)				ETA/ETS beds and trenches (Table L1)	Drip and spray irrigation (Table M1)	LPED irrigation (Table M1)	Mounds (basal area) (Table N1)
				Primary treated effluent			Secondary treated effluent				
				Conservative rate	Maximum rate						
1	Gravels and sands	Structureless (massive)	> 3.0	(see Note 1 of Table L1 for DLR values)				(see Note 4 of Table L1)	5 (see Note 2 of Table M1)	(see Note 3 of Table M1)	32
2	Sandy loams	Weakly structured massive	> 3.0							4	24
			1.4 – 3.0	15	25	50					
3	Loams	High/ moderate structured	1.5 – 3.0	15	25	50			4 (see Note 1 of Table M1)	3.5	24
		Weakly structured or massive	0.5 – 1.5	10	15	30					16
4	Clay loams	High/ moderate structured	0.5 – 1.5	10	15	30		12	3.5 (see Note 1 of Table M1)	3	16
		Weakly structured	0.12 – 0.5	6	10	20		8			8
		Massive	0.06 – 0.12	4	5	10		5			(see Note to Table N1)
5	Light clays	Strongly structured	0.12 – 0.5	5	8	12		8	3 (see Note 1 of Table M1)	2.5 (see Note 4 of Table M1)	8
		Moderately structured	0.06 – 0.12	(see Notes 2 and 3 of Table L1)	5	10		5 (see Notes 2, 3, and 5 of Table L1)			(see Note to Table N1)
		Weakly structured or massive	< 0.06			8					
6	Medium to heavy clays	Strongly structured	0.06 – 0.5						2 (see Note 2 of Table M1)	(see Note 3 of Table M1)	
		Moderately structured	< 0.06								
		Weakly structured or massive	< 0.06								

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5.2 Disposal Fields and Reserve area

Constraints:
The property has a number of constraints, namely

- The area of the land (less than 10,000m^2)
- **Proximity to No4 Main Channel requiring a minimum 30m setback for a Secondary type treatment system.**
- **A 60m setback to the channel would be required for a primary treatment system. Indicating only a Secondary treatment system would be suitable for Lots 1 & 3.**
- Soil properties, which include
    - Moderate clay content
    - Slightly saline, typical of the area;
- Minor building works will be required for any proposed dwelling, which will include further drainage and infrastructure; and
- Not being connected to a reticulated sewerage scheme, and hence increasing the unsewered residential density in the vicinity.

The primary disposal field and reserve field should be situated within the appropriate setbacks as in Table in Section 5.3.

The purpose of the reserve area is to have an area that is appropriate and accessible if the primary disposal field fails. The reserve area must remain clear of any development and abide by the appropriate setback distances specified.

5.3 Setback Distances

Setback buffer distances from effluent land application areas and treatment systems are required to help prevent human contact, maintain public amenity and protect sensitive environments. The relevant buffer distances for this site, taken from Table 5 of the Code (2016) for treated effluent are:

TABLE 4: Setback distances for Treated Effluent

Setback Distances for Secondary Treated Effluent	Setback Distances for Primary Treated Effluent
• 1.5m down-slope of a building; • 3m up-slope of a building; • 1.5m down-slope of adjacent lot; • 3m up-slope of adjacent lot; • 1.5m away from water or gas supply pipe; • 3m from stormwater drain; • 1.5m from swimming pool; • 30m from dam or reservoir (stock & non-potable, below ground); • 30m up-slope of stream or channel (continuous or ephemeral, non-potable). • 100m up slope of stream (Potable Water Supply Water Catchment).	• 3m down-slope of a building; • 6m up-slope of a building; • 3m down-slope of adjacent lot; • 6m up-slope of adjacent lot; • 3m away from water or gas supply pipe; • 6m from stormwater drain; • 3m from swimming pool; • 60m from dam or reservoir (stock & non-potable, below ground); • 60m up-slope of stream or channel (continuous or ephemeral, non-potable). • 100m up slope of stream (Potable Water Supply Water Catchment).

Setback compliance: The disposal area must comply with all of the above setbacks.

Driveways, paths etc. should not be located over an effluent disposal area. The treatment plant must be accessible for maintenance.

5.4 Installation of the Land Application

The tank must be situated on firm ground and be located with regard to setback criteria. It must be easily accessible for maintenance.

The land application area should be a prepared, vegetated and planted to vigorous water and salt tolerant grasses or shrubs. It should be sited in an area of maximum sunshine and air-flow – to aid transpiration of effluent by plants i.e. not in a sheltered and/or shaded area. New land application areas should be vegetated immediately after installation.

The area should be a dedicated area for effluent disposal, protected from vehicle or stock access, and it should not be a high use area for pedestrian traffic. Paving, driveways, patios, fences, building extensions, sheds, children's playgrounds, utility service trenching must not be built over or encroach on an effluent application area.

Installation of the system must be carried out by a suitably qualified, licensed plumber or drainer with experience in effluent application systems.

Any stormwater runoff must be directed away from land application areas.

5.5 Monitoring, operation and maintenance

Maintenance is to be carried out in accordance with the EPA Certificate of Approval of the selected treatment system and Council's permit conditions. The treatment system will only function adequately if appropriately and regularly maintained. The Code of Practice EPA Victoria Appendix D contains the relevant maintenance directions for Septic Tanks.

- Vegetation that is grown over areas designated to distribute treated effluent must be maintained and protected;
- The effluent disposal area must not be driven on by any vehicles;
- Monitoring and maintenance recommendations for the treatment system must be adhered to.
- The treatment system must be accessible for monitoring and maintenance;
- The domestic wastewater treatment system must be maintained in accordance with relevant guidelines such as EPA Publication 891 and 760;
- Restrict the use of germicides (such as strong detergents, disinfectants, toilet cleaners and bleaches), as they will kill the bacteria which makes the septic work;
- Use soapy water to clean toilets and other fixtures;
- Use only detergents that have low alkaline salts and chlorine levels;
- Use of proprietary or chemical additives is not recommended at any time for septic systems – except for lime;
- Do not flush sanitary napkins and disposable nappies down the system;
- Minimise the amounts of oil and fat flushed into the system;
- Use a sink strainer to restrict food scraps entering the septic system;
- Do not use garbage disposal units;
- Odours may occur on installation or after addition of large quantities of germicide. If this happens, flush a cup of lime down the toilet each day until odours abate;
- Fill tank with water to reduce odours on start-up or after de-sludging tanks. They should not be washed or disinfected after de-sludging;
- Ensure the tank and disposal field are not built over or disturbed;
- **Inspect the system at least annually, and de-sludge the tank at least once every three years, or as otherwise directed by the council.**

To ensure the land application system functions adequately, residents must:

- Use household cleaning products that are suitable for septic tanks;
- Keep as much fat and oil out of the system as possible;
- Conserve water (AAA rated fixtures and appliances are recommended);
- The tank should be checked annually to see if it requires desludging. Keep a record of all tank pump outs, inspections and maintenance procedures and provide local council a copy as required.

To ensure the land application system functions adequately, residents must:

- Regularly harvest (mow) vegetation within the LAA and remove this to maximise uptake of water and nutrients;
- Not erect any structures and paths over the LAA;
- Avoid vehicle and livestock access to the LAA, to prevent compaction and damage; and
- Check the effluent disposal area regularly for signs of seepage to prevent failure of the system

6 Conclusion

As a result of our investigations, we conclude that sustainable onsite wastewater management is feasible with appropriate mitigation measures, as outlined, for 10 Dalton Street, Koondrook.

Conditionally, we recommend the following:

Treatment and disposal of domestic wastewater can be achieved:

- **Slope <1%**
- **Minimum 30m BUILDING AND WASTE WATER setback to GMW channel**
- **Lot size and site layout will constrain the type of system chosen to treat waste water.**
- **DLR 10mm/day**
- **DIR 3.5mm/day**
- **An equivalent reserve area may be required;**
- **Envirotech AWTS and subsurface irrigation would produce a higher quality waste water and allow for setbacks to be reduced.**
- **Lots 1 & 3 suitable for a Secondary treatment system only due to lot size and shape restrictions.**

***The final locations and design should be determined by consultation with the landowner and wastewater system supplier/plumber. Waste water treatment field should not be located near large trees.**

Use of gypsum on the water treatment areas at 1 kg/m2 is recommended

All desired setbacks must be considered when designing the layout for future buildings, paths and the waste water treatment system.

Access to the treatment plant and irrigation areas must be available for maintenance.

Good loamy topsoil should be placed on the irrigation areas.

Prepare receiving soil by shallow cultivation to at least 200mm depth. This should take place when soil is just dry of optimum moisture content to achieve best results and prevent smearing and compaction.

Use low sodium detergents (liquid) to improve effluent quality and not degrade soil properties further.

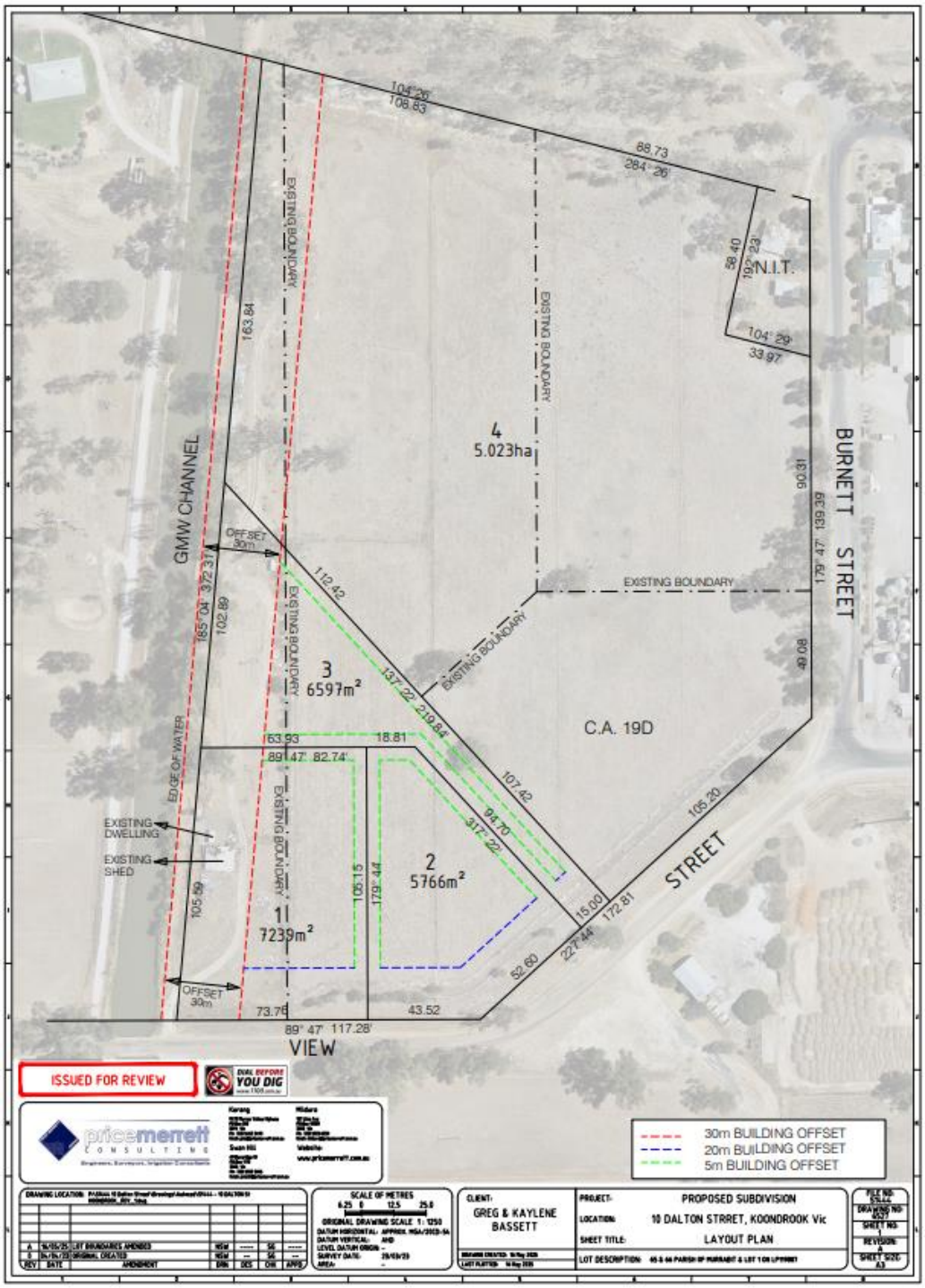
Access to the treatment plant and irrigation areas must be available for maintenance.

7 References

This report has been prepared according to the guidelines set out in

1. EPA Code of Practice – On Site Wastewater Management
   Publication 891.4 July 2016.
2. AS/NZS 1547:2012 – On-site domestic wastewater management.
3. Australian Soil and Land Survey, Field Handbook.
4. SEED Soils of NSW website

8 Site Plan


104° 26'
108.83
88.73
284° 26'
58.40
192° 23'
N.I.T.
104° 29'
33.97
EXISTING BOUNDARY
163.84
4
5.023ha
BURNETT STREET
90.31
179° 47' 139.39
49.08
GMW CHANNEL
OFFSET 30m
185° 04' 372.31
102.89
112.42
3
6597m²
137° 22'
219.84
C.A. 19D
163.93
18.81
89° 47' 82.74'
EDGE OF WATER
EXISTING DWELLING
EXISTING SHED
105.59
105.15
179° 44'
2
5766m²
1
7239m²
107.42
94.70
317° 22'
105.20
STREET
15.00
172.81
227° 44'
52.60
OFFSET 30m
73.76
43.52
89° 47' 117.28'
VIEW
ISSUED FOR REVIEW
DIAL BEFORE YOU DIG
pricemerrett CONSULTING
30m BUILDING OFFSET
20m BUILDING OFFSET
5m BUILDING OFFSET
SCALE OF METRES
6.25 0 12.5 25.0
ORIGINAL DRAWING SCALE 1:1250
CLIENT:
GREG & KAYLENE BASSETT
PROJECT:
PROPOSED SUBDIVISION
LOCATION:
10 DALTON STRRET, KOONDROOK Vic
SHEET TITLE:
LAYOUT PLAN
LOT DESCRIPTION:
SHEET SIZE:
A3

scaada

Environmental &
Sustainability

Preliminary Site Investigation

Preliminary Site Investigation

10 Dalton Street, Koondrook, Victoria

[redacted]

Prepared for

[redacted]

Prepared by

Scaada Environmental

[redacted]

Project prepared by	[redacted] Environmental Consultant
Project reviewed by	[redacted] Senior Environmental Consultant

Distribution

Report Status	Format	Distributed to	Date
V1.0	PDF	[redacted]	31/07/2025

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Executive Summary

Acre Town Planning (on behalf of Kaylene and Greg Bassett) engaged Scaada Environmental Pty Ltd (Scaada Environmental) to complete a Preliminary Site Investigation (PSI) at 10 Dalton Street, Koondrook, Victoria (the 'site'), in order to support the proposed reconfiguration of the land into three 'lifestyle allotments'. The investigation aimed to assess potential soil contamination due to historical farming activities.

Scaada completed a desktop assessment and confirmatory soil sampling, focusing on contaminants commonly associated with agriculture. Results showed no evidence of soil contamination. Although a former abattoir was present on the site, its small scale and long-ago closure suggest only a medium contamination risk. Thus, Scaada Environmental believe the historical agricultural use is unlikely to have resulted in contamination at the site.

Scaada Environmental have the following recommendations based on the content of this Preliminary Site Investigation:

- Seek an exemption from Ministerial Direction No.1 under the Planning and Environment Act.
- Alternatively, engage an EPA-appointed Environmental Auditor for a Preliminary Risk Screen, per Planning Practice Note 30.

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1 INTRODUCTION

Acre Town Planning (on behalf of Kaylene and Greg Bassett) engaged Scaada Environmental Pty Ltd (Scaada Environmental) to complete a Preliminary Site Investigation (PSI) for a section of site zoned as LDRZ (Low Density Residential Zone) located at 10 Dalton Street, Koondrook, Victoria (the 'site').

Scaada Environmental understands that a subdivision in planned for the site that would reconfigure the site to allow for three 'lifestyle allotments'. In order to satisfy request for information requirements stipulated by the Gannawarra Shire Council, a PSI was requested to establish whether farming activities carried out on the subject land may have resulted in potential land contamination. This request is satisfied by the formulation of the desktop assessment portion of this PSI. As an additional step, confirmatory soil sampling completed for common contaminants of concern associated with agricultural practices have been collected and results included within this report.

1.1 OBJECTIVE

The objective of the PSI was to gain sufficient knowledge of the previous land uses of the investigation area and to understand the potential contamination status of the site.

The specific objectives of the project were to:

- Complete a site history review to identify any potentially contaminating activities which may have taken place on the site;
- Identify any potentially contaminated areas of the site;
- Establish whether farming activities carried out on the subject land may have resulted in potential land contamination. Then, assess for actual impact via confirmatory soil samples;
- Prepare a report summarising the findings and conclusions of the assessment and any subsequent recommendations.

1.2 SCOPE OF WORKS

In order to meet the project objective, the following scope of works was completed:

- Review of available historical information associated with the site;
- Complete a site visit, inclusive of confirmatory soil samples;
- Complete a review of publicly available documents summarised by Lotsearch; and
- Provision of a Preliminary Site Investigation Report.

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2 SITE INFORMATION

The site information is summarised below in Table 1.

Table 1: Site information

Item	Details
Site Address	10 Dalton Street, Koondrook, Victoria, 3580, Australia
Total Investigation Area	19,563 m^2
Lot and Plan Number	1\LP119887 66\PP3230
Planning Zone	Low Density Residential (LDRZ)
Planning Overlay	Environmental Significance Overlay – Schedule 4 (ESO4)[1] Specific Controls Overlay (SCO)
Areas of Cultural Heritage Sensitivity	The investigation site is not listed on the Commonwealth Heritage List, National Heritage List or Victorian Heritage Register.
Current Site Use	The site is predominately utilised for cattle grazing, with a singular shed onsite used to store farming equipment.
Previous Site Use	Based on a review of historical aerial photographs, and any other sources utilised, Scaada Environmental understands that the site was historically used for agricultural purposes and small-scale abattoir.
Surrounding Land Uses	North: Residential properties. East: Agricultural land including some rural residential properties and No. 4 Main Channel. South: Agricultural land including some rural residential and industrial properties and No. 4 Main Channel. West: Residential and industrial properties.

3 SITE HISTORY INVESTIGATION

Scaada Environmental have completed this PSI in general accordance with guidance provided in *National Environmental Protection (Assessment of Site Contamination) Measure* (NEPC, 2013).

In order to complete this PSI Scaada Environmental have reviewed available historical information associated with the site with the aim of determining if potentially contaminating activities have taken place or if any potential historical sources of contamination to the site exist. This review has included the evaluation of a site report generated by Lotsearch (dated 14 July 2025), included in Appendix E. A review of the following was undertaken as part of the PSI:

- Geology and hydrogeology of the area;
- Coastal acid sulfate soil hazard maps;
- Selected historical aerial photographs and maps including the property and surrounding area;
- Planning schemes / zoning maps;
- The EPA Victoria Priority Sites Register for the site and surrounds;
- The EPA Victoria register of issued certificates and statements of Environmental Audit for the site and surrounds;

[1] Schedule 4 to Clause 42.01 Environmental Significance Overlay - Areas of Poor Drainage or Potentially Subject to Inundation

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- Registered groundwater bore information in the public register;
- Cathodic Protect System search for fuel storages on site;
- Previous environmental site assessments;
- Additional online sources;
- History of surrounding land (where possible);
- Review of current and former landfill sites within a 500m radius of the site; and
- Interview with nearby local resident.

3.1 GEOLOGY

3.1.1 Regional Geology

According to the Geological Survey of Victoria, Balranald and Deniliquin Map Sheet (1997) (scale 1:250,000), the site is underlain by the Shepparton Formation (Quaternary: clay, silt, sand and gravel of alluvial origin).

3.2 HYDROGEOLOGY

The Visualising Victoria's Groundwater website (https://www.vvg.org.au/) and a groundwater resource report sourced from the Department of Environment, Land, Water and Planning (DELWP) (https://www.water.vic.gov.au/groundwater/groundwater-resource-reports) on 29 July 2025 have been reviewed and indicate that the expected depth to groundwater underneath the site is within the first 5 metres below surface level. This aquifer would be expected to have groundwater salinity levels ranging between 13,001 and 35,000 mg/L Total Dissolved Solids (TDS). The inferred groundwater flow direction beneath the site is believed to be west towards the Murray River.

The groundwater resource report is included in Appendix B.

3.3 TOPOGRAPHY

The site has been observed to be generally flat, with the elevation ranging from 73 AHDm to 77 AHDm[2].

3.4 SURFACE WATER

There are no visible surface water bodies located onsite. The nearest water body offsite is the No. 4 Main Channel, located approximately within 10m west. It is assumed surface water onsite would drain to paddock swales onsite across impermeable surfaces or/and infiltrate into the soil profile in uncovered areas. The Murray River is another noteworthy offsite water body, located approximately 250m northeast.

3.5 ONLINE SOURCES

Scaada Environmental completed an online search to further assess the potential contamination status of the site. The following sources were accessed:

- The Cathodic Protection Systems – Public Search (Energy Safe Victoria, 2025) was used to assess if there were any potential USTs present on site. There were no listed USTs on the public search register for the site.

[2] The site's elevation was informed through Nearmaps' elevation profile tool (Nearmaps, 2025).

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3.6 REVIEW OF HISTORICAL AERIAL PHOTOGRAPHS

Historical aerial photographs and maps featuring the site and its surrounds were reviewed for evidence of any potentially contaminating activities that may have been undertaken at the site. The reviewed aerial photographs were captured between 1945 and 2023 and are included in the Lotsearch Report in Appendix E. No photographs prior to 1945 were available. The key observations noted during the review are summarised below in Table 2.

Table 2: Review of historical aerial photographs

Year	Source	On-site	Off-site
1945	Department of Environment, Land, Water and Planning (Vicmap Topographic Mapping Program)	The site is predominantly vacant land, potentially used for agricultural use) with a small building structure located close to the west site boundary to the south.	No. 4 Main Channel runs north to south and located approx. 10m from the site's west boundary. An additional potential water channel bisects the No. 4 Main Channel, southwest of the site. View Street (south) is established road. The surrounding land is predominantly vacant land, potentially used for agriculture. A singular dam approx. 150m southeast of the site.
1957		Additional larger structure erected west of the original structure onsite. A distinct track in a loop shape, runs to View Street.	Additional potential residential or farming structures have erected to the east, southwest and northeast of the site.
1961	NSW Department of Customer Service	No significant changes evident.	Burnett Street is established.
1970		No significant changes evident.	Additional buildings or dwellings erected in the northeast. Buildings to the southwest have been demolished.
1981	Department of Environment, Land, Water and Planning (Vicmap Topographic Mapping Program)	Image provided too poor of quality to identify specific changes near the building onsite.	Land development to the east of the site, too poor of image quality to identify specific. Assumed constructions of both residential and industrial buildings.
1991	NSW Department of Customer Service	No significant changes evident.	Further construction buildings to the northeast. Large dam to the southwest of site.
1996		No significant changes evident.	Construction of buildings to the northwest and southwest.
2007	2025 Google Inc, used with permission. Google and the Google logo are	No significant changes evident.	No significant changes evident.
2015		No significant changes evident.	No significant changes evident.

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Year	Source	On-site	Off-site
2023	registered trademarks of Google Inc.	No significant changes evident.	No significant changes evident.

(Lotsearch,2025)

The review of areal images was completed in collaboration with a local residence who has lived within walking distance of the site their entire life. They were able to confirm that the small building onsite, observable in earliest historical image (1945), previously operated as a small, non-industrial abattoir until the 1980s (approx.).

3.7 HISTORICAL SITE USES

3.7.1 Historical Onsite Uses

Information provided by Lotsearch indicates various different historical uses by matching the address with Business Directory Records (1905-1991). No potential historical site uses for the site have been derived from the business activities provided by Lotsearch.

3.7.2 Historical Neighbouring Site Uses

Information provided by Lotsearch indicates various different historical uses by matching the address with Business Directory Records (1905-1991). No potential historical site uses for neighbouring sites have been derived from the business activities provided by Lotsearch.

3.8 NATURAL HAZARDS

Information provided by Lotsearch indicates that the site is located within a Designated Bushfire Prone Area.

3.9 ACID SULFATE SOILS

Information provided by Lotsearch indicates that there is an extremely low (1-5%) probability of Acid Sulfate Soil (ASS) being present at the site.

3.10 NEARBY LANDFILL SITES (WITHIN 500M)

Landfill gas, containing methane and carbon dioxide, is produced by current and former landfills and has the potential to migrate to neighbouring land under the correct conditions. As per guidance provided in EPA Victoria Publication 1950 Landfill buffer guidelines (EPA, 2024), if there is a current or former putrescible waste landfill located within 500m of a proposed development then the responsible Planning Authority must demonstrate to the EPA that it will not be negatively impacted by the landfill site i.e. through landfill gas migration to the site.

The information provided by Lotsearch indicates that there are no former or current landfill sites listed on the EPA Victorian Landfill Register within 500m of the site.

3.11 EPA PRIORITY SITES REGISTER

EPA Victoria's priority sites register lists sites that have been issued either a Clean Up Notice (CUN) or a Pollutant Abatement Notice (PAN) by the EPA. Sites managed by voluntary agreements or sites subject to management by planning controls are not listed on the priority sites register. There are no sites within 1 km of the investigation area currently or former listed on the EPA Priority Sites Register.

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3.12 Nearby Environmental Audits

Lotsearch completed a search of environmental audits that have been conducted within a 1 km radius of site. There were no EPA environmental audits listed within 1 km of the investigation site.

3.13 EPA Check Your Groundwater Area

An EPA Check Your Groundwater Area (CYGA)[3] is an area, site or property where an environmental audit has been undertaken and was determined to have residual groundwater contamination which may preclude a potential use of the groundwater

The information provided by Lotsearch indicates that there are no CYGA/GQRUZ within 1km of the site.

3.14 EPA Prescribed Industrial Waste Sites

Lotsearch completed a search of sites within a 1 km radius of site that are registered treaters, disposers and permitted transporters of prescribed industrial waste. There were no EPA prescribed industrial waste sites listed within 1 km of the investigation site.

3.15 Groundwater Borehole Search

The Lotsearch report listed eleven registered groundwater boreholes that were identified within 2 km of the investigation site. The identified groundwater boreholes were listed as being for investigation [9], and/or unknown [2] use.

3.16 Gas Works and Liquid Fuel Facilities

Information provided by Lotsearch indicates that there are no fuel depots or operational petrol stations within 1km of site.

3.17 Ecological Constraints

Information provided by Lotsearch indicates that there are potentially two native vegetation on site, Riverine Grassy Woodland plains which is classified as vulnerable and Riverine Chenopod Woodland plains which is classified as endangered.

4 Site Visit and Observations

Scaada Environmental attended site on the 19th of July 2025 to complete site observations and complete targeted soil sampling. During Scaada Environmental's site visit the following observations were recorded:

- Site was primarily used as cattle grazing.
- Various wood stockpiles near the northern boundary of investigation area.
- Historical abattoir location currently used for storing farming equipment. Shed constructed of a wooden frame with corrugated metal.
- Minor building debris observed on soil swale along the southern boundary and No. 4 Main Channel bank.

[3] The CYGA is a recent update to the previous designations of areas as 'Groundwater Quality Restricted Use Zones' (GQRUZ).

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- No potentially asbestos containing materials were observed.
- No signs of stress or die off of grasses and trees.

4.1 INTERVIEW

After completion of the site visit, Scaada Environmental met with and interviewed Jean Taylor, a Koondrook local, that has lived in the area for 75 years. Jean confirmed that the shed at the Site previously operated as a small scale, private abattoir that only served private clients and the Barham Butcher. Jean estimated the cessation of operations at the abattoir 1980s.

5 LIMITED SITE SOIL ASSESSMENT

In order to gain a further understanding into the contamination status of the Site, Scaada collected seven shallow soil samples to the maximum depth of 0.1mBGL at 10 Dalton Street, Koondrook on 19 July 2025. The soil samples were in a gridded formation with two of the seven samples targeted the old abattoir building. Sample locations are showed in Figure 2, Appendix A. All samples were submitted to a NATA accredited laboratory for analysis. Soil samples were analysed for OCP, OPP, and TPH to access the potential impact from agricultural use onsite.

Environment Reference Standard (Victoria Government, May 2021) (ERS) outlines the environmental values of land that require protection based on the intended land use as *sensitive other* (low density residential). Analytical results for the soil samples collected as part of this investigation have been compared against the assessment criteria determined by the ERS listed in *National Environmental Protection (Assessment of Site Contamination) Measure* (NEPC, 2013), to determine if contaminant concentrations present a human health or ecological risk. The analytical results are presented in Table 1, Appendix F. Laboratory chain of custody documents and the certified laboratory reports are provided in Appendix G.

All analyte concentrations were below the adopted human health and ecological assessment criteria. Concentrations of non-detect were reported for all analysis, with the exception of Total Recoverable Hydrocarbons (TRH) within samples S1 and S7[4].

No visual or olfactory indication of soil contamination was observed. No staining for hydrocarbon odours were noted onsite.

6 POTENTIAL CONTAMINATION SOURCES

6.1 SUMMARY OF POTENTIAL CONTAMINATION SOURCES

The site history review identified the following potentially contaminating activities and sources with regard to the current and former uses of the site has been outlined in Table 3 and Table 4.

Table 3: Onsite potential contamination sources

Potential Contamination Source/Activity	Contaminants of Potential Concern (COPC)	Details	Level of Expected Impact
Abattoir	Nutrients (e.g. nitrogen, phosphorus), Biological Oxygen Demand (BOD), Total	Building onsite was previously used as an abattoir, potential for the operation of it to have impacted the environment.	Medium – based on years since operation and size of operations.

[4] These samples were not analysed for Petroleum Hydrocarbons via silica gel clean up method.

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Potential Contamination Source/Activity	Contaminants of Potential Concern (COPC)	Details	Level of Expected Impact
	Suspended Solids (TSS), Oil and grease		
Former agricultural practices	Organochlorine pesticides (OCP), Organophosphate Pesticides (OPP), BTEX (benzene, toluene, ethyl benzene, and xylenes) and polyaromatic hydrocarbons (PAHs), nitrate	Agricultural practices may include, spraying of weeds and crops, operation of farm machinery and watering.	Low – Based on observations and soil samples results.
Potential importation of uncontrolled soil material	TPH, BTEX, PAH, metals, asbestos, and inert waste.	Potential importation of uncontrolled soil material that may have been contaminated could impact the environment. As the landscape surrounding the building onsite has been cleared multiple times, use of uncontrolled imported soil may have been used.	Low – Based on minor expected volumes and observations made in the field.

Table 4: Offsite potential contamination sources

Potential Contamination Source/Activity	Contaminants of Potential Concern (COPC)	Details	Level of Expected Impact
Agricultural practices	OCP, BTEX, PAHs and nitrate	Agricultural practices may include, spraying of weeds and crops, operation of farm machinery and watering.	Low – Based on soil samples results and site having same historical use.

6.2 PLANNING PRACTICE NOTE 30

Planning Practice Note 30 (PPN30) (DELWP, 2021), would determine the site is to have a high potential for contamination based on the presence of the closed abattoir. With intended use of the site remaining as residential zoning and the associated potential contamination level, PPN30 recommends a Preliminary Risk Screen Assessment (PRSA) or environmental audit in line with the Environment Protection Act. These assessments can only be undertaken by EPA Victoria-appointed Environmental Auditor. Scaada Environmental acknowledges that this should only apply to the western site parcel (1\LP119887).

PPN30 also lists the following three reasons for when an exemption may be granted to avoid the need for a PRSA or Environmental Audit:

- *Potentially contaminated land is already used for a sensitive use, agriculture or open space.*
- *Prior industry use of the land was benign and unlikely to result in any contamination.*
- *If there is a regional strategy to manage contamination (for example former gold mining activities).*

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Scaada Environmental believe the context surrounding the abattoir may be considered benign and the site is already zoned correctly for the future sensitive use.

7 CONCLUSIONS & RECOMMENDATIONS

Scaada Environmental has completed this Preliminary Site Investigation and determined that it is unlikely potentially contaminating activities that occurred on the site have impacted the soil onsite. Although the presence of a former abattoir typically indicates a high potential for contamination, the small scale of the facility and the considerable time since its closure suggest that the contamination risk is more appropriately classified as medium.

No impact to soil was observed or reported within soil analysis results. Thus, Scaada Environmental believe the historical agricultural use is unlikely to have resulted in contamination at the site.

Scaada Environmental have the following recommendations based on the content of this Preliminary Site Investigation:

- Exploration of an exception to be granted from the need to comply with *Ministerial Direction No.1* (Planning and Environmental Act 1987 2021). A planning authority may request an exemption from the Minister or Executive Director, Statutory Planning Services, Department of Environment, Land, Water and Planning.
- Alternatively, to engage an EPA Victoria-appointed Environmental Auditor to complete a PRSA to identify if the land is suitable for intended site development or if it requires an audit, in accordance with Planning Practice Note 30 (PPN30) (DELWP 2021).

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8 REFERENCES

Department of Environment, Land, Water and Planning (DELWP)(2021) Potentially Contaminated Land, Planning Practice Note 30.

Department of Environment Government of Western Australia (2004) Potentially Contaminating Activities, Industries and Landuses, Contaminated Sites Management Series.

Department of Natural Resources and Environment (1997) Geological Survey of Victoria, Balranald and Deniliquin, SJ 54-12 and SJ 54-13, 1:250,000 Geological Map Series

Energy Safe Victoria (2025), CPS Public Search, accessed on 30 July 2025 [https://portal-public.energysafe.vic.gov.au/prod/SearchCPS.html]

EPA Victoria (2015) Siting, design, operation and rehabilitation of landfills, Publication 788.3.

Interviewee (2025), *Jean Taylor*, Retired, 20th July 2025.

Planning and Environmental Act 1987 (2021), Section 12(1A), *Ministerial Direction No.1 – Potentially Contaminated Land*

NEPC (2013) *National Environment protection (Assessment of Site Contamination) Measure 1999,* as amended in 2013, National Environment Protection Council;

State Government of Victoria, *Environmental Reference Standard***,** May 2021;

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9 STATEMENT OF LIMITATIONS

This report has been compiled by Scaada Environmental Pty Ltd (Scaada Environmental) (ABN – 30 624 289 229 & ACN – 624 289 229) for “The client as nominated”, as Scaada Environmental’s client, in accordance with the agreed quoted work, scope, schedule and budget.

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

The report is based on information gained from site work and any other environmental condition, as delineated and specified in the body of the report and supplemented by reported data of the local area. Assessment has been scoped with consideration to industry standards, regulations, guidelines, and your specific requirements, including budget and time requirements and constrains. The characterisation of site conditions is an interpretation of information collected during assessment, in accordance with industry standards and best practice.

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

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

The report has been developed for a specific purpose, as agreed upon and applies only to the site or area investigated. Unless otherwise stated in the report, this report cannot be applied to an adjacent site or area, nor can it be used when the nature of the specific purpose changes from that which was agreed. For each purpose, a tailored approach to the assessment of “the site(s) as nominated” required. In most cases, a key objective is to identify, and if possible, quantify the risks to recognised and potential contamination posed in the context of the agreed purpose. Such risks may be financial (for example, clean-up costs or constraints on site) and/or physical (for example, potential health risks to users of the site or the unknown.

Interpretation of factual data, the analysis of samples is completed in a NATA accredited laboratory where applicable Scaada Environmental take no responsibility for the reported results of external providers/parties. Analytical processes are those controlled solely by the laboratory from which the analysis for this report was undertaken. The interpretation of the laboratory results provided to Scaada Environmental on environmental site assessments identify actual conditions only at those points where samples are taken and, on the date collected and as such, analytical facilities analyse, and report results from such samples as received. Data derived from indirect field measurements, and sometimes other reports based on the site, are interpreted by specialised engineers or scientists to provide an opinion about overall site conditions and their likely impact with respect to the report purpose and recommended actions.

Variations in soil and groundwater conditions may occur between tests or sample locations and actual conditions may differ from those inferred to exist. No environmental assessment program, no matter how comprehensive, can reveal all subsurface details and anomalies, owing to the spatial heterogeneity of the environment.

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

Recommendations in this report are only preliminary; the report recommendations are specific to information provided within this report only. The client acknowledges that the investigation only covered areas relevant to this scope of works, and as identified by the client. This report assumes, in accordance with industry practice, that the site conditions recognised through discrete sampling are representative of actual conditions throughout the investigation area. Recommendations are based on the resulting interpretation. Should further data be obtained that differs from the data on which the report recommendations are based (such as through excavation or other additional assessment), then we strongly recommend a new report be complete.

Any party carrying out recommendations made within this report take on the responsibility of ensuring they are done so with the appropriate permits, permissions and within EPA guidelines, legislative requirements, and local regulations, unless Scaada Environmental is engaged by the client to complete as part of the formal proposal.

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Report for benefit of client, unless otherwise agreed between us, the report has been prepared for your benefit and no other party. Other parties should not rely upon the report or the accuracy or completeness of any recommendation and should make their own enquiries and obtain independent advice in relation to such matters. Scaada Environmental accepts no responsibility and will not be liable to any other person or organisation for, or in relation to, any matter dealt with, or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the report. To avoid misuse of the information presented in your report, we recommend that Scaada Environmental be consulted before the report is provided to another party who may not be familiar with the background and the purpose of the report. In particular, an environmental disclosure report for a property vendor may not be suitable for satisfying the needs of that property's purchaser. This report should not be applied for any purpose other than that stated in the report.

Interpretation by other professionals can be costly, issues can occur when other professionals develop their plans based on misinterpretations of a report. To help avoid misinterpretations, a suitably qualified and experienced environmental consultant should be retained to explain the implications of the report to other professionals referring to the report and then review plans and specifications produced to see how other professionals have incorporated the report findings. Given Scaada Environmental prepared the report and has familiarity with the site, Scaada Environmental is well placed to provide such assistance. If another party is engaged to interpret the recommendations of the report, there is a risk that the contents of the report may be misinterpreted. Scaada Environmental disowns any responsibility for such misinterpretation.

Data should not be separated from the report, the report presents the findings of the site assessment in full, and as such the report should not be copied in part or altered in any way. Logs, figures, laboratory data, drawings are customarily included in our reports and are developed by scientists or engineers based on their interpretation of field logs, field testing and interpretation of associated analytical reports. This information should not under any circumstance be redrawn for inclusion in other documents or separated from the report in any way. This report should be reproduced in full. No responsibility is accepted for use of any part of this report in any other context or for any other purpose or by third parties, unless with formal written agreement with Scaada Environmental.

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

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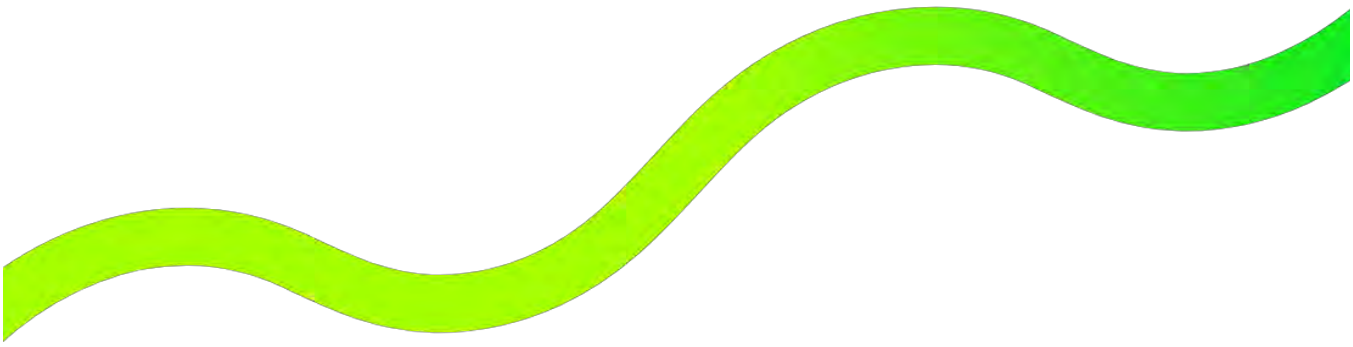
Preliminary Site Investigation

APPENDIX A – SITE FIGURES



SITE FIGURE - 10 Dalton Street, Koondrook, Victoria

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Figure 1
Preliminary Site Invetsigation - Site Boundary and Potentially Contaminating Activities Onsite
10 Dalton Street, Koondrook, Victoria

Previously Operating Abattior
Property border

N

SG-T4-E-FRM-043 - Site Figure Version 04 21/03/2024

SITE FIGURE - 10 Dalton Street, Koondrook, Victoria

scaada

Figure 2
Preliminary Site Invetsigation - Soil Sampling Locations
10 Dalton Street, Koondrook, Victoria

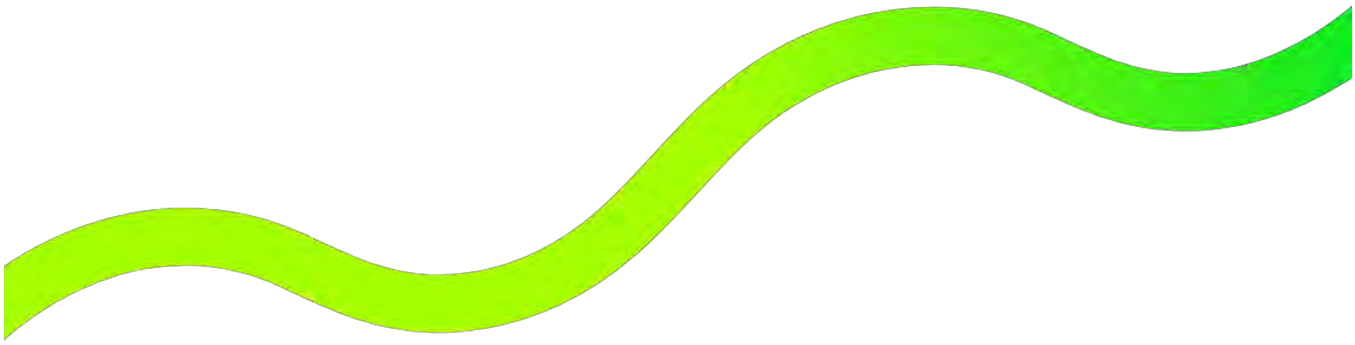
Sample location (approx.)
Property border

N

SG-T4-E-FRM-043 - Site Figure Version 04 21/03/2024

Preliminary Site Investigation

APPENDIX B – DELWP GROUNDWATER RESOURCE REPORT



Groundwater Resource Report

Groundwater catchment: Loddon **VICGRID94 Easting: 2420282 Northing: 2651100**

Depth to water table: < 5m **Water table salinity (mg/L): 13001 - 35000**

Groundwater layers (Aquifers and Aquitards)	Depth below surface (m)	Groundwater salinity (mg/L)
UTQA Upper Tertiary / Quaternary Aquifer layered clay, sands and silt	0 - 40	> 35000
UTAM Upper Tertiary Aquifer (marine) sand	40 - 75	> 35000
LTA Lower Tertiary Aquifer sand, gravel, clay and silt, minor coal	75 - 143	3501 - 13000
BSE Mesozoic and Palaeozoic Bedrock (basement) sedimentary (fractured rock): Sandstone, siltstone, mudstone, shale. Igneous (fractured rock): includes volcanics, granites, granodiorites.	143 - 343	> 35000

There are no GMUs at this location

For further information about this report contact:
Department of Environment, Land, Water & Planning
Email: ground.water@delwp.vic.gov.au

For further information on groundwater licensing in this area contact:
Goulburn Murray Water
Phone: 1800 013 357
Email: reception@g-mwater.com.au
Website: http://www.g-mwater.com.au/water-resources/ground-water

Disclaimer

This publication may be of assistance to you but the State of Victoria and its employees do not guarantee that the publication is without flaw of any kind or is wholly appropriate for your particular purposes and therefore disclaims all liability for any error, loss or other consequence which may arise from you relying on any information in this publication.

Printed: 30 July 2025
Date Updated: 11 January 2019

VICTORIA State Government | Environment, Land, Water and Planning

How to read this report

Introduction

Groundwater is part of the water cycle. When rain or snow falls on land, some of it evaporates, some flows to streams and rivers, and some seeps into the soil. Some of the water in the soil is used by plants but some continues to move down through the soil and rock until all the pores and cracks are full of water. This is known as the water table and this water is called groundwater.

Groundwater is a finite resource that, like surface water, is allocated under the Water Act (1989). A Bore Construction Licence is required to drill for groundwater including for domestic and stock purposes. Taking and using groundwater for commercial or irrigation purposes requires an additional licence.

Purpose of this report

This report has been prepared to provide potential groundwater users with basic information about groundwater beneath their property. This includes the different geological layers, the depths of the layers and the salinity of groundwater in the layers. Information on the groundwater management units (GMU) and any associated caps on the volume that can be licensed (the PCV) are also provided.

Definitions and context

Term	Description
Groundwater Catchment	An identified area of the State within which groundwater resources are connected.
Easting / Northing	The VICGRID 94 coordinates of the spot that was selected on the interactive map.
Groundwater Salinity	Indicates the possible concentration of salts within the groundwater. The salt content indicates the possible uses of the water (see the Beneficial Use Table below). Fertilisers and other contaminants can also enter groundwater and affect its use. It is up to you to make sure that the groundwater you use is suitable for your purpose.
Aquifer	An aquifer is a layer of soil or rock which stores usable volumes of groundwater. Aquifers are generally limestones, gravels and sands, as well as some fractured rocks where the cracks in the rock are open and connected (some basalts, sandstones and limestones). How much water can be pumped from an aquifer depends on how much water is stored in pores and cracks, how well connected the pores and cracks are, and how thick the layer is. It is more likely that volumes of water for irrigation and urban water supply will come from gravels, sands, limestones and basalts that are at least 30 metres thick. Low volumes of water for domestic and stock use are likely from any aquifer greater than 10 metres thick. The advice above is a guide only, as the amount of water available can be highly variable. Actual pumping volumes can only be determined from drilling, appropriate construction and testing of a bore.
Aquitard	An aquitard is a layer of rock or soil that does not allow water to move through it easily, limiting its capacity to supply water. Aquitards are generally silts, clays and fractured rocks (where there are few cracks in the rock or the cracks are poorly connected).
Groundwater Management Unit (GMU)	A collective term for groundwater management areas (GMAs) and water supply protection areas (WSPAs). GMAs and WSPAs are defined areas and depths below the surface where rules for groundwater use may apply. WSPAs often have caps on groundwater use and plans describing how the resource is managed. GMAs usually have caps on groundwater use and may have local plans and rules. All other areas are managed directly through the Water Act (1989). Always check with your local Rural Water Corporation to be sure that the information on the GMU is correct for your specific location.
Permissible Consumptive Volume (PCV)	A cap that is set under the Water Act (1989) declaring the total volume of groundwater that may be taken from the area. Once the PCV is reached, no additional extraction can be licensed for use within the area unless traded from another groundwater licence holder.
Depth to Water Table	This is an indication of the depth at which groundwater might first be encountered when drilling a bore. The depth can vary from year to year, and from place to place and may vary significantly from that indicated in this report.

Beneficial Use Table

Salinity range (mg/L TDS)	Beneficial use as described by State Environment Protection Policy (Groundwaters of Victoria) s160							
	Potable water - preferred	Potable water - acceptable	Potable mineral water	Irrigation	Stock water	Industry	Ecosystem protection	Buildings and structures
<500	✓	✓	✓	✓	✓	✓	✓	✓
501-1000		✓	✓	✓	✓	✓	✓	✓
1001-3500			✓	✓	✓	✓	✓	✓
3501-13000					✓	✓	✓	✓
13001+						✓	✓	✓

Accessibility

If you would like to receive this publication in an alternate format, please telephone or email the DELWP Customer Service Centre 136 186, email customer.service@delwp.vic.gov.au, or via the National Relay Service on 133 677 www.relayservice.com.au.

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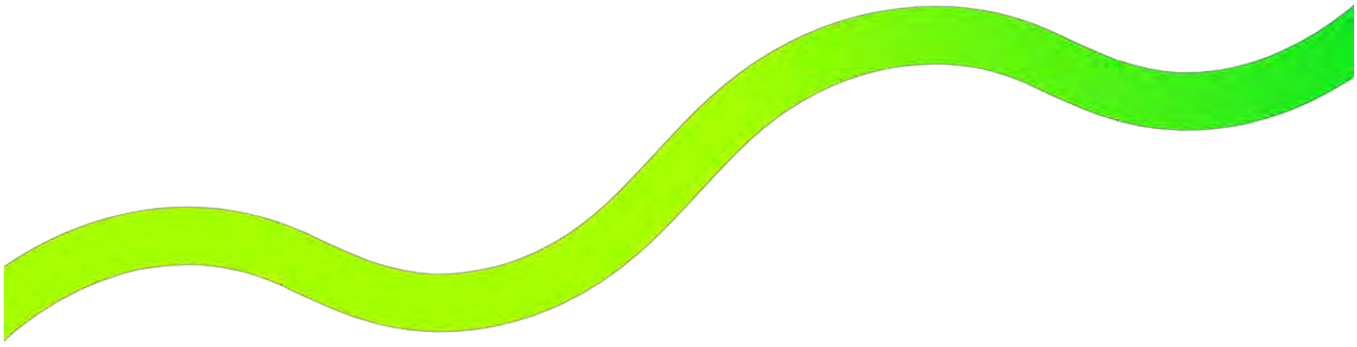
VICTORIA State Government | Environment, Land, Water and Planning

Preliminary Site Investigation

APPENDIX C – DELWP PROPERTY REPORT



PLANNING PROPERTY REPORT

Department of Transport and Planning

From www.planning.vic.gov.au at 17 July 2025 08:55 AM

PROPERTY DETAILS

Crown Description:	**Allot. 66 PARISH OF MURRABIT**
Address:	**10 DALTON STREET KOONDROOK 3580**
Standard Parcel Identifier (SPI):	**66\PP3230**
Local Government Area (Council):	**GANNAWARRA** www.gannawarra.vic.gov.au
Council Property Number:	**A35741 (Part)**
Planning Scheme:	**Gannawarra** Planning Scheme - Gannawarra
Directory Reference:	**Vicroads 591 P7**

This parcel is one of 5 parcels comprising the property. For full parcel details get the free Property report at Property Reports

UTILITIES

Rural Water Corporation:	**Goulburn-Murray Water**
Urban Water Corporation:	**Lower Murray Water**
Melbourne Water:	**Outside drainage boundary**
Power Distributor:	**POWERCOR**

STATE ELECTORATES

Legislative Council:	**NORTHERN VICTORIA**
Legislative Assembly:	**MURRAY PLAINS**

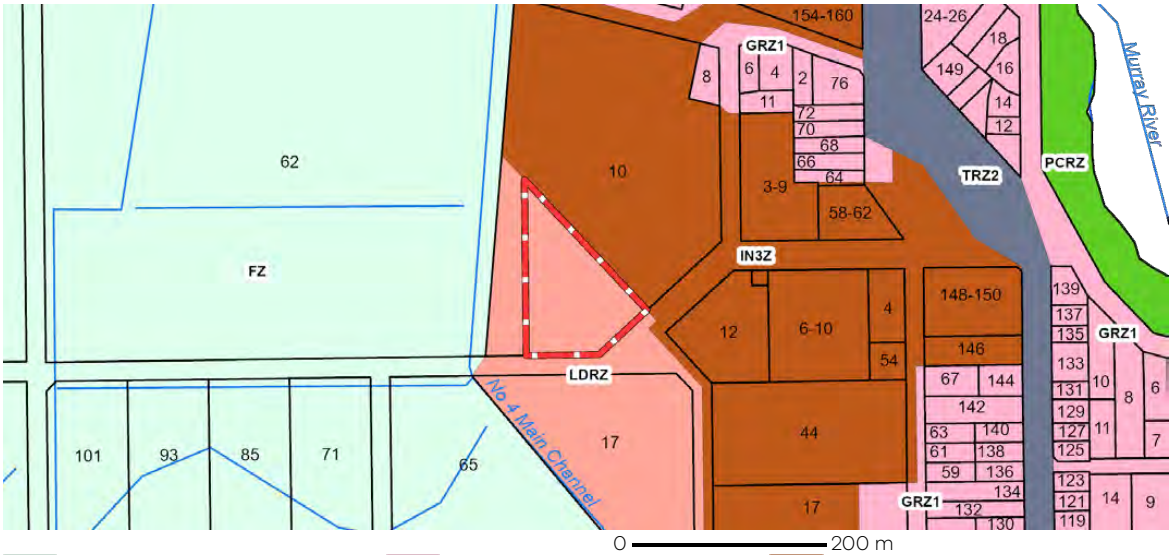
OTHER

Registered Aboriginal Party:	**None**
Fire Authority:	**Country Fire Authority**

View location in VicPlan

Planning Zones

LOW DENSITY RESIDENTIAL ZONE (LDRZ)
SCHEDULE TO THE LOW DENSITY RESIDENTIAL ZONE (LDRZ)



Note: labels for zones may appear outside the actual zone - please compare the labels with the legend.

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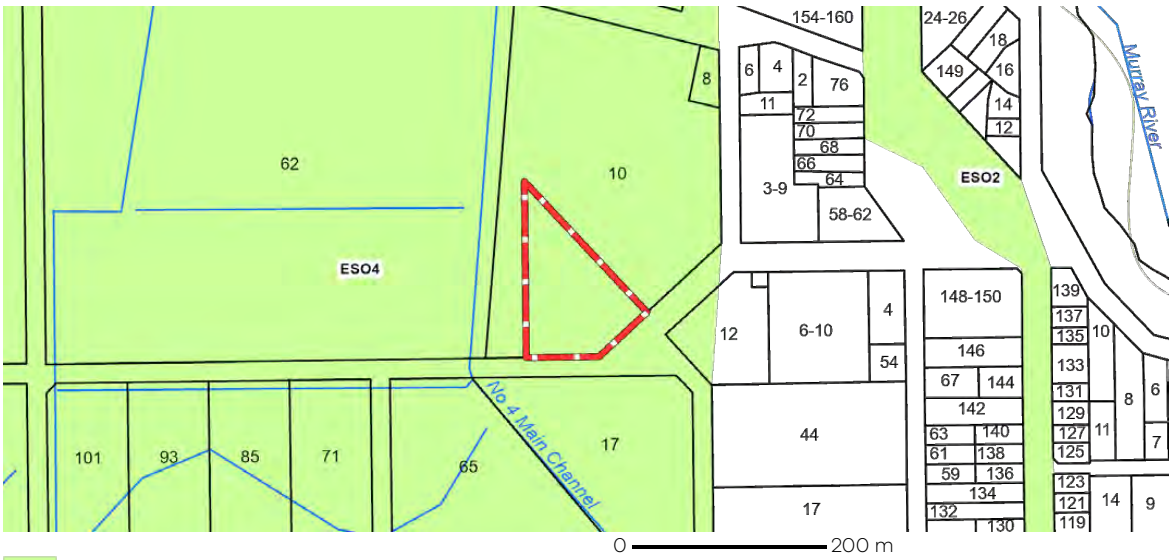
PLANNING PROPERTY REPORT

Department of Transport and Planning

Planning Overlays

ENVIRONMENTAL SIGNIFICANCE OVERLAY (ESO)
ENVIRONMENTAL SIGNIFICANCE OVERLAY - SCHEDULE 4 (ESO4)



ESO - Environmental Significance Overlay Water course

Note: due to overlaps, some overlays may not be visible, and some colours may not match those in the legend

SPECIFIC CONTROLS OVERLAY (SCO)
SPECIFIC CONTROLS OVERLAY - PS MAP REF SCO2 SCHEDULE (SCO2)

SCO - Specific Controls Overlay Water course

Note: due to overlaps, some overlays may not be visible, and some colours may not match those in the legend

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PLANNING PROPERTY REPORT

Department of Transport and Planning

Planning Overlays

OTHER OVERLAYS

Other overlays in the vicinity not directly affecting this land

HERITAGE OVERLAY (HO)

LAND SUBJECT TO INUNDATION OVERLAY (LSIO)

HO - Heritage Overlay | LSIO - Land Subject to Inundation Overlay | Water course

Note: due to overlaps, some overlays may not be visible, and some colours may not match those in the legend

Further Planning Information

Planning scheme data last updated on 17 July 2025.

A **planning scheme** sets out policies and requirements for the use, development and protection of land.
This report provides information about the zone and overlay provisions that apply to the selected land.
Information about the State and local policy, particular, general and operational provisions of the local planning scheme that may affect the use of this land can be obtained by contacting the local council or by visiting https://www.planning.vic.gov.au

This report is NOT a **Planning Certificate** issued pursuant to Section 199 of the ***Planning and Environment Act 1987.***
It does not include information about exhibited planning scheme amendments, or zonings that may abut the land.
To obtain a Planning Certificate go to Titles and Property Certificates at Landata - https://www.landata.vic.gov.au

For details of surrounding properties, use this service to get the Reports for properties of interest.

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For other information about planning in Victoria visit https://www.planning.vic.gov.au

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PLANNING PROPERTY REPORT

Department of Transport and Planning

Designated Bushfire Prone Areas

This parcel is in a designated bushfire prone area. Special bushfire construction requirements apply to the part of the property mapped as a designated bushfire prone area (BPA). Planning provisions may apply.

Where part of the property is mapped as BPA, if no part of the building envelope or footprint falls within the BPA area, the BPA construction requirements do not apply.

Note: the relevant building surveyor determines the need for compliance with the bushfire construction requirements.

Designated BPA are determined by the Minister for Planning following a detailed review process. The Building Regulations 2018, through adoption of the Building Code of Australia, apply bushfire protection standards for building works in designated BPA.

Designated BPA maps can be viewed on VicPlan at https://mapshare.vic.gov.au/vicplan/ or at the relevant local council.

Create a BPA definition plan in VicPlan to measure the BPA.

Information for lot owners building in the BPA is available at https://www.planning.vic.gov.au.

Further information about the building control system and building in bushfire prone areas can be found on the Victorian Building Authority website https://www.vba.vic.gov.au. Copies of the Building Act and Building Regulations are available from http://www.legislation.vic.gov.au. For Planning Scheme Provisions in bushfire areas visit https://www.planning.vic.gov.au.

Native Vegetation

Native plants that are indigenous to the region and important for biodiversity might be present on this property. This could include trees, shrubs, herbs, grasses or aquatic plants. There are a range of regulations that may apply including need to obtain a planning permit under Clause 52.17 of the local planning scheme. For more information see Native Vegetation (Clause 52.17) with local variations in Native Vegetation (Clause 52.17) Schedule

To help identify native vegetation on this property and the application of Clause 52.17 please visit the Native Vegetation Information Management system https://nvim.delwp.vic.gov.au/ and Native vegetation (environment.vic.gov.au) or please contact your relevant council.

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PLANNING PROPERTY REPORT

Department of Transport and Planning

From www.planning.vic.gov.au at 17 July 2025 08:56 AM

PROPERTY DETAILS

Lot and Plan Number:	**Lot 1 LP119887**
Address:	**10 DALTON STREET KOONDROOK 3580**
Standard Parcel Identifier (SPI):	**1\LP119887**
Local Government Area (Council):	**GANNAWARRA** www.gannawarra.vic.gov.au
Council Property Number:	**A35741 (Part)**
Planning Scheme:	**Gannawarra** Planning Scheme - Gannawarra
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Legislative Council:	**NORTHERN VICTORIA**
Legislative Assembly:	**MURRAY PLAINS**

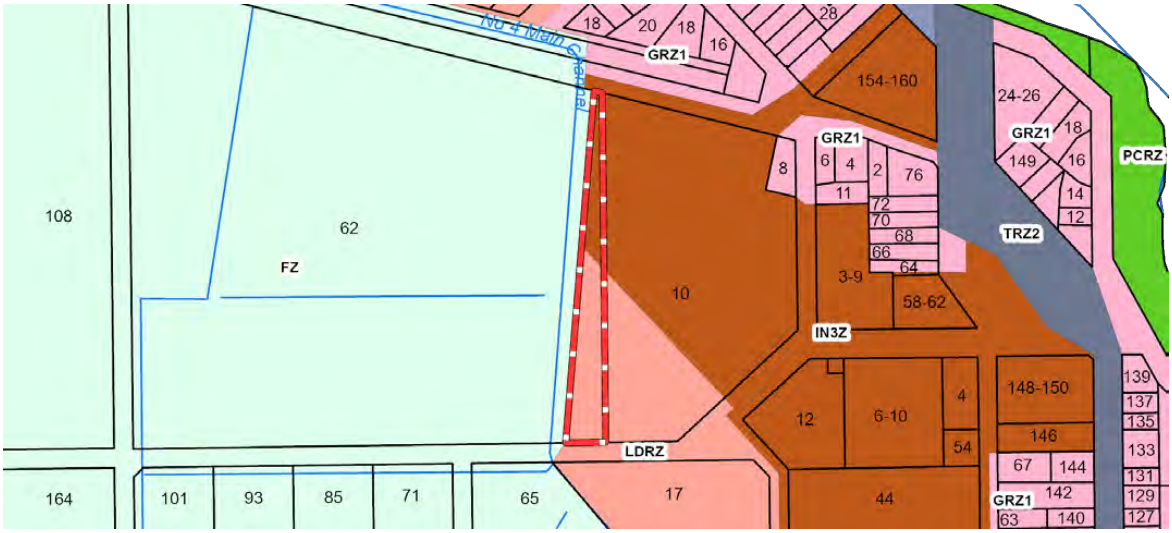
OTHER

Registered Aboriginal Party:	**None**
Fire Authority:	**Country Fire Authority**

View location in VicPlan

Planning Zones

INDUSTRIAL 3 ZONE (IN3Z)
SCHEDULE TO THE INDUSTRIAL 3 ZONE (IN3Z)
LOW DENSITY RESIDENTIAL ZONE (LDRZ)
SCHEDULE TO THE LOW DENSITY RESIDENTIAL ZONE (LDRZ)



FZ - Farming
GRZ - General Residential
IN3Z - Industrial 3
LDRZ - Low Density Residential
PCRZ - Public Conservation and Resource
TRZ2 - Principal Road Network
TRZ3 - Significant Municipal Road
Water course

Note: labels for zones may appear outside the actual zone - please compare the labels with the legend.

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PLANNING PROPERTY REPORT

Department of Transport and Planning

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ENVIRONMENTAL SIGNIFICANCE OVERLAY - SCHEDULE 4 (ESO4)

ESO - Environmental Significance Overlay **Water course**

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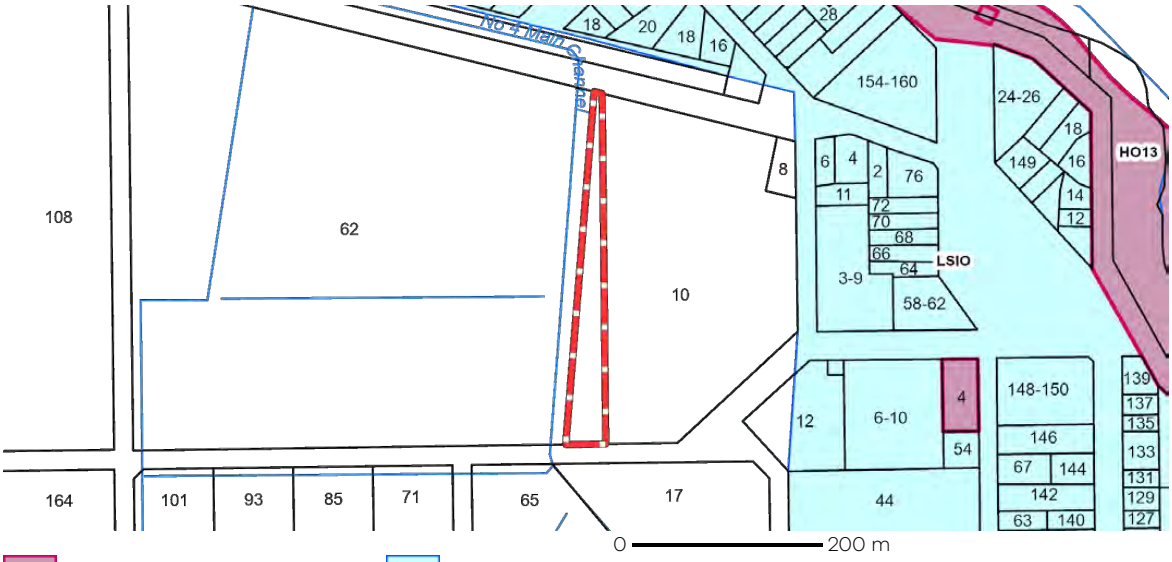

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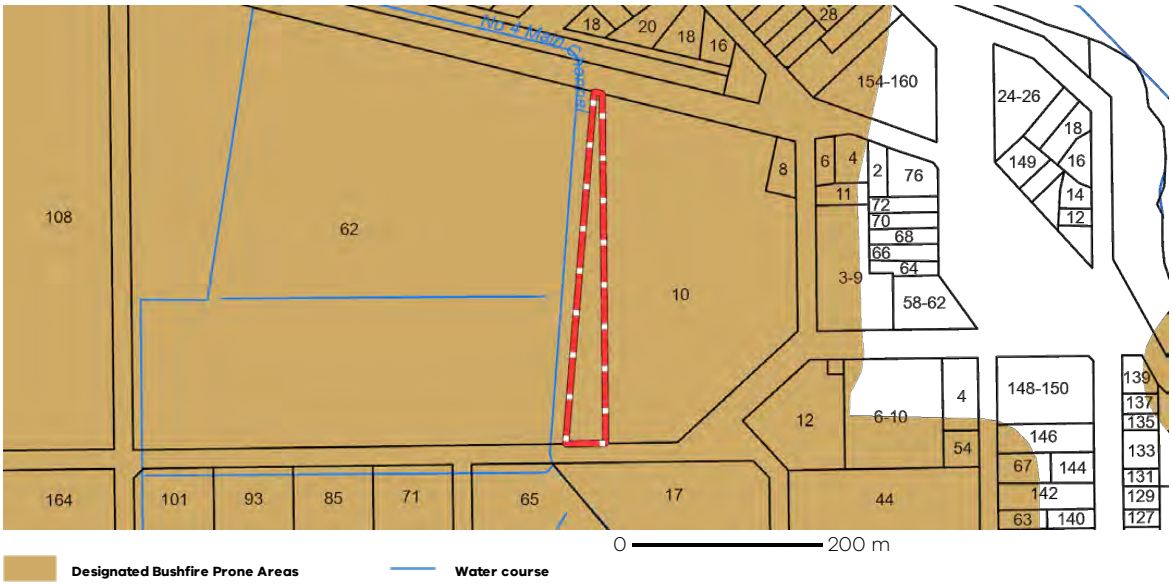

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APPENDIX D – SITE PHOTOGRAPHS

Photograph 1: Front gate entry.

Photograph 2: Minor building debris. Facing east along southern boundary.

Photograph 3: No 4. Main Channel.

Photograph 4: Wood stockpile onsite.

Photograph 5: Inside historical abattoir.

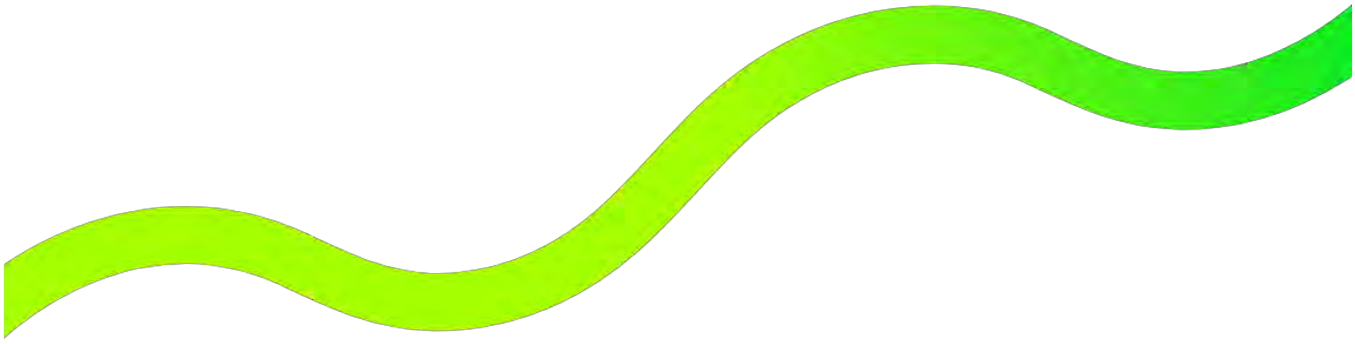
Photograph 6: Inside historical abattoir.

Photograph 7: Front of historical abattoir. Facing south.

Photograph 8: Rear of historical abattoir. Facing north.

Preliminary Site Investigation

APPENDIX E – LOTSEARCH REPORT



LOTSEARCH
LOTSEARCH ENVIRO PROFESSIONAL

Date: 14 Jul 2025 17:12:01

Reference: LS087761 EP

Address: 10 Dalton Street, Koondrook, VIC 3580

Disclaimer:
The purpose of this report is to provide an overview of some of the site history, environmental risk and planning information available, affecting an individual address or geographical area in which the property is located. It is not a substitute for an on-site inspection or review of other available reports and records. It is not intended to be, and should not be taken to be, a rating or assessment of the desirability or market value of the property or its features.
You should obtain independent advice before you make any decision based on the information within the report.
The detailed terms applicable to use of this report are set out at the end of this report.

Dataset Listing

Datasets contained within this report, detailing their source and data currency:

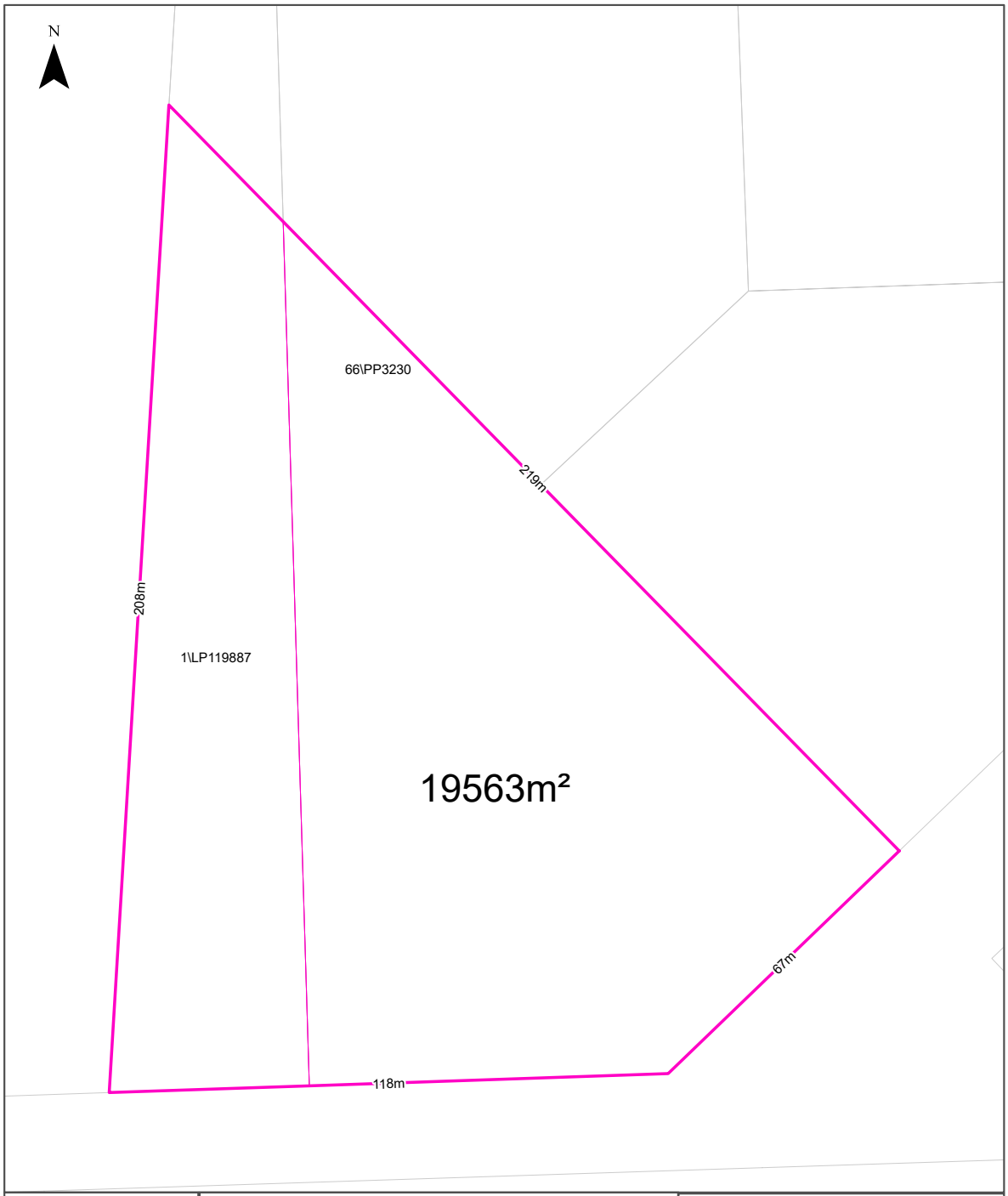
Dataset Name	Custodian	Supply Date	Currency Date	Update Frequency	Dataset Buffer (m)	No. Features On-site	No. Features within 100m	No. Features within Buffer
Topographic and Cadastre data	VIC Department of Energy, Environment and Climate Action	24/06/2025	24/06/2025	Monthly	-	-	-	-
Current EPA Priority Sites	Environment Protection Authority Victoria	14/07/2025	14/07/2025	Weekly	1000m	0	0	0
EPA Site Management Orders	Environment Protection Authority Victoria	27/06/2025	27/06/2025	Monthly	1000m	0	0	0
Former EPA Priority Sites & other Remedial Notices	Environment Protection Authority Victoria	25/10/2024	01/07/2024	Quarterly	1000m	0	0	0
EPA Contaminated Land Notifications	Environment Protection Authority Victoria	17/04/2025	17/04/2025	Quarterly	1000m	0	0	0
EPA PFAS Site Investigations	Environment Protection Authority Victoria	02/07/2025	19/06/2023	Monthly	2000m	0	0	0
Defence PFAS Investigation & Management Program - Investigation Sites	Australian Department of Defence	11/06/2025	11/06/2025	Monthly	2000m	0	0	0
Defence PFAS Investigation & Management Program - Management Sites	Australian Department of Defence	11/06/2025	11/06/2025	Monthly	2000m	0	0	0
Airservices Australia National PFAS Management Program	Airservices Australia	11/06/2025	21/05/2025	Monthly	2000m	0	0	0
Defence Controlled Areas	Australian Department of Defence	10/04/2025	10/04/2025	Quarterly	2000m	0	0	0
Defence 3 Year Regional Contamination Investigation Program	Australian Department of Defence	11/06/2025	02/09/2022	Quarterly	2000m	0	0	0
National Unexploded Ordnance (UXO)	Australian Department of Defence	10/04/2025	10/04/2025	Quarterly	2000m	0	0	0
EPA Preliminary Risk Screening Assessments	Environment Protection Authority Victoria	09/07/2025	09/07/2025	Monthly	1000m	0	0	0
EPA Environmental Audit Reports	Environment Protection Authority Victoria	27/06/2025	27/06/2025	Monthly	1000m	0	0	0
EPA Groundwater Zones with Restricted Uses	Environment Protection Authority Victoria	23/06/2025	23/06/2025	Monthly	1000m	0	0	0
EPA Register of Permissions	Environment Protection Authority Victoria	07/05/2025	07/05/2025	Monthly	1000m	0	1	1
Legacy EPA Licensed Activities	Environment Protection Authority Victoria	19/07/2022	22/07/2021	Not required	1000m	0	0	0
Legacy EPA Works Approvals	Environment Protection Authority Victoria	13/12/2022	13/12/2022	Not Required	1000m	0	0	0
National Waste Management Facilities Database	Geoscience Australia	30/05/2025	19/01/2023	Annually	1000m	0	0	0
Statewide Waste and Resource Recovery Infrastructure Plan Facilities	Sustainability Victoria	30/04/2024	31/12/2012	None Planned	1000m	0	0	0
Legacy EPA Prescribed Industrial Waste	Environment Protection Authority Victoria	12/08/2020	12/08/2020	Not Required	1000m	0	0	1
EPA Victorian Landfill Register	Environment Protection Authority Victoria	20/05/2025	19/05/2025	Quarterly	1000m	0	0	0
Former Gasworks	Various historical sources collated by Lotsearch	15/08/2017	15/08/2017	Not required	1000m	0	0	0
National Liquid Fuel Facilities	Geoscience Australia	16/10/2024	19/01/2023	Annually	1000m	0	0	0
Historical Business Directories (Premise & Intersection Matches)	Hardie Grant; Sands & McDougall, State Library Victoria			Not required	150m	0	0	0
Historical Business Directories (Road & Area Matches)	Hardie Grant; Sands & McDougall, State Library Victoria			Not required	150m	-	0	0
Historical Business Directory Dry Cleaners & Motor Garages/Service Stations (Premise & Intersection Matches)	Hardie Grant; Sands & McDougall, State Library Victoria			Not required	500m	0	0	0
Historical Business Directory Dry Cleaners & Motor Garages/Service Stations (Road & Area Matches)	Hardie Grant; Sands & McDougall, State Library Victoria			Not required	500m	-	0	0

Dataset Name	Custodian	Supply Date	Currency Date	Update Frequency	Dataset Buffer (m)	No. Features On-site	No. Features within 100m	No. Features within Buffer
Features of Interest	VIC Department of Energy, Environment and Climate Action	20/05/2025	20/05/2025	Quarterly	1000m	0	1	28
Hydrogeology Map of Australia	Geoscience Australia	22/04/2025	19/08/2019	Annually	1000m	1	1	1
Watertable Salinity	VIC Department of Energy, Environment and Climate Action	15/05/2025	15/05/2025	Quarterly	1000m	1	1	1
Depth to Watertable	VIC Department of Energy, Environment and Climate Action	20/09/2024	05/12/2014	Annually	0m	1	-	-
Surface Elevation	Centre for eResearch and Digital Innovation (CeRDI), Federation University	02/07/2025	23/09/2013	Annually	0m	1	-	-
Basement Elevation	VIC Department of Energy, Environment and Climate Action	09/08/2024	23/09/2013	Annually	0m	1	-	-
Groundwater Boreholes WMIS	VIC Department of Energy, Environment and Climate Action	23/04/2024	23/04/2024	Quarterly	2000m	0	0	10
Groundwater Boreholes Earth Resources Database	VIC Department of Jobs, Skills, Industry and Regions	30/01/2025	17/02/2010	Annually	2000m	0	0	11
Groundwater Boreholes Fed Uni	Federation University Australia	21/12/2017	07/01/2014	Annually	2000m	0	0	0
Historical Mining Activity - Shafts	VIC Department of Jobs, Skills, Industry and Regions	10/09/2024	10/09/2024	Annually	1000m	0	0	0
Geological Units 1:250,000	VIC Department of Energy, Environment and Climate Action	30/04/2025	24/06/2014	Annually	1000m	1	1	2
Geological Structures 1:250,000	VIC Department of Energy, Environment and Climate Action	30/04/2025	24/06/2014	Annually	1000m	0	0	0
Shear zones 250k	VIC Department of Energy, Environment and Climate Action	30/04/2025	24/06/2014	Annually	1000m	0	0	0
Atlas of Australian Soils	Australian Bureau of Agricultural and Resource Economics and Sciences	15/01/2025	17/02/2011	Annually	1000m	1	1	1
Victorian Soil Type Mapping	VIC Department of Jobs, Skills, Industry and Regions	20/05/2025	24/09/2024	Annually	1000m	2	3	7
Atlas of Australian Acid Sulfate Soils	CSIRO	15/01/2025	21/02/2013	Annually	1000m	1	1	3
Coastal Acid Sulfate Soils	VIC Department of Jobs, Skills, Industry and Regions	29/04/2025	22/04/2025	Annually	1000m	0	0	0
Planning Scheme Zones	VIC Department of Energy, Environment and Climate Action	23/06/2025	23/06/2025	Monthly	1000m	1	3	20
Planning Scheme Overlay	VIC Department of Energy, Environment and Climate Action	23/06/2025	23/06/2025	Monthly	1000m	2	3	10
Commonwealth Heritage List	Australian Department of Climate Change, Energy, the Environment and Water	23/10/2024	13/04/2022	Annually	1000m	0	0	0
National Heritage List	Australian Department of Climate Change, Energy, the Environment and Water	23/10/2024	13/04/2022	Annually	1000m	0	0	0
Victorian Heritage Register	VIC Department of Energy, Environment and Climate Action	20/05/2025	20/05/2025	Quarterly	1000m	0	0	1
Cultural Heritage Sensitivity	State Government Victoria - Department of Premier and Cabinet	20/05/2025	20/05/2025	Quarterly	1000m	0	0	2
Bushfire Prone Area	VIC Department of Energy, Environment and Climate Action	02/07/2025	10/09/2024	Monthly	1000m	1	1	1
Fire History	State Government Victoria - Department of Energy, Environment and Climate Action	02/07/2025	28/01/2025	Monthly	1000m	0	0	0
Victorian Coastal Inundation Sea Level Rise	VIC Department of Energy, Environment and Climate Action	06/02/2025	16/11/2024	Annually	1000m	0	0	0
Native Vegetation (Modelled 2005 Ecological Vegetation Classes)	VIC Department of Energy, Environment and Climate Action	11/06/2025	11/06/2025	Annually	1000m	2	2	2
Ramsar Wetland Areas in Victoria	VIC Department of Energy, Environment and Climate Action	19/05/2025	05/03/2025	Annually	1000m	0	0	0
Collaborative Australian Protected Areas Database (CAPAD) 2022 - Terrestrial	Australian Department of Climate Change, Energy, The Environment and Water	20/03/2025	19/06/2024	Annually	1000m	0	0	1
Collaborative Australian Protected Areas Database (CAPAD) 2022 - Marine	Australian Department of Climate Change, Energy, The Environment and Water	20/03/2025	30/06/2022	Annually	1000m	0	0	0
Groundwater Dependent Ecosystems Atlas	Bureau of Meteorology	30/05/2025	07/05/2020	Annually	1000m	1	1	5

Dataset Name	Custodian	Supply Date	Currency Date	Update Frequency	Dataset Buffer (m)	No. Features On-site	No. Features within 100m	No. Features within Buffer
Inflow Dependent Ecosystems Likelihood	Bureau of Meteorology	30/05/2025	07/05/2020	Annually	1000m	1	1	6

Site Diagram

10 Dalton Street, Koondrook, VIC 3580



Legend

- Site Boundary
- Internal Parcel Boundaries

Total Area: 19563m²

Total Perimeter: 612m

Disclaimers:

Measurements are approximate only and may have been simplified or smaller lengths removed for readability.

Parcels that make up a small percentage of the total site area have not been labelled for increased legibility.

Scale: 0 25 50 Meters

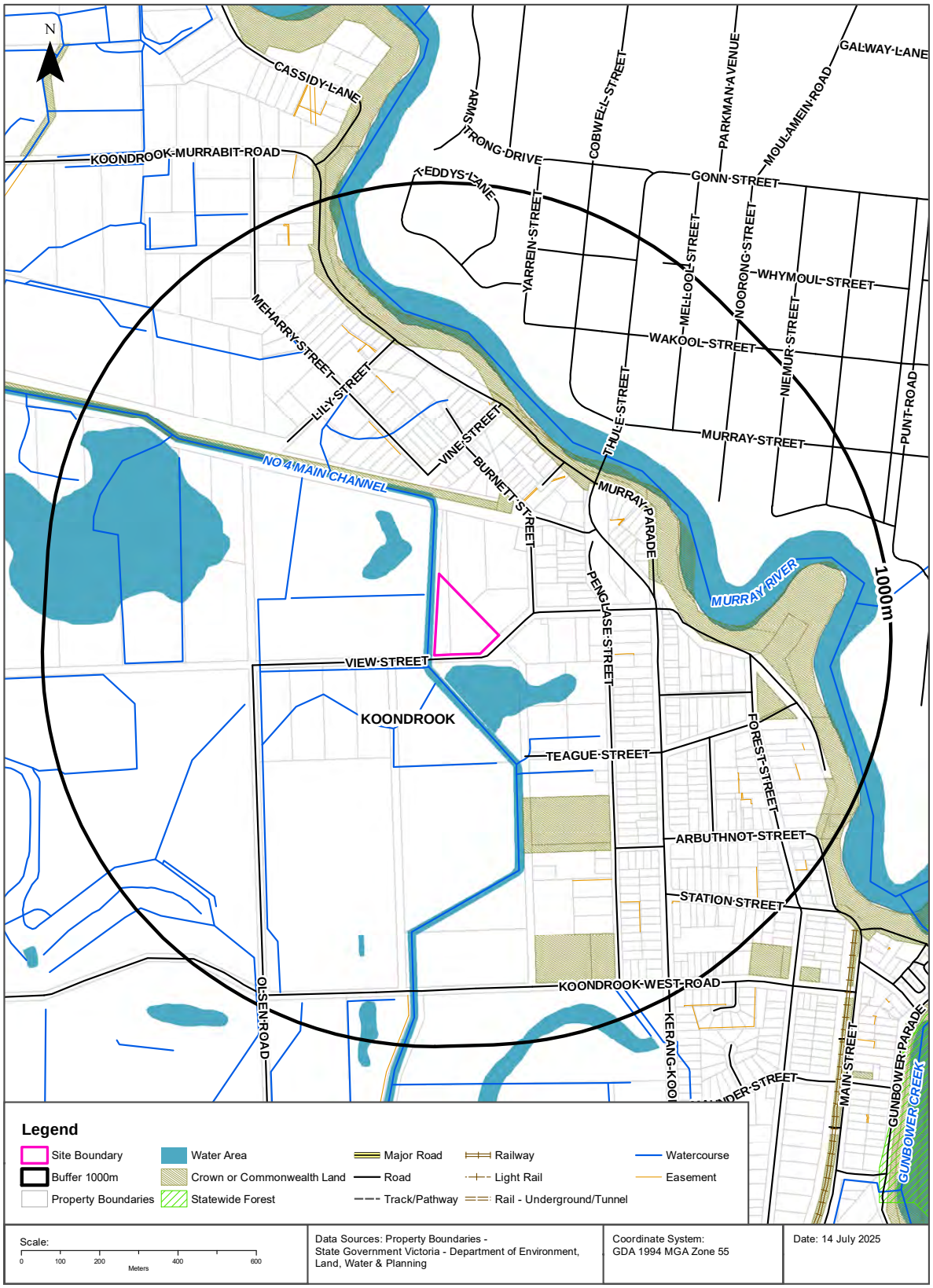
Data Sources: Property Boundaries - State Government Victoria - Department of Environment, Land, Water & Planning

Coordinate System: GDA 1994 MGA Zone 55

Date: 14 July 2025

Topographic Data

10 Dalton Street, Koondrook, VIC 3580



EPA Contamination Registers & Other Pollution Notices

10 Dalton Street, Koondrook, VIC 3580

Current EPA Priority Sites Register

Sites on the current EPA priority sites register that exist within the dataset buffer:

Notice No	Address	Suburb	Issue	Loc Conf	Dist (m)	Direction
N/A	No records in buffer					

Priority Sites Register Custodian: State Government Victoria - Environment Protection Authority (EPA)

Site Management Orders

Sites within the dataset buffer that have been issued a Site Management Orders:

Site Management Order ID	Issue Date	Address	Status	Loc Conf	Dist (m)	Direction
N/A	No records in buffer					

Site Management Orders Data Custodian: State Government Victoria - Environment Protection Authority (EPA)

Former EPA Priority Sites & Other Pollution Notices

Sites within the dataset buffer that have been issued a Pollution Notice:
Note. Due to pollution notices being revoked and removed from published lists this is not an exhaustive list of all past pollution notices.

Map ID	Notice No	Notice Type	Company	Address	Suburb	Status	Issue	Date Issued	Loc Conf	Dist	Dir
N/A	No records in buffer										

Pollution Notice Data Custodian: State Government Victoria - Environment Protection Authority (EPA)

Contaminated Land Notifications

Sites within the dataset buffer that have been notified to the EPA under Section 40 of the Environmental Protection Act 2017:

Notification No	Company	Address	Status	Type of Noification	Date Issued	Loc Conf	Dist	Dir
No records in buffer								

Contaminated Land Notifications Custodian: State Government Victoria– Environment Protection Authority (EPA)

PFAS Investigation & Management Programs

10 Dalton Street, Koondrook, VIC 3580

EPA PFAS Site Investigations

Sites being investigated by the EPA for PFAS contamination within the dataset buffer:

Map ID	Site Name	Address	Location Confidence	Distance	Direction
N/A	No records in buffer				

EPA PFAS Site Investigations Data Custodian: State Government Victoria - Environment Protection Authority (EPA)

Defence PFAS Investigation & Management Program Investigation Sites

Sites being investigated by the Department of Defence for PFAS contamination within the dataset buffer:

Map ID	Base Name	Address	Location Confidence	Distance	Direction
N/A	No records in buffer				

Defence PFAS Investigation & Management Program Data Custodian: Department of Defence, Australian Government

Defence PFAS Investigation & Management Program Management Sites

Sites being managed by the Department of Defence for PFAS contamination within the dataset buffer:

Map ID	Base Name	Address	Location Confidence	Distance	Direction
N/A	No records in buffer				

Defence PFAS Investigation & Management Program Data Custodian: Department of Defence, Australian Government

Airservices Australia National PFAS Management Program

Sites being investigated or managed by Airservices Australia for PFAS contamination within the dataset buffer:

Map ID	Site Name	Impacts	Location Confidence	Distance	Direction
N/A	No records in buffer				

Airservices Australia National PFAS Management Program Data Custodian: Airservices Australia

Defence Sites and Unexploded Ordnance

10 Dalton Street, Koondrook, VIC 3580

Defence Controlled Areas (DCA)

Defence Controlled Areas provided by the Department of Defence within the dataset buffer:

Site ID	Location Name	Loc Conf	Dist	Dir
N/A	No records in buffer			

Defence Controlled Areas, Data Custodian: Department of Defence, Australian Government

Defence 3 Year Regional Contamination Investigation Program (RCIP)

Sites which have been assessed as part of the Defence 3 Year Regional Contamination Investigation Program within the dataset buffer:

Property ID	Base Name	Address	Known Contamination	Loc Conf	Dist	Dir
N/A	No records in buffer					

Defence 3 Year Regional Contamination Investigation Program, Data Custodian: Department of Defence, Australian Government

National Unexploded Ordnance (UXO)

Sites which have been assessed by the Department of Defence for the potential presence of unexploded ordnance within the dataset buffer:

Site ID	Location Name	Category	Area Description	Additional Information	Commonwealth	Loc Conf	Dist	Dir
N/A	No records in buffer							

National Unexploded Ordnance (UXO), Data Custodian: Department of Defence, Australian Government

EPA Records

10 Dalton Street, Koondrook, VIC 3580

EPA Preliminary Risk Screen Assessments

EPA Preliminary Risk Screen Assessment records that exist within the dataset buffer:

PRSA ID	Site Address	Completion Date	Attachment A	Attachment B	Attachment C	Loc Conf	Distance	Direction
N/A		No records in buffer						

Preliminary Risk Screen Assessments Audit Data Custodian: State Government Victoria - Environment Protection Authority (EPA)

EPA Environmental Audits

EPA environmental audit records that exist within the dataset buffer:
Note. Please click on CARMS No. to activate a hyperlink to online documentation. If link does not work, documentation may still be accessible via the EPA Interaction Portal.

Map ID	Transaction No	CARMS No	Site	Address	Suburb	Date Complete	Audit Category	Loc Conf	Dist	Dir
N/A	No records in buffer									

Environmental Audit Data Custodian: State Government Victoria - Environment Protection Authority (EPA)

EPA Groundwater Zones with Restricted Uses (GQRUZ)

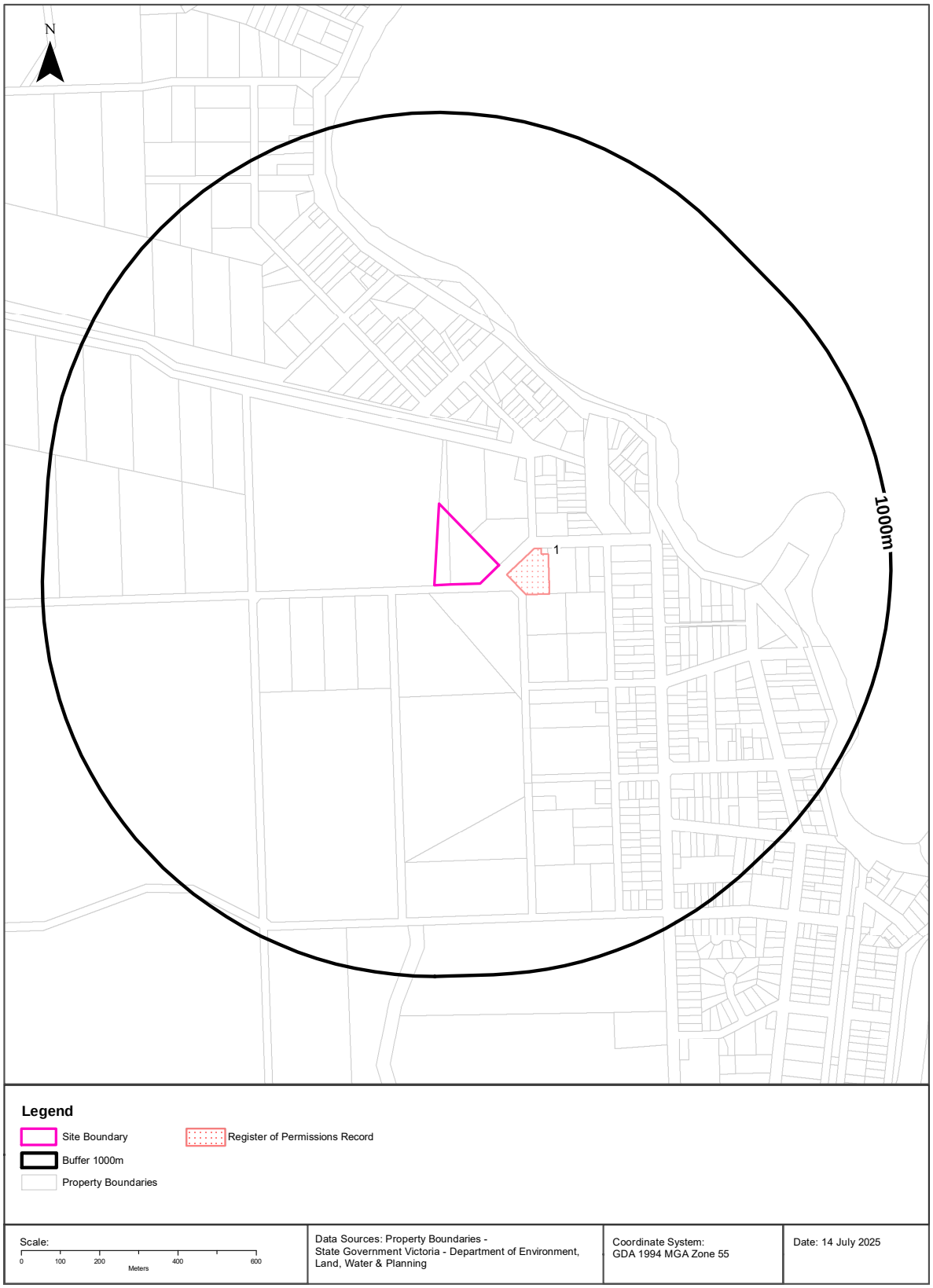
EPA Groundwater Zones with Restricted Uses (GQRUZ) records that exist within the dataset buffer:

Map ID	File No	Reference No	Site History	Site Address	Restricted Uses	Status	Loc Conf	Dist	Dir
N/A		No records in buffer							

Environmental GQRUZ Data Custodian: State Government Victoria - Environment Protection Authority (EPA)

EPA Activities - Register of Permissions

10 Dalton Street, Koondrook, VIC 3580



EPA Activities

10 Dalton Street, Koondrook, VIC 3580

EPA Activities - Register of Permissions

EPA Register of Permissions records that exist within the dataset buffer:
Note - Records with the following activities have been excluded:
- L05 (Operation of events outside of hours or extended operations)
- L06 (Conducting more than six outdoor concerts)

Map ID	Permission ID	Permission Type	Activity	Premise Address	Status	Issue Date	Expiry Date	Doc Link	Loc Conf	Dist (m)	Dir
1	R000305250	Registration	A13c (Waste and resource recovery - small)	12 View Street, Koondrook, Victoria, 3580, Australia	Active	17/01/2023	17/01/2028	Link	Premise Match	30m	East

EPA Register of Permissions Custodian: State Government Victoria - Environment Protection Authority (EPA)
Creative Commons 4.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/4.0/

EPA Activities

10 Dalton Street, Koondrook, VIC 3580

Legacy EPA Licensed Activities

Activities licensed under the repealed *Environment Protection Act 1970 (Vic.)* within the dataset buffer:

Trans No	Licence No	Licence Type	Organisation	Premise Ref	Premise Address 1	Premise Address 2	Activities	Loc Conf	Dist (m)	Direction
N/A	No records in buffer									

Legacy Activity Data Custodian: State Government Victoria - Environment Protection Authority (EPA)

Legacy EPA Works Approvals

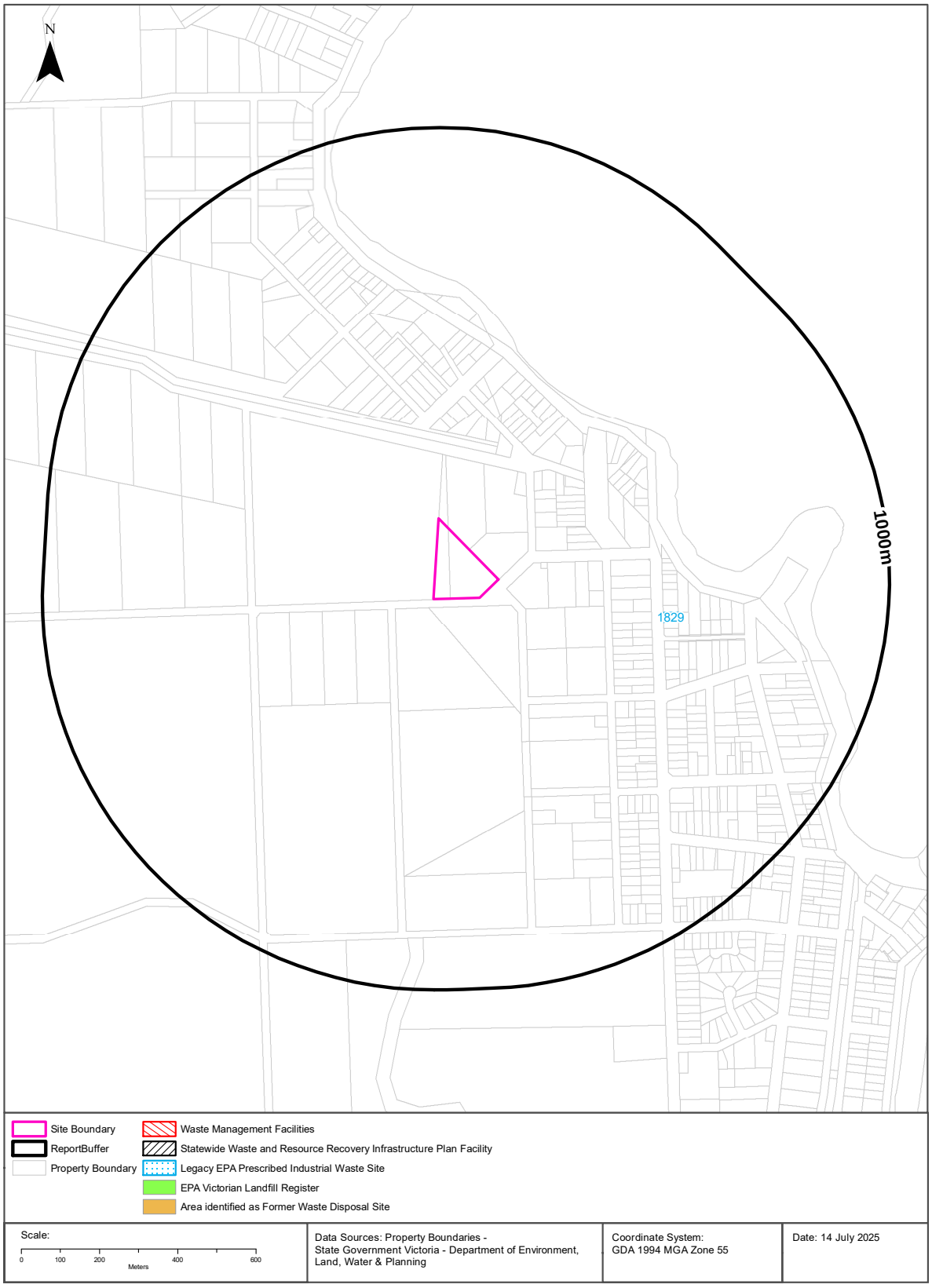
Works approvals licensed under the repealed *Environment Protection Act 1970 (Vic.)* within the dataset buffer:

Transaction No	Status	Approval No	Organisation	Premise Address	Suburb	Scheduled Categories	Loc Conf	Dist (m)	Direction
N/A	No records in buffer								

Legacy Works Approvals Data Custodian: State Government Victoria - Environment Protection Authority (EPA)

Waste Management Facilities and Landfills

10 Dalton Street, Koondrook, VIC 3580



Waste Management Facilities and Landfills

10 Dalton Street, Koondrook, VIC 3580

National Waste Management Facilities Database

Sites on the National Waste Management Facilities Database within the dataset buffer:

Map ID	Owner	Name	Address	Management Type	Facility Type	Status	Loc Conf	Dist	Dir
N/A	No records in buffer								

Source: Waste Management Facilities Database
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Statewide Waste and Resource Recovery Infrastructure Plan Facilities

Statewide Waste and Resource Recovery Infrastructure Plan Facilities within the dataset buffer:

Map Id	Owner	Site Name	Address	Suburb	Category	Sub Category	Loc Conf	Distance	Direction
N/A	No records in buffer								

SWRRIPF Data Source: State Government Victoria - Department of Sustainability

Legacy EPA Prescribed Industrial Waste

EPA Prescribed Industrial Waste treaters, disposers and permitted transporters under the repealed *Environment Protection Act 1970 (Vic.)* within the dataset buffer:

Map Id	Company Name	Address	Suburb	Treatment /Disposal	Transport	Accredited Agent	EPA List Status	Loc Conf	Dist (m)	Dir
1829	BRAMICH, JOHN ROBERT [KOONDROOK]	129 GRIGG RD	KOONDROOK VIC 3580	No	Yes	No	Former EPA Register Record	Premise Match	429m	East

Legacy Prescribed Industrial Waste Data Source: State Government Victoria - Environment Protection Authority (EPA)

EPA Victorian Landfill Register

EPA Victorian Landfill Register sites within the dataset buffer:

Landfill Register No.	Site	Address	Operating Status	Est. Year Of Closure	Waste type	Loc Conf	Dist (m)	Direction
N/A	No records in buffer							

EPA Victorian Landfill Register Data Source: State Government Victoria - Environment Protection Authority (EPA)

Former Gasworks and Liquid Fuel Facilities

10 Dalton Street, Koondrook, VIC 3580

Former Gasworks

Former Gasworks identified from various historical sources within the dataset buffer:
Note - As this is a dataset collated from various historical sources, it is not an exhaustive list of all former Gasworks

Map Id	Site Name	Date Opened	Year Closed	Location Confidence	Distance	Direction
N/A	No records in buffer					

Former Gasworks Data Source: Collated from various historical sources

National Liquid Fuel Facilities

National Liquid Fuel Facilties within the dataset buffer:

Map Id	Owner	Name	Address	Suburb	Class	Operational Status	Operator	Revision Date	Loc Conf	Dist (m)	Direction
N/A	No records in buffer										

Source: Waste Management Facilities Database
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Historical Business Directories

10 Dalton Street, Koondrook, VIC 3580

Business Directory Records 1905-1991
Premise or Road Intersection Matches

Potentially contaminative business activities extracted from Universal Business Directory and Sands & McDougall Directory records, from years 1991, 1980, 1970, 1960, 1950, 1945, 1925 & 1905, mapped to a premise or road intersection within the dataset buffer:

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
N/A	No records in buffer						

Business Directory Content reproduced with permission of UBD and Hardie Grant Media Pty Ltd DD 01/08/2018 and Sands & McDougall's Directory of Victoria (Digitised by State Library Victoria)

Business Directory Records 1905-1991
Road or Area Matches

Potentially contaminative business activities extracted from Universal Business Directory and Sands & McDougall Directory records, from years 1991, 1980, 1970, 1960, 1950, 1945, 1925 & 1905, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published:

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Road Corridor or Area
N/A	No records in buffer					

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Historical Business Directories

10 Dalton Street, Koondrook, VIC 3580

Dry Cleaners, Motor Garages & Service Stations Premise or Road Intersection Matches

Dry Cleaners, Motor Garages & Service Stations from Sands & McDougall's Directories and UBD Business Directories, mapped to a premise or road intersection within the dataset buffer.

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
N/A	No records in buffer						

Business Directory Content reproduced with permission of UBD and Hardie Grant Media Pty Ltd DD 01/08/2018 and Sands & McDougall's Directory of Victoria (Digitised by State Library Victoria)

Dry Cleaners, Motor Garages & Service Stations Road or Area Matches

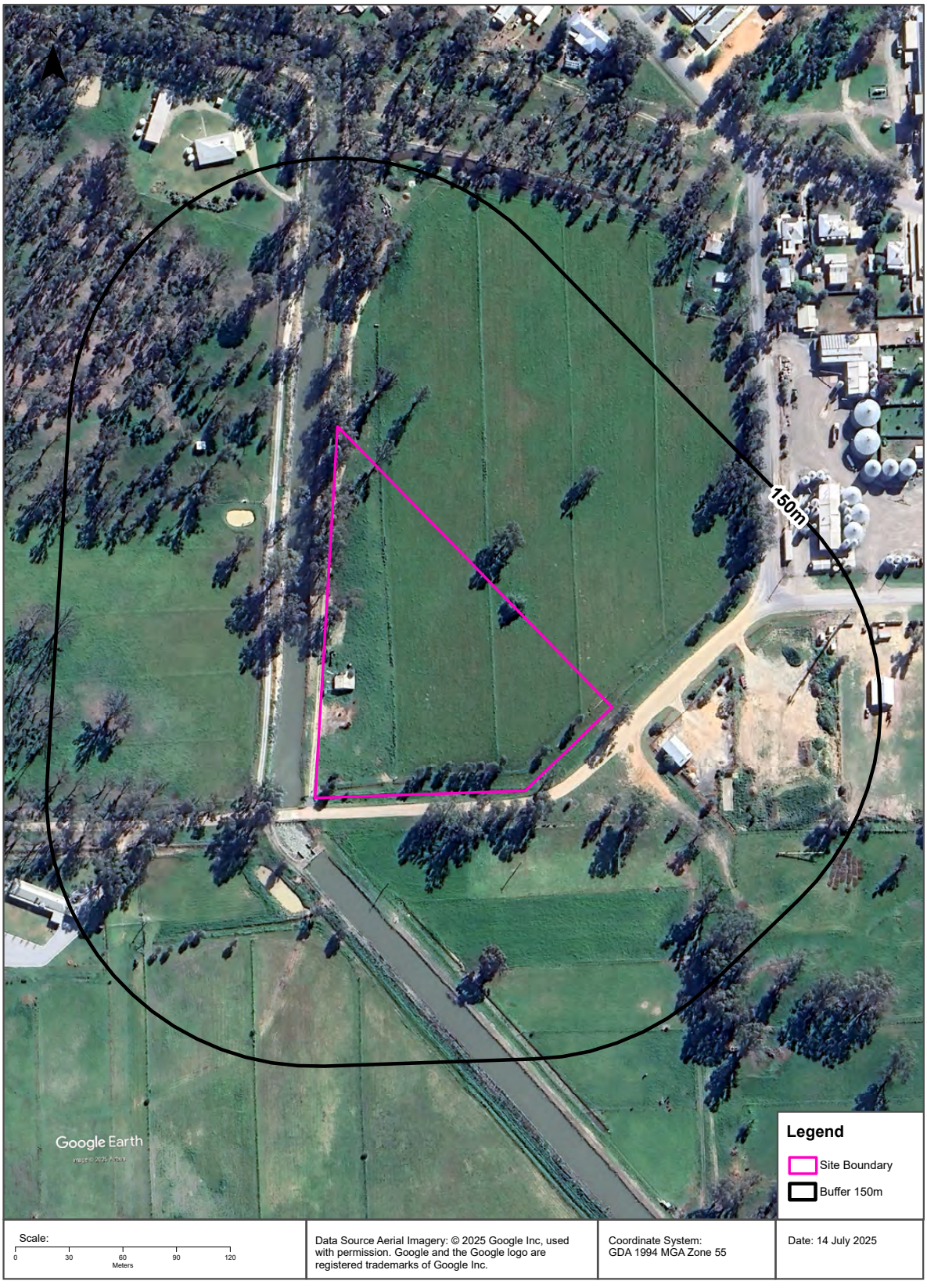
Dry Cleaners, Motor Garages & Service Stations from UBD Business Directories and Sands & McDougall's Directories, mapped to a road or an area within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published.

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Road Corridor or Area
N/A	No records in buffer					

Business Directory Content reproduced with permission of UBD and Hardie Grant Media Pty Ltd DD 01/08/2018 and Sands & McDougall's Directory of Victoria (Digitised by State Library Victoria)

Aerial Imagery 2023

10 Dalton Street, Koondrook, VIC 3580



Aerial Imagery 2015

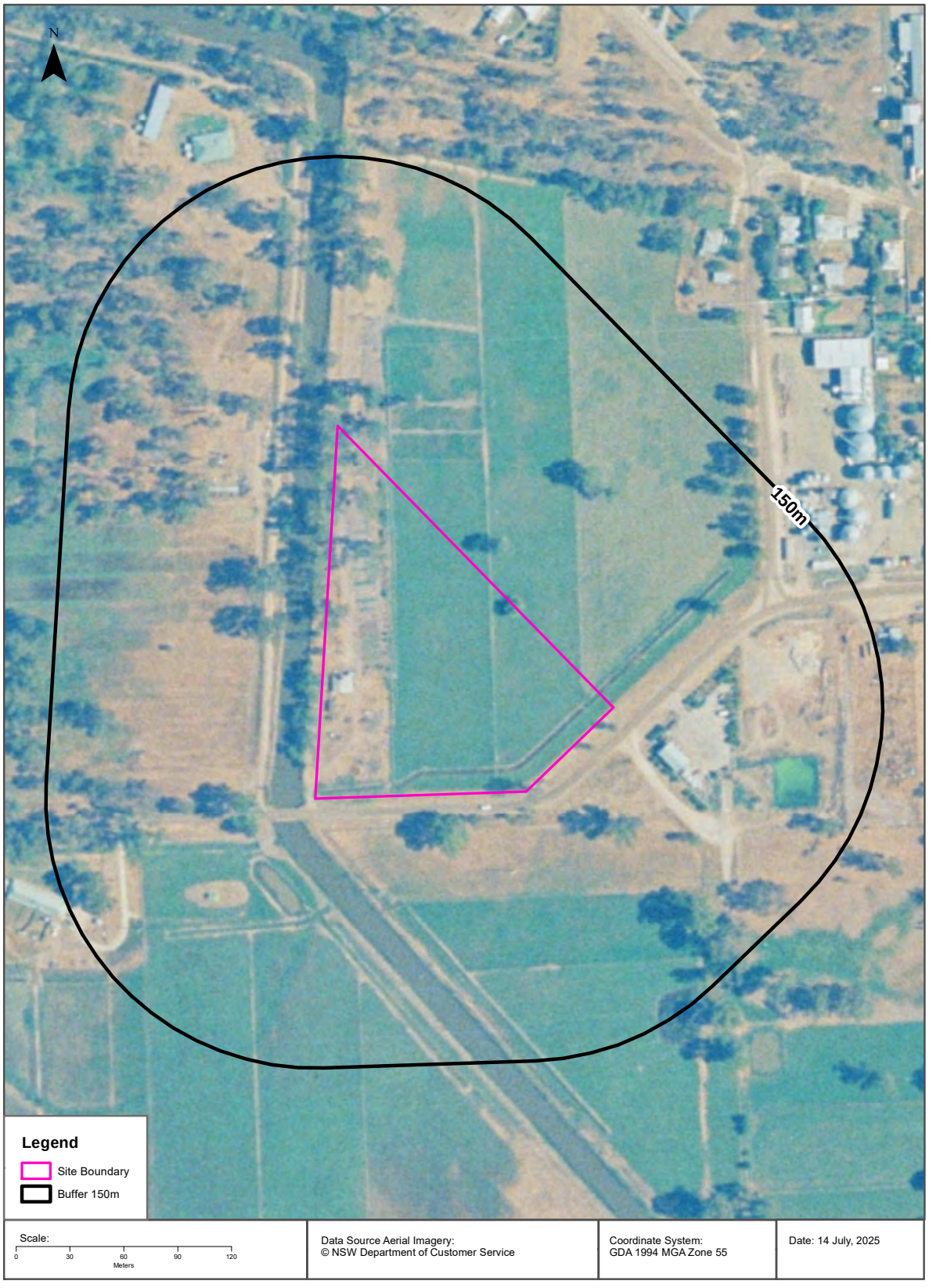
10 Dalton Street, Koondrook, VIC 3580

Aerial Imagery 2007

10 Dalton Street, Koondrook, VIC 3580

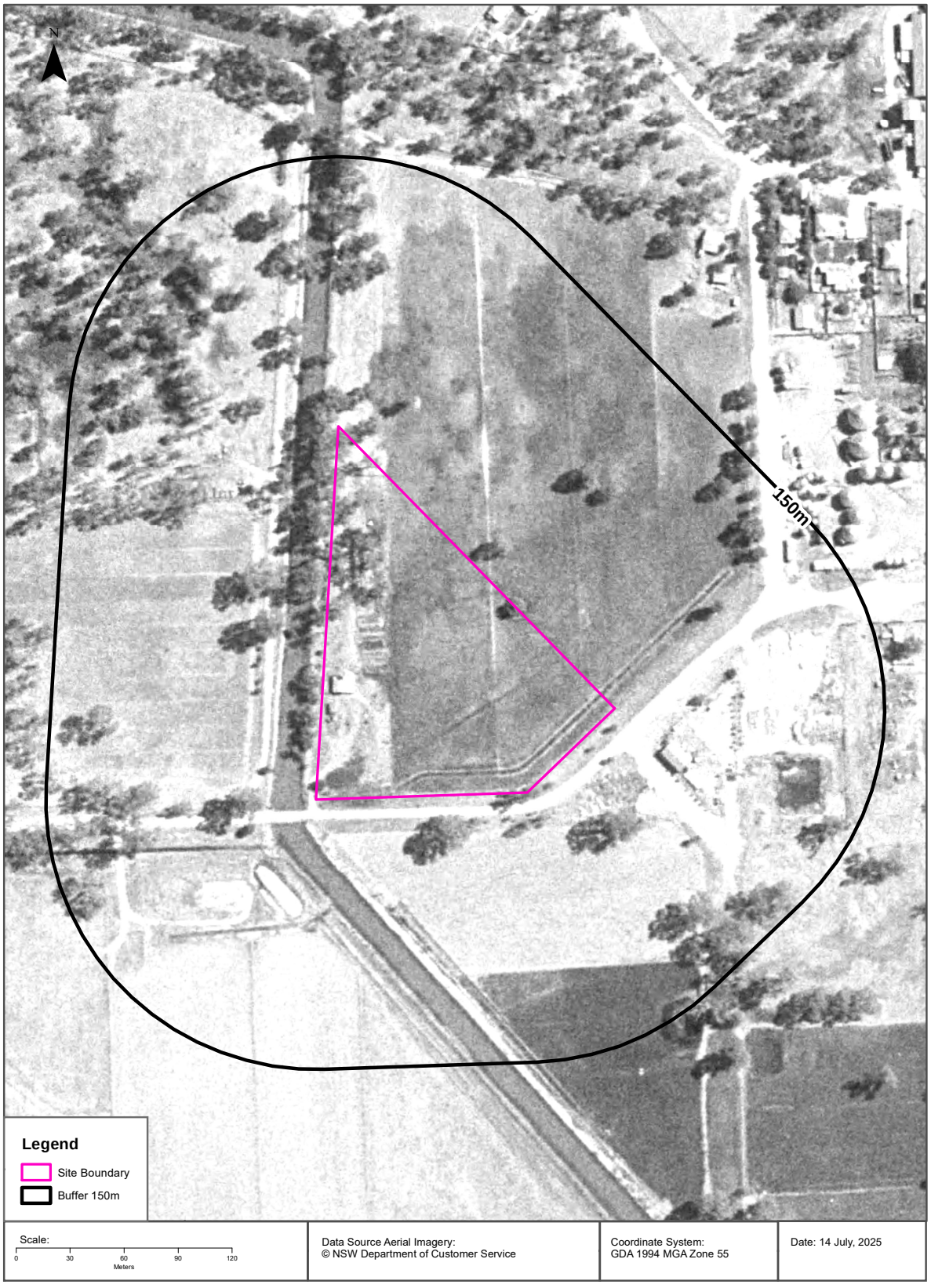
Aerial Imagery 1996

10 Dalton Street, Koondrook, VIC 3580



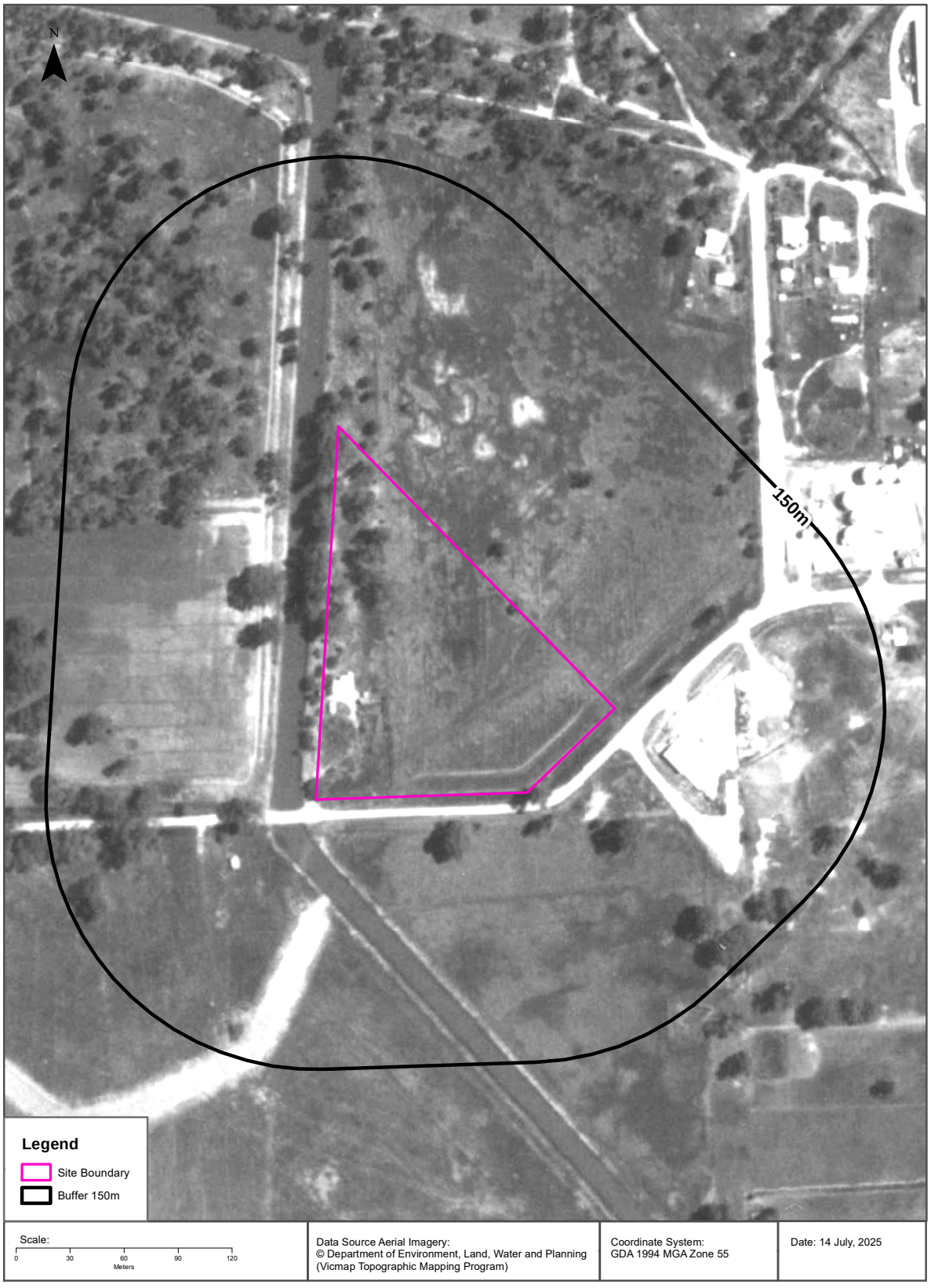
Aerial Imagery 1991

10 Dalton Street, Koondrook, VIC 3580



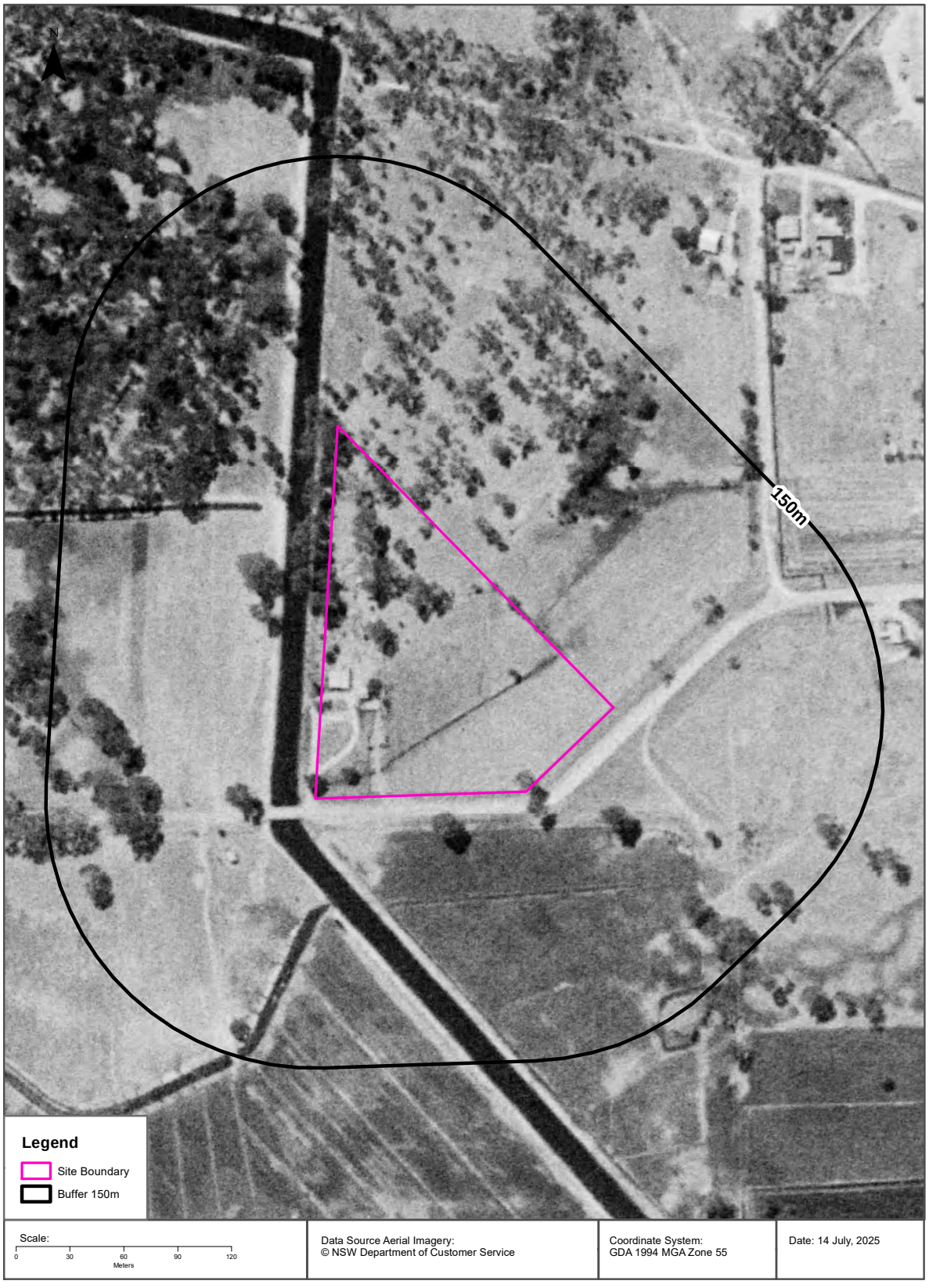
Aerial Imagery 1981

10 Dalton Street, Koondrook, VIC 3580



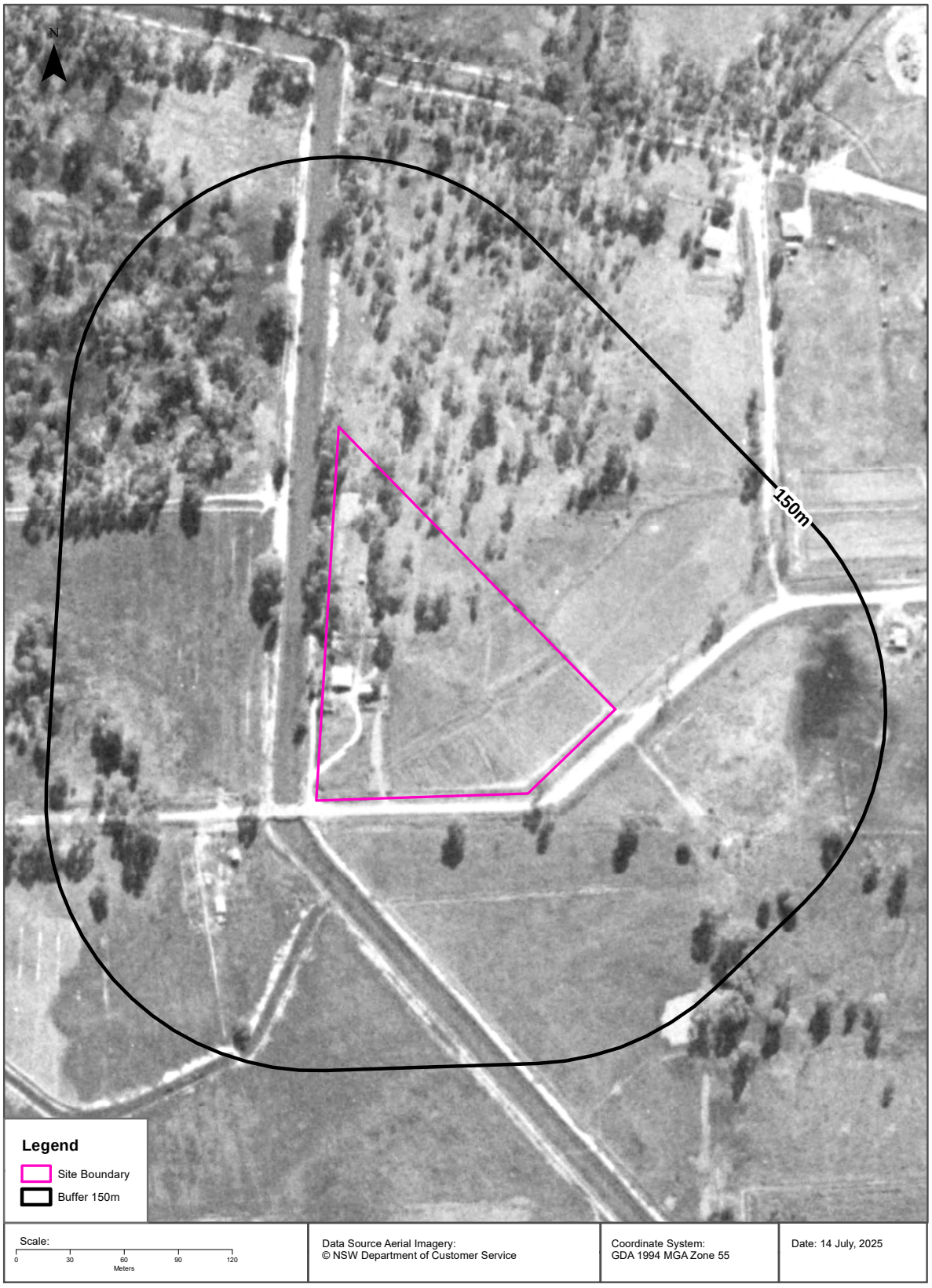
Aerial Imagery 1970

10 Dalton Street, Koondrook, VIC 3580



Aerial Imagery 1961

10 Dalton Street, Koondrook, VIC 3580

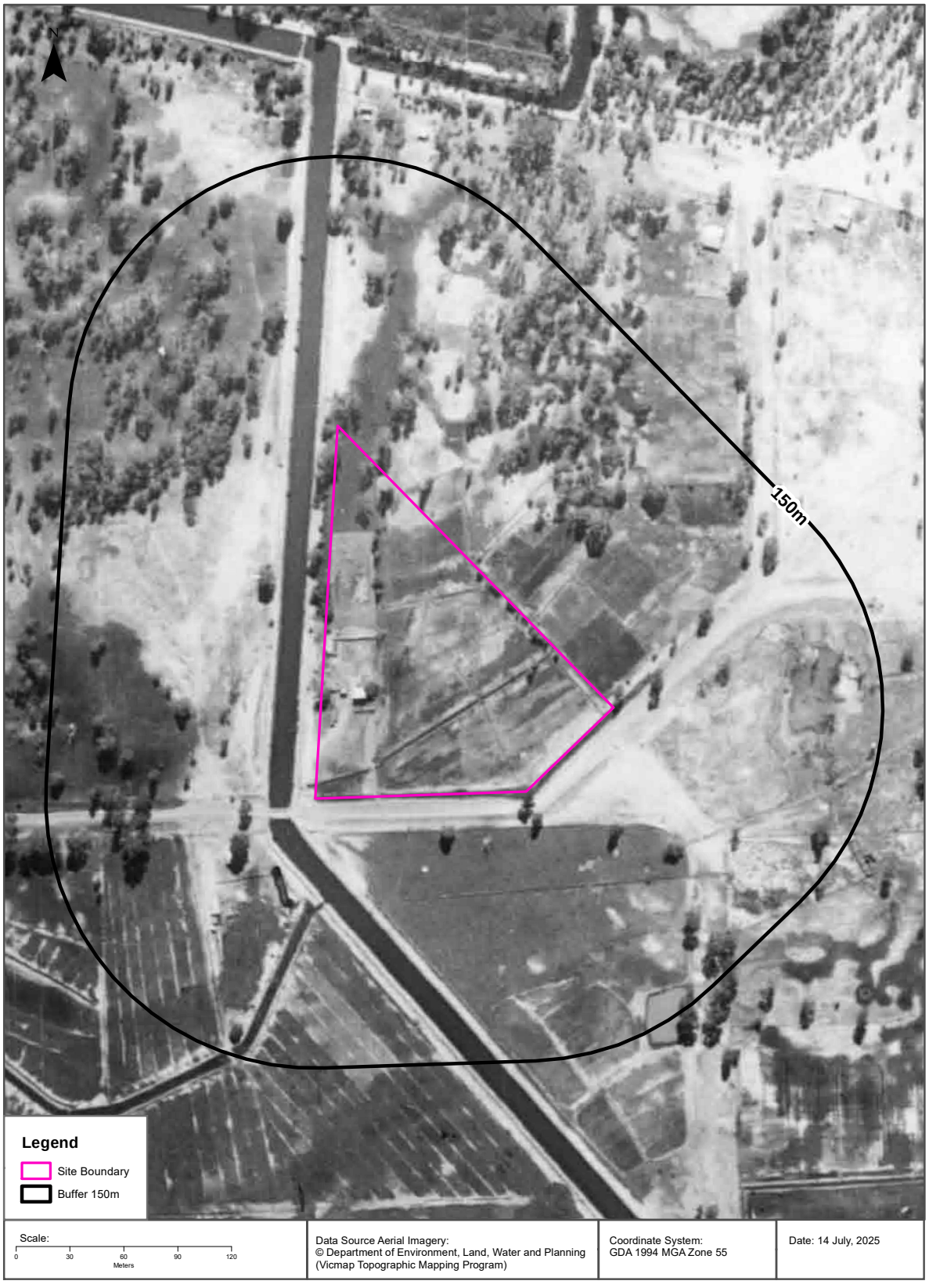


Aerial Imagery 1957

10 Dalton Street, Koondrook, VIC 3580

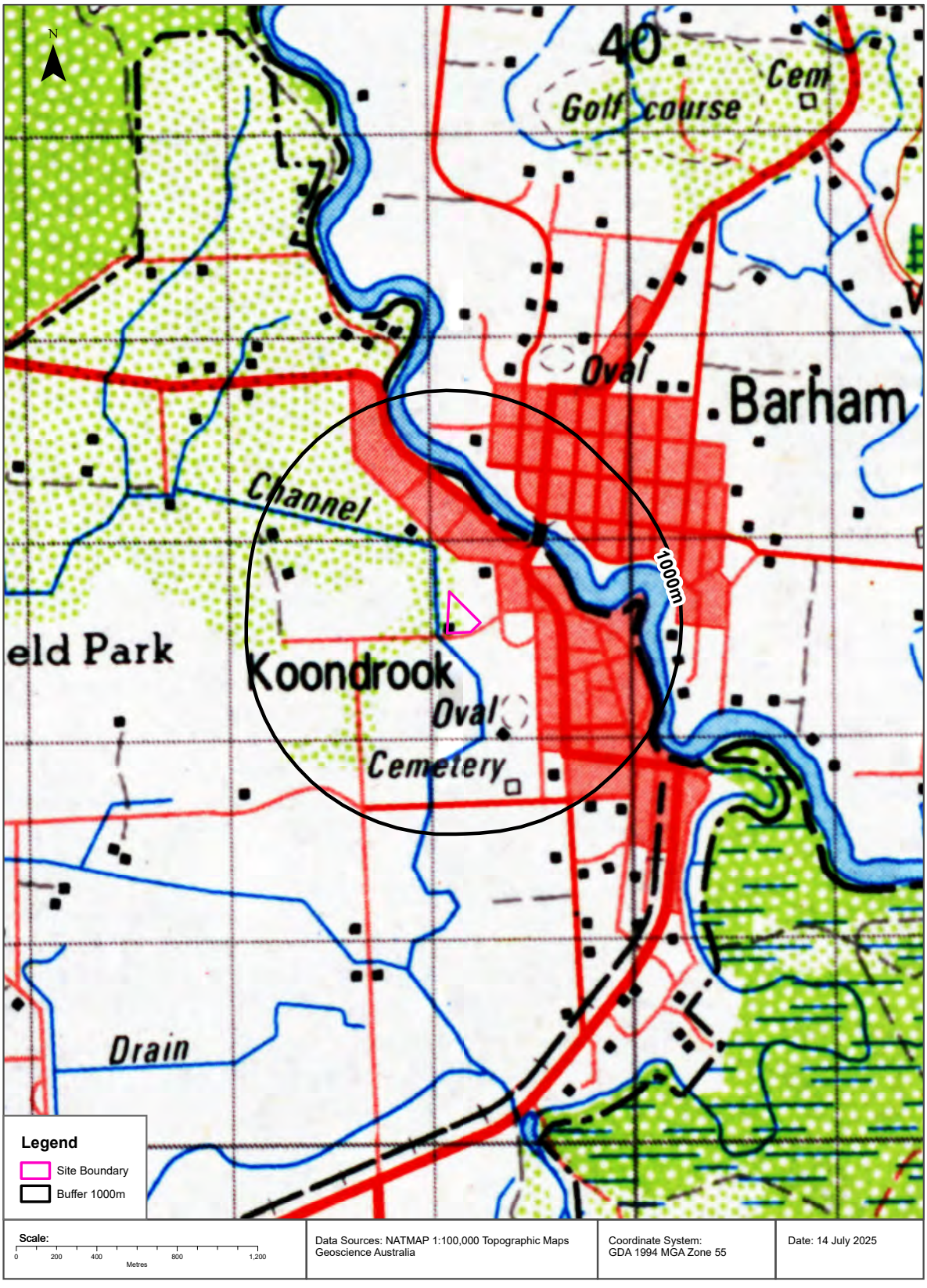
Aerial Imagery 1945

10 Dalton Street, Koondrook, VIC 3580



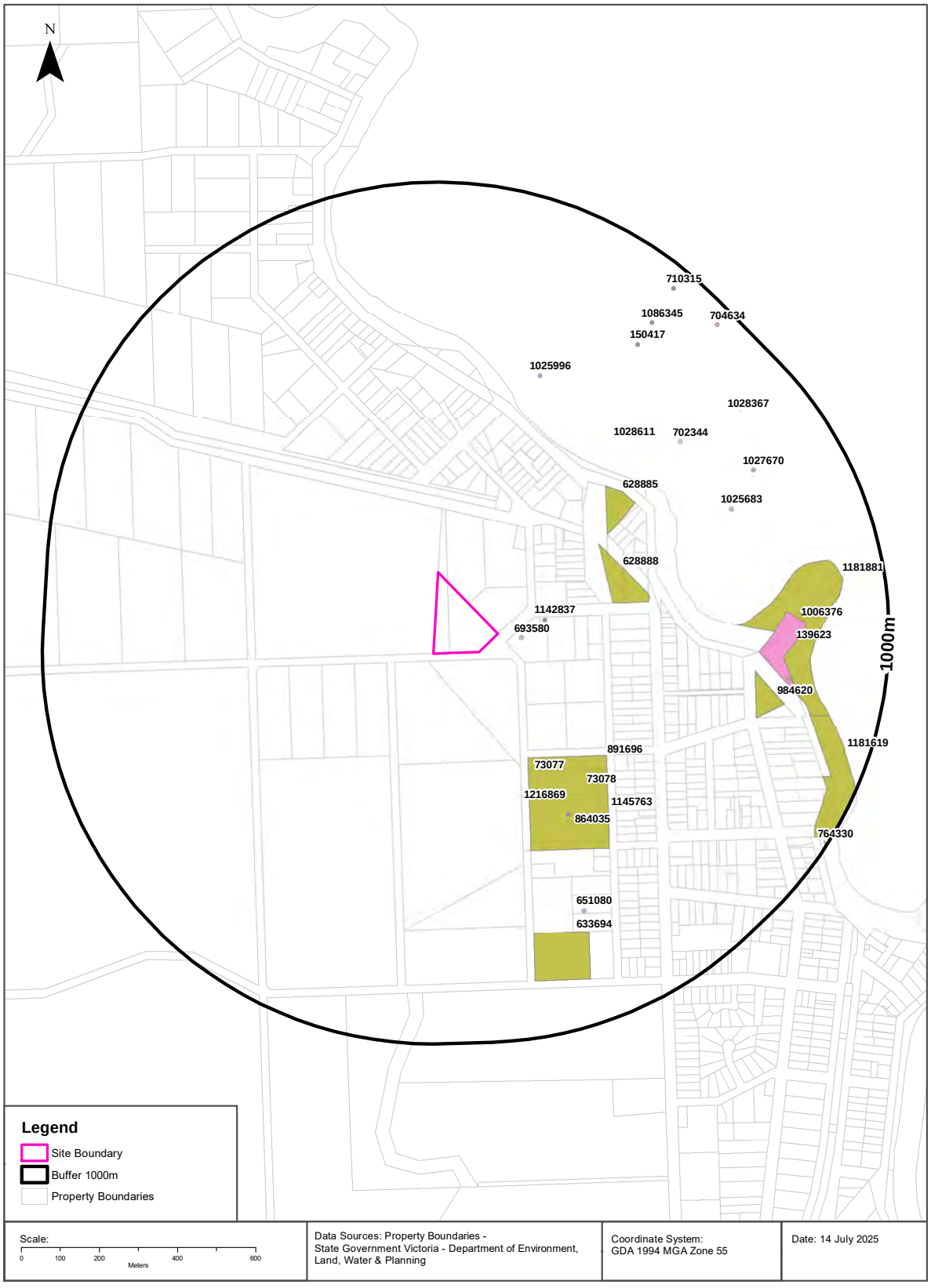
Historical Map 1983

10 Dalton Street, Koondrook, VIC 3580



Features of Interest

10 Dalton Street, Koondrook, VIC 3580



Features of Interest

10 Dalton Street, Koondrook, VIC 3580

Features of Interest

Features of Interest within the dataset buffer:

Feature Id	Feature Type	Feature Sub Type	Name	Distance	Direction
693580	storage facility	depot		56m	East
1142837	communication service	radio communication facility	Koondrook 765	120m	East
891696	reserve	park	Koondrook Public Recreation Reserve	299m	South East
628888	reserve	park	Sidney Reid Reserve	304m	East
73077	sport facility	tennis court		337m	South East
628885	reserve	park	James Park	378m	North East
73078	sport facility	sports ground		387m	South East
1216869	recreational resource	club house		410m	South East
864035	emergency facility	neighbourhood safer place	Koondrook (Football Oval) NSP	471m	South East
1145763	landmark	tower		494m	South East
1025996	recreational resource	club house	Barham And District Services Memorial Bowling Club	563m	North
1181881	reserve	conservation park	Koondrook H.R.	614m	East
1028611	reserve	park	Riverside Park	634m	North East
1006376	education centre	education complex		669m	East
702344	cultural centre	library	Barham Library	671m	North East
1025683	landmark	tourist attraction	Barham Caravan And Tourist Park	672m	North East
651080	sport facility	swimming pool		709m	South East
633694	reserve	cemetery	Koondrook Cemetery	734m	South
139623	education centre	primary school	Koondrook Primary School	742m	East
984620	care facility	child care	Koondrook Preschool	748m	East
150417	place of worship	church		770m	North East
1027670	recreational resource	club house	Clubarham	771m	North East
1181619	reserve	conservation park	Koondrook Historic Reserve	825m	East
1086345	place of worship	church		836m	North East
1028367	reserve	park	Noorong Street Park	843m	North East
710315	place of worship	church		940m	North East
704634	education centre	primary school	Barham Public School	949m	North East
764330	reserve	park	Apex Park	988m	South East

Features of Interest Data Custodian: State Government Victoria - Dept of Environment, Land, Water & Planning
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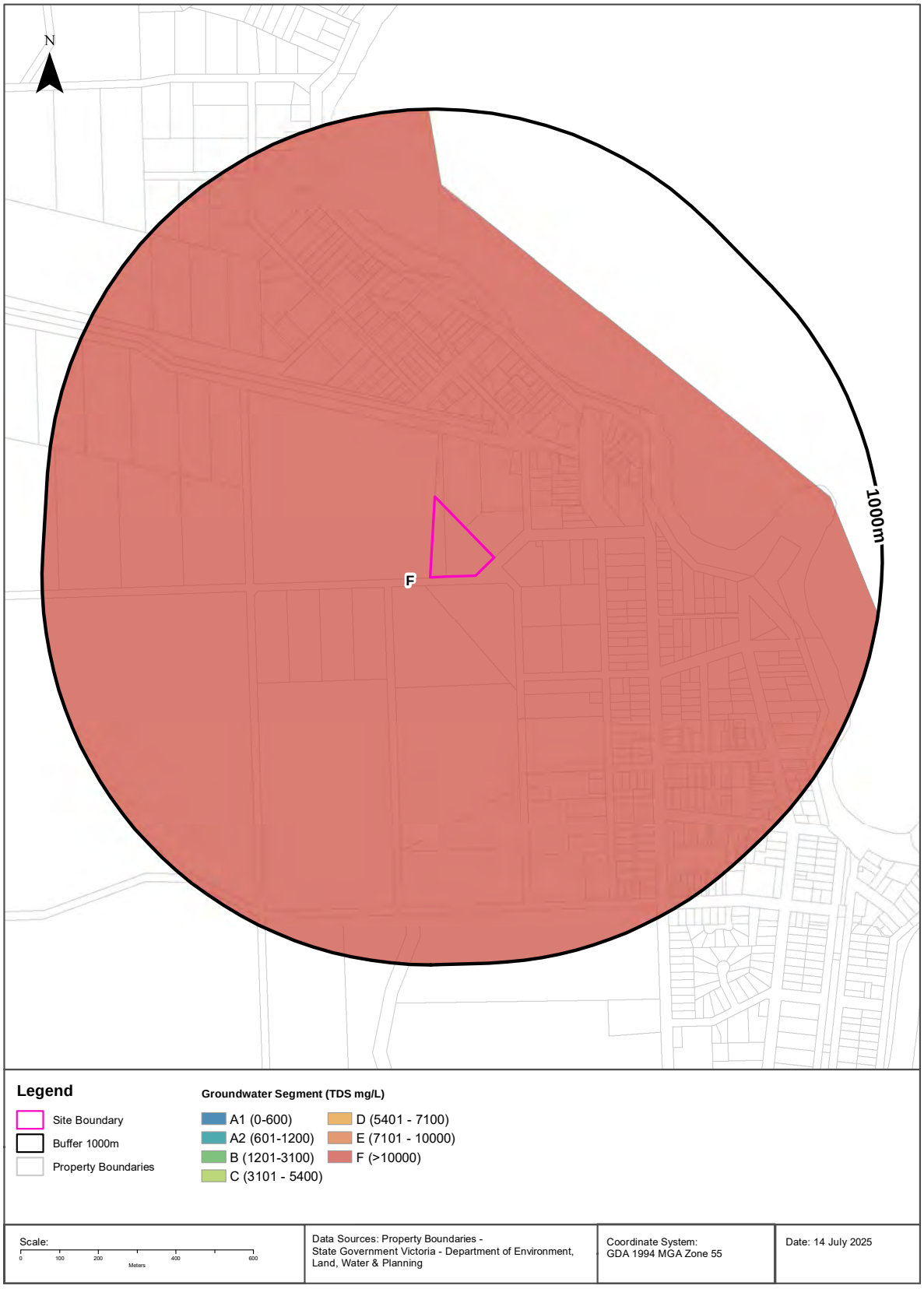
Watertable Salinity

10 Dalton Street, Koondrook, VIC 3580



Hydrogeology & Groundwater

10 Dalton Street, Koondrook, VIC 3580

Hydrogeology

Description of aquifers within the dataset buffer:

Description	Dist(m)	Dir
Porous, extensive aquifers of low to moderate productivity	0	On-site

Hydrogeology Map of Australia: Commonwealth of Australia (Geoscience Australia)
Creative Commons 3.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/3.0/au/deed.en

Watertable Salinity

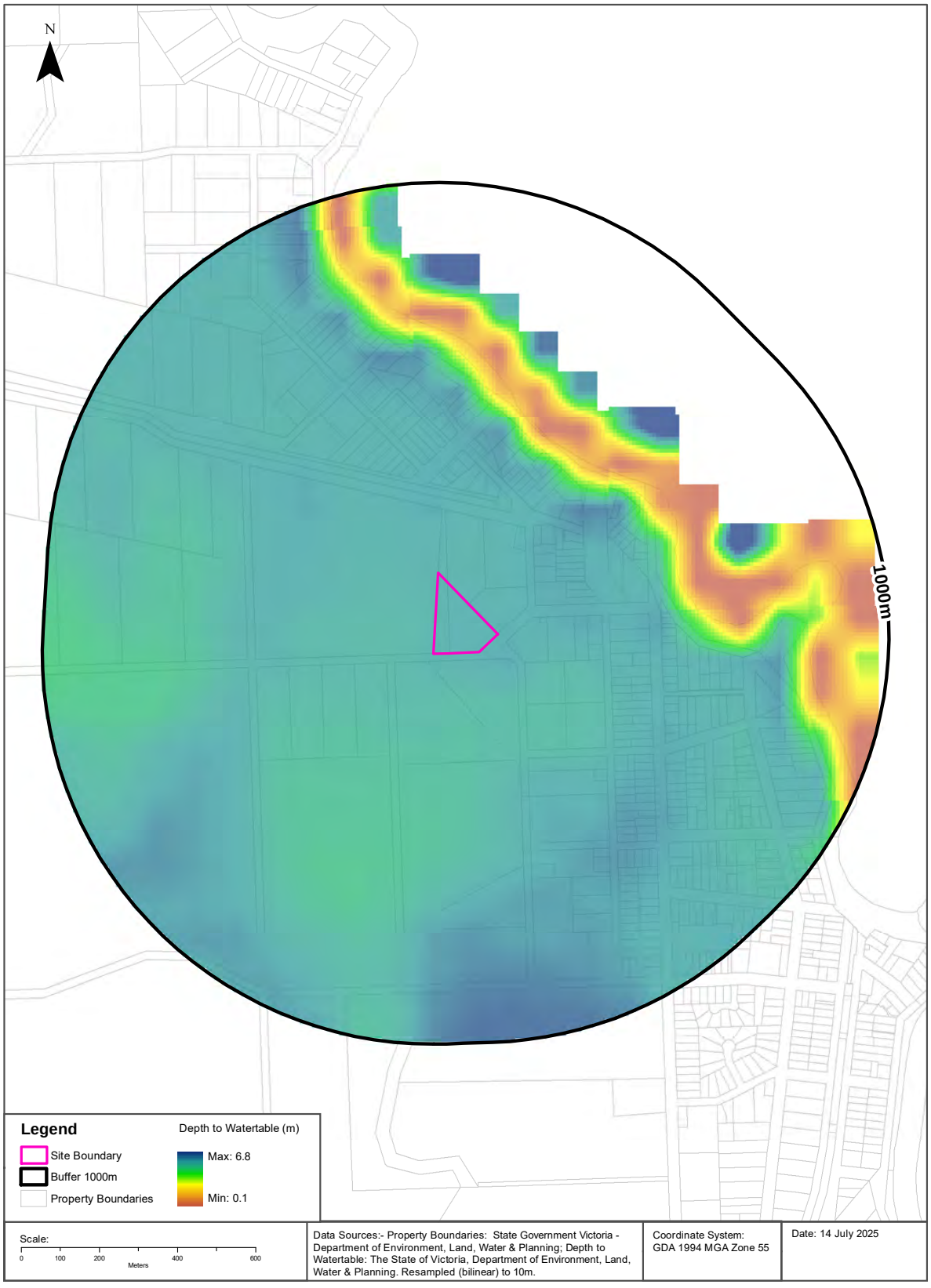
Watertable Salinity concentrations within the dataset buffer:

Groundwater Segment	Total Dissolved Solids (mg/L)	Dist(m)	Dir
F	> 10000	0	On-site

Source: Watertable Salinity
Creative Commons 4.0 © State Government of Victoria (Department of Energy, Environment and Climate Action) 2024

Depth to Watertable

10 Dalton Street, Koondrook, VIC 3580



Hydrogeology & Groundwater

10 Dalton Street, Koondrook, VIC 3580

Depth to Watertable

On-site Depth to Watertable:

Depth to Watertable	Percent Of Site Area
Less than 5 metres	100

Surface Elevation

Approximate on-site Surface Elevation:

Surface Elevation
77 AHDm

Basement Elevation

Approximate on-site Basement Elevation:

Basement Elevation - Basement Rocks comprise Lower Palaeozoic basement rocks that form the highlands and the crystalline basement; and Mesozoic rocks of the Otway and Gippsland basins both outcropping and subsurface
-66 AHDm to -65 AHDm

Groundwater Data Custodian: State Government Victoria - Dept of Environment, Land, Water & Planning
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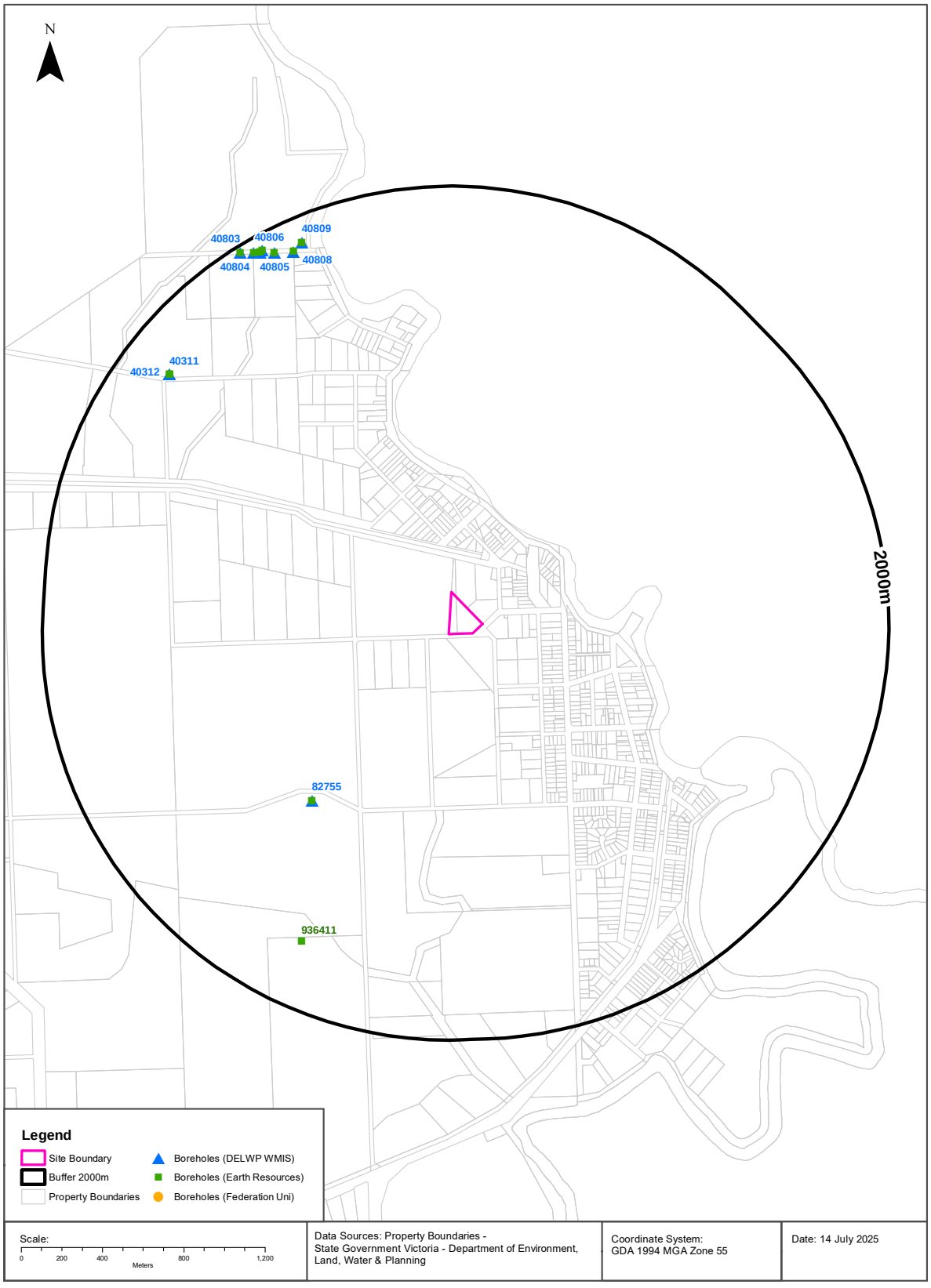
Groundwater Boreholes

10 Dalton Street, Koondrook, VIC 3580



Groundwater Boreholes

10 Dalton Street, Koondrook, VIC 3580

Boreholes (DELWP WMIS)

Boreholes from the Department of Environment, Land, Water & Planning's Water Measurement Information System, within the dataset buffer:

Bore Id	Use Type	Drillers Log	Construction	Latest Water Levels	Geology	Completed Date	Dist (m)	Dir
82755	Not Known		0.00m-14.00m INNER LINING - CASING = Not Known 14.00m-15.20m INNER LINING - SCREEN = Not Known		14.00m-15.20m	24/09/1984	1061 m	South West
40311	Groundwater Investigation, Observation	0.00m-1.52m BROWN SANDY CLAYEY LOAM 1.52m-3.05m LIGHT BROWN & WHITE SANDY CLAYEY LOAM		Date/time: 1972-03-08 1300 Quality: 47 WLMP: 2.90m DBNS: 2.86m RWL: 74.23mAHD		02/04/1964	1753 m	North West
40312	Groundwater Investigation, Observation			Date/time: 1965-09-08 0000 Quality: 47 WLMP: 1.09m DBNS: 1.33m RWL: 75.76mAHD		01/01/1950	1753 m	North West
40808	Groundwater Investigation	0.00m-0.60m s/c BR HARD PLASTIC 0.60m-1.20m S/C O/GY HARD PLASTIC 1.20m-2.40m z/s/c O/GY/BR FIRM PLASTI 2.40m-3.10m S/C O/GY HARD PLASTIC 3.10m-4.30m z/s/c O/GY/BR FIRM PLASTIC 4.30m-5.50m C BR FIRM PLASTIC 5.50m-7.30m S/C Y SOFT PLASTIC 7.30m-8.50m S/C Y WET 8.50m-10.40m S/C LT/Y FINE SAND 10.40m-11.00m z/c YGY SOFT PLASTIC FINE SAND 11.00m-12.20m z/s LT/GY WET MEDIUM SAND 12.20m-15.20m z/c GY/BR SOFT PLASTI				25/06/1970	1849 m	North West
40809	Groundwater Investigation, Observation		0.00m-1.30m INNER LINING - CASING = Not Known 1.30m-4.30m INNER LINING - SCREEN = Not Known	Date/time: 1994-11-08 0000 Quality: 47 WLMP: 3.59m DBNS: 3.60m RWL: 73.51mAHD		26/06/1970	1874 m	North West
40807	Groundwater Investigation	0.00m-1.21m Z/S/C O/BR/GY HARD PLASTIC 1.21m-1.82m S/C O/BR HARD PLASTIC 1.82m-2.43m Z/S/C O/BR/GY FIRM PLASTIC 2.43m-3.65m Z/S/C O/GY/BR SOFT PLASTIC 3.65m-4.26m S/C BR/GY SOFT PLASTIC 4.26m-5.48m S/C BR SOFT PLASTIC 5.48m-8.53m S/C LT/BR WET 8.53m-10.97m S/C BR WET 10.97m-14.63m S BLK WET 14.63m-15.24m C BR/GY FIRM PLASTIC				23/06/1970	1885 m	North West

Bore Id	Use Type	Drillers Log	Construction	Latest Water Levels	Geology	Completed Date	Dist (m)	Dir
40805	Groundwater Investigation	0.00m-0.60m Z/C BR/GY HARD PLASTIC 0.60m-1.21m Z/S/C Y/O/GY HARD PLASTIC 1.21m-1.82m C BR FIRM PLASTIC 1.82m-2.43m Z/S/C O/G/BK FIRM PLASTIC 2.43m-3.65m S/C BR SOFT PLASTIC 3.65m-4.87m Z/S GY/BR SOFT PLASTIC 4.87m-6.09m Z/S LT/BR SOFT PLASTIC 6.09m-8.53m S GY WET 8.53m-13.41m S BK WET 13.41m-14.63m S BK WET 14.63m-15.24m C BR/GY HARD PLASTIC				19/06/1970	1920 m	North West
40806	Groundwater Investigation	0.00m-0.60m Z/C BR/GY HARD PLASTIC 0.60m-1.82m Z/S/C Y/GY HARD PLASTIC 1.82m-2.43m S/C BR SOFT PLASTIC 2.43m-3.04m S/C LT/BR SOFT PLASTIC 3.04m-4.26m Z/S/C O/GY/BR SOFT PLASTIC 4.26m-7.92m S/C BR WET 7.92m-10.97m S LT/BR 10.97m-14.63m S LT/GY 14.63m-15.24m C BR/GY				22/06/1970	1922 m	North West
40804	Groundwater Investigation	0.00m-0.60m S/C BR HARD PLASTIC 0.60m-1.82m S/C O/GY HARD PLASTIC 1.82m-3.04m Z/S/C O/GY/BR FIRM PLASTIC 3.04m-3.65m S/C BR FIRM PLASTIC 3.65m-4.26m Z/S/C O/GY/BR SOFT PLASTIC 4.26m-5.48m S/C BR SOFT PLASTIC 5.48m-10.97m Z/S LT/BR WET 10.97m-14.63m S BLK WET 14.63m-15.24m C BLUE HARD PLASTIC				22/06/1970	1933 m	North West
40803	Groundwater Investigation	0.00m-0.60m S/C BR SOFT PLASTIC 0.60m-1.82m Z/S/C O/GY/BR FIRM PLASTIC 1.82m-2.43m Z/S/C Y/GY/BK FIRM PLASTIC 2.43m-4.26m Z/S BR/O/GY SOFT PLASTIC 4.26m-6.09m Z/S LT/BR WET 6.09m-7.92m S Y WET 7.92m-11.58m S LT/Y WET 11.58m-14.02m S/C O/GY SOFT PLASTIC 14.02m-14.63m Z/G LT/GY SOFT PLASTIC 14.63m-15.24m C BR/GY HARD PLASTIC				19/06/1970	1969 m	North West

Boreholes WMIS Data Custodian: State Government Victoria - Dept of Environment, Land, Water & Planning
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Boreholes (Earth Resources Database)

Boreholes from the Earth Resources dataset, within the dataset buffer:

Bore Id	Bore Type	Company	Usage	Method	Status	Drill Date	Depth	Elevation	Accuracy (m)	Dist (m)	Dir
82755		Private Individual/Corporation		Jet	Abandoned	24/09/1984	15.20		100	1061 m	South West
936411				Rotary Air Blast	Unknown	09/12/1980			50	1675 m	South West
40311		Rural Water Commission	Groundwater Investigation			02/04/1964	3.05	77.09	100	1754 m	North West
40312		Rural Water Commission	Groundwater Investigation			01/01/1950	3.00	77.09	300	1754 m	North West
40808		Rural Water Commission	Groundwater Investigation			25/06/1970	6.00	76.89	300	1851 m	North West
40809		Rural Water Commission	Groundwater Investigation			26/06/1970	4.30	77.11	300	1875 m	North West
40807		Rural Water Commission	Groundwater Investigation			23/06/1970	6.00	76.76	300	1887 m	North West
40805		Rural Water Commission	Groundwater Investigation			19/06/1970	6.00	76.73	300	1922 m	North West
40806		Rural Water Commission	Groundwater Investigation			22/06/1970	6.00	76.85	300	1923 m	North West
40804		Rural Water Commission	Groundwater Investigation			22/06/1970	6.00	76.76	300	1935 m	North West
40803		Rural Water Commission	Groundwater Investigation			19/06/1970	6.00	76.82	300	1969 m	North West

Boreholes Earth Resources Data Source: © The State of Victoria, Department of Economic Development, Jobs, Transport and Resources 2015. Creative Commons Attribution 3.0 Australia

Boreholes (Federation University)

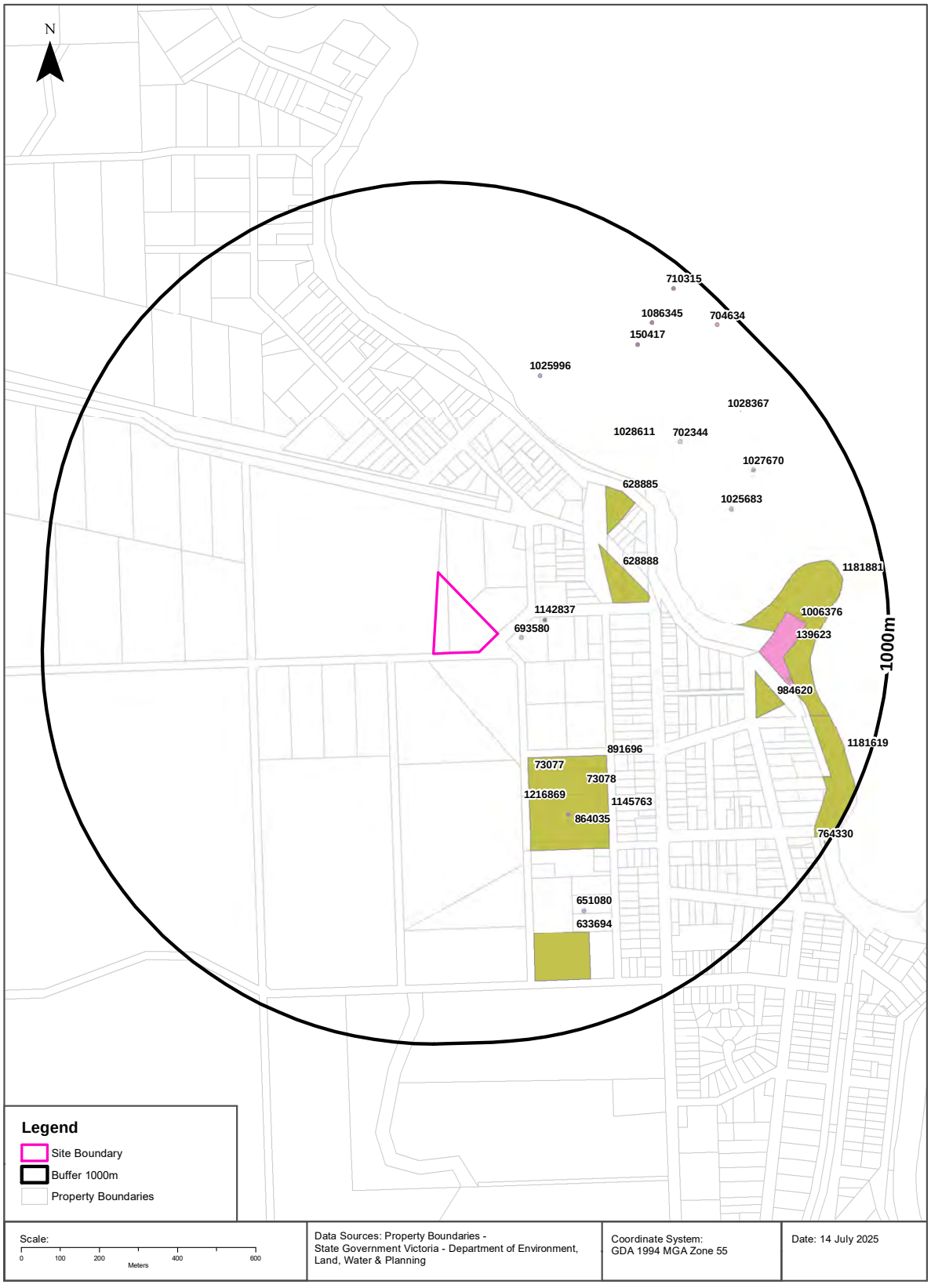
Boreholes from the Federation University Australia dataset, within the dataset buffer:

Bore Id	Authority	Type	Uses	Initial TD	Log	Dist (m)	Dir
N/A	No records in buffer						

Boreholes FedUni Data Source: © Federation University Australia

Features of Interest

10 Dalton Street, Koondrook, VIC 3580



Features of Interest

10 Dalton Street, Koondrook, VIC 3580

Features of Interest

Features of Interest within the dataset buffer:

Feature Id	Feature Type	Feature Sub Type	Name	Distance	Direction
693580	storage facility	depot		56m	East
1142837	communication service	radio communication facility	Koondrook 765	120m	East
891696	reserve	park	Koondrook Public Recreation Reserve	299m	South East
628888	reserve	park	Sidney Reid Reserve	304m	East
73077	sport facility	tennis court		337m	South East
628885	reserve	park	James Park	378m	North East
73078	sport facility	sports ground		387m	South East
1216869	recreational resource	club house		410m	South East
864035	emergency facility	neighbourhood safer place	Koondrook (Football Oval) NSP	471m	South East
1145763	landmark	tower		494m	South East
1025996	recreational resource	club house	Barham And District Services Memorial Bowling Club	563m	North
1181881	reserve	conservation park	Koondrook H.R.	614m	East
1028611	reserve	park	Riverside Park	634m	North East
1006376	education centre	education complex		669m	East
702344	cultural centre	library	Barham Library	671m	North East
1025683	landmark	tourist attraction	Barham Caravan And Tourist Park	672m	North East
651080	sport facility	swimming pool		709m	South East
633694	reserve	cemetery	Koondrook Cemetery	734m	South
139623	education centre	primary school	Koondrook Primary School	742m	East
984620	care facility	child care	Koondrook Preschool	748m	East
150417	place of worship	church		770m	North East
1027670	recreational resource	club house	Clubarham	771m	North East
1181619	reserve	conservation park	Koondrook Historic Reserve	825m	East
1086345	place of worship	church		836m	North East
1028367	reserve	park	Noorong Street Park	843m	North East
710315	place of worship	church		940m	North East
704634	education centre	primary school	Barham Public School	949m	North East
764330	reserve	park	Apex Park	988m	South East

Features of Interest Data Custodian: State Government Victoria - Dept of Environment, Land, Water & Planning
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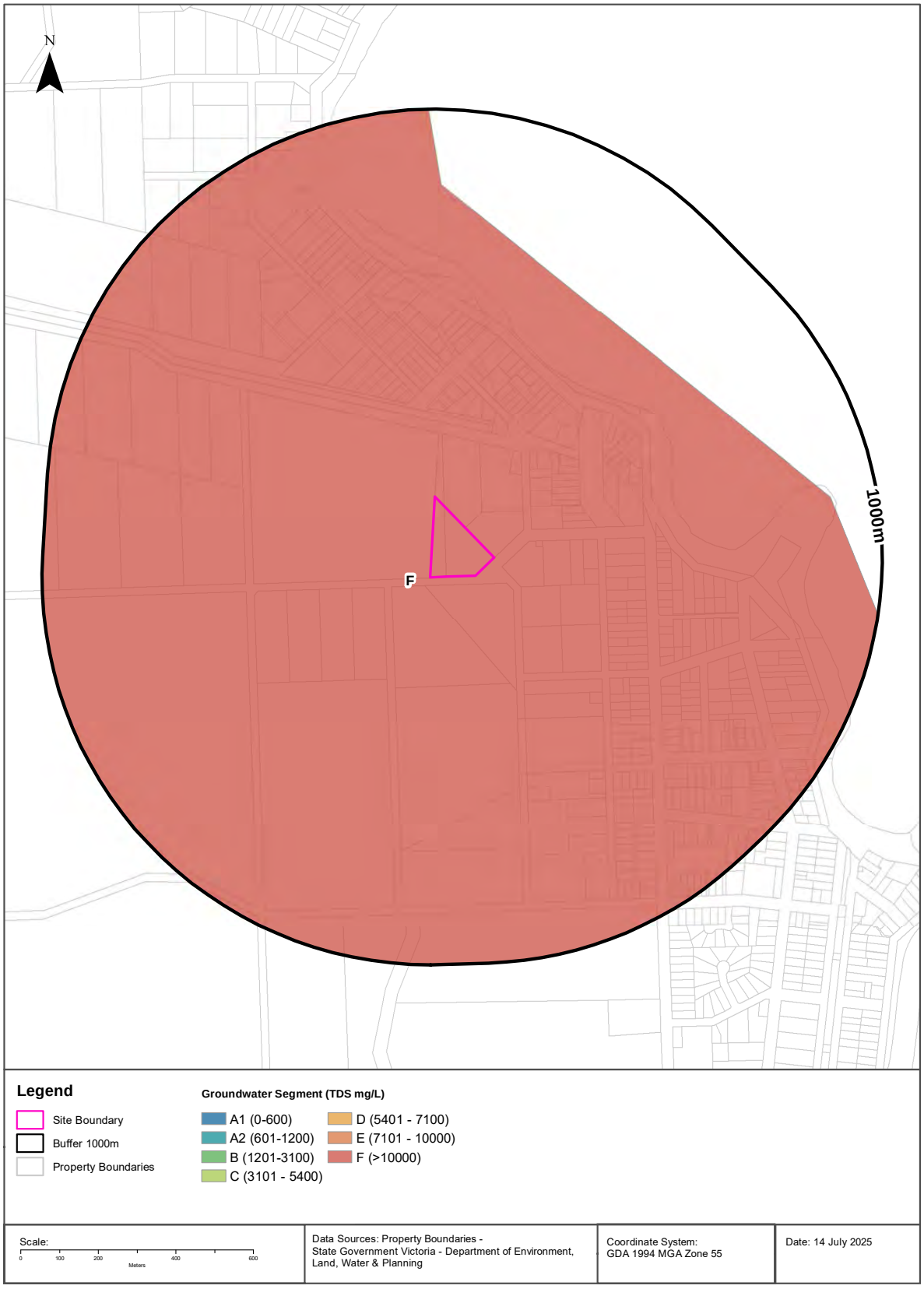
Watertable Salinity

10 Dalton Street, Koondrook, VIC 3580



Hydrogeology & Groundwater

10 Dalton Street, Koondrook, VIC 3580

Hydrogeology

Description of aquifers within the dataset buffer:

Description	Dist(m)	Dir
Porous, extensive aquifers of low to moderate productivity	0	On-site

Hydrogeology Map of Australia: Commonwealth of Australia (Geoscience Australia)
Creative Commons 3.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/3.0/au/deed.en

Watertable Salinity

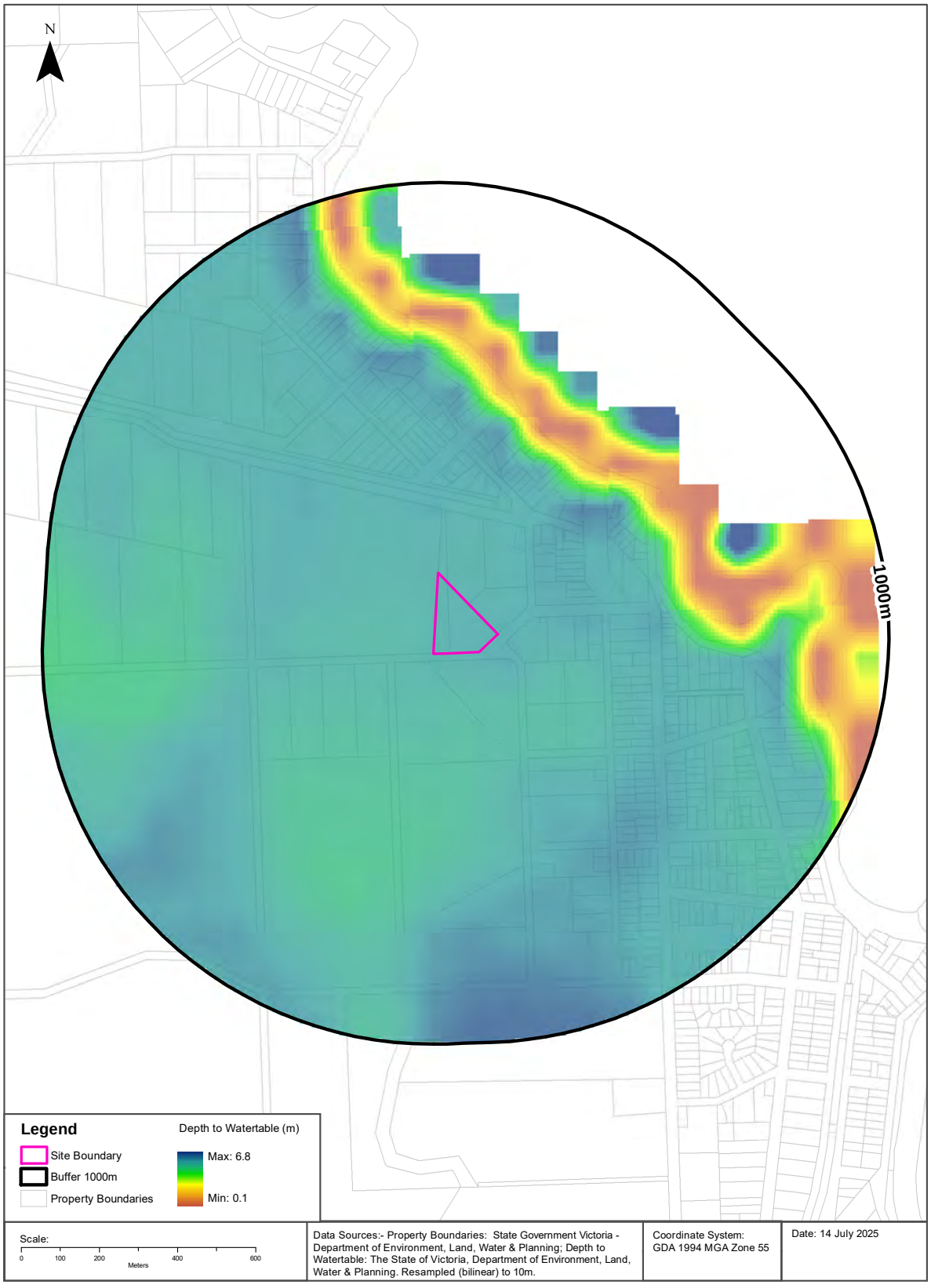
Watertable Salinity concentrations within the dataset buffer:

Groundwater Segment	Total Dissolved Solids (mg/L)	Dist(m)	Dir
F	> 10000	0	On-site

Source: Watertable Salinity
Creative Commons 4.0 © State Government of Victoria (Department of Energy, Environment and Climate Action) 2024

Depth to Watertable

10 Dalton Street, Koondrook, VIC 3580



Hydrogeology & Groundwater

10 Dalton Street, Koondrook, VIC 3580

Depth to Watertable

On-site Depth to Watertable:

Depth to Watertable	Percent Of Site Area
Less than 5 metres	100

Surface Elevation

Approximate on-site Surface Elevation:

Surface Elevation
77 AHDm

Basement Elevation

Approximate on-site Basement Elevation:

Basement Elevation - Basement Rocks comprise Lower Palaeozoic basement rocks that form the highlands and the crystalline basement; and Mesozoic rocks of the Otway and Gippsland basins both outcropping and subsurface
-66 AHDm to -65 AHDm

Groundwater Data Custodian: State Government Victoria - Dept of Environment, Land, Water & Planning
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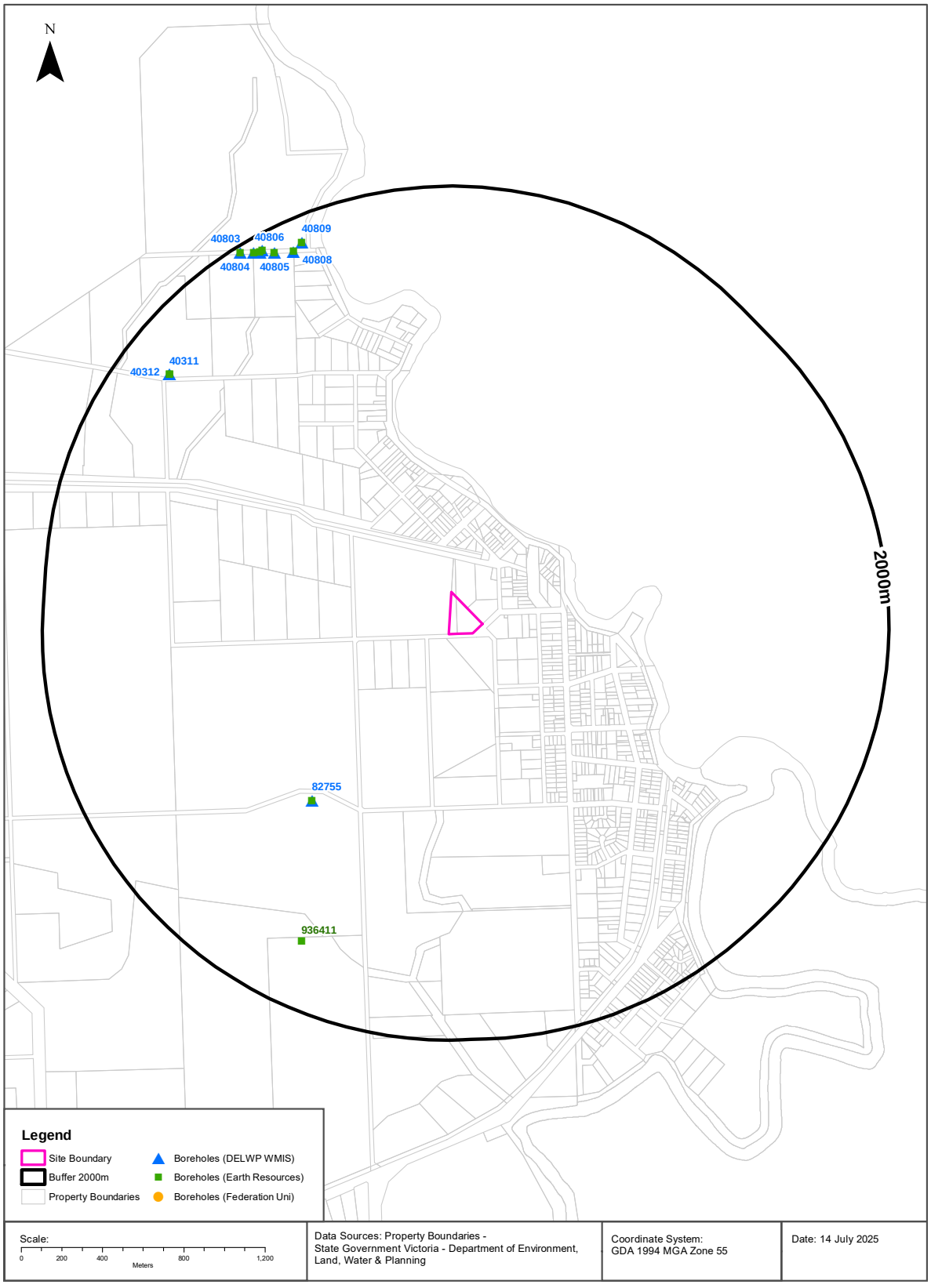
Groundwater Boreholes

10 Dalton Street, Koondrook, VIC 3580



Groundwater Boreholes

10 Dalton Street, Koondrook, VIC 3580

Boreholes (DELWP WMIS)

Boreholes from the Department of Environment, Land, Water & Planning's Water Measurement Information System, within the dataset buffer:

Bore Id	Use Type	Drillers Log	Construction	Latest Water Levels	Geology	Completed Date	Dist (m)	Dir
82755	Not Known		0.00m-14.00m INNER LINING - CASING = Not Known 14.00m-15.20m INNER LINING - SCREEN = Not Known		14.00m-15.20m	24/09/1984	1061 m	South West
40311	Groundwater Investigation, Observation	0.00m-1.52m BROWN SANDY CLAYEY LOAM 1.52m-3.05m LIGHT BROWN & WHITE SANDY CLAYEY LOAM		Date/time: 1972-03-08 1300 Quality: 47 WLMP: 2.90m DBNS: 2.86m RWL: 74.23mAHD		02/04/1964	1753 m	North West
40312	Groundwater Investigation, Observation			Date/time: 1965-09-08 0000 Quality: 47 WLMP: 1.09m DBNS: 1.33m RWL: 75.76mAHD		01/01/1950	1753 m	North West
40808	Groundwater Investigation	0.00m-0.60m s/c BR HARD PLASTIC 0.60m-1.20m S/C O/GY HARD PLASTIC 1.20m-2.40m z/s/c O/GY/BR FIRM PLASTI 2.40m-3.10m S/C O/GY HARD PLASTIC 3.10m-4.30m z/s/c O/GY/BR FIRM PLASTIC 4.30m-5.50m C BR FIRM PLASTIC 5.50m-7.30m S/C Y SOFT PLASTIC 7.30m-8.50m S/C Y WET 8.50m-10.40m S/C LT/Y FINE SAND 10.40m-11.00m z/c YGY SOFT PLASTIC FINE SAND 11.00m-12.20m z/s LT/GY WET MEDIUM SAND 12.20m-15.20m z/c GY/BR SOFT PLASTI				25/06/1970	1849 m	North West
40809	Groundwater Investigation, Observation		0.00m-1.30m INNER LINING - CASING = Not Known 1.30m-4.30m INNER LINING - SCREEN = Not Known	Date/time: 1994-11-08 0000 Quality: 47 WLMP: 3.59m DBNS: 3.60m RWL: 73.51mAHD		26/06/1970	1874 m	North West
40807	Groundwater Investigation	0.00m-1.21m Z/S/C O/BR/GY HARD PLASTIC 1.21m-1.82m S/C O/BR HARD PLASTIC 1.82m-2.43m Z/S/C O/BR/GY FIRM PLASTIC 2.43m-3.65m Z/S/C O/GY/BR SOFT PLASTIC 3.65m-4.26m S/C BR/GY SOFT PLASTIC 4.26m-5.48m S/C BR SOFT PLASTIC 5.48m-8.53m S/C LT/BR WET 8.53m-10.97m S/C BR WET 10.97m-14.63m S BLK WET 14.63m-15.24m C BR/GY FIRM PLASTIC				23/06/1970	1885 m	North West

Bore Id	Use Type	Drillers Log	Construction	Latest Water Levels	Geology	Completed Date	Dist (m)	Dir
40805	Groundwater Investigation	0.00m-0.60m Z/C BR/GY HARD PLASTIC 0.60m-1.21m Z/S/C Y/O/GY HARD PLASTIC 1.21m-1.82m C BR FIRM PLASTIC 1.82m-2.43m Z/S/C O/G/BK FIRM PLASTIC 2.43m-3.65m S/C BR SOFT PLASTIC 3.65m-4.87m Z/S GY/BR SOFT PLASTIC 4.87m-6.09m Z/S LT/BR SOFT PLASTIC 6.09m-8.53m S GY WET 8.53m-13.41m S BK WET 13.41m-14.63m S BK WET 14.63m-15.24m C BR/GY HARD PLASTIC				19/06/1970	1920 m	North West
40806	Groundwater Investigation	0.00m-0.60m Z/C BR/GY HARD PLASTIC 0.60m-1.82m Z/S/C Y/GY HARD PLASTIC 1.82m-2.43m S/C BR SOFT PLASTIC 2.43m-3.04m S/C LT/BR SOFT PLASTIC 3.04m-4.26m Z/S/C O/GY/BR SOFT PLASTIC 4.26m-7.92m S/C BR WET 7.92m-10.97m S LT/BR 10.97m-14.63m S LT/GY 14.63m-15.24m C BR/GY				22/06/1970	1922 m	North West
40804	Groundwater Investigation	0.00m-0.60m S/C BR HARD PLASTIC 0.60m-1.82m S/C O/GY HARD PLASTIC 1.82m-3.04m Z/S/C O/GY/BR FIRM PLASTIC 3.04m-3.65m S/C BR FIRM PLASTIC 3.65m-4.26m Z/S/C O/GY/BR SOFT PLASTIC 4.26m-5.48m S/C BR SOFT PLASTIC 5.48m-10.97m Z/S LT/BR WET 10.97m-14.63m S BLK WET 14.63m-15.24m C BLUE HARD PLASTIC				22/06/1970	1933 m	North West
40803	Groundwater Investigation	0.00m-0.60m S/C BR SOFT PLASTIC 0.60m-1.82m Z/S/C O/GY/BR FIRM PLASTIC 1.82m-2.43m Z/S/C Y/GY/BK FIRM PLASTIC 2.43m-4.26m Z/S BR/O/GY SOFT PLASTIC 4.26m-6.09m Z/S LT/BR WET 6.09m-7.92m S Y WET 7.92m-11.58m S LT/Y WET 11.58m-14.02m S/C O/GY SOFT PLASTIC 14.02m-14.63m Z/G LT/GY SOFT PLASTIC 14.63m-15.24m C BR/GY HARD PLASTIC				19/06/1970	1969 m	North West

Boreholes WMIS Data Custodian: State Government Victoria - Dept of Environment, Land, Water & Planning
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Boreholes (Earth Resources Database)

Boreholes from the Earth Resources dataset, within the dataset buffer:

Bore Id	Bore Type	Company	Usage	Method	Status	Drill Date	Depth	Elevation	Accuracy (m)	Dist (m)	Dir
82755		Private Individual/Corporation		Jet	Abandoned	24/09/1984	15.20		100	1061 m	South West
936411				Rotary Air Blast	Unknown	09/12/1980			50	1675 m	South West
40311		Rural Water Commission	Groundwater Investigation			02/04/1964	3.05	77.09	100	1754 m	North West
40312		Rural Water Commission	Groundwater Investigation			01/01/1950	3.00	77.09	300	1754 m	North West
40808		Rural Water Commission	Groundwater Investigation			25/06/1970	6.00	76.89	300	1851 m	North West
40809		Rural Water Commission	Groundwater Investigation			26/06/1970	4.30	77.11	300	1875 m	North West
40807		Rural Water Commission	Groundwater Investigation			23/06/1970	6.00	76.76	300	1887 m	North West
40805		Rural Water Commission	Groundwater Investigation			19/06/1970	6.00	76.73	300	1922 m	North West
40806		Rural Water Commission	Groundwater Investigation			22/06/1970	6.00	76.85	300	1923 m	North West
40804		Rural Water Commission	Groundwater Investigation			22/06/1970	6.00	76.76	300	1935 m	North West
40803		Rural Water Commission	Groundwater Investigation			19/06/1970	6.00	76.82	300	1969 m	North West

Boreholes Earth Resources Data Source: © The State of Victoria, Department of Economic Development, Jobs, Transport and Resources 2015. Creative Commons Attribution 3.0 Australia

Boreholes (Federation University)

Boreholes from the Federation University Australia dataset, within the dataset buffer:

Bore Id	Authority	Type	Uses	Initial TD	Log	Dist (m)	Dir
N/A	No records in buffer						

Boreholes FedUni Data Source: © Federation University Australia

Historical Mining Activity - Shafts

10 Dalton Street, Koondrook, VIC 3580

Historical Mining Activity - Shafts

Mine Shaft Locations were collected by a variety of methods from 1869 in some areas of the state, mainly concentrating in Ballarat and Bendigo. In places a shaft may be recorded multiple times with a different source. In cases where several shaft locations are shown close together (generally with separations less than stated position errors) and they have different sources, it is possible that one shaft has been mapped several times. In cases where several shaft locations are shown close together but they have the same information source, it is possible that each shaft location represents a different shaft on the ground.

Historical Mine Shafts within the dataset buffer:

Map Id	Name	Source	Depth (m)	Collar (ft)	Fill/Cap Method	Location Desc	Location Accuracy	Distance	Direction
N/A	No records in buffer								

Historical Mining Activity Data Custodian: State Government Victoria - Dept of Economic Development, Jobs, Transport & Resources
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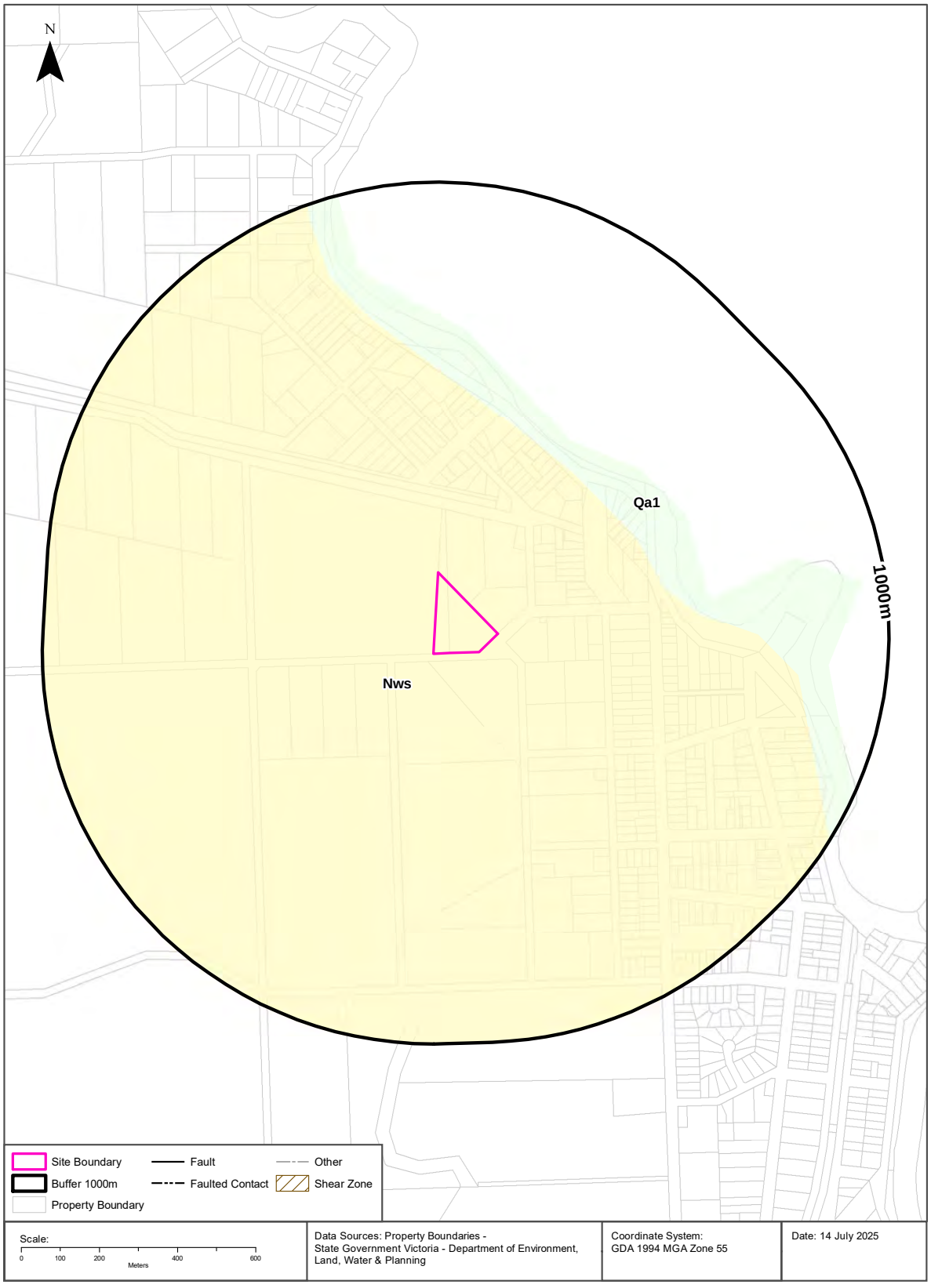
Geology

10 Dalton Street, Koondrook, VIC 3580



Geology

10 Dalton Street, Koondrook, VIC 3580

Geological Units 1:250,000

What are the Geological Units within the dataset buffer?

Symbol	Name	Description	Geological Age	Lithology	Distance	Direction
Nws	Shepparton Formation (Nws): generic	Clay, sand, silt, pooly-sorted lenticular gravel. Dissected flood plain alluvium: terraces 1-10 metres above present river channels; well developed soil 2-3 m thick.	Pliocene to Holocene	clay lithology (dominant); sand (significant); silt material (significant); gravel material (significant)	0m	On-site
Qa1	alluvium(Qa1): generic	Gravel, sand, silt: variably sorted and rounded; generally unconsolidated; includes deposits of low terraces; alluvial floodplain deposits	Pleistocene to Holocene	gravel material (significant); sand (significant); silt material (significant)	414m	North East

Geology Data Custodian: State Government Victoria - Dept of Economic Development, Jobs, Transport & Resources
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Geological Structures 1:250,000

What are the Geological Faults or Faulted Contacts within the dataset buffer?

Map Id	Type	Name	Contact	Positional Accuracy	Distance	Direction
N/A	No records in buffer					

What are the Shear Zones within the dataset buffer?

Map Id	Type	Name	Description	Positional Accuracy	Distance	Direction
N/A	No records in buffer					

Geology Data Custodian: State Government Victoria - Dept of Economic Development, Jobs, Transport & Resources
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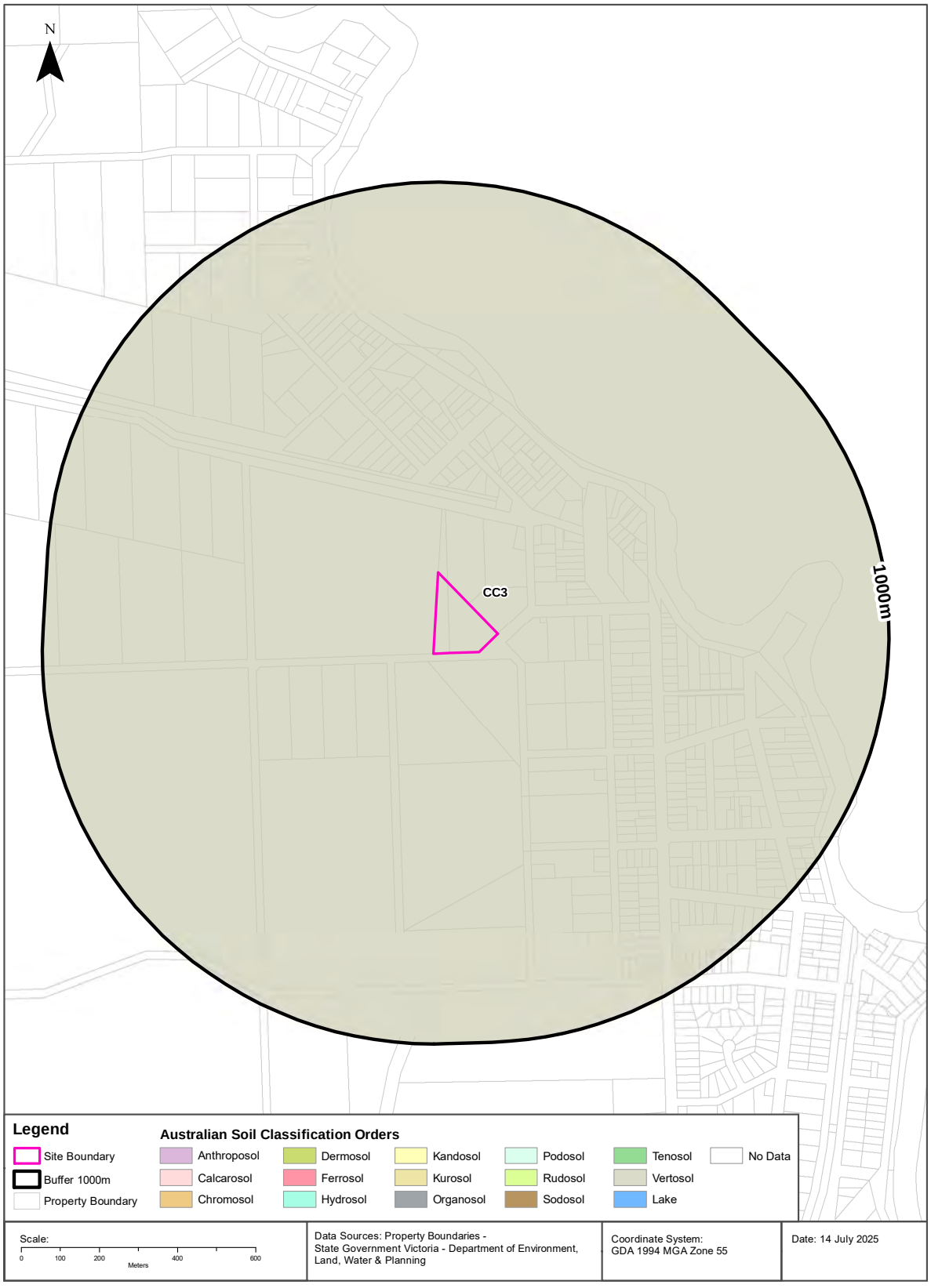
Atlas of Australian Soils

10 Dalton Street, Koondrook, VIC 3580



Soils

10 Dalton Street, Koondrook, VIC 3580

Atlas of Australian Soils

Soil mapping units and Australian Soil Classification orders within the dataset buffer:

Map Unit Code	Soil Order	Map Unit Description	Distance	Direction
CC3	Vertosol	Plains: gilgai plains of cracking grey clays (Ug5.2) with small areas of cracking brown clays (Ug5.3); and very small areas of hard alkaline red soils (Dr2.33) and hard alkaline brown soils (Db1.33) on low rises.	0m	On-site

Atlas of Australian Soils Data Source: CSIRO
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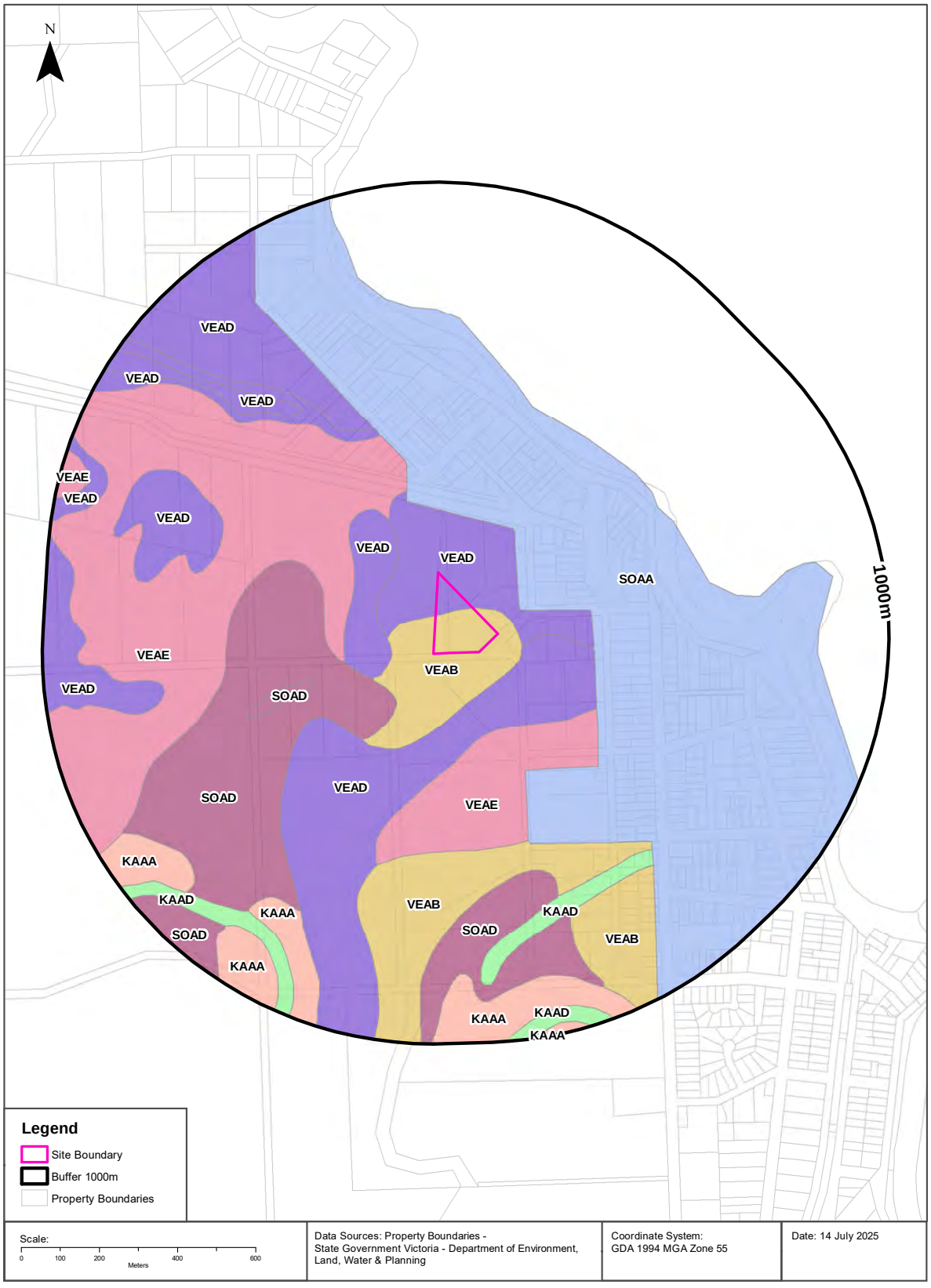
Victorian Soil Type Mapping

10 Dalton Street, Koondrook, VIC 3580



Soils

10 Dalton Street, Koondrook, VIC 3580

Victorian Soil Type Mapping

Victorian Soil Types within the dataset buffer:

Symbol	Description	Distance	Direction
VEAB	Vertosols Brown	0m	On-site
VEAD	Vertosols Grey	0m	On-site
SOAA	Sodosols Red	84m	East
SOAD	Sodosols Grey	147m	South West
VEAE	Vertosols Black	185m	West
KAAD	Kandasols Grey	648m	South
KAAA	Kandasols Red	740m	South

Victorian Soil Type Mapping Data Source: Department of Economic Development, Jobs, Transport and Resources
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Atlas of Australian Acid Sulfate Soils

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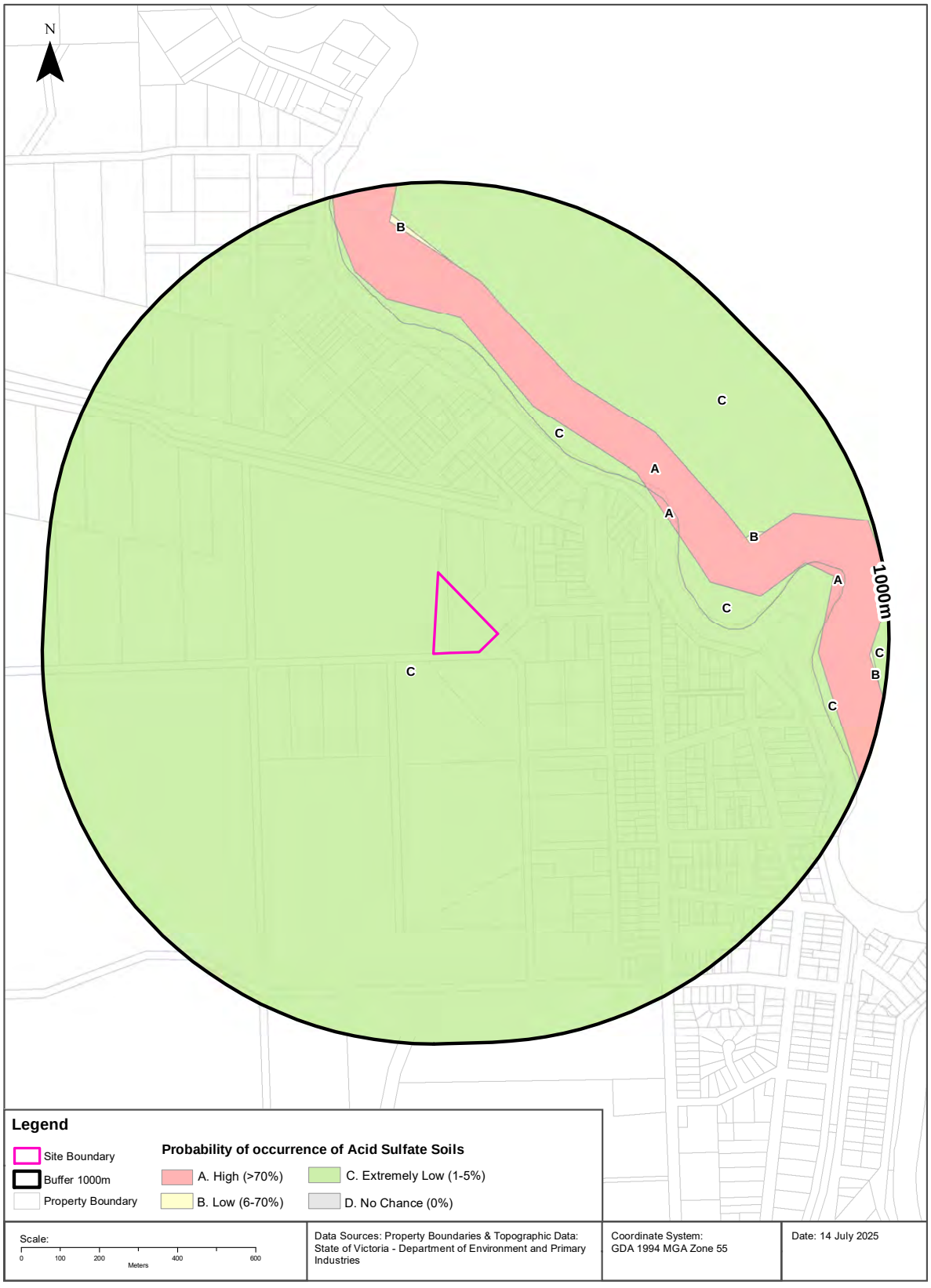

Acid Sulfate Soils

10 Dalton Street, Koondrook, VIC 3580

Atlas of Australian Acid Sulfate Soils

Atlas of Australian Acid Sulfate Soil categories within the dataset buffer:

Class	Description	Distance	Direction
C	Extremely low probability of occurrence. 1-5% chance of occurrence with occurrences in small localised areas.	0m	On-site
A	High Probability of occurrence. >70% chance of occurrence.	490m	North East
B	Low Probability of occurrence. 6-70% chance of occurrence.	679m	East

Atlas of Australian Acid Sulfate Soils Data Source: CSIRO

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Acid Sulfate Soils

10 Dalton Street, Koondrook, VIC 3580

Coastal Acid Sulfate Soils

Coastal Acid Sulfate Soil types within the dataset buffer:

Coastal Acid Sulfate Soil Types	Distance (m)	Direction
No records in buffer		

Coastal Acid Sulfate Data Custodian: State Government Victoria - Dept of Environment, Land, Water & Planning
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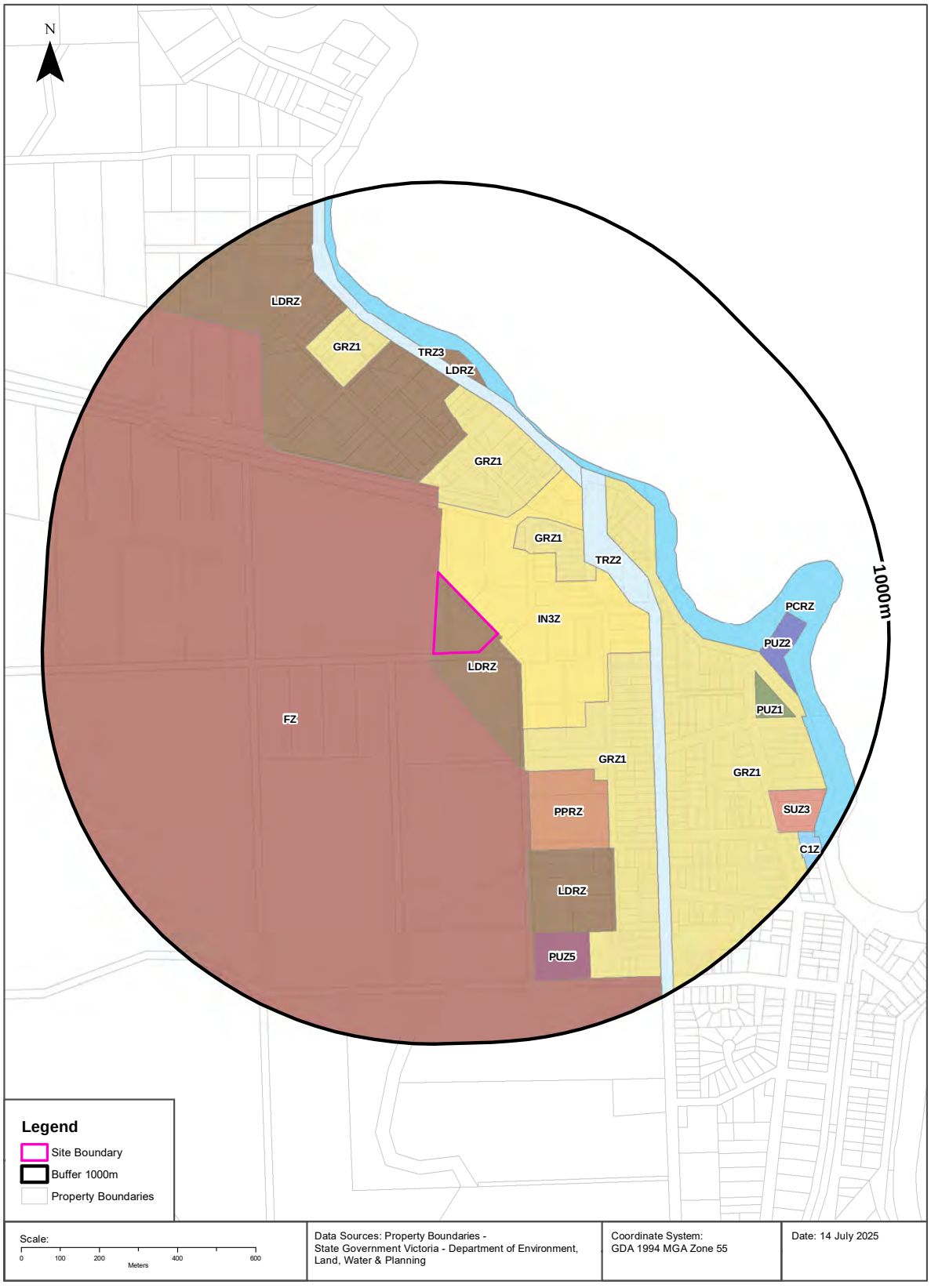
Planning Zones

10 Dalton Street, Koondrook, VIC 3580



Planning

10 Dalton Street, Koondrook, VIC 3580

Planning Zones

Planning zones within the dataset buffer:

Zone Code	Description	Distance	Direction
LDRZ	LOW DENSITY RESIDENTIAL ZONE	0m	On-site
FZ	FARMING ZONE	0m	South West
IN3Z	INDUSTRIAL 3 ZONE	0m	East
GRZ1	GENERAL RESIDENTIAL ZONE - SCHEDULE 1	177m	North
GRZ1	GENERAL RESIDENTIAL ZONE - SCHEDULE 1	181m	North East
GRZ1	GENERAL RESIDENTIAL ZONE - SCHEDULE 1	228m	South East
LDRZ	LOW DENSITY RESIDENTIAL ZONE	236m	North West
TRZ2	TRANSPORT ZONE 2 - PRINCIPAL ROAD NETWORK	288m	East
PPRZ	PUBLIC PARK AND RECREATION ZONE	332m	South East
GRZ1	GENERAL RESIDENTIAL ZONE - SCHEDULE 1	378m	South East
TRZ3	TRANSPORT ZONE 3 - SIGNIFICANT MUNICIPAL ROAD	412m	North
PCRZ	PUBLIC CONSERVATION AND RESOURCE ZONE	434m	East
LDRZ	LOW DENSITY RESIDENTIAL ZONE	491m	North
LDRZ	LOW DENSITY RESIDENTIAL ZONE	524m	South East
GRZ1	GENERAL RESIDENTIAL ZONE - SCHEDULE 1	533m	North
PUZ1	PUBLIC USE ZONE - SERVICE AND UTILITY	664m	East
PUZ2	PUBLIC USE ZONE - EDUCATION	669m	East
PUZ5	PUBLIC USE ZONE - CEMETERY/CREMATORIUM	734m	South
SUZ3	SPECIAL USE ZONE - SCHEDULE 3	799m	South East
C1Z	COMMERCIAL 1 ZONE	919m	South East

Planning Zone Data Custodian: State Government Victoria - Dept of Environment, Land, Water & Planning
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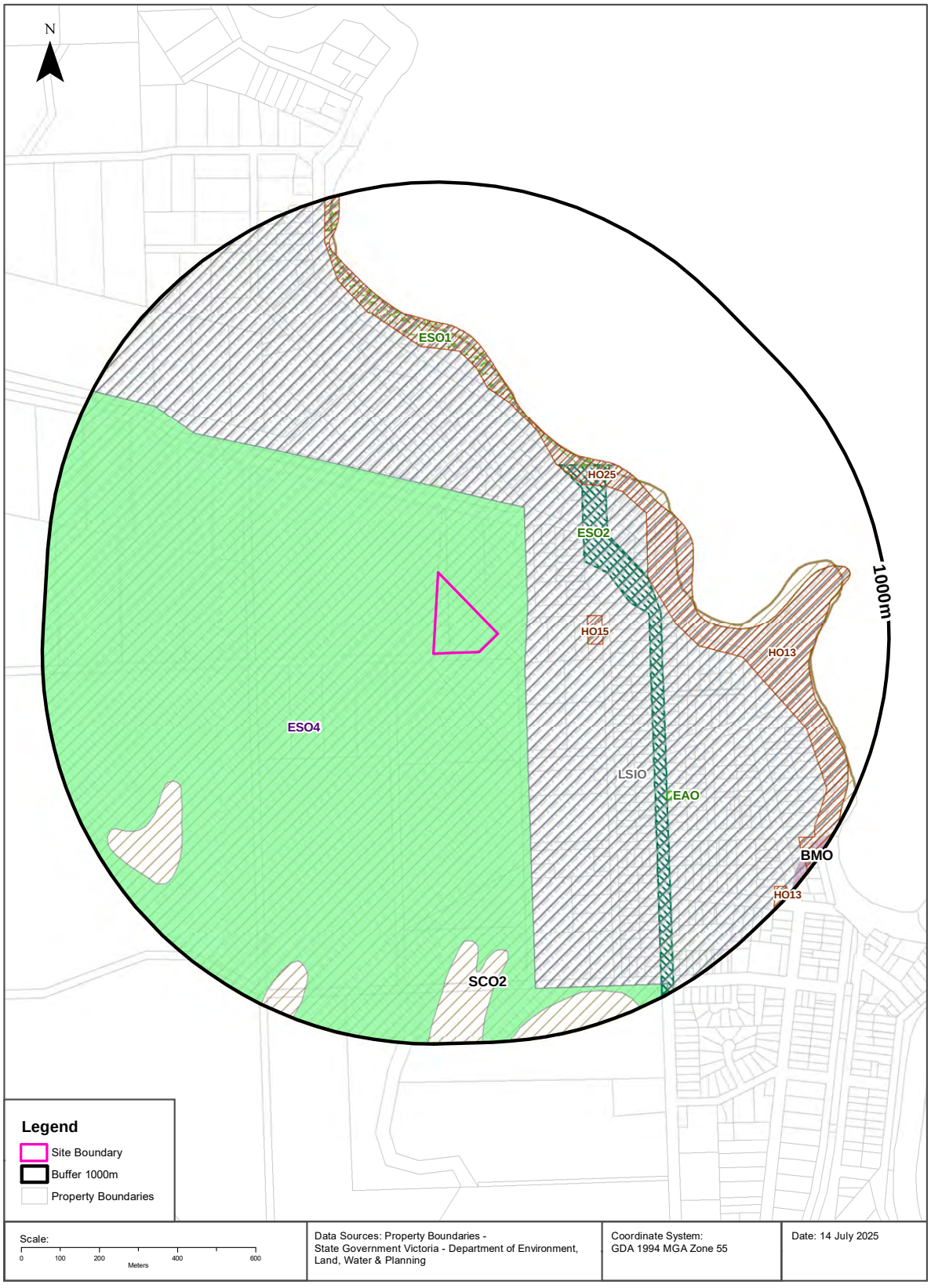
Planning Overlays

10 Dalton Street, Koondrook, VIC 3580



Planning

10 Dalton Street, Koondrook, VIC 3580

Planning Overlays

Planning overlays within the dataset buffer:

Zone Code	Description	Distance	Direction
ESO4	ENVIRONMENTAL SIGNIFICANCE OVERLAY - SCHEDULE 4	0m	On-site
SCO2	SPECIFIC CONTROLS OVERLAY - PS MAP REF SCO2	0m	On-site
LSIO	LAND SUBJECT TO INUNDATION OVERLAY	72m	East
HO15	HERITAGE OVERLAY (HO15)	229m	East
ESO2	ENVIRONMENTAL SIGNIFICANCE OVERLAY - SCHEDULE 2	288m	East
HO13	HERITAGE OVERLAY (HO13)	409m	East
ESO1	ENVIRONMENTAL SIGNIFICANCE OVERLAY - SCHEDULE 1	440m	North
HO25	HERITAGE OVERLAY (HO25)	467m	North East
EAO	ENVIRONMENTAL AUDIT OVERLAY	591m	South East
BMO	BUSHFIRE MANAGEMENT OVERLAY	967m	South East

Planning Overlay Data Custodian: State Government Victoria - Dept of Environment, Land, Water & Planning
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Heritage

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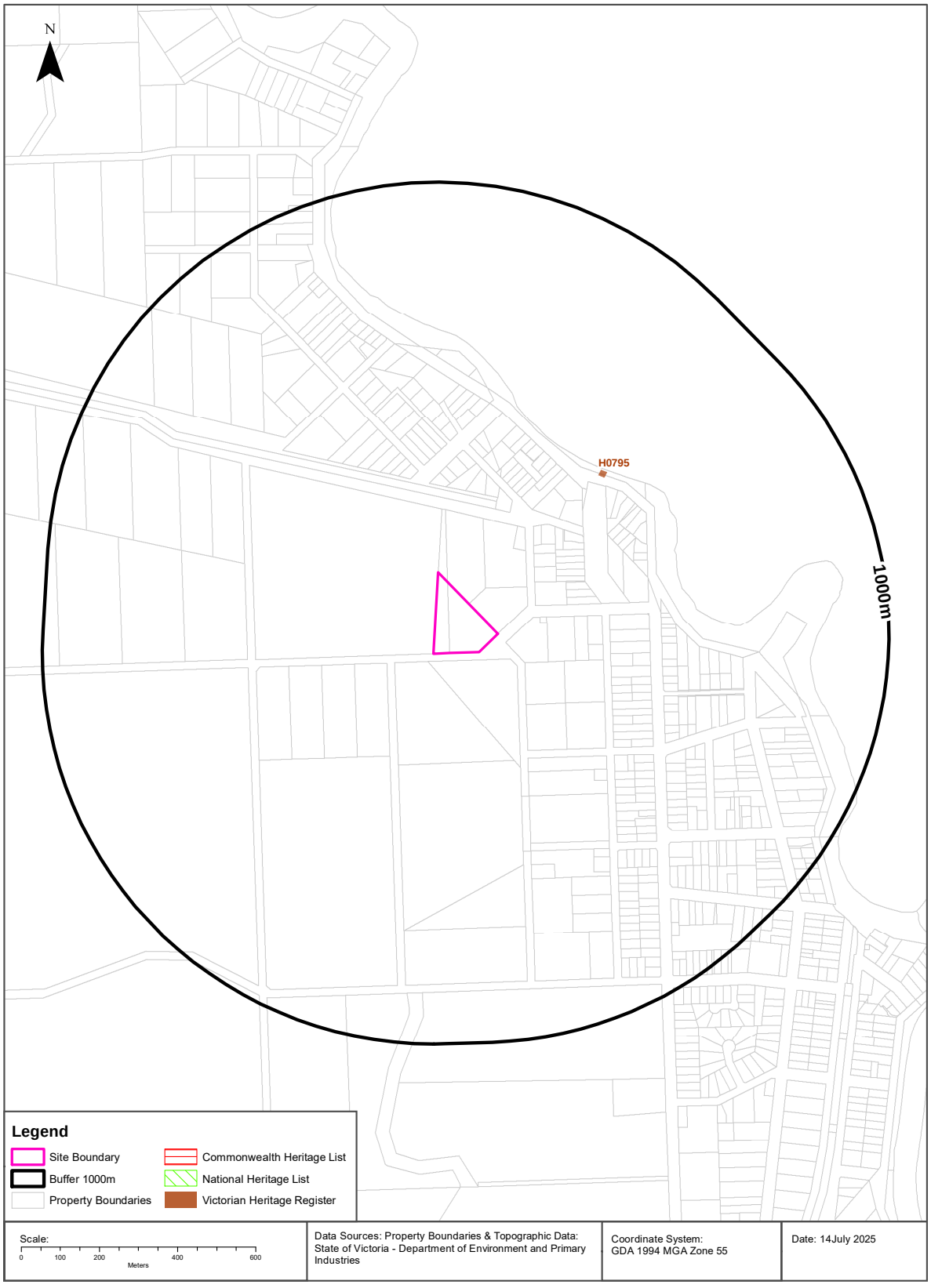

Heritage

10 Dalton Street, Koondrook, VIC 3580

Commonwealth Heritage List

What are the Commonwealth Heritage List Items located within the dataset buffer?

Place Id	Name	Address	Place File No	Class	Status	Register Date	Distance	Direction
N/A	No records in buffer							

Heritage Data Source: Australian Government Department of the Environment and Energy - Heritage Branch
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National Heritage List

What are the National Heritage List Items located within the dataset buffer?
Note. Please click on Place Id to activate a hyperlink to online website.

Place Id	Name	Address	Place File No	Class	Status	Register Date	Distance	Direction
N/A	No records in buffer							

Heritage Data Source: Australian Government Department of the Environment and Energy - Heritage Branch
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Victorian Heritage Register

What are the Victorian Heritage Register items located within the dataset buffer?:

VHR Number	Description	Distance	Direction
H0795	BARHAM-KOONDROOK BRIDGE	467m	North East

Victorian Heritage Register Data Custodian: State Government Victoria - Dept of Environment, Land, Water & Planning
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Cultural Heritage Sensitivity

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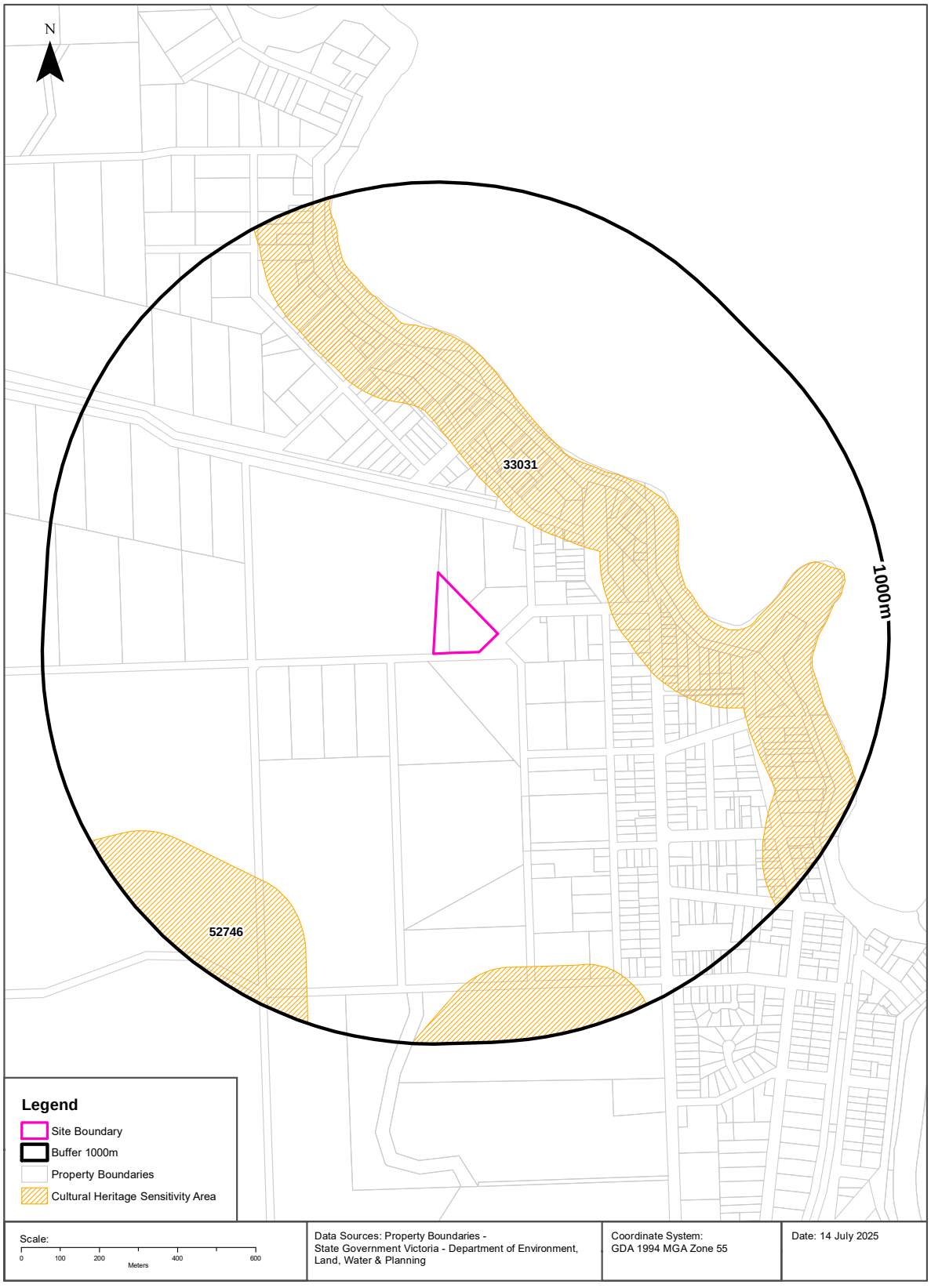

Heritage

10 Dalton Street, Koondrook, VIC 3580

Cultural Heritage Sensitivity

Areas of Cultural Heritage Sensitivity as specified in Division 3 of Part 2 in the Victorian Aboriginal Heritage Regulations 2018, within the dataset buffer:

Map Id	Distance	Direction
33031	245m	North East
52746	723m	South West

Cultural Heritage Sensitivity Data Custodian: State Government Victoria - Department of Premier and Cabinet
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Natural Hazards

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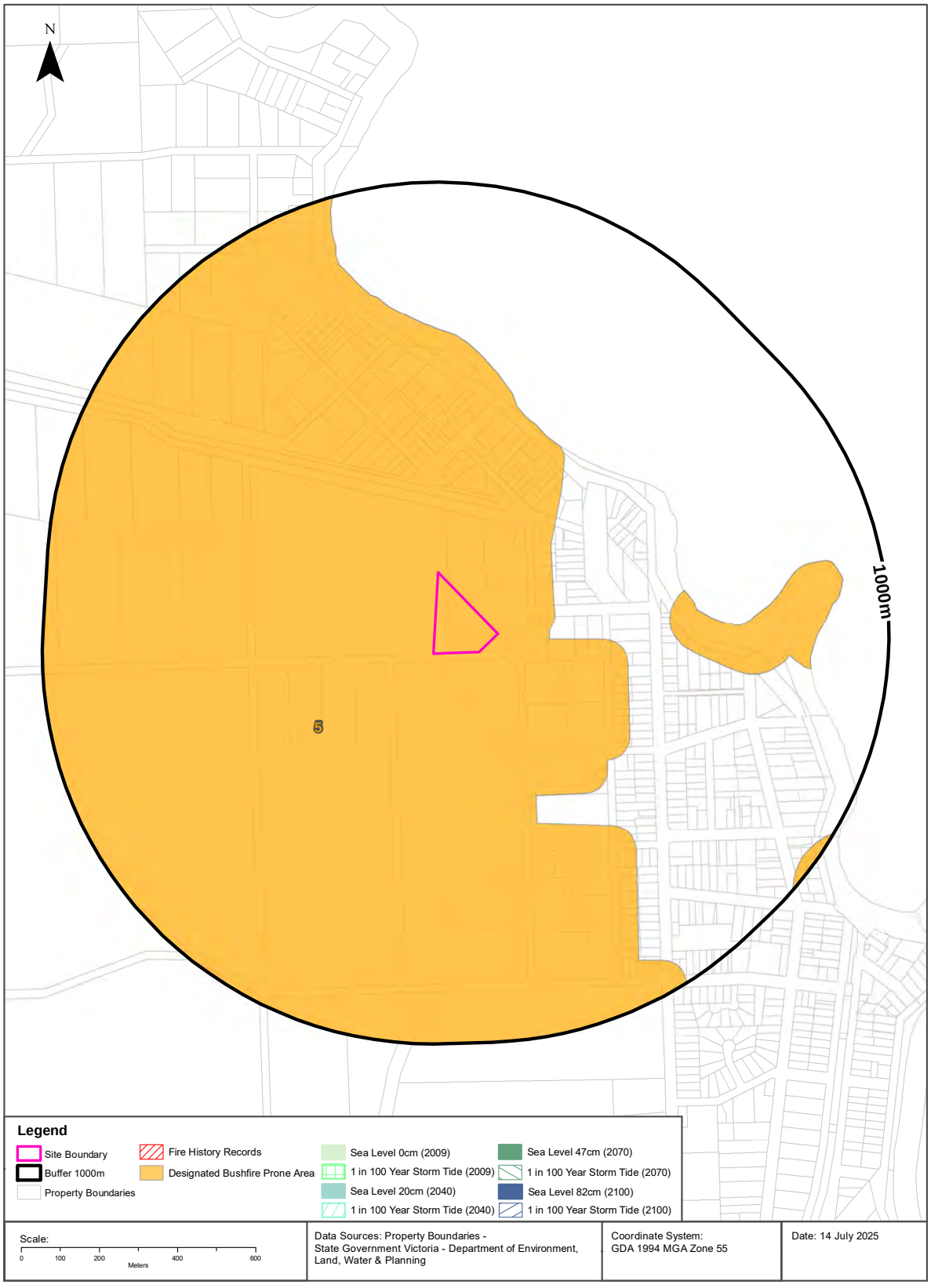

Natural Hazards

10 Dalton Street, Koondrook, VIC 3580

Bushfire Prone Areas

What are the designated bushfire prone areas within the dataset buffer?

Map ID	Feature	Plan No	LGA	Gazetted Date	Distance	Direction
5	Designated Bushfire Prone Area	LEGL./18-240	GANNAWARRA	16/05/2018	0m	On-site

Bushfire Prone Area Data Custodian: State Government Victoria - Dept of Transport, Planning & Local Infrastructure
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Fire History

What are the fire history records of fires primarily on public land, within the dataset buffer?

Map Id	Fire Type	Fire Key	Season	Fire No	Fire Name	Treatment	Fire Cover	Start Date	Dist (m)	Direction
N/A	No records in buffer									

Fire History Data Custodian: State Government Victoria - Dept of Environment, Land, Water & Planning
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Victorian Coastal Inundation Sea Level Rise

What coastal inundation sea level rise features exist within the dataset buffer?

Description	Distance	Direction
No records in buffer		

Victorian Coastal Inundation Sea Level Rise Data Custodian: State Government Victoria - Dept of Environment, Land, Water & Planning
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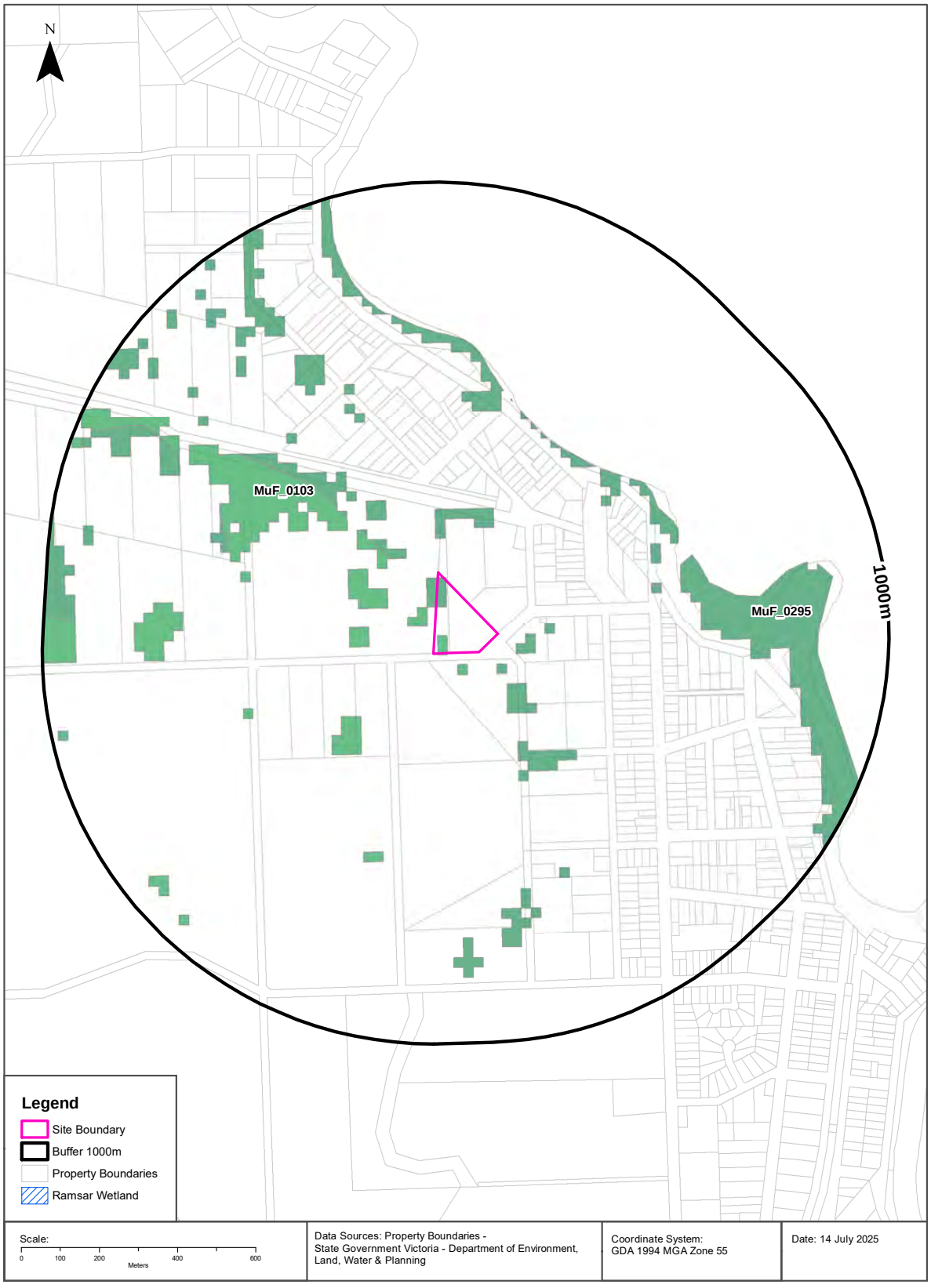
Ecological Constraints - Native Vegetation 2005 & Ramsar Wetlands

10 Dalton Street, Koondrook, VIC 3580



Ecological Constraints

10 Dalton Street, Koondrook, VIC 3580

Native Vegetation (Modelled 2005 Ecological Vegetation Classes)

What native vegetation exists within the dataset buffer?

Veg Code	EVC Name	EVCCode	Group	Subgroup	Bioregion	Conservation Status	Geographic Occurance	Dist	Dir
MuF_0295	Riverine Grassy Woodland	0295	Riverine Grassy Woodlands or Forests	Broader plain	Murray Fans	Vulnerable	Common	0m	On-site
MuF_0103	Riverine Chenopod Woodland	0103	Riverine Grassy Woodlands or Forests	Broader plain	Murray Fans	Endangered	Common	0m	On-site

Native Vegetation Data Custodian: State Government Victoria - Dept of Environment, Land, Water & Planning
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Ramsar Wetlands

What Ramsar wetland areas exist within the dataset buffer?

Map ID	Site Name	Lake Name	Distance	Direction
N/A	No records in buffer			

Ramsar Wetland Area Data Custodian: State Government Victoria - Dept of Environment, Land, Water & Planning
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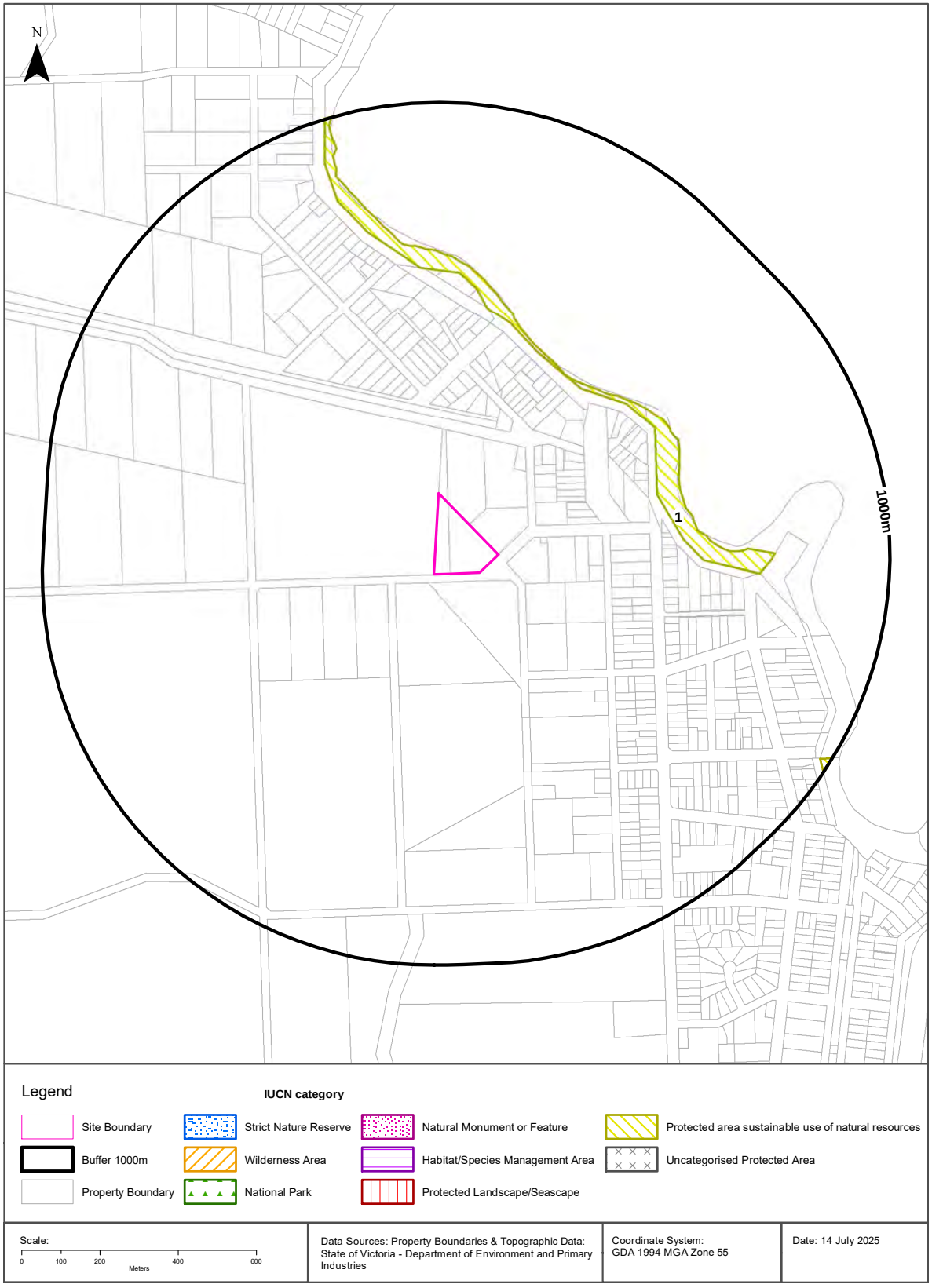
Ecological Constraints - Protected Areas

10 Dalton Street, Koondrook, VIC 3580



Ecological Constraints

10 Dalton Street, Koondrook, VIC 3580

Collaborative Australian Protected Areas Database - Terrestrial

Protected areas in terrestrial environments identified by the CAPAD within the dataset buffer:

Map ID	Area Name	Area Details	Management Category	Authority	Jurisdiction	Dist	Dir
1	River Murray Reserve (non-PV)	Natural Features Reserve	Protected area with sustainable use of natural resources	Victorian Department of Environment, Land, Water and Planning	State	433m	North East

Collaborative Australian Protected Areas Database - Marine

Protected areas in marine environments identified by the CAPAD within the dataset buffer:

Map ID	Area Name	Area Details	Management Category	Authority	Jurisdiction	Dist	Dir
N/A	No records in buffer						

Source: Collaborative Australian Protected Areas Database (CAPAD) 2022

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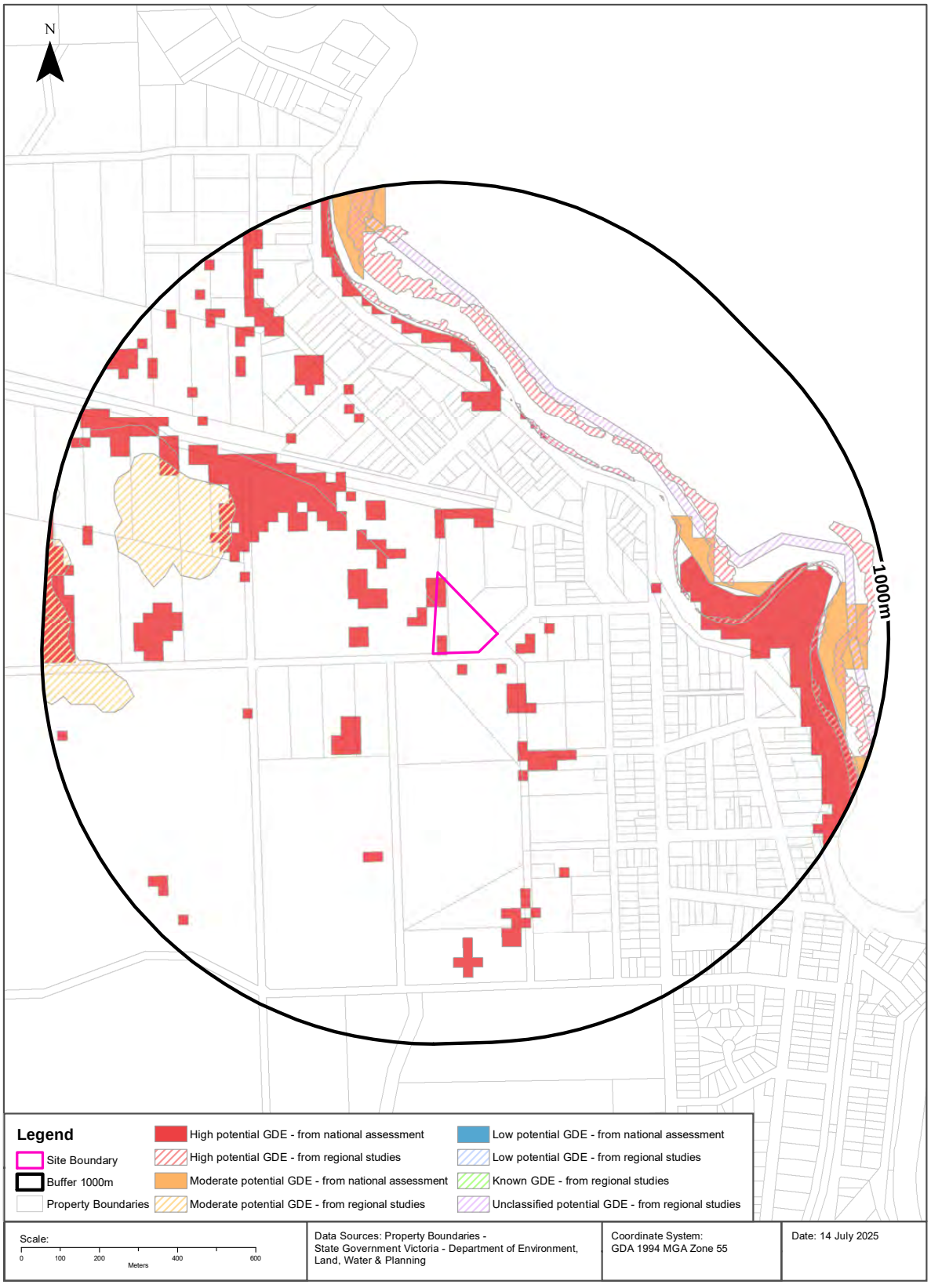
Ecological Constraints - Groundwater Dependent Ecosystems Atlas

10 Dalton Street, Koondrook, VIC 3580



Ecological Constraints

10 Dalton Street, Koondrook, VIC 3580

Groundwater Dependent Ecosystems Atlas

Type	Name	GDE Potential	Geomorphology	Ecosystem Type	Aquifer Geology	Distance	Direction
Terrestrial		High potential GDE - from national assessment	Alluvial plain.	Vegetation		0m	On-site
Terrestrial		High potential GDE - from regional studies	Alluvial plain.	Vegetation		435m	North East
Aquatic		Moderate potential GDE - from national assessment	Alluvial plain.	Wetland		526m	East
Aquatic		Moderate potential GDE - from regional studies	Alluvial plain.	Wetland		533m	West
Aquatic		Unclassified potential GDE - from regional studies	Alluvial plain.	River		535m	North East

Groundwater Dependent Ecosystems Atlas Data Source: The Bureau of Meteorology
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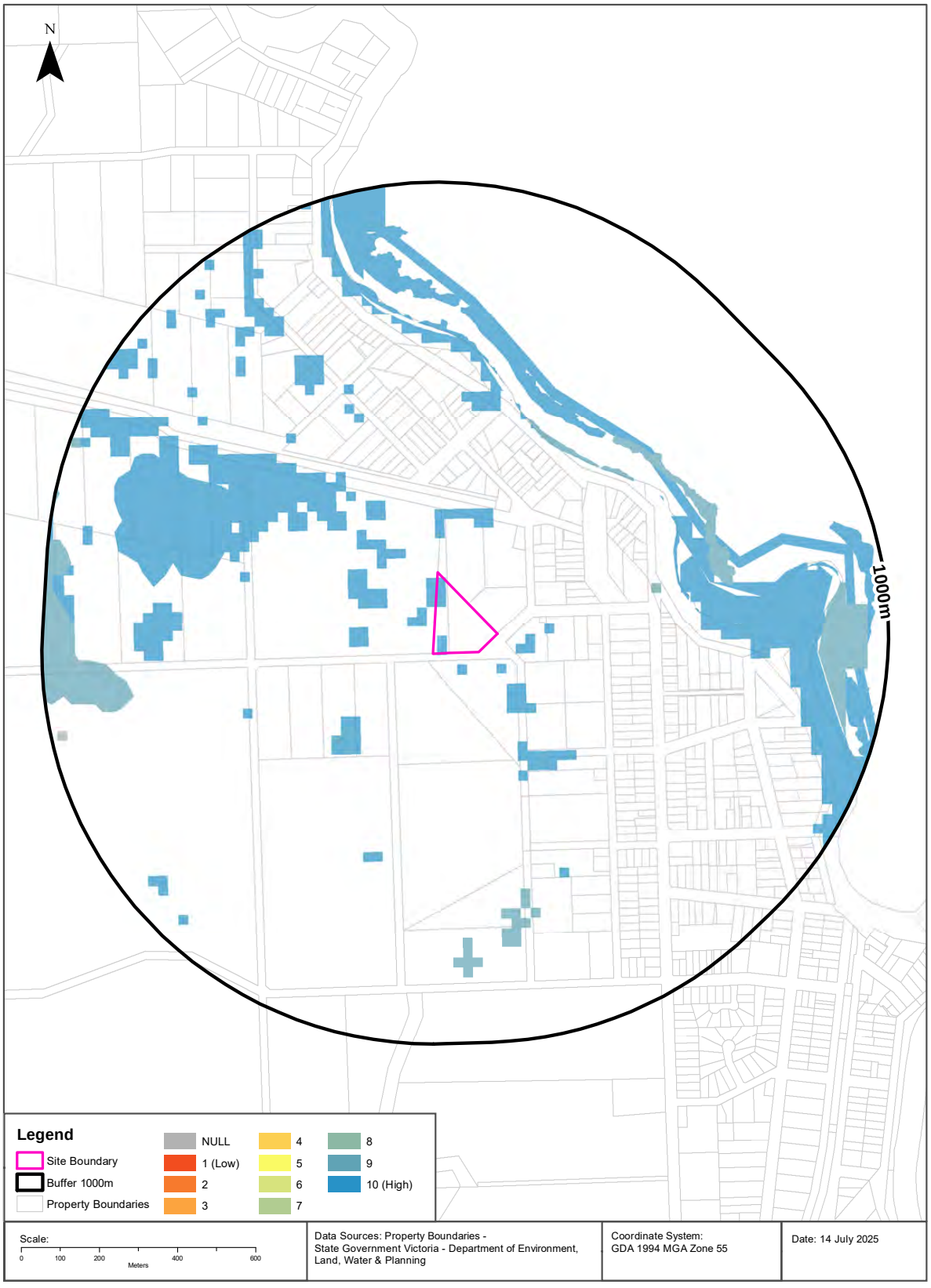
Inflow Dependent Ecosystems Likelihood

10 Dalton Street, Koondrook, VIC 3580



Ecological Constraints

10 Dalton Street, Koondrook, VIC 3580

Inflow Dependent Ecosystems Likelihood

Type	Name	IDE Likelihood	Geomorphology	Ecosystem Type	Aquifer Geology	Distance	Direction
Terrestrial		10	Alluvial plain.	Vegetation		0m	On-site
Terrestrial		9	Alluvial plain.	Vegetation		407m	East
Aquatic		10	Alluvial plain.	Wetland		526m	East
Aquatic		10	Alluvial plain.	River		535m	North East
Aquatic		9	Alluvial plain.	Wetland		771m	West
Terrestrial		8	Alluvial plain.	Vegetation		956m	West

Inflow Dependent Ecosystems Likelihood Data Source: The Bureau of Meteorology
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Location Confidences

Where Lotsearch has had to georeference features from supplied addresses, a location confidence has been assigned to the data record. This indicates a confidence to the positional accuracy of the feature. Where applicable, a code is given under the field heading “LC” or “LocConf”. These codes lookup to the following location confidences:

LC Code	Location Confidence
Premise Match	Georeferenced to the site location / premise or part of site
Area Match	Georeferenced to an approximate or general area
Road Match	Georeferenced to a road or rail corridor
Road Intersection	Georeferenced to a road intersection
Buffered Point	A point feature buffered to x metres
Adjacent Match	Land adjacent to a georeferenced feature
Network of Features	Georeferenced to a network of features
Suburb Match	Georeferenced to a suburb boundary
As Supplied	Spatial data supplied by provider

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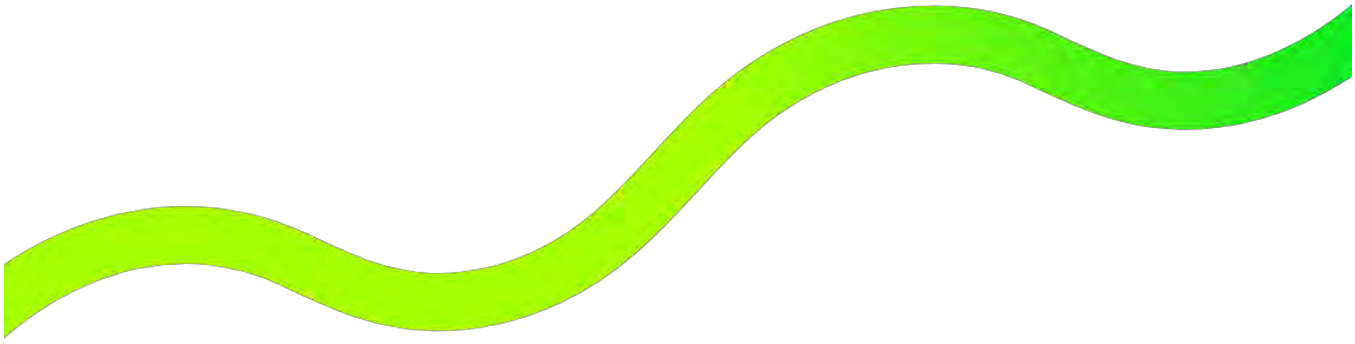
Preliminary Site Investigation

APPENDIX F – RESULTS TABLE



scaada

Table 1
Preliminary Site Investigation
10 Dalton Street, Koondrook, Victoria
Analytical Results - NEPM

Acre

Field ID							**S1**	**S2**	**S4**	**S5**	**S6**	**S7**
Date							**19 Jul 2025**	**19 Jul 2025**	**19 Jul 2025**	**19 Jul 2025**	**19 Jul 2025**	**19 Jul 2025**
Lab Report Number							**1247665**	**1247665**	**1247665**	**1247665**	**1247665**	**1247665**
	Unit	EQL	NEPM 2013 Table 1B(7) Management Limits in Res / Parkland, Fine Soil	NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Clay >=0m, <1m	NEPM 2013 Table 1B(5) Generic EIL - Urban Res & Public Open Space	NEPM 2013 Table 1B(6) ESLs for Urban Res, Fine Soil >=0m, <2m	NEPM 2013 Table 1A(1) HILs Res A Soil						
Inorganics													
Moisture Content (dried @ 103°C)	%	1						16	11	19	19	24	20
BTEX													
Naphthalene (VOC)	mg/kg	0.5		5[2]	170		3[1]	<0.5	<0.5	-	<0.5	<0.5	<0.5
Benzene	mg/kg	0.1		0.7[2]		65		<0.1	<0.1	-	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1		480[2]		105		<0.1	<0.1	-	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1				125		<0.1	<0.1	-	<0.1	<0.1	<0.1
Xylene (m & p)	mg/kg	0.2						<0.2	<0.2	-	<0.2	<0.2	<0.2
Xylene (o)	mg/kg	0.1						<0.1	<0.1	-	<0.1	<0.1	<0.1
Xylene Total	mg/kg	0.3		110[2]		45		<0.3	<0.3	-	<0.3	<0.3	<0.3
TPH													
C10-C14 Fraction (SG)	mg/kg	20						-	<20	-	-	-	-
C10-C36 Fraction (Sum)(SG)	mg/kg	50						-	<50	-	-	-	-
C15-C28 Fraction (SG)	mg/kg	50						-	<50	-	-	-	-
C29-C36 Fraction (SG)	mg/kg	50						-	<50	-	-	-	-
TRH													
C6-C10 Fraction (F1)	mg/kg	20	800					<20	-	-	<20	<20	<20
C6-C10 (F1 minus BTEX)	mg/kg	20		50[2]		180		<20	-	-	<20	<20	<20
>C10-C16 Fraction (F2)	mg/kg	50	1,000			120		<50	-	-	<50	<50	<50
>C10-C16 Fraction (F2 minus Naphthalene)	mg/kg	50		280[2]		120		<50	-	-	<50	<50	<50
>C16-C34 Fraction (F3)	mg/kg	100	3,500			1,300		960	-	-	<100	<100	<100
>C34-C40 Fraction (F4)	mg/kg	100	10,000			5,600		260	-	-	<100	<100	<100
C6-C9 Fraction	mg/kg	20						<20	-	-	<20	<20	<20
>C10-C40 Fraction (Sum)	mg/kg	100						1,220	-	-	<100	<100	<100
C10-C14 Fraction	mg/kg	20						<20	-	-	<20	<20	23
C15-C28 Fraction	mg/kg	50						480	-	-	<50	<50	<50
C29-C36 Fraction	mg/kg	50						610	-	-	53	<50	<50
C10-C36 Fraction (Sum)	mg/kg	50						1,090	-	-	53	<50	<50
Phenols													
4,6-Dinitro-2-methylphenol	mg/kg	0.5						-	-	<0.5	-	-	-
NA													
Allethrin	MG/KG	2						-	-	<2	-	-	-
Phenothrin	MG/KG	2						-	-	<2	-	-	-
Tetramethrin	MG/KG	2						-	-	<2	-	-	-
Baythroid	mg/kg	2						-	-	<2	-	-	-
TRH - (Silica Gel Cleanup)													
>C10-C16 Fraction (SG)	mg/kg	50						-	<50	-	-	-	-
>C10-C16 (F2 minus Naphthalene) (SG)	mg/kg	50				120		-	<50	-	-	-	-
>C16-C34 Fraction (SG)	mg/kg	100				1,300		-	<100	-	-	-	-
>C34-C40 Fraction (SG)	mg/kg	100				5,600		-	<100	-	-	-	-
>C10-C40 Fraction (SG)	mg/kg	100						-	<100	-	-	-	-
Other													
Actril (loxynil)	mg/kg	0.5						-	-	<0.5	-	-	-
Halogenated Benzenes													
Hexachlorobenzene	mg/kg	0.05					10	<0.05	-	<0.05	<0.05	<0.05	<0.05
Herbicides													
2,4,5-Trichlorophenoxy Acetic Acid	mg/kg	0.5					600	-	-	<0.5	-	-	-
2,4,5-TP (Silvex)	mg/kg	0.5						-	-	<0.5	-	-	-
Hedonal	mg/kg	0.5					900	-	-	<0.5	-	-	-
2,4-Dichlorprop	mg/kg	0.5						-	-	<0.5	-	-	-
4-(2,4-Dichlorophenoxy)butyric Acid (2,4-DB)	mg/kg	0.5						-	-	<0.5	-	-	-
Ametryn	mg/kg	0.2						-	-	<0.2	-	-	-
Atraton	mg/kg	0.2						-	-	<0.2	-	-	-
Atrazine	mg/kg	0.2					320	-	-	<0.2	-	-	-
Dicamba	mg/kg	0.5						-	-	<0.5	-	-	-
Dinoseb	mg/kg	0.5						-	-	<0.5	-	-	-
2-Methyl-4-chlorophenoxyacetic acid	mg/kg	0.5					600	-	-	<0.5	-	-	-
2-Methyl-4-Chlorophenoxy Butanoic Acid	mg/kg	0.5					600	-	-	<0.5	-	-	-
Mecoprop	mg/kg	0.5					600	-	-	<0.5	-	-	-
Prometon	mg/kg	0.2						-	-	<0.2	-	-	-
Prometryn	mg/kg	0.2						-	-	<0.2	-	-	-
Propazine	mg/kg	0.2						-	-	<0.2	-	-	-
Simazine	mg/kg	0.2						-	-	<0.2	-	-	-
Simetryn	mg/kg	0.2						-	-	<0.2	-	-	-

scaada

Table 1
Preliminary Site Investigation
10 Dalton Street, Koondrook, Victoria
Analytical Results - NEPM

Acre

							Field ID	S1	S2	S4	S5	S6	S7
							Date	19 Jul 2025	19 Jul 2025	19 Jul 2025	19 Jul 2025	19 Jul 2025	19 Jul 2025
							Lab Report Number	1247665	1247665	1247665	1247665	1247665	1247665
	Unit	EQL	NEPM 2013 Table 1B(7) Management Limits in Res / Parkland, Fine Soil	NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Clay >=0m, <1m	NEPM 2013 Table 1B(5) Generic EIL - Urban Res & Public Open Space	NEPM 2013 Table 1B(6) ESLs for Urban Res, Fine Soil >=0m, <2m	NEPM 2013 Table 1A(1) HILs Res A Soil						
Terbutryn	mg/kg	0.2						-	-	<0.2	-	-	-
Thiobencarb	mg/kg	2						-	-	<2	-	-	-
Organic													
Terbutylazine	mg/kg	0.2						-	-	<0.2	-	-	-
Organochlorine Pesticides													
Organochlorine pesticides EPAVic	mg/kg	0.1						<0.1	-	<0.1	<0.1	<0.1	<0.1
Other organochlorine pesticides EPAVic	mg/kg	0.1						<0.1	-	<0.1	<0.1	<0.1	<0.1
4,4-DDE	mg/kg	0.05						<0.05	-	<0.05	<0.05	<0.05	<0.05
a-BHC	mg/kg	0.05						<0.05	-	<0.05	<0.05	<0.05	<0.05
Aldrin	mg/kg	0.05						<0.05	-	<0.05	<0.05	<0.05	<0.05
Aldrin + Dieldrin	mg/kg	0.05					6	<0.05	-	<0.05	<0.05	<0.05	<0.05
b-BHC	mg/kg	0.05						<0.05	-	<0.05	<0.05	<0.05	<0.05
Chlordane	mg/kg	0.1					50	<0.1	-	<0.1	<0.1	<0.1	<0.1
d-BHC	mg/kg	0.05						<0.05	-	<0.05	<0.05	<0.05	<0.05
DDD	mg/kg	0.05						<0.05	-	<0.05	<0.05	<0.05	<0.05
DDT	mg/kg	0.05			180			<0.05	-	<0.05	<0.05	<0.05	<0.05
DDT+DDE+DDD	mg/kg	0.05					240	<0.05	-	<0.05	<0.05	<0.05	<0.05
Dieldrin	mg/kg	0.05						<0.05	-	<0.05	<0.05	<0.05	<0.05
Endosulfan I	mg/kg	0.05						<0.05	-	<0.05	<0.05	<0.05	<0.05
Endosulfan II	mg/kg	0.05						<0.05	-	<0.05	<0.05	<0.05	<0.05
Endosulfan sulphate	mg/kg	0.05						<0.05	-	<0.05	<0.05	<0.05	<0.05
Endrin	mg/kg	0.05					10	<0.05	-	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	mg/kg	0.05						<0.05	-	<0.05	<0.05	<0.05	<0.05
Endrin ketone	mg/kg	0.05						<0.05	-	<0.05	<0.05	<0.05	<0.05
g-BHC (Lindane)	mg/kg	0.05						<0.05	-	<0.05	<0.05	<0.05	<0.05
Heptachlor	mg/kg	0.05					6	<0.05	-	<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	mg/kg	0.05						<0.05	-	<0.05	<0.05	<0.05	<0.05
Methoxychlor	mg/kg	0.05					300	<0.05	-	<0.05	<0.05	<0.05	<0.05
Toxaphene	mg/kg	0.5					20	<0.5	-	<0.5	<0.5	<0.5	<0.5
Organophosphorous Pesticides													
Tokuthion	mg/kg	0.2						<0.2	-	<0.2	<0.2	<0.2	<0.2
Azinophos methyl	mg/kg	0.2						<0.2	-	<0.2	<0.2	<0.2	<0.2
Bolstar (Sulprofos)	mg/kg	0.2						<0.2	-	<0.2	<0.2	<0.2	<0.2
Chlorfenvinphos	mg/kg	0.2						<0.2	-	<0.2	<0.2	<0.2	<0.2
Chlorpyrifos	mg/kg	0.2					160	<0.2	-	<0.2	<0.2	<0.2	<0.2
Chlorpyrifos-methyl	mg/kg	0.2						<0.2	-	<0.2	<0.2	<0.2	<0.2
Coumaphos	mg/kg	2						<2	-	<2	<2	<2	<2
Demeton-O	mg/kg	0.2						<0.2	-	<0.2	<0.2	<0.2	<0.2
Demeton-S	mg/kg	0.2						<0.2	-	<0.2	<0.2	<0.2	<0.2
Diazinon	mg/kg	0.2						<0.2	-	<0.2	<0.2	<0.2	<0.2
Dichlorvos	mg/kg	0.2						<0.2	-	<0.2	<0.2	<0.2	<0.2
Dimethoate	mg/kg	0.2						<0.2	-	<0.2	<0.2	<0.2	<0.2
Disulfoton	mg/kg	0.2						<0.2	-	<0.2	<0.2	<0.2	<0.2
Ethion	mg/kg	0.2						<0.2	-	<0.2	<0.2	<0.2	<0.2
Ethoprop	mg/kg	0.2						<0.2	-	<0.2	<0.2	<0.2	<0.2
Fenitrothion	mg/kg	0.2						<0.2	-	<0.2	<0.2	<0.2	<0.2
Fensulfothion	mg/kg	0.2						<0.2	-	<0.2	<0.2	<0.2	<0.2
Fenthion	mg/kg	0.2						<0.2	-	<0.2	<0.2	<0.2	<0.2
EPN	mg/kg	0.2						<0.2	-	<0.2	<0.2	<0.2	<0.2
Malathion	mg/kg	0.2						<0.2	-	<0.2	<0.2	<0.2	<0.2
Merphos	mg/kg	0.2						<0.2	-	<0.2	<0.2	<0.2	<0.2
Methyl parathion	mg/kg	0.2						<0.2	-	<0.2	<0.2	<0.2	<0.2
Mevinphos (Phosdrin)	mg/kg	0.2						<0.2	-	<0.2	<0.2	<0.2	<0.2
Monocrotophos	mg/kg	2						<2	-	<2	<2	<2	<2
Naled (Dibrom)	mg/kg	0.2						<0.2	-	<0.2	<0.2	<0.2	<0.2
Omethoate	mg/kg	2						<2	-	<2	<2	<2	<2
Phorate	mg/kg	0.2						<0.2	-	<0.2	<0.2	<0.2	<0.2
Pyrazophos	mg/kg	0.2						<0.2	-	<0.2	<0.2	<0.2	<0.2
Ronnel	mg/kg	0.2						<0.2	-	<0.2	<0.2	<0.2	<0.2
Terbufos	mg/kg	0.2						<0.2	-	<0.2	<0.2	<0.2	<0.2
Trichloronate	mg/kg	0.2						<0.2	-	<0.2	<0.2	<0.2	<0.2
Tetrachlorvinphos	mg/kg	0.2						<0.2	-	<0.2	<0.2	<0.2	<0.2
Pesticides													
Aldicarb	mg/kg	2						-	-	<2	-	-	-

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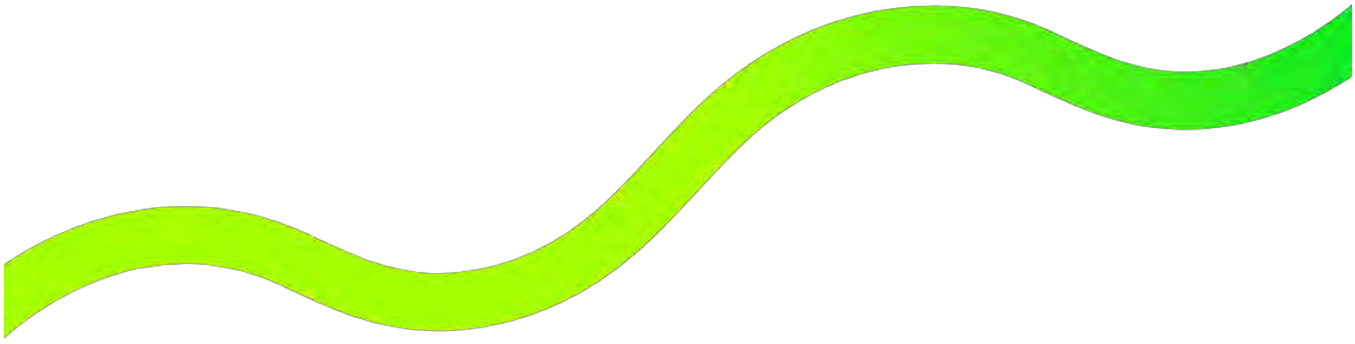
Bendiocarb	**mg/kg**	2						-	-	<2	-	-	-
Carbaryl	**mg/kg**	2						-	-	<2	-	-	-
Carbofuran	**mg/kg**	2						-	-	<2	-	-	-
Cypermethrins(total)	**mg/kg**	2						-	-	<2	-	-	-
Fenvalerate	**mg/kg**	2						-	-	<2	-	-	-
Methomyl	**mg/kg**	2						-	-	<2	-	-	-
Oxamyl	**mg/kg**	2						-	-	<2	-	-	-
Parathion	**mg/kg**	0.2						<0.2	-	<0.2	<0.2	<0.2	<0.2
Permethrin	**mg/kg**	2						-	-	<2	-	-	-
Pirimiphos-methyl	**mg/kg**	0.2						<0.2	-	<0.2	<0.2	<0.2	<0.2
Resmethrin	**mg/kg**	2						-	-	<2	-	-	-

Environmental Standards
NEPM, NEPM 2013 Table 1B(7) Management Limits in Res / Parkland, Fine Soil
2013, NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Clay
2013, NEPM 2013 Table 1B(6) ESLs for Urban Res, Fine Soil
2013, NEPM 2013 Table 1A(1) HILs Res A Soil
[1] CRC CARE, Technical Report 39 - Risk-based remediation and management guidance for benzo(a)pyrene
[2] CRC CARE, Technical Report 10 - Health screening levels for petroleum hydrocarbons in soil and groundwater

Preliminary Site Investigation

APPENDIX G – LABORATORY DOCUMENTS



scaada Scaada Environmental - CHAIN OF CUSTODY

CLIENT: Scaada Environmental (SCAENV)	Standard		FOR LABORATORY USE ONLY (Circle) Custody Seal Intact? Yes No N/A
OFFICE: East 6B 33 Mackey Street, North Geelong			Free ice / frozen ice bricks present upon receipt? Yes No N/A
PROJECT: J262598	Quote:	COC SEQUENCE NUMBER (Circle) COC: 1 2 3 4 5	Random Sample Temperature on Receipt: °C
ORDER NUMBER: J262598		OF: 1 2 3 4 5	Other comment:
PROJECT MANAGER: Mitchell O'Neill	CONTACT PH: 0498592683		
SAMPLER: " "	SAMPLER MOBILE: " "	RELINQUISHED BY: Mitchell ONeill	RECEIVED BY:
COC emailed to Laboratory? YES / NO	EDD FORMAT (or default):	DATE/TIME: 22/7/25	DATE/TIME:
Email Reports to : SCAADA@ESDAT.COM.AU; SERVICES@SCAADA.COM.AU; LABRESULTS@SCAADA.COM.AU;		RELINQUISHED BY:	RECEIVED BY:
Email Invoice to : ACCOUNTS@SCAADA.COM.AU		DATE/TIME:	DATE/TIME:
COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:			

LAB USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).												Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	B14A	B1 + B14	B1SC									HOLD	
	S1	19/7	S	1 Jar	1		X											
	S2				1			X										
	S3				1												X	
	S4				1	X												
	S5				1		X											
	S6				1		X											
	S7				1		X											
				TOTAL	7													

Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic;
F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle: E = EDTA Preserved Bottles; ST = Sterile Bottle: ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag; Jar = Teflon Lined Glass Jar; PFAS = Plastic PFAS Jar; ZPL = Plastic Ziplock bag

(1) 23/7/25 12:47:05

Date/Time: 23/7/25 Chilled: Yes/No Temp: 13°C Correction: Final Temp:

eurofins | Environment Testing

www.eurofins.com.au EnviroSales@eurofinsanz.com

Eurofins Environment Testing Australia Pty Ltd

ABN: 50 005 085 521

Melbourne	Geelong	Sydney	Canberra	Brisbane	Newcastle
6 Monterey Road	19/8 Lewalan Street	179 Magowar Road	Unit 1,2 Dacre Street	1/21 Smallwood Place	1/2 Frost Drive
Dandenong South	Grovedale	Girraween	Mitchell	Murarrie	Mayfield West
VIC 3175	VIC 3216	NSW 2145	ACT 2911	QLD 4172	NSW 2304
+61 3 8564 5000	+61 3 8564 5000	+61 2 9900 8400	+61 2 6113 8091	+61 7 3902 4600	+61 2 4968 8448
NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261
Site# 1254	Site# 25403	Site# 18217	Site# 25466	Site# 20794 & 2780	Site# 25079

Eurofins ARL Pty Ltd

ABN: 91 05 0159 898

Perth
46-48 Banksia Road
Welshpool
WA 6106
+61 8 6253 4444
NATA# 2377
Site# 2370 & 2554

Eurofins Environment Testing NZ Ltd

NZBN: 9429046024954

Auckland	Auckland (Focus)	Christchurch	Tauranga
35 O'Rorke Road	Unit C1/4 Pacific Rise	43 Detroit Drive	1277 Cameron Road
Penrose	Mount Wellington	Rolleston	Gate Pa
Auckland 1061	Auckland 1061	Christchurch 7675	Tauranga 3112
+64 9 526 4551	+64 9 525 0568	+64 3 343 5201	+64 9 525 0568
IANZ# 1327	IANZ# 1308	IANZ# 1290	IANZ# 1402

Sample Receipt Advice

Company name:	Scaada Group Services Pty Ltd
Contact name:	Mitch O'Neill
Project name:	Not provided
Project ID:	J262598
Turnaround time:	5 Day
Date/Time received	Jul 23, 2025 9:00 AM
Eurofins reference	1247665

Sample Information

✓	A detailed list of analytes logged into our LIMS, is included in the attached summary table.
✓	All samples have been received as described on the above COC.
✓	COC has been completed correctly.
✓	Attempt to chill was evident.
✓	Appropriately preserved sample containers have been used.
✓	All samples were received in good condition.
✓	Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
✓	Appropriate sample containers have been used.
✓	Sample containers for volatile analysis received with zero headspace.
✗	Split sample sent to requested external lab.
✗	Some samples have been subcontracted.
N/A	Custody Seals intact (if used).

Notes

Contact

If you have any questions with respect to these samples, please contact your Analytical Services Manager:

Thomas Mangiameli on phone : or by email: Thomas.Mangiameli@eurofinsanz.com

Results will be delivered electronically via email to Mitch O'Neill - mitch.oneill@scaada.com.au.

Note: A copy of these results will also be delivered to the general Scaada Group Services Pty Ltd email address.

Global Leader - Results you can trust

eurofins

web: www.eurofins.com.au
email: EnviroSales@eurofinsanz.com

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

Melbourne	Geelong	Sydney	Canberra	Brisbane	Newcastle
6 Monterey Road	19/8 Lewalan Street	179 Magowar Road	Unit 1,2 Dacre Street	1/21 Smallwood Place	1/2 Frost Drive
Dandenong South	Grovedale	Girraween	Mitchell	Murarrie	Mayfield West
VIC 3175	VIC 3216	NSW 2145	ACT 2911	QLD 4172	NSW 2304
+61 3 8564 5000	+61 3 8564 5000	+61 2 9900 8400	+61 2 6113 8091	+61 7 3902 4600	+61 2 4968 8448
NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261
Site# 1254	Site# 25403	Site# 18217	Site# 25466	Site# 20794 & 2780	Site# 25079

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ABN: 91 05 0159 898

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46-48 Banksia Road
Welshpool
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+61 8 6253 4444
NATA# 2377
Site# 2370 & 2554

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NZBN: 9429046024954

Auckland	Auckland (Focus)	Christchurch	Tauranga
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IANZ# 1327	IANZ# 1308	IANZ# 1290	IANZ# 1402

Company Name: Scaada Group Services Pty Ltd
Address: West 6 Federal Mills Park, 33 Mackey Street
North Geelong
VIC 3215

Project Name:
Project ID: J262598

Order No.:
Report #: 1247665
Phone: 0455 500 084
Fax:

Received: Jul 23, 2025 9:00 AM
Due: Jul 30, 2025
Priority: 5 Day
Contact Name: Mitch O'Neill

Eurofins Analytical Services Manager : Thomas Mangiameli

Sample Detail						HOLD*	Suite B14: OCP/OPP	Moisture Set	Eurofins Suite B1	Eurofins Suite B1SG: TRH (With Silica Gel Clean up), BTEXN	Suite B14A: Herbicides/OCP/OPP/Pyrethroids/Triazines/
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X
External Laboratory											
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**						
1	S1	Jul 19, 2025		Soil	M25-JI0061986		X	X	X		
2	S2	Jul 19, 2025		Soil	M25-JI0061987			X		X	
3	S4	Jul 19, 2025		Soil	M25-JI0061988			X			X
4	S5	Jul 19, 2025		Soil	M25-JI0061989		X	X	X		
5	S6	Jul 19, 2025		Soil	M25-JI0061990		X	X	X		
6	S7	Jul 19, 2025		Soil	M25-JI0061991		X	X	X		
7	S3	Jul 19, 2025		Soil	M25-JI0061992	X					
Test Counts						1	4	6	4	1	1

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Certificate of Analysis

SCAADA Environmental Pty Ltd
West 6 Federal Mills Park, 33 Mackey Street
North Geelong
VIC 3215

NATA Accredited
Accreditation Number 1261
Site Number 1254

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

Attention: **Mitch O'Neill**

Report **1247665-S**
Project name
Project ID J262598
Received Date Jul 23, 2025

Client Sample ID			**S1**	**S2**	**S4**	**S5**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**M25-JI0061986**	**M25-JI0061987**	**M25-JI0061988**	**M25-JI0061989**
Date Sampled			**Jul 19, 2025**	**Jul 19, 2025**	**Jul 19, 2025**	**Jul 19, 2025**
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons						
TRH C6-C9	20	mg/kg	< 20	-	-	< 20
TRH C10-C14	20	mg/kg	< 20	-	-	< 20
TRH C15-C28	50	mg/kg	480	-	-	< 50
TRH C29-C36	50	mg/kg	610	-	-	53
TRH C10-C36 (Total)	50	mg/kg	1090	-	-	53
TRH C6-C10	20	mg/kg	< 20	-	-	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	-	-	< 20
TRH >C10-C16	50	mg/kg	< 50	-	-	< 50
TRH >C10-C16 less Naphthalene (F2)*[N01]	50	mg/kg	< 50	-	-	< 50
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
TRH >C16-C34	100	mg/kg	960	-	-	< 100
TRH >C34-C40	100	mg/kg	260	-	-	< 100
TRH >C10-C40 (total)*	100	mg/kg	1220	-	-	< 100
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	-	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	-	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	-	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	-	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	-	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	-	< 0.3
4-Bromofluorobenzene (surr.)	1	%	92	130	-	92
Organochlorine Pesticides						
Chlordanes - Total	0.1	mg/kg	< 0.1	-	< 0.1	< 0.1
4.4'-DDD	0.05	mg/kg	< 0.05	-	< 0.05	< 0.05
4.4'-DDE	0.05	mg/kg	< 0.05	-	< 0.05	< 0.05
4.4'-DDT	0.05	mg/kg	< 0.05	-	< 0.05	< 0.05
a-HCH	0.05	mg/kg	< 0.05	-	< 0.05	< 0.05
Aldrin	0.05	mg/kg	< 0.05	-	< 0.05	< 0.05
b-HCH	0.05	mg/kg	< 0.05	-	< 0.05	< 0.05
d-HCH	0.05	mg/kg	< 0.05	-	< 0.05	< 0.05
Dieldrin	0.05	mg/kg	< 0.05	-	< 0.05	< 0.05
Endosulfan I	0.05	mg/kg	< 0.05	-	< 0.05	< 0.05
Endosulfan II	0.05	mg/kg	< 0.05	-	< 0.05	< 0.05
Endosulfan sulphate	0.05	mg/kg	< 0.05	-	< 0.05	< 0.05
Endrin	0.05	mg/kg	< 0.05	-	< 0.05	< 0.05

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Client Sample ID			S1	S2	S4	S5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M25-JI0061986	M25-JI0061987	M25-JI0061988	M25-JI0061989
Date Sampled			Jul 19, 2025	Jul 19, 2025	Jul 19, 2025	Jul 19, 2025
Test/Reference	LOR	Unit				
Organochlorine Pesticides						
Endrin aldehyde	0.05	mg/kg	< 0.05	-	< 0.05	< 0.05
Endrin ketone	0.05	mg/kg	< 0.05	-	< 0.05	< 0.05
g-HCH (Lindane)	0.05	mg/kg	< 0.05	-	< 0.05	< 0.05
Heptachlor	0.05	mg/kg	< 0.05	-	< 0.05	< 0.05
Heptachlor epoxide	0.05	mg/kg	< 0.05	-	< 0.05	< 0.05
Hexachlorobenzene	0.05	mg/kg	< 0.05	-	< 0.05	< 0.05
Methoxychlor	0.05	mg/kg	< 0.05	-	< 0.05	< 0.05
Toxaphene	0.5	mg/kg	< 0.5	-	< 0.5	< 0.5
Aldrin and Dieldrin (Total)*	0.05	mg/kg	< 0.05	-	< 0.05	< 0.05
DDT + DDE + DDD (Total)*	0.05	mg/kg	< 0.05	-	< 0.05	< 0.05
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	< 0.1	-	< 0.1	< 0.1
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	< 0.1	-	< 0.1	< 0.1
Dibutylchlorendate (surr.)	1	%	91	-	109	84
Tetrachloro-m-xylene (surr.)	1	%	106	-	103	134
Organophosphorus Pesticides						
Azinphos-methyl	0.2	mg/kg	< 0.2	-	< 0.2	< 0.2
Bolstar	0.2	mg/kg	< 0.2	-	< 0.2	< 0.2
Chlorfenvinphos	0.2	mg/kg	< 0.2	-	< 0.2	< 0.2
Chlorpyrifos	0.2	mg/kg	< 0.2	-	< 0.2	< 0.2
Chlorpyrifos-methyl	0.2	mg/kg	< 0.2	-	< 0.2	< 0.2
Coumaphos	2	mg/kg	< 2	-	< 2	< 2
Demeton-S	0.2	mg/kg	< 0.2	-	< 0.2	< 0.2
Demeton-O	0.2	mg/kg	< 0.2	-	< 0.2	< 0.2
Diazinon	0.2	mg/kg	< 0.2	-	< 0.2	< 0.2
Dichlorvos	0.2	mg/kg	< 0.2	-	< 0.2	< 0.2
Dimethoate	0.2	mg/kg	< 0.2	-	< 0.2	< 0.2
Disulfoton	0.2	mg/kg	< 0.2	-	< 0.2	< 0.2
EPN	0.2	mg/kg	< 0.2	-	< 0.2	< 0.2
Ethion	0.2	mg/kg	< 0.2	-	< 0.2	< 0.2
Ethoprop	0.2	mg/kg	< 0.2	-	< 0.2	< 0.2
Ethyl parathion	0.2	mg/kg	< 0.2	-	< 0.2	< 0.2
Fenitrothion	0.2	mg/kg	< 0.2	-	< 0.2	< 0.2
Fensulfothion	0.2	mg/kg	< 0.2	-	< 0.2	< 0.2
Fenthion	0.2	mg/kg	< 0.2	-	< 0.2	< 0.2
Malathion	0.2	mg/kg	< 0.2	-	< 0.2	< 0.2
Merphos	0.2	mg/kg	< 0.2	-	< 0.2	< 0.2
Methyl parathion	0.2	mg/kg	< 0.2	-	< 0.2	< 0.2
Mevinphos	0.2	mg/kg	< 0.2	-	< 0.2	< 0.2
Monocrotophos	2	mg/kg	< 2	-	< 2	< 2
Naled	0.2	mg/kg	< 0.2	-	< 0.2	< 0.2
Omethoate	2	mg/kg	< 2	-	< 2	< 2
Phorate	0.2	mg/kg	< 0.2	-	< 0.2	< 0.2
Pirimiphos-methyl	0.2	mg/kg	< 0.2	-	< 0.2	< 0.2
Pyrazophos	0.2	mg/kg	< 0.2	-	< 0.2	< 0.2
Ronnel	0.2	mg/kg	< 0.2	-	< 0.2	< 0.2
Terbufos	0.2	mg/kg	< 0.2	-	< 0.2	< 0.2
Tetrachlorvinphos	0.2	mg/kg	< 0.2	-	< 0.2	< 0.2
Tokuthion	0.2	mg/kg	< 0.2	-	< 0.2	< 0.2
Trichloronate	0.2	mg/kg	< 0.2	-	< 0.2	< 0.2
Triphenylphosphate (surr.)	1	%	114	-	103	130

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Client Sample ID			S1	S2	S4	S5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M25-JI0061986	M25-JI0061987	M25-JI0061988	M25-JI0061989
Date Sampled			Jul 19, 2025	Jul 19, 2025	Jul 19, 2025	Jul 19, 2025
Test/Reference	LOR	Unit				
Sample Properties						
% Moisture	1	%	16	11	19	19
TRH after Silica Cleanup (NEPM) *						
TRH >C10-C16 after Silica Cleanup less Naphthalene (F2)	50	mg/kg	-	< 50	-	-
TRH - 2013 NEPM Fractions (after silica gel clean-up)						
TRH >C10-C16 (after silica gel clean-up)	50	mg/kg	-	< 50	-	-
TRH >C16-C34 (after silica gel clean-up)	100	mg/kg	-	< 100	-	-
TRH >C34-C40 (after silica gel clean-up)	100	mg/kg	-	< 100	-	-
TRH >C10-C40 (total) (after silica-gel clean up)*	100	mg/kg	-	< 100	-	-
TRH - 1999 NEPM Fractions (after silica gel clean-up)						
TRH C10-C14 (after silica gel clean-up)	20	mg/kg	-	< 20	-	-
TRH C15-C28 (after silica gel clean-up)	50	mg/kg	-	< 50	-	-
TRH C29-C36 (after silica gel clean-up)	50	mg/kg	-	< 50	-	-
TRH C10-C36 (Total) (after silica gel clean-up)	50	mg/kg	-	< 50	-	-
Triazines						
Ametryn	0.2	mg/kg	-	-	< 0.2	-
Atraton	0.2	mg/kg	-	-	< 0.2	-
Atrazine	0.2	mg/kg	-	-	< 0.2	-
Prometon	0.2	mg/kg	-	-	< 0.2	-
Prometryn	0.2	mg/kg	-	-	< 0.2	-
Propazine	0.2	mg/kg	-	-	< 0.2	-
Simazine	0.2	mg/kg	-	-	< 0.2	-
Simetryn	0.2	mg/kg	-	-	< 0.2	-
Terbuthylazine	0.2	mg/kg	-	-	< 0.2	-
Terbutryne	0.2	mg/kg	-	-	< 0.2	-
Carbamate Pesticides						
Aldicarb	2	mg/kg	-	-	< 2	-
Bendiocarb	2	mg/kg	-	-	< 2	-
Carbaryl	2	mg/kg	-	-	< 2	-
Carbofuran	2	mg/kg	-	-	< 2	-
Methomyl	2	mg/kg	-	-	< 2	-
Oxamyl	2	mg/kg	-	-	< 2	-
Thiobencarb	2	mg/kg	-	-	< 2	-
Synthetic Pyrethroids*						
Allethrin*	2	mg/kg	-	-	< 2	-
Cyfluthrin*	2	mg/kg	-	-	< 2	-
Cypermethrin (total)*	2	mg/kg	-	-	< 2	-
Fenvalerate*	2	mg/kg	-	-	< 2	-
Permethrin	2	mg/kg	-	-	< 2	-
Phenothrin*	2	mg/kg	-	-	< 2	-
Resmethrin*	2	mg/kg	-	-	< 2	-
Tetramethrin*	2	mg/kg	-	-	< 2	-
Acid Herbicides						
2.4-D	0.5	mg/kg	-	-	< 0.5	-
2.4-DB	0.5	mg/kg	-	-	< 0.5	-
2.4.5-T	0.5	mg/kg	-	-	< 0.5	-
2.4.5-TP	0.5	mg/kg	-	-	< 0.5	-
Actril (loxynil)	0.5	mg/kg	-	-	< 0.5	-
Dicamba	0.5	mg/kg	-	-	< 0.5	-

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Client Sample ID			S1	S2	S4	S5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M25-JI0061986	M25-JI0061987	M25-JI0061988	M25-JI0061989
Date Sampled			Jul 19, 2025	Jul 19, 2025	Jul 19, 2025	Jul 19, 2025
Test/Reference	LOR	Unit				
Acid Herbicides						
Dichlorprop	0.5	mg/kg	-	-	< 0.5	-
Dinitro-o-cresol	0.5	mg/kg	-	-	< 0.5	-
Dinoseb	0.5	mg/kg	-	-	< 0.5	-
MCPA	0.5	mg/kg	-	-	< 0.5	-
MCPB	0.5	mg/kg	-	-	< 0.5	-
Mecoprop	0.5	mg/kg	-	-	< 0.5	-
Warfarin (surr.)	1	%	-	-	75	-

Client Sample ID			S6	S7
Sample Matrix			Soil	Soil
Eurofins Sample No.			M25-JI0061990	M25-JI0061991
Date Sampled			Jul 19, 2025	Jul 19, 2025
Test/Reference	LOR	Unit		
Total Recoverable Hydrocarbons				
TRH C6-C9	20	mg/kg	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	23
TRH C15-C28	50	mg/kg	< 50	< 50
TRH C29-C36	50	mg/kg	< 50	< 50
TRH C10-C36 (Total)	50	mg/kg	< 50	< 50
TRH C6-C10	20	mg/kg	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50
TRH >C10-C16 less Naphthalene (F2)*[N01]	50	mg/kg	< 50	< 50
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5
TRH >C16-C34	100	mg/kg	< 100	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100
TRH >C10-C40 (total)*	100	mg/kg	< 100	< 100
BTEX				
Benzene	0.1	mg/kg	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	80	72
Organochlorine Pesticides				
Chlordanes - Total	0.1	mg/kg	< 0.1	< 0.1
4.4'-DDD	0.05	mg/kg	< 0.05	< 0.05
4.4'-DDE	0.05	mg/kg	< 0.05	< 0.05
4.4'-DDT	0.05	mg/kg	< 0.05	< 0.05
a-HCH	0.05	mg/kg	< 0.05	< 0.05
Aldrin	0.05	mg/kg	< 0.05	< 0.05
b-HCH	0.05	mg/kg	< 0.05	< 0.05
d-HCH	0.05	mg/kg	< 0.05	< 0.05
Dieldrin	0.05	mg/kg	< 0.05	< 0.05
Endosulfan I	0.05	mg/kg	< 0.05	< 0.05
Endosulfan II	0.05	mg/kg	< 0.05	< 0.05
Endosulfan sulphate	0.05	mg/kg	< 0.05	< 0.05

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Client Sample ID			S6	S7
Sample Matrix			Soil	Soil
Eurofins Sample No.			M25-JI0061990	M25-JI0061991
Date Sampled			Jul 19, 2025	Jul 19, 2025
Test/Reference	LOR	Unit		
Organochlorine Pesticides				
Endrin	0.05	mg/kg	< 0.05	< 0.05
Endrin aldehyde	0.05	mg/kg	< 0.05	< 0.05
Endrin ketone	0.05	mg/kg	< 0.05	< 0.05
g-HCH (Lindane)	0.05	mg/kg	< 0.05	< 0.05
Heptachlor	0.05	mg/kg	< 0.05	< 0.05
Heptachlor epoxide	0.05	mg/kg	< 0.05	< 0.05
Hexachlorobenzene	0.05	mg/kg	< 0.05	< 0.05
Methoxychlor	0.05	mg/kg	< 0.05	< 0.05
Toxaphene	0.5	mg/kg	< 0.5	< 0.5
Aldrin and Dieldrin (Total)*	0.05	mg/kg	< 0.05	< 0.05
DDT + DDE + DDD (Total)*	0.05	mg/kg	< 0.05	< 0.05
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	< 0.1	< 0.1
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	< 0.1	< 0.1
Dibutylchlorendate (surr.)	1	%	120	104
Tetrachloro-m-xylene (surr.)	1	%	107	88
Organophosphorus Pesticides				
Azinphos-methyl	0.2	mg/kg	< 0.2	< 0.2
Bolstar	0.2	mg/kg	< 0.2	< 0.2
Chlorfenvinphos	0.2	mg/kg	< 0.2	< 0.2
Chlorpyrifos	0.2	mg/kg	< 0.2	< 0.2
Chlorpyrifos-methyl	0.2	mg/kg	< 0.2	< 0.2
Coumaphos	2	mg/kg	< 2	< 2
Demeton-S	0.2	mg/kg	< 0.2	< 0.2
Demeton-O	0.2	mg/kg	< 0.2	< 0.2
Diazinon	0.2	mg/kg	< 0.2	< 0.2
Dichlorvos	0.2	mg/kg	< 0.2	< 0.2
Dimethoate	0.2	mg/kg	< 0.2	< 0.2
Disulfoton	0.2	mg/kg	< 0.2	< 0.2
EPN	0.2	mg/kg	< 0.2	< 0.2
Ethion	0.2	mg/kg	< 0.2	< 0.2
Ethoprop	0.2	mg/kg	< 0.2	< 0.2
Ethyl parathion	0.2	mg/kg	< 0.2	< 0.2
Fenitrothion	0.2	mg/kg	< 0.2	< 0.2
Fensulfothion	0.2	mg/kg	< 0.2	< 0.2
Fenthion	0.2	mg/kg	< 0.2	< 0.2
Malathion	0.2	mg/kg	< 0.2	< 0.2
Merphos	0.2	mg/kg	< 0.2	< 0.2
Methyl parathion	0.2	mg/kg	< 0.2	< 0.2
Mevinphos	0.2	mg/kg	< 0.2	< 0.2
Monocrotophos	2	mg/kg	< 2	< 2
Naled	0.2	mg/kg	< 0.2	< 0.2
Omethoate	2	mg/kg	< 2	< 2
Phorate	0.2	mg/kg	< 0.2	< 0.2
Pirimiphos-methyl	0.2	mg/kg	< 0.2	< 0.2
Pyrazophos	0.2	mg/kg	< 0.2	< 0.2
Ronnel	0.2	mg/kg	< 0.2	< 0.2
Terbufos	0.2	mg/kg	< 0.2	< 0.2
Tetrachlorvinphos	0.2	mg/kg	< 0.2	< 0.2
Tokuthion	0.2	mg/kg	< 0.2	< 0.2

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Client Sample ID			S6	S7
Sample Matrix			Soil	Soil
Eurofins Sample No.			M25-JI0061990	M25-JI0061991
Date Sampled			Jul 19, 2025	Jul 19, 2025
Test/Reference	LOR	Unit		
Organophosphorus Pesticides				
Trichloronate	0.2	mg/kg	< 0.2	< 0.2
Triphenylphosphate (surr.)	1	%	119	99
Sample Properties				
% Moisture	1	%	24	20

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Sample History

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

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

Description	Testing Site	Extracted	Holding Time
Eurofins Suite B1			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Melbourne	Jul 24, 2025	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Jul 24, 2025	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Jul 24, 2025	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Eurofins Suite B1SG: TRH (With Silica Gel Clean up), BTEXN			
BTEX	Melbourne	Jul 24, 2025	14 Days
- Method: LTM-ORG-2010 BTEX and Volatile TRH			
TRH after Silica Cleanup (NEPM) *	Melbourne	Jul 23, 2025	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
TRH - 2013 NEPM Fractions (after silica gel clean-up)	Melbourne	Jul 24, 2025	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
TRH - 1999 NEPM Fractions (after silica gel clean-up)	Melbourne	Jul 24, 2025	14 Days
- Method: TRH C6-C36 (Silica Gel Cleanup) - MGT 100A			
Organochlorine Pesticides	Melbourne	Jul 24, 2025	14 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water (USEPA 8270)			
Organophosphorus Pesticides	Melbourne	Jul 24, 2025	14 Days
- Method: LTM-ORG-2200 Organophosphorus Pesticides by GC-MS (USEPA 8270)			
Triazines	Melbourne	Jul 24, 2025	14 Days
- Method: LTM-ORG-2210 Triazine Herbicides in Soil and Water by GC-MS/MS			
Carbamate Pesticides	Melbourne	Jul 24, 2025	14 Days
- Method: LTM-ORG-2290 Carbamates in waters and soils by HPLC			
Synthetic Pyrethroids*	Melbourne	Jul 24, 2025	14 Days
- Method: LTM-ORG-2170 Synthetic Pyrethroids by HPLC-UV			
Acid Herbicides	Melbourne	Jul 24, 2025	14 Days
- Method: LTM-ORG-2180 Phenoxy Acid Herbicides			
% Moisture	Melbourne	Jul 23, 2025	14 Days
- Method: LTM-GEN-7080 Moisture			

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Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

Melbourne	Geelong	Sydney	Canberra	Brisbane	Newcastle
6 Monterey Road	19/8 Lewalan Street	179 Magowar Road	Unit 1,2 Dacre Street	1/21 Smallwood Place	1/2 Frost Drive
Dandenong South	Grovedale	Girraween	Mitchell	Murarrie	Mayfield West
VIC 3175	VIC 3216	NSW 2145	ACT 2911	QLD 4172	NSW 2304
+61 3 8564 5000	+61 3 8564 5000	+61 2 9900 8400	+61 2 6113 8091	+61 7 3902 4600	+61 2 4968 8448
NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261
Site# 1254	Site# 25403	Site# 18217	Site# 25466	Site# 20794 & 2780	Site# 25079

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35 O'Rorke Road	Unit C1/4 Pacific Rise	43 Detroit Drive	1277 Cameron Road
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Company Name: Scaada Group Services Pty Ltd
Address: West 6 Federal Mills Park, 33 Mackey Street
North Geelong
VIC 3215

Project Name:
Project ID: J262598

Order No.:
Report #: 1247665
Phone: 0455 500 084
Fax:

Received: Jul 23, 2025 9:00 AM
Due: Jul 30, 2025
Priority: 5 Day
Contact Name: Mitch O'Neill

Eurofins Analytical Services Manager : Thomas Mangiameli

Sample Detail						HOLD*	Suite B14: OCP/OPP	Moisture Set	Eurofins Suite B1	Eurofins Suite B1SG: TRH (With Silica Gel Clean up), BTEXN	Suite B14A: Herbicides/OCP/OPP/Pyrethroids/Triazines/
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X
External Laboratory											
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**						
1	S1	Jul 19, 2025		Soil	M25-Jl0061986		X	X	X		
2	S2	Jul 19, 2025		Soil	M25-Jl0061987			X		X	
3	S4	Jul 19, 2025		Soil	M25-Jl0061988			X			X
4	S5	Jul 19, 2025		Soil	M25-Jl0061989		X	X	X		
5	S6	Jul 19, 2025		Soil	M25-Jl0061990		X	X	X		
6	S7	Jul 19, 2025		Soil	M25-Jl0061991		X	X	X		
7	S3	Jul 19, 2025		Soil	M25-Jl0061992	X					
Test Counts						1	4	6	4	1	1

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Internal Quality Control Review and Glossary

General

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

Holding Times

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

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

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

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

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

Units

mg/kg: milligrams per kilogram	**mg/L:** milligrams per litre	**ppm:** parts per million
µg/L: micrograms per litre	**ppb:** parts per billion	**%:** Percentage
org/100 mL: Organisms per 100 millilitres	**NTU:** Nephelometric Turbidity Units	**MPN/100 mL:** Most Probable Number of organisms per 100 millilitres
CFU: Colony Forming Unit	**Colour:** Pt-Co Units (CU)	

Terms

APHA	American Public Health Association
CEC	Cation Exchange Capacity
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples, these are performed on laboratory-certified clean sands and in the case of water samples, these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a similar compound to the analyte target is reported as percentage recovery. See below for acceptance criteria.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment; however, free tributyltin was measured, and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 6.0
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

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

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

Results <10 times the LOR:	No Limit
Results between 10-20 times the LOR:	RPD must lie between 0-50%
Results >20 times the LOR:	RPD must lie between 0-30%

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

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%, VOC recoveries 50 – 150%

PFAS field samples containing surrogate recoveries above the QC limit designated in QSM 6.0, where no positive PFAS results have been reported or reviewed, and no data was affected.

QC Data General Comments

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

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Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Organochlorine Pesticides							
Chlordanes - Total	mg/kg	< 0.1			0.1	Pass	
4.4'-DDD	mg/kg	< 0.05			0.05	Pass	
4.4'-DDE	mg/kg	< 0.05			0.05	Pass	
4.4'-DDT	mg/kg	< 0.05			0.05	Pass	
a-HCH	mg/kg	< 0.05			0.05	Pass	
Aldrin	mg/kg	< 0.05			0.05	Pass	
b-HCH	mg/kg	< 0.05			0.05	Pass	
d-HCH	mg/kg	< 0.05			0.05	Pass	
Dieldrin	mg/kg	< 0.05			0.05	Pass	
Endosulfan I	mg/kg	< 0.05			0.05	Pass	
Endosulfan II	mg/kg	< 0.05			0.05	Pass	
Endosulfan sulphate	mg/kg	< 0.05			0.05	Pass	
Endrin	mg/kg	< 0.05			0.05	Pass	
Endrin aldehyde	mg/kg	< 0.05			0.05	Pass	
Endrin ketone	mg/kg	< 0.05			0.05	Pass	
g-HCH (Lindane)	mg/kg	< 0.05			0.05	Pass	
Heptachlor	mg/kg	< 0.05			0.05	Pass	
Heptachlor epoxide	mg/kg	< 0.05			0.05	Pass	
Hexachlorobenzene	mg/kg	< 0.05			0.05	Pass	
Methoxychlor	mg/kg	< 0.05			0.05	Pass	
Toxaphene	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Organophosphorus Pesticides							
Azinphos-methyl	mg/kg	< 0.2			0.2	Pass	
Bolstar	mg/kg	< 0.2			0.2	Pass	
Chlorfenvinphos	mg/kg	< 0.2			0.2	Pass	
Chlorpyrifos	mg/kg	< 0.2			0.2	Pass	
Chlorpyrifos-methyl	mg/kg	< 0.2			0.2	Pass	
Coumaphos	mg/kg	< 2			2	Pass	
Demeton-S	mg/kg	< 0.2			0.2	Pass	
Demeton-O	mg/kg	< 0.2			0.2	Pass	
Diazinon	mg/kg	< 0.2			0.2	Pass	
Dichlorvos	mg/kg	< 0.2			0.2	Pass	
Dimethoate	mg/kg	< 0.2			0.2	Pass	
Disulfoton	mg/kg	< 0.2			0.2	Pass	
EPN	mg/kg	< 0.2			0.2	Pass	
Ethion	mg/kg	< 0.2			0.2	Pass	
Ethoprop	mg/kg	< 0.2			0.2	Pass	
Ethyl parathion	mg/kg	< 0.2			0.2	Pass	
Fenitrothion	mg/kg	< 0.2			0.2	Pass	
Fensulfothion	mg/kg	< 0.2			0.2	Pass	
Fenthion	mg/kg	< 0.2			0.2	Pass	
Malathion	mg/kg	< 0.2			0.2	Pass	
Merphos	mg/kg	< 0.2			0.2	Pass	
Methyl parathion	mg/kg	< 0.2			0.2	Pass	
Mevinphos	mg/kg	< 0.2			0.2	Pass	
Monocrotophos	mg/kg	< 2			2	Pass	
Naled	mg/kg	< 0.2			0.2	Pass	
Omethoate	mg/kg	< 2			2	Pass	
Phorate	mg/kg	< 0.2			0.2	Pass	

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Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Pirimiphos-methyl	mg/kg	< 0.2			0.2	Pass	
Pyrazophos	mg/kg	< 0.2			0.2	Pass	
Ronnel	mg/kg	< 0.2			0.2	Pass	
Terbufos	mg/kg	< 0.2			0.2	Pass	
Tetrachlorvinphos	mg/kg	< 0.2			0.2	Pass	
Tokuthion	mg/kg	< 0.2			0.2	Pass	
Trichloronate	mg/kg	< 0.2			0.2	Pass	
Method Blank							
Total Recoverable Hydrocarbons							
TRH C6-C9	mg/kg	< 20			20	Pass	
TRH C29-C36	mg/kg	< 50			50	Pass	
TRH C6-C10	mg/kg	< 20			20	Pass	
Naphthalene	mg/kg	< 0.5			0.5	Pass	
TRH >C34-C40	mg/kg	< 100			100	Pass	
Method Blank							
BTEX							
Benzene	mg/kg	< 0.1			0.1	Pass	
Toluene	mg/kg	< 0.1			0.1	Pass	
Ethylbenzene	mg/kg	< 0.1			0.1	Pass	
m&p-Xylenes	mg/kg	< 0.2			0.2	Pass	
o-Xylene	mg/kg	< 0.1			0.1	Pass	
Xylenes - Total*	mg/kg	< 0.3			0.3	Pass	
Method Blank							
TRH - 2013 NEPM Fractions (after silica gel clean-up)							
TRH >C10-C16 (after silica gel clean-up)	mg/kg	< 50			50	Pass	
TRH >C16-C34 (after silica gel clean-up)	mg/kg	< 100			100	Pass	
TRH >C34-C40 (after silica gel clean-up)	mg/kg	< 100			100	Pass	
Method Blank							
TRH - 1999 NEPM Fractions (after silica gel clean-up)							
TRH C10-C14 (after silica gel clean-up)	mg/kg	< 20			20	Pass	
TRH C15-C28 (after silica gel clean-up)	mg/kg	< 50			50	Pass	
TRH C29-C36 (after silica gel clean-up)	mg/kg	< 50			50	Pass	
Method Blank							
Triazines							
Ametryn	mg/kg	< 0.2			0.2	Pass	
Atraton	mg/kg	< 0.2			0.2	Pass	
Atrazine	mg/kg	< 0.2			0.2	Pass	
Prometon	mg/kg	< 0.2			0.2	Pass	
Prometryn	mg/kg	< 0.2			0.2	Pass	
Propazine	mg/kg	< 0.2			0.2	Pass	
Simazine	mg/kg	< 0.2			0.2	Pass	
Simetryn	mg/kg	< 0.2			0.2	Pass	
Terbuthylazine	mg/kg	< 0.2			0.2	Pass	
Terbutryne	mg/kg	< 0.2			0.2	Pass	
Method Blank							
Synthetic Pyrethroids*							
Allethrin*	mg/kg	< 2			2	Pass	
Cyfluthrin*	mg/kg	< 2			2	Pass	
Cypermethrin (total)*	mg/kg	< 2			2	Pass	
Fenvalerate*	mg/kg	< 2			2	Pass	
Permethrin	mg/kg	< 2			2	Pass	
Phenothrin*	mg/kg	< 2			2	Pass	
Resmethrin*	mg/kg	< 2			2	Pass	
Tetramethrin*	mg/kg	< 2			2	Pass	

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Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons							
TRH C10-C14	mg/kg	< 20			20	Pass	
TRH C15-C28	mg/kg	< 50			50	Pass	
TRH C29-C36	mg/kg	< 50			50	Pass	
TRH >C10-C16	mg/kg	< 50			50	Pass	
TRH >C16-C34	mg/kg	< 100			100	Pass	
TRH >C34-C40	mg/kg	< 100			100	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons							
TRH C6-C9	%	114			70-130	Pass	
TRH C6-C10	%	87			70-130	Pass	
Naphthalene	%	71			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	80			70-130	Pass	
Toluene	%	86			70-130	Pass	
Ethylbenzene	%	86			70-130	Pass	
m&p-Xylenes	%	91			70-130	Pass	
Xylenes - Total*	%	90			70-130	Pass	
LCS - % Recovery							
Organochlorine Pesticides							
Chlordanes - Total	%	89			70-130	Pass	
4.4'-DDD	%	99			70-130	Pass	
4.4'-DDE	%	93			70-130	Pass	
4.4'-DDT	%	84			70-130	Pass	
a-HCH	%	91			70-130	Pass	
Aldrin	%	88			70-130	Pass	
b-HCH	%	98			70-130	Pass	
d-HCH	%	99			70-130	Pass	
Dieldrin	%	91			70-130	Pass	
Endosulfan I	%	92			70-130	Pass	
Endosulfan II	%	89			70-130	Pass	
Endosulfan sulphate	%	88			70-130	Pass	
Endrin	%	86			70-130	Pass	
Endrin aldehyde	%	77			70-130	Pass	
Endrin ketone	%	86			70-130	Pass	
g-HCH (Lindane)	%	81			70-130	Pass	
Heptachlor	%	98			70-130	Pass	
Heptachlor epoxide	%	89			70-130	Pass	
Hexachlorobenzene	%	103			70-130	Pass	
Methoxychlor	%	86			70-130	Pass	
LCS - % Recovery							
Organophosphorus Pesticides							
Diazinon	%	102			70-130	Pass	
Dimethoate	%	112			70-130	Pass	
Ethion	%	99			70-130	Pass	
Fenitrothion	%	82			70-130	Pass	
Methyl parathion	%	89			70-130	Pass	
Mevinphos	%	102			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons							
TRH C10-C14	%	74			70-130	Pass	
TRH >C10-C16	%	75			70-130	Pass	

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Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
LCS - % Recovery							
TRH - 2013 NEPM Fractions (after silica gel clean-up)							
TRH >C10-C16 (after silica gel clean-up)	%	75			70-130	Pass	
LCS - % Recovery							
TRH - 1999 NEPM Fractions (after silica gel clean-up)							
TRH C10-C14 (after silica gel clean-up)	%	74			70-130	Pass	
LCS - % Recovery							
Triazines							
Prometryn	%	107			70-130	Pass	
LCS - % Recovery							
Synthetic Pyrethroids*							
Allethrin*	%	72			70-130	Pass	
Cyfluthrin*	%	91			70-130	Pass	
Cypermethrin (total)*	%	91			70-130	Pass	
Fenvalerate*	%	75			70-130	Pass	
Phenothrin*	%	72			70-130	Pass	
Resmethrin*	%	87			70-130	Pass	
Tetramethrin*	%	94			70-130	Pass	
LCS - % Recovery							
Acid Herbicides							
2.4-D	%	118			70-130	Pass	
2.4-DB	%	114			70-130	Pass	
2.4.5-T	%	115			70-130	Pass	
2.4.5-TP	%	88			70-130	Pass	
Actril (loxynil)	%	81			70-130	Pass	
Dicamba	%	118			70-130	Pass	
Dichlorprop	%	122			70-130	Pass	
Dinitro-o-cresol	%	110			70-130	Pass	
MCPA	%	125			70-130	Pass	
MCPB	%	92			70-130	Pass	
Mecoprop	%	130			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons							
TRH C10-C14	%	73			70-130	Pass	
TRH >C10-C16	%	71			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Total Recoverable Hydrocarbons				Result 1					
TRH C6-C9	M25-JI0061986	CP	%	94			70-130	Pass	
TRH C10-C14	M25-JI0067079	NCP	%	95			70-130	Pass	
TRH C6-C10	M25-JI0061986	CP	%	92			70-130	Pass	
TRH >C10-C16	M25-JI0067079	NCP	%	94			70-130	Pass	
Naphthalene	M25-JI0061986	CP	%	76			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	M25-JI0061986	CP	%	74			70-130	Pass	
Toluene	M25-JI0061986	CP	%	83			70-130	Pass	
Ethylbenzene	M25-JI0061986	CP	%	88			70-130	Pass	
m&p-Xylenes	M25-JI0061986	CP	%	92			70-130	Pass	
o-Xylene	M25-JI0061986	CP	%	90			70-130	Pass	
Xylenes - Total*	M25-JI0061986	CP	%	91			70-130	Pass	
Spike - % Recovery									
TRH - 2013 NEPM Fractions (after silica gel clean-up)				Result 1					

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Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
TRH >C10-C16 (after silica gel clean-up)	M25-Jl0068190	NCP	%	85			70-130	Pass	
Spike - % Recovery									
TRH - 1999 NEPM Fractions (after silica gel clean-up)				Result 1					
TRH C10-C14 (after silica gel clean-up)	M25-Jl0068190	NCP	%	85			70-130	Pass	
Spike - % Recovery									
Organophosphorus Pesticides				Result 1					
Diazinon	M25-Jl0061991	CP	%	130			70-130	Pass	
Dimethoate	M25-Jl0061991	CP	%	96			70-130	Pass	
Ethion	M25-Jl0061991	CP	%	100			70-130	Pass	
Fenitrothion	M25-Jl0061991	CP	%	103			70-130	Pass	
Methyl parathion	M25-Jl0061991	CP	%	113			70-130	Pass	
Mevinphos	M25-Jl0061991	CP	%	102			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Total Recoverable Hydrocarbons				Result 1	Result 2	RPD			
TRH C6-C9	M25-Jl0067189	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C6-C10	M25-Jl0067189	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
Naphthalene	M25-Jl0067189	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	M25-Jl0067189	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	M25-Jl0067189	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	M25-Jl0067189	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	M25-Jl0067189	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	M25-Jl0067189	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total*	M25-Jl0067189	NCP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	
Duplicate									
Sample Properties				Result 1	Result 2	RPD			
% Moisture	M25-Jl0061972	NCP	%	8.6	8.8	2.0	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons				Result 1	Result 2	RPD			
TRH C10-C14	M25-Jl0061989	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C15-C28	M25-Jl0061989	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH C29-C36	M25-Jl0061989	CP	mg/kg	53	54	2.0	30%	Pass	
TRH >C10-C16	M25-Jl0061989	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH >C16-C34	M25-Jl0061989	CP	mg/kg	< 100	< 100	<1	30%	Pass	
TRH >C34-C40	M25-Jl0061989	CP	mg/kg	< 100	< 100	<1	30%	Pass	
Duplicate									
Organochlorine Pesticides				Result 1	Result 2	RPD			
Chlordanes - Total	M25-Jl0061989	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
4.4'-DDD	M25-Jl0061989	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDE	M25-Jl0061989	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDT	M25-Jl0061989	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
a-HCH	M25-Jl0061989	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Aldrin	M25-Jl0061989	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
b-HCH	M25-Jl0061989	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
d-HCH	M25-Jl0061989	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Dieldrin	M25-Jl0061989	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan I	M25-Jl0061989	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan II	M25-Jl0061989	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan sulphate	M25-Jl0061989	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin	M25-Jl0061989	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	

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Duplicate									
Organochlorine Pesticides				Result 1	Result 2	RPD			
Endrin aldehyde	M25-Jl0061989	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin ketone	M25-Jl0061989	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
g-HCH (Lindane)	M25-Jl0061989	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor	M25-Jl0061989	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor epoxide	M25-Jl0061989	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Hexachlorobenzene	M25-Jl0061989	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Methoxychlor	M25-Jl0061989	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Toxaphene	M25-Jl0061989	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Organophosphorus Pesticides				Result 1	Result 2	RPD			
Azinphos-methyl	M25-Jl0061989	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Bolstar	M25-Jl0061989	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorfenvinphos	M25-Jl0061989	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorpyrifos	M25-Jl0061989	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorpyrifos-methyl	M25-Jl0061989	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Coumaphos	M25-Jl0061989	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Demeton-S	M25-Jl0061989	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Demeton-O	M25-Jl0061989	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Diazinon	M25-Jl0061989	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Dichlorvos	M25-Jl0061989	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Dimethoate	M25-Jl0061989	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Disulfoton	M25-Jl0061989	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
EPN	M25-Jl0061989	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethion	M25-Jl0061989	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethoprop	M25-Jl0061989	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethyl parathion	M25-Jl0061989	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fenitrothion	M25-Jl0061989	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fensulfothion	M25-Jl0061989	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fenthion	M25-Jl0061989	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Malathion	M25-Jl0061989	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Merphos	M25-Jl0061989	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Methyl parathion	M25-Jl0061989	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Mevinphos	M25-Jl0061989	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Monocrotophos	M25-Jl0061989	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Naled	M25-Jl0061989	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Omethoate	M25-Jl0061989	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Phorate	M25-Jl0061989	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Pirimiphos-methyl	M25-Jl0061989	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Pyrazophos	M25-Jl0061989	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ronnel	M25-Jl0061989	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Terbufos	M25-Jl0061989	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Tetrachlorvinphos	M25-Jl0061989	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Tokuthion	M25-Jl0061989	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Trichloronate	M25-Jl0061989	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Duplicate									
Triazines				Result 1	Result 2	RPD			
Ametryn	M25-Jl0061989	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Atraton	M25-Jl0061989	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Atrazine	M25-Jl0061989	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Prometon	M25-Jl0061989	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Prometryn	M25-Jl0061989	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Propazine	M25-Jl0061989	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Simazine	M25-Jl0061989	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Simetryn	M25-Jl0061989	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	

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Duplicate									
Triazines				Result 1	Result 2	RPD			
Terbuthylazine	M25-Jl0061989	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Terbutryne	M25-Jl0061989	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons				Result 1	Result 2	RPD			
TRH C10-C14	M25-Jl0061990	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C15-C28	M25-Jl0061990	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH C29-C36	M25-Jl0061990	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH >C10-C16	M25-Jl0061990	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH >C16-C34	M25-Jl0061990	CP	mg/kg	< 100	< 100	<1	30%	Pass	
TRH >C34-C40	M25-Jl0061990	CP	mg/kg	< 100	< 100	<1	30%	Pass	
Duplicate									
Organochlorine Pesticides				Result 1	Result 2	RPD			
Chlordanes - Total	M25-Jl0061990	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
4.4'-DDD	M25-Jl0061990	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDE	M25-Jl0061990	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDT	M25-Jl0061990	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
a-HCH	M25-Jl0061990	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Aldrin	M25-Jl0061990	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
b-HCH	M25-Jl0061990	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
d-HCH	M25-Jl0061990	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Dieldrin	M25-Jl0061990	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan I	M25-Jl0061990	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan II	M25-Jl0061990	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan sulphate	M25-Jl0061990	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin	M25-Jl0061990	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin aldehyde	M25-Jl0061990	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin ketone	M25-Jl0061990	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
g-HCH (Lindane)	M25-Jl0061990	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor	M25-Jl0061990	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor epoxide	M25-Jl0061990	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Hexachlorobenzene	M25-Jl0061990	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Methoxychlor	M25-Jl0061990	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Toxaphene	M25-Jl0061990	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Organophosphorus Pesticides				Result 1	Result 2	RPD			
Azinphos-methyl	M25-Jl0061990	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Bolstar	M25-Jl0061990	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorfenvinphos	M25-Jl0061990	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorpyrifos	M25-Jl0061990	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorpyrifos-methyl	M25-Jl0061990	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Coumaphos	M25-Jl0061990	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Demeton-S	M25-Jl0061990	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Demeton-O	M25-Jl0061990	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Diazinon	M25-Jl0061990	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Dichlorvos	M25-Jl0061990	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Dimethoate	M25-Jl0061990	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Disulfoton	M25-Jl0061990	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
EPN	M25-Jl0061990	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethion	M25-Jl0061990	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethoprop	M25-Jl0061990	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethyl parathion	M25-Jl0061990	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fenitrothion	M25-Jl0061990	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fensulfothion	M25-Jl0061990	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fenthion	M25-Jl0061990	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	

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Duplicate									
Organophosphorus Pesticides				Result 1	Result 2	RPD			
Malathion	M25-JI0061990	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Merphos	M25-JI0061990	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Methyl parathion	M25-JI0061990	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Mevinphos	M25-JI0061990	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Monocrotophos	M25-JI0061990	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Naled	M25-JI0061990	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Omethoate	M25-JI0061990	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Phorate	M25-JI0061990	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Pirimiphos-methyl	M25-JI0061990	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Pyrazophos	M25-JI0061990	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ronnel	M25-JI0061990	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Terbufos	M25-JI0061990	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Tetrachlorvinphos	M25-JI0061990	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Tokuthion	M25-JI0061990	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Trichloronate	M25-JI0061990	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Duplicate									
Triazines				Result 1	Result 2	RPD			
Ametryn	M25-JI0061990	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Atraton	M25-JI0061990	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Atrazine	M25-JI0061990	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Prometon	M25-JI0061990	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Prometryn	M25-JI0061990	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Propazine	M25-JI0061990	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Simazine	M25-JI0061990	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Simetryn	M25-JI0061990	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Terbuthylazine	M25-JI0061990	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Terbutryne	M25-JI0061990	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	

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Comments

Sample Integrity

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

Qualifier Codes/Comments

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

Authorised by:

Catherine Wilson	Analytical Services Manager
Joseph Edouard	Senior Analyst-Volatile
Joseph Edouard	Senior Analyst-Organic
Edward Lee	Senior Analyst-Organic
Carroll Lee	Senior Analyst-Organic

Glenn Jackson
Managing Director

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

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

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The Victorian Government acknowledges the Traditional Owners of Victoria and pays respects to their ongoing connection to their Country, History and Culture. The Victorian Government extends this respect to their Elders, past, present and emerging.

REGISTER SEARCH STATEMENT (Title Search) Transfer of Land Act 1958

VOLUME 08937 FOLIO 517

Security no : 124124486487E
Produced 15/05/2025 01:17 PM

LAND DESCRIPTION

Lot 2 on Plan of Subdivision 095459.
PARENT TITLE Volume 03366 Folio 196
Created by instrument LP095459 10/08/1972

REGISTERED PROPRIETOR

Estate Fee Simple
Joint Proprietors
[redacted]

ENCUMBRANCES, CAVEATS AND NOTICES

COVENANT F016945 26/09/1973

Any encumbrances created by Section 98 Transfer of Land Act 1958 or Section 24 Subdivision Act 1988 and any other encumbrances shown or entered on the plan or imaged folio set out under DIAGRAM LOCATION below.

DIAGRAM LOCATION

SEE LP095459 FOR FURTHER DETAILS AND BOUNDARIES

ACTIVITY IN THE LAST 125 DAYS

NIL

----------END OF REGISTER SEARCH STATEMENT----------

Additional information: (not part of the Register Search Statement)

Street Address: 10 DALTON STREET KOONDROOK VIC 3580

DOCUMENT END

Imaged Document Cover Sheet

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Document Type	**Plan**
Document Identification	**LP095459**
Number of Pages (excluding this cover sheet)	**1**
Document Assembled	**15/05/2025 13:17**

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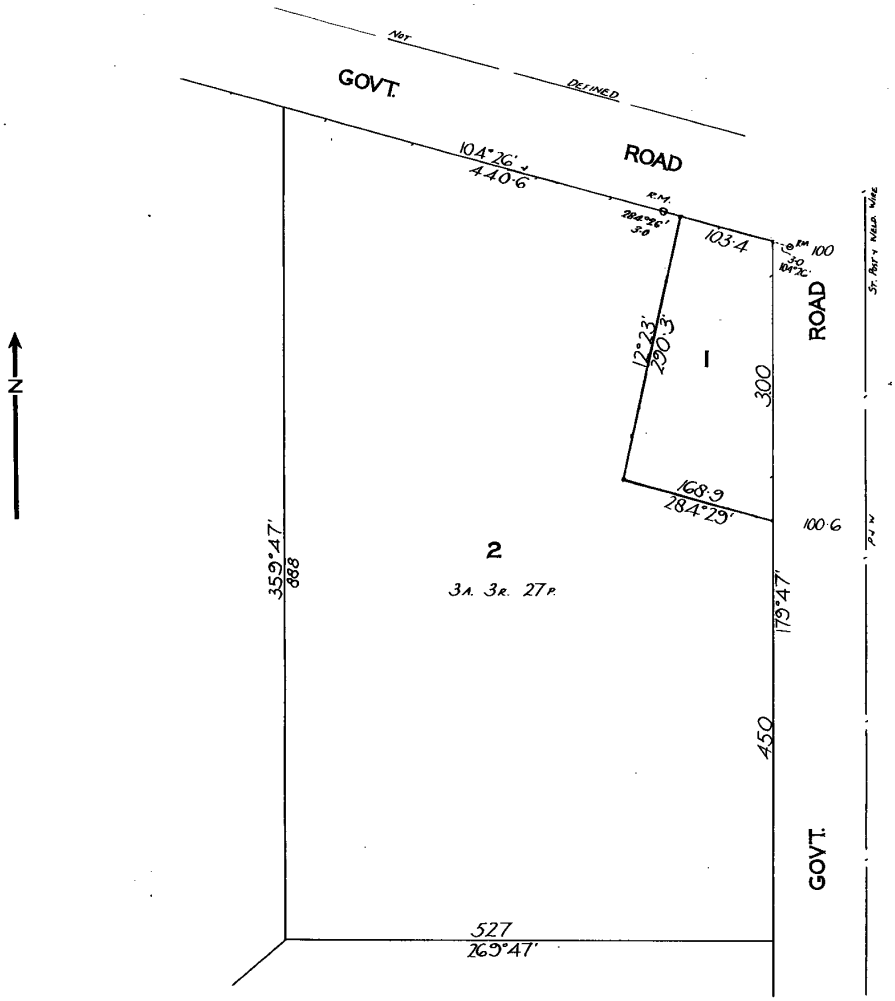
LP95459
EDITION 1
APPROVED 30/6/72

PLAN OF SUBDIVISION OF:	APPROPRIATIONS	ENCUMBRANCES & OTHER NOTATIONS
CROWN ALLOTMENT 56 PARISH: MURRABIT COUNTY: GUNBOWER		LOT 2 IS THE BALANCE OF CROWN ALLOTMENT 56 AND IS NOT THE RESULT OF THIS SURVEY.

DEPTH LIMITATION: 50 FEET

LINKS 100 50 0 50 100 150 200
METRES 20 10 0 10 20 30 40

V.3366 F.196



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The Victorian Government acknowledges the Traditional Owners of Victoria and pays respects to their ongoing connection to their Country, History and Culture. The Victorian Government extends this respect to their Elders, past, present and emerging.

REGISTER SEARCH STATEMENT (Title Search) Transfer of Land Act 1958

VOLUME 09191 FOLIO 403

Security no : 124106107665K
Produced 16/05/2023 07:35 AM

LAND DESCRIPTION

Lot 1 on Plan of Subdivision 119887.
PARENT TITLE Volume 05762 Folio 262
Created by instrument LP119887 02/03/1977

REGISTERED PROPRIETOR

Estate Fee Simple
Joint Proprietors
[redacted]

ENCUMBRANCES, CAVEATS AND NOTICES

Any encumbrances created by Section 98 Transfer of Land Act 1958 or Section 24 Subdivision Act 1988 and any other encumbrances shown or entered on the plan or imaged folio set out under DIAGRAM LOCATION below.

DIAGRAM LOCATION

SEE LP119887 FOR FURTHER DETAILS AND BOUNDARIES

ACTIVITY IN THE LAST 125 DAYS

NIL

----------END OF REGISTER SEARCH STATEMENT----------

Additional information: (not part of the Register Search Statement)

Street Address: 10 DALTON STREET KOONDROOK VIC 3580

DOCUMENT END

Imaged Document Cover Sheet

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Document Type	**Plan**
Document Identification	**LP119887**
Number of Pages (excluding this cover sheet)	**1**
Document Assembled	**16/05/2023 07:38**

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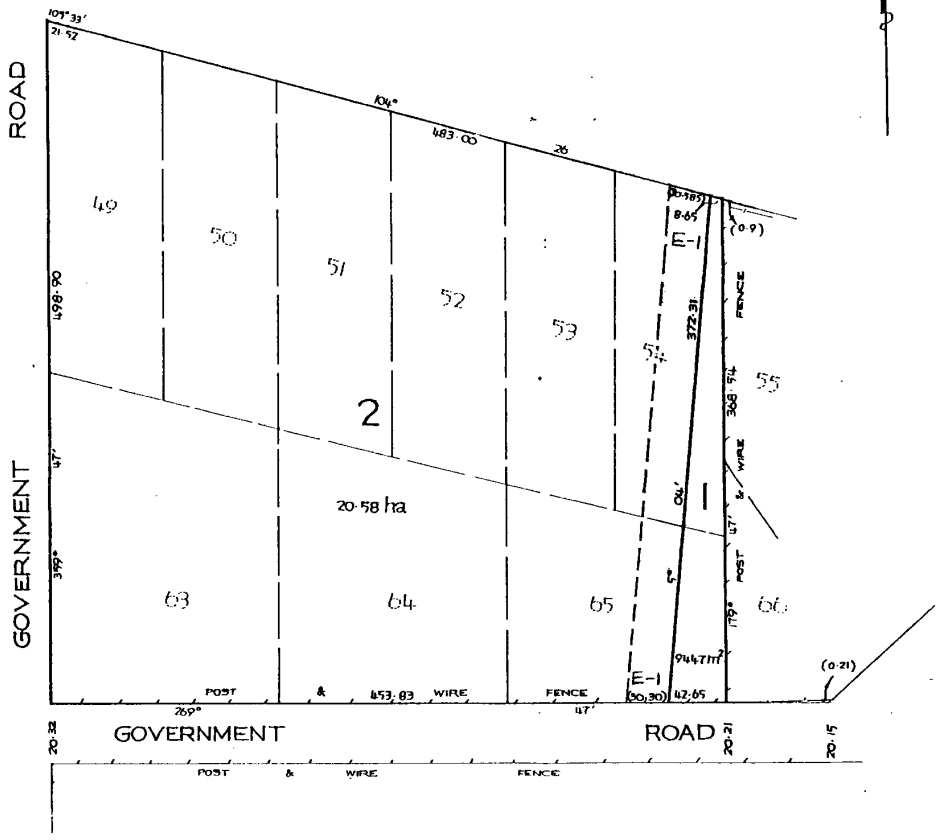
LP119887
EDITION 1
APPROVED 30/11/76

PLAN OF SUBDIVISION OF CROWN ALLOTMENTS 49, 50, 51, 52, 53, 54, 63, 64 & 65 PARISH OF MURRABIT COUNTY OF GUNBOWER 0 10 20 30 40 50 100 200 LENGTHS ARE IN METRES	APPROPRIATIONS	ENCUMBRANCES & OTHER NOTATIONS
		NOTE: FOR DATUM AND REFERENCE MARKS SEE FIELDNOTES BLUE - ENCUMBERED BY THE RESERVATION SET OUT IN CROWN GRANT VOLUME 3705 FOLIO 740921 LOT 2 IS THE BALANCE OF C/T 5762 - 115226Z AND IS NOT SUBJECT TO SURVEY ROAD WIDTHS ARE NOT DRAWN TO SCALE

V.5762 F.262

DEPTH LIMITATION: 15·24m

COLOUR CONVERSION
E-1 = BLUE



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The Victorian Government acknowledges the Traditional Owners of Victoria and pays respects to their ongoing connection to their Country, History and Culture. The Victorian Government extends this respect to their Elders, past, present and emerging.

REGISTER SEARCH STATEMENT (Title Search) Transfer of Land Act 1958

VOLUME 08126 FOLIO 299

Security no : 124124485555S
Produced 15/05/2025 01:03 PM

LAND DESCRIPTION

Crown Allotment 19D Parish of Murrabit.
PARENT TITLE Volume 03347 Folio 335
Created by instrument A267952 19/12/1956

REGISTERED PROPRIETOR

Estate Fee Simple
Joint Proprietors
[redacted]

ENCUMBRANCES, CAVEATS AND NOTICES

COVENANT F016945 26/09/1973

For details of any other encumbrances see the plan or imaged folio set out under DIAGRAM LOCATION below.

DIAGRAM LOCATION

SEE TP342356M FOR FURTHER DETAILS AND BOUNDARIES

ACTIVITY IN THE LAST 125 DAYS

NIL

----------END OF REGISTER SEARCH STATEMENT----------

Additional information: (not part of the Register Search Statement)

Street Address: 10 DALTON STREET KOONDROOK VIC 3580

DOCUMENT END

Imaged Document Cover Sheet

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Document Type	**Plan**
Document Identification	**TP342356M**
Number of Pages (excluding this cover sheet)	**1**
Document Assembled	**15/05/2025 13:03**

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TITLE PLAN		EDITION 1	TP 342356M

Location of Land

Parish: MURRABIT
Township:
Section:
Crown Allotment: 19D
Crown Portion:

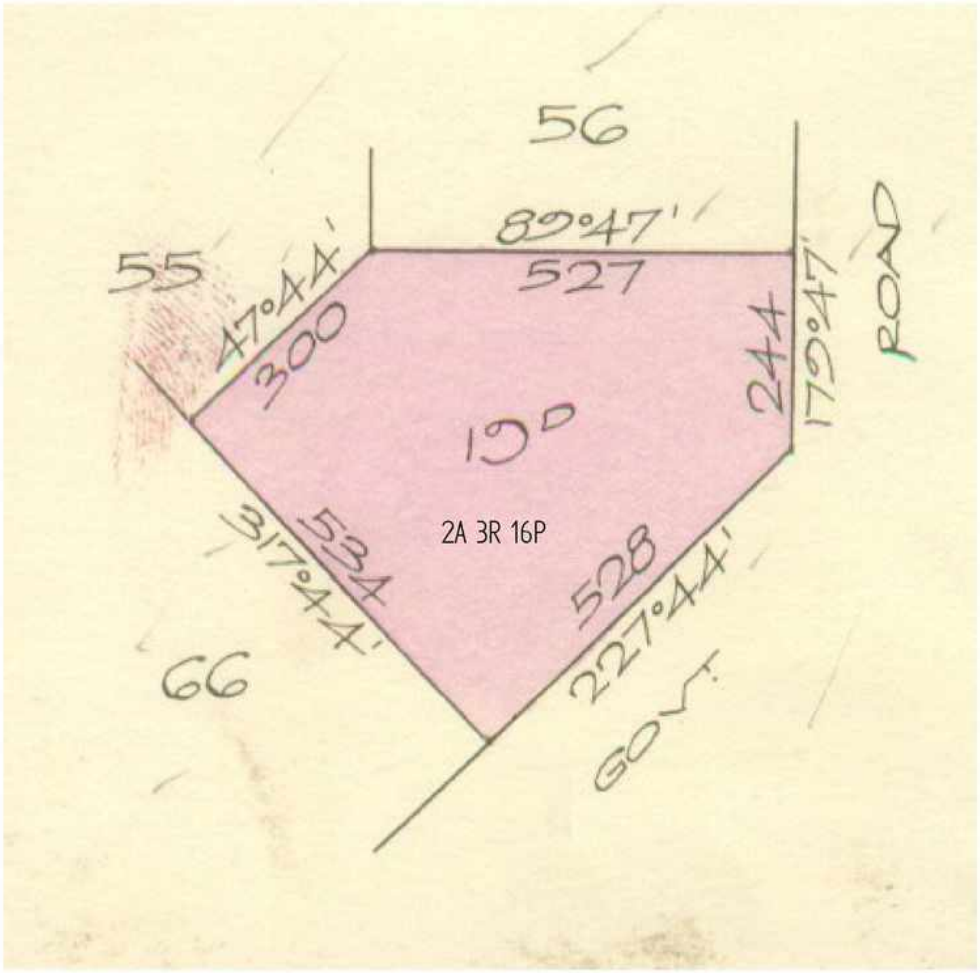
Last Plan Reference:
Derived From: VOL 8126 FOL 299
Depth Limitation: 50 FEET

Notations

ANY REFERENCE TO MAP IN THE TEXT MEANS THE DIAGRAM SHOWN ON THIS TITLE PLAN

Description of Land / Easement Information

THIS PLAN HAS BEEN PREPARED FOR THE LAND REGISTRY, LAND VICTORIA, FOR TITLE DIAGRAM PURPOSES AS PART OF THE LAND TITLES AUTOMATION PROJECT
COMPILED: 03/03/2000
VERIFIED: BH



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REGISTER SEARCH STATEMENT (Title Search) Transfer of Land Act 1958

VOLUME 09004 FOLIO 673

Security no : 124106107759H
Produced 16/05/2023 07:48 AM

LAND DESCRIPTION

Crown Allotment 55 and Crown Allotment 66 Parish of Murrabit.
PARENT TITLE Volume 03366 Folio 196
Created by instrument F016945 26/09/1973

REGISTERED PROPRIETOR

Estate Fee Simple
Joint Proprietors
[redacted]

ENCUMBRANCES, CAVEATS AND NOTICES

COVENANT F016945 21/11/2001

For details of any other encumbrances see the plan or imaged folio set out under DIAGRAM LOCATION below.

DIAGRAM LOCATION

SEE TP307289Y FOR FURTHER DETAILS AND BOUNDARIES

ACTIVITY IN THE LAST 125 DAYS

NIL

DOCUMENT END

Imaged Document Cover Sheet

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Document Type	**Plan**
Document Identification	**TP307289Y**
Number of Pages (excluding this cover sheet)	**1**
Document Assembled	**16/05/2023 07:49**

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TITLE PLAN		EDITION 1	TP 307289Y

Location of Land

Parish: MURRABIT
Township:
Section:
Crown Allotment: 55, 66
Crown Portion:

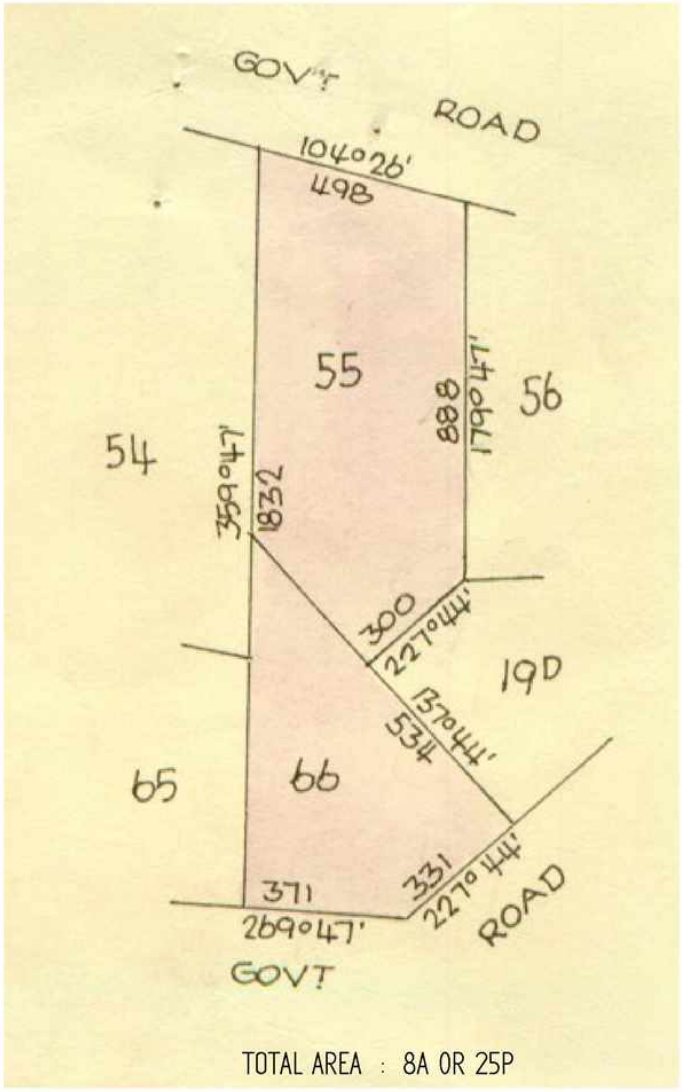
Last Plan Reference:
Derived From: VOL 9004 FOL 673
Depth Limitation: 50 FEET

Notations

ANY REFERENCE TO MAP IN THE TEXT MEANS THE DIAGRAM SHOWN ON THIS TITLE PLAN

Description of Land / Easement Information

THIS PLAN HAS BEEN PREPARED FOR THE LAND REGISTRY, LAND VICTORIA, FOR TITLE DIAGRAM PURPOSES AS PART OF THE LAND TITLES AUTOMATION PROJECT
COMPILED: 08/02/2000
VERIFIED: BH



LENGTHS ARE IN LINKS	Metres = 0.3048 x Feet Metres = 0.201168 x Links		Sheet 1 of 1 sheets

7.4 KOONDROOK CARAVAN PARK, KOONDROOK RETREAT AND COHUNA WATERFRONT CARAVAN PARK

Author:	**Scott Wishart, Manager Economic Development**
Authoriser:	**Geoff Rollinson (Chief Executive Officer)**

RECOMMENDATION

That Council:

1. **Note that the former lessees of the Koondrook Caravan Park relinquished the lease in May 2026;**
2. **Note that interim management arrangements are currently in place to maintain operations pending a long-term leasing arrangement;**
3. **Note that the current lease for the Cohuna Waterfront Caravan Park expires on 30 April 2027;**
4. **Endorse the inclusion of the Koondrook Retreat within the tender process for the operation of the Koondrook Caravan Park;**
5. **Authorises the Chief Executive Officer to prepare, advertise and evaluate a public tender process for the operation of:**
    a. **the Koondrook Caravan Park and Koondrook Retreat; and**
    b. **the Cohuna Waterfront Caravan Park;**
6. **Authorises the Chief Executive Officer to negotiate lease arrangements for the Council-owned land at 5 Keene Street, Koondrook, a concurrent section 17D lease for the Koondrook Retreat Crown land site, and a lease arrangement for the Cohuna Waterfront Caravan Park;**
7. **Receives a further report following completion of the tender process recommending preferred operators and lease arrangements for Council consideration.**

EXECUTIVE SUMMARY

The former lessees of the Koondrook Caravan Park (KCP) advised Council on 24 December 2025 of their intention to relinquish the lease. The lease subsequently concluded in May 2026 and interim management arrangements have been established to ensure continuity of operations while long-term operating arrangements are determined.

The KCP adjoins the Koondrook Retreat (KR), where the glamping tents are situated on Crown land. The two tourism facilities currently operate under separate management and tenure arrangements despite functioning as a complementary tourism accommodation precinct.

The KCP occupies a significant riverside location at 5 Keene Street, Koondrook, on the banks of the Murray River. While several future land use options exist, including sale, subdivision, redevelopment or alternative leasing arrangements, the preferred option is to retain the land in Council ownership, continue its operation as a caravan park and tourism destination, and seek a single operator to manage both the Koondrook Caravan Park and Koondrook Retreat.

It is proposed that Council undertake a public tender process seeking an experienced tourism operator, with the KCP lease and a concurrent section 17D Crown land lease for the KR offered as a combined management opportunity.

Council also owns the Cohuna Waterfront Caravan Park at 58 Island Road, Cohuna. The current lease expires on 30 April 2027. Given the approaching expiry date, it is proposed that Council also commence planning for the future lease of the Cohuna Waterfront Caravan Park through a public tender process. While separate from the Koondrook Caravan Park and Retreat arrangements, the Cohuna Waterfront Caravan Park represents a significant tourism asset and presents an opportunity for Council to undertake a consistent market testing process across its major caravan park facilities.

PURPOSE

To consider the future operation of the Koondrook Caravan Park, Koondrook Retreat and Cohuna Waterfront Caravan Park and to seek Council endorsement to undertake a public tender process for long-term operators of the tourism accommodation facilities.

DISCUSSION

The Koondrook Caravan Park (KCP) is a Council-owned tourism accommodation facility located at 5 Keene Street, Koondrook. The former lessees advised Council on 24 December 2025 of their intention to relinquish the lease. The lease subsequently concluded in May 2026.

To ensure continuity of operations and minimise disruption to visitors, interim management arrangements have been established while Council determines the most appropriate long-term operating model and undertakes a competitive tender process.

Adjoining the caravan park is the Koondrook Retreat (KR), which includes the glamping tent accommodation facilities. The Koondrook Retreat is situated on Crown land under separate tenure arrangements and is not currently included within the caravan park lease. The existing service agreement for the management of the Koondrook Retreat expires on 15 December 2026.

The current circumstances provide Council with an opportunity to establish a coordinated management approach for both facilities through a single procurement process.

Current Arrangements

Koondrook Caravan Park

- Location: 5 Keene Street, Koondrook
- Previous Lease Expiry: 2 April 2026, extended to May 2026.
- Lease Concluded: May 2026
- Rental: $3,400.29 per month plus GST
- Annual Rent Reviews: CPI

Koondrook Retreat

- Commencement Date: 15 December 2022
- Expiry Date: 15 December 2026
- Management Fee: 25% of nightly takings (plus GST if applicable)
- 2024 Return to Council: $15,960
- Average Monthly Return: Approximately $1,330

The Cohuna Waterfront Caravan Park is a Council-owned tourism accommodation facility located at 58 Island Road, Cohuna. The current lease remains active and is due to expire on 30 April 2027.

The park occupies a prime waterfront location and is an important tourism asset, contributing to visitation, local spending, employment and economic activity within Cohuna and the wider Gannawarra region.

Given the approaching lease expiry, Council has an opportunity to test the market through a competitive public tender process to identify the most suitable long-term operating arrangement and maximise the tourism and economic potential of the asset.

Current Arrangements

- Location: 58 Island Road, Cohuna
- Lease Expiry: 30 April 2027
- Rental: $15,004.00 per month plus GST
- Payment Frequency: Monthly
- Annual Rent Reviews: CPI

Whilst the Cohuna Waterfront Caravan Park would form part of the proposed tender program, it would be offered as a standalone leasing opportunity and would not be linked to the Koondrook Retreat or the Koondrook Caravan Park lease arrangements.

Future Operating Model

The Koondrook Caravan Park and Koondrook Retreat operate as complementary tourism accommodation facilities and collectively contribute to visitor attraction, local economic activity and destination development within Koondrook and the wider Gannawarra.

Whilst historically managed through separate agreements, there are operational and commercial advantages in establishing a single management arrangement across both facilities. Potential benefits include:

- Improved visitor experience through coordinated marketing and booking systems;
- Greater operational efficiencies;
- Increased attractiveness to prospective operators;
- Enhanced opportunities for investment and facility improvements;
- Streamlined management and maintenance responsibilities; and
- A more integrated tourism accommodation offering for the region.

Accordingly, it is proposed that Council seek a long-term operator through a public tender process that incorporates both the Koondrook Caravan Park and Koondrook Retreat.

In addition to the Koondrook opportunity, Council will seek to establish future lease arrangements for the Cohuna Waterfront Caravan Park. Given the differing geographic locations and operational requirements of the facilities, it is proposed that the Cohuna Waterfront Caravan Park be offered as a separate leasing opportunity through the tender process.

Land Tenure Arrangements

The Koondrook Caravan Park is located on Council-owned land at 5 Keene Street, Koondrook.

The Koondrook Retreat is located on adjoining Crown land and is subject to separate land management requirements.

The Cohuna Waterfront Caravan Park is located on Council-owned land at 72 Cohuna Island Road, Cohuna.

Should Council pursue the proposed operating model, it is proposed that:

- The Koondrook Caravan Park component be leased through an appropriate lease arrangement over the Council-owned land at 5 Keene Street, Koondrook;
- The Koondrook Retreat component be provided through a concurrent section 17D lease arrangement over the adjoining Crown land; and

- The Cohuna Waterfront Caravan Park be leased through a separate lease arrangement over the Council-owned land at 72 Cohuna Island Road, Cohuna.

This approach would enable Council to undertake a coordinated market testing process for both caravan park assets while recognising the differing land tenure arrangements applicable to the Koondrook Retreat. It would also provide flexibility for tenderers to submit proposals for one or both caravan park operations, depending on Council's preferred procurement approach.

Tender Process

The proposed tender process would seek submissions from experienced tourism, accommodation and caravan park operators and include consideration of:

- Demonstrated operational capability and experience;
- Financial capacity and business sustainability;
- Proposed lease rental structure;
- Marketing and tourism development initiatives;
- Asset maintenance responsibilities;
- Capital investment and improvement proposals; and
- Strategies to maximise visitation and economic benefit for Koondrook and the Gannawarra.

Following evaluation of submissions, a further report would be presented to Council recommending a preferred operator and associated lease arrangements.

RELEVANT LAW

- *Local Government Act 2020*
- *Crown Land (Reserves) Act 1978*
- *Residential Tenancies Act 1997*
- *Retail Leases Act 2003*

RELATED COUNCIL DECISIONS

Council received two Briefing reports on the Koondrook Caravan Park, Koondrook Retreat and the Cohuna Waterfront Caravan Park in September 2025 and November 2025.

OPTIONS

Council has several strategic options regarding the future use of the site, including:

- Subdivision and sale of the land as residential land;
- Subdivision and sale of the land as commercial land;
- Sale of the land in its current configuration;
- Subdivision and leasing of commercial sites;
- Subdivision and leasing of residential sites;
- Retention of the land and operation as a caravan park; or
- Any other option as determined by Council.

The recommended option is for Council to retain ownership of the land and continue its use as a tourism accommodation facility.

Should Council choose to continue caravan park operations, further considerations include:

- Combining the Koondrook Caravan Park and Koondrook Retreat under a single operating arrangement;
- Determining lease terms, rental methodology and renewal options;
- Establishing responsibilities for maintenance, asset renewal and capital improvements;
- Managing accommodation assets including cabins, glamping facilities, caravan sites and amenities; and
- Formalising long-term arrangements following the current interim operating period.

SUSTAINABILITY IMPLICATIONS

Social

The caravan parks currently accommodate a number of permanent residents and provides an important community and visitor accommodation function.

Economic

The caravan parks and Koondrook Retreat contribute to tourism activity, local business expenditure, employment opportunities and broader regional economic development.

Environmental

The sites are located adjacent to the Murray River, Gunbower Creek and areas of environmental significance. Future development and management will need to consider environmental impacts and regulatory requirements.

COMMUNITY ENGAGEMENT

Should Council proceed with a new lease arrangement, the opportunity will be publicly advertised through an open tender process.

Any future rezoning, redevelopment or sale of land would be subject to the applicable statutory consultation and approval processes.

INNOVATION AND CONTINUOUS IMPROVEMENT

A new operator may introduce innovative tourism products, improved customer experiences, expanded accommodation offerings and enhanced marketing initiatives that strengthen visitation to Koondrook, Cohuna and the Gannawarra.

COLLABORATION

Council officers will work with the Department of Energy, Environment and Climate Action and any other relevant agencies to facilitate the Crown land tenure requirements associated with the Koondrook Retreat site.

FINANCIAL VIABILITY

The previous KCP lease generated rental income of $3,400.29 per month plus GST, subject to annual CPI reviews.

The Koondrook Retreat generated $15,960 in revenue to Council during 2024 through the current service agreement arrangement.

Under the current arrangements when depreciation is included, both sites make a small deficit.

A competitive tender process will allow Council to assess the market's appetite for the combined operation of the facilities and determine an appropriate commercial model that supports both tourism outcomes and long-term financial sustainability.

The Cohuna Waterfront Caravan Park currently generates rental income of $15,004.00 per month plus GST, subject to annual CPI reviews.

The inclusion of the Cohuna Waterfront Caravan Park in the proposed tender process will enable Council to assess market demand for the long-term operation of the facility and identify opportunities to optimise commercial returns while maintaining its role as a key tourism asset.

REGIONAL, STATE AND NATIONAL PLANS AND POLICIES

The land at 5 Keene Street, Koondrook is currently zoned Special Use Zone Schedule 4 (SUZ4) – Caravan Park.

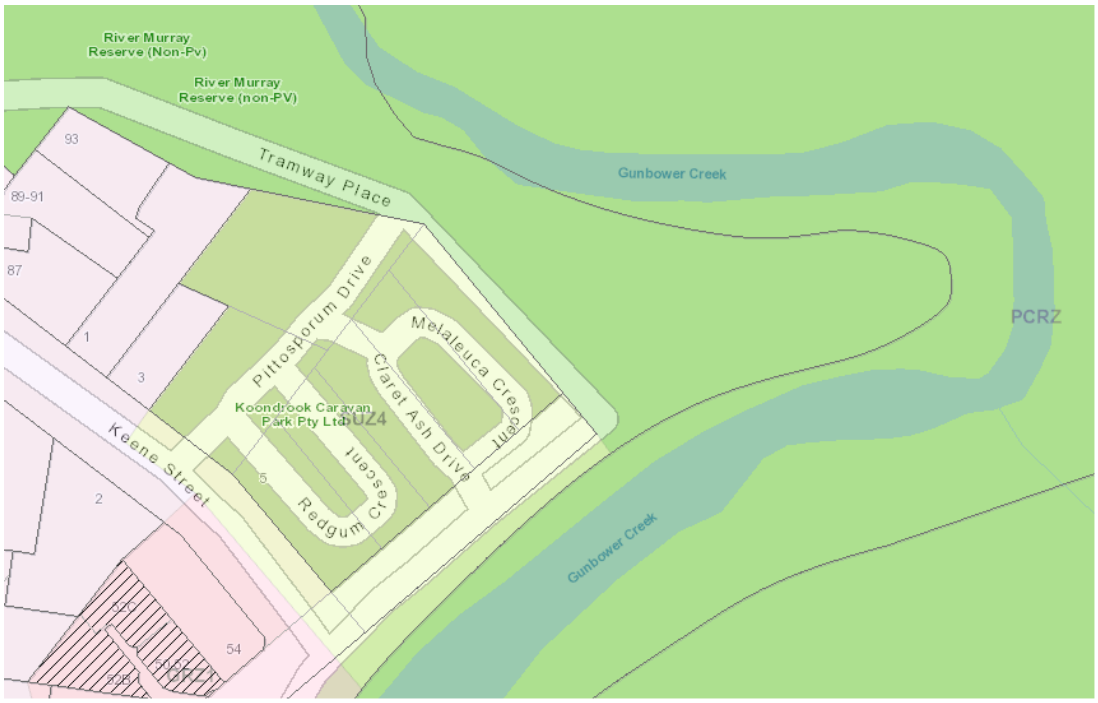
The purpose of the zone includes:

- To recognise and provide for the use and development of land for tourism facilities including the Koondrook Caravan Park; and
- To ensure development occurs in an orderly manner and does not adversely affect surrounding amenity.

The land is also affected by:

- Bushfire Management Overlay (BMO);
- Heritage Overlay (HO13); and
- Land Subject to Inundation Overlay (LSIO).

Most redevelopment proposals or changes in land use would require planning approval.



The Cohuna Waterfront Caravan Park at 72 Cohuna Island Road, Cohuna is situated within the Public Park and Recreation Zone (PPRZ).

The purpose of the zone includes:

- To recognise areas for public recreation and open space;
- To protect and conserve areas of significance where appropriate; and
- To provide for commercial uses where they complement the recreational use of the land.

The land is also affected by:

- Environmental Significance Overlay Schedule 1 (ESO1);
- Environmental Significance Overlay Schedule 4 (ESO4); and
- Specific Controls Overlay Schedule 2 (SCO2).

Most redevelopment proposals or changes in land use at either site would be subject to the provisions of the Gannawarra Planning Scheme and may require planning approval.

COUNCIL PLANS AND POLICIES

Goal 2: Growth - Grow the Gannawarra through a diverse and broad economy.
2. Promote tourism and events that showcase Gannawarra.

TRANSPARENCY OF COUNCIL DECISIONS

This report will be considered in an open Council meeting.

CONFLICT OF INTEREST

The officer preparing this report declares that they have no conflict of interest in this matter.

ATTACHMENTS

1. Koondrook Caravan Park Project Schedule 23 July 2026 WORKING DOC [**7.4.1** - 8 pages]

Expression of Interest – Offer to Lease - Proposed Project Schedule

Koondrook Caravan Park, 5 Keene Street, Koondrook, Victoria, 3580

Koondrook Glamping Retreat, Keene Street, Koondrook, Victoria, 3580

Item	Activity / Task	Particulars	Commencement Date	Responsible	Completion Date
Instructions & Consultancy Engagement Agreement	Gannawarra Shire Council	Preparation of proposed scope of works to be undertaken by Securitec, formal engagement agreement to be prepared & executed along with Project Proposal and Project Schedule to client. Consultancy Agreement (in form of legal CDS, Project Proposal and Proposed Project Schedule to be emailed to you for consideration and execution.	27 February 2026	Steve Bartlett	**Complete**
ASIC Searches		ASIC searches for corporate companies in transaction. Determine & identify any relevant Trust Structures. Commence discussions with Scott Wishart	Following return of Costs Disclosure Statement / engagement agreement	Tash Murray	**Complete**
Land Title Searches	Land Titles Office	Complete land title searches and identify planning searches required. Complete all regional planning, environmental and compliance searches.	Following return of engagement agreement	Tash Murray	**Complete** **1 Jun 2026**
Draft Lease Glamping Retreat	S17D Crown Land (Reserves) Act lease agreement	Draft proposed s17D Crown Land lease agreement with contingency clauses to run parallel with Koondrook Caravan Park freehold lease.	Mon 29 June 2026	Securitec	

Colour Legend: Complete Underway Pending

Updated: 23 July 2026

Expression of Interest – Offer to Lease - Proposed Project Schedule

Koondrook Caravan Park, 5 Keene Street, Koondrook, Victoria, 3580

Koondrook Glamping Retreat, Keene Street, Koondrook, Victoria, 3580

		Include:- Capital Works Schedule & Maintenance Schedule			
Draft Lease Koondrook Caravan Park	Freehold – Non-Retail Leases Act lease agreement	Draft proposed Non RLA lease agreement with contingency clauses to run parallel with Koondrook Glamping Retreat s17D lease. Incl:- Capital Works Schedule & Maintenance Schedule	Mon 29 June 2026	Securitec	
Marketing	Frank Lane Marketing / local Digital Photographer to undertake site inspection	Quotation from Frank Lane Marketing to develop digital information memorandum*, stills and potential digital video clip incl drone footage. (Subject to quotation and approved disbursement)	Tues 14 July 2026	Steve Bartlett	
Photoshoot / Site Inspection	Frank Lane Marketing	On approval, engage Frank Lane Marketing & photographer to undertake site inspection at same time and accompanied by Securitec. *Note this is weather dependent.*	Fri 14 Aug 2026	Steve Bartlett	
Drafting of EOI Documents Combined docs:- Koondrook Caravan Park & Koondrook Glamping Retreat	Prepare Drafts for Approval by Council	Draft copies of documents required for Expression of Interest process for review by Council - 1. Confidentiality Deeds (corporate & non-corporate) 2. EOI Registration Form	Fri 14 Aug 2026	Securitec	

Colour Legend: Complete Underway Pending

Updated: 23 July 2026

Expression of Interest – Offer to Lease - Proposed Project Schedule

Koondrook Caravan Park, 5 Keene Street, Koondrook, Victoria, 3580

Koondrook Glamping Retreat, Keene Street, Koondrook, Victoria, 3580

		3. Invitation for EOI (Flyer) 4. Information Memorandum*			
Marketing	Review of Video and Brochure & request various amendments	Review of materials and requests for any amendments made.	Fri 21 Aug 2026	Steve Bartlett / Frank Lane / Council	
Council	**Authority to Proceed with EOI**	Briefing to Council Meeting of Council	3 August 2026 19 August 2026		
Finalisation of EOI Preparation & Offer	Finalisation of instructions	Discussions with you regarding statutory preparations information memorandum and planning, review of project documents and taking of further instructions to finalise documents and commence EOI process. Procurement / EOI platform to be booked & uploaded – *Note this will be Council's responsibility.*	Fri 28 August 2026	Securitec Council	
EOI Launch	Launch of EOI and direct approach to key parties	Direct contact with active purchasers of identified corporate parties & larger venture capitalists with financial capacity. Personal Discussions and negotiations on your behalf with each of the potential purchasers on a targeted basis. Upon commencement of negotiations:-	Monday 7 Sept 2026	Securitec	

Colour Legend: Complete Underway Pending

Updated: 23 July 2026

Expression of Interest – Offer to Lease - Proposed Project Schedule

Koondrook Caravan Park, 5 Keene Street, Koondrook, Victoria, 3580

Koondrook Glamping Retreat, Keene Street, Koondrook, Victoria, 3580

		1. Execute Confidentiality Agreement with each proponent; 2. Provide exclusive access to secure Portal to commence Due Diligence; 3. EOI negotiations on your behalf; 4. Full EOI documents to be made available including Draft Sale of Asset Agreements and Draft Lease; 5. Attend to all questions from proponents during EOI period. (On e-tender site)			
EOI Negotiations		Attending to telephone, email and discussions with each interested group, Confidentiality Agreements emailed to each for execution, EOI documents to be provided thereafter, arranging and attending to property inspections with each of the parties separately and advising you during the EOI process.	Monday 7 Sept 2026	Steve Bartlett	
Site Inspections		Dates to be provided to interested proponents for site inspections. Generally, a block of dates Mon- Fri with one inspection booked each morning and afternoon.	Tues 15 Sept Wed 16 Sept	Steve Bartlett	

Colour Legend: Complete Underway Pending

Updated: 23 July 2026

DRAFT

Expression of Interest – Offer to Lease - Proposed Project Schedule

Koondrook Caravan Park, 5 Keene Street, Koondrook, Victoria, 3580

Koondrook Glamping Retreat, Keene Street, Koondrook, Victoria, 3580

		To be coordinated by, attended and managed by Securitec.			
		When interested parties identified: 1. Provide Confidentiality Agreement for execution. 2. Upon return, provide EOI Documents for completion. 3. Arrange Site Inspection(s) 4. Attending to all inquiries and negotiations on your behalf 5. EOI negotiations on your behalf Securitec to provide ongoing management of this process and advice to you regarding the same.		Steve Bartlett Securitec	
Close of EOI	Last date of EOI closing at 4pm.	To be received on digital procurement platform – TBA **	Fri 2 Oct 2026	Council	
Review of EOI Project	Consider submissions from registered proponents	Review Expressions of Interest, review of offers and/or commercial interest in purchasing. Discussions with you, providing advice and seeking your further instructions along with advice to Council. Arranging and Attending to interviews of potential lessees, etc	Mon 5 Oct 2026	Council Steve Bartlett	

Colour Legend: Complete Underway Pending

Updated: 23 July 2026

Expression of Interest – Offer to Lease - Proposed Project Schedule

Koondrook Caravan Park, 5 Keene Street, Koondrook, Victoria, 3580

Koondrook Glamping Retreat, Keene Street, Koondrook, Victoria, 3580

Council		Briefing to Council Meeting of Council	2 Nov 2026 21 Oct 2026		
Finalisation of Leases and Agreements and advice to Council	Proposed Purchaser	Formal advice to Council upon the interest and offers received, and dependent upon your instructions in relation to the sale of Assets; finalisation of Sale of Asset Agreements, Deed of s17D Crown Land (Reserves Act) Lease Agreement & contingent Deed of Freehold Lease.	Fri 23 Oct 2026	Securitec Council	
Council to consider recommendations	Proposed Lessee	Briefing to Council Meeting of Council	9 Nov 2026 18 Nov 2026	Council	
Notice of Intention	Notice of Intention to Lease	Council to advertise Notice of Intention to Lease in accordance with s115 Local Government Act for 28 days. (Council to advise policy)***	TBA	Council	
Ministerial Approval	Approval to be sought by Council	Approval to be sought from Minister of Minister's delegate in relation to s17D Crown land lease. (Crown licence to be considered in the interim if delay likely pending Lease approval).	TBA	Council	
Council Determination	Council to formally consider at statutory meeting	Enter into Deed of Freehold Lease and sale of assets at the caravan park; and Enter into a Deed of Crown Land (Reserves) Act Lease and sale of assets at the Glamping Retreat.	February 2027 TBA	Council	

Colour Legend: Complete Underway Pending

Updated: 23 July 2026

Expression of Interest – Offer to Lease - Proposed Project Schedule

Koondrook Caravan Park, 5 Keene Street, Koondrook, Victoria, 3580

Koondrook Glamping Retreat, Keene Street, Koondrook, Victoria, 3580

Transition to Settlement	Discussions with approved Lessee	Liaising with incoming lessee, preparation and management of lease agreements, sale of asset agreements and transfers in readiness for Settlement. Attending to settlement adjustments as necessary.	Mid Feb 2027	Securitec	
Settlement	Attend to and manage settlement with approved Lessee	Settlement of leases including attendance at park for settlement, transfer and handover.	Mon 1 Mar 2027	Securitec / Council	
Post Settlement	Finalisation of Project	Ensure that all lodgings, transfers and finalised and completion of file. Discussion with Council.	Fri 5 Mar 2027	Securitec Steve Bartlett	

Notes

Notes & Discussion Items

1. **Information Memorandum*** - further discussion required as to the extent and scope of the IM. To include photography – stills and drone video to ensure that the high quality photographs on the HPM website for both the caravan park and glamping retreat are reached along with showcasing the wharf development already undertaken by Council. Development of Information Memorandum and Invitation to Tender to be developed by Securitec and digital enhancement by Frank Lane Marketing. Request for quotation to Frank Lane Marketing on 22 June 2026.

2. **Procurement Policy**** - further discussion required as the extent of the advertising – treat as a tender within council's procurement policy or other method. To be operated on e-tender platform.

3. **Public Advertising Policy***** - further discussion required regarding public advertising with Notice of Intention to Lease – strict s115 LGA compliance or council alternative policy? Yes, in addition to be consistent with Council's Community Engagement policy

4. **Discussion** – extend current Interim Management Agreement with HPM at the Koondrook Caravan Park as current Management Agreement is due to expire on 2 November 2026 to be consistent with the natural expiration date of the Glamping Retreat. We suggest extend by 2 days by mutual consent with settlement on both Koondrook Caravan Park and Glamping Retreat to occur on 5 November 2026 to avoid issues with the Melbourne Cup Long Weekend. – Extend out to new proposed date on 1 March 2027.

Colour Legend: Complete Underway Pending

Updated: 23 July 2026

DRAFT

Expression of Interest – Offer to Lease - Proposed Project Schedule

Koondrook Caravan Park, 5 Keene Street, Koondrook, Victoria, 3580

Koondrook Glamping Retreat, Keene Street, Koondrook, Victoria, 3580

5. **Discussion** required in respect to Crown Land Management delegation protocols for the Glamping Retreat. Is DEECA approval / consent to lease being discussed or sought by Council, does DEECA have sufficient Ministerial delegation to approve or is Ministerial consent approvals required? Should we contemplate and make allowance for an interim Crown licence to operate from 6 November 2026 pending s17D Crown land (Reserves) Act lease approval? To be determined by Council.

DRAFT

Colour Legend: Complete Underway Pending

Updated: 23 July 2026

7.5 COUNCIL POLICY NO. 123 - ROADSIDE, PARKS AND RESERVES TRADING

Author: **Fiona Gormann, Manager Planning and Regulatory Services**
Authoriser: **Wade Williams (Director Infrastructure & Development)**

RECOMMENDATION

That Council adopt Council Policy No. 123 – Roadsides, Parks and Reserves Trading.

EXECUTIVE SUMMARY

The purpose of this report is to present the proposed Roadsides, Parks and Reserves Trading Policy (Policy No. 123) for Council's consideration and adoption.

The Policy establishes a clear, fair and transparent framework for the assessment and management of itinerant trading activities on Council-controlled roadsides, parks and reserves throughout the municipality. It provides guidance regarding permit requirements, permit duration, fees, operating hours, insurance requirements, compliance obligations and site allocation principles.

The Policy supports Council's responsibility to protect public safety, preserve municipal amenity, ensure equitable access to public land and provide consistency in decision making. It also recognises the importance of supporting commercial operators, community organisations and visitors while balancing the interests of permanent businesses and the broader community.

Adoption of the Policy will provide a contemporary governance framework that aligns with the Gannawarra Shire Council Community Amenity Local Law 2023 and relevant State and Commonwealth legislation.

PURPOSE

The purpose of this report is to seek Council's approval to adopt Council Policy No. 123 – Roadsides, Parks and Reserves Trading Policy.

The Policy provides a consistent administrative framework for regulating itinerant trading on Council-managed land and ensures permit applications are assessed fairly, transparently and in accordance with legislative requirements.

DISCUSSION

Council has a responsibility to appropriately manage the use of public land while ensuring community safety, protecting public assets and maintaining the amenity of the municipality.

Roadsides, parks and reserves are important public assets intended for the enjoyment and benefit of the whole community. Increasing interest in temporary food vendors, coffee vans, produce stalls, mobile services and other itinerant businesses has highlighted the need for a consistent policy framework that clearly outlines Council's expectations and approval processes.

Whilst itinerant trading contributes positively to local economic activity, tourism and community activation, inappropriate trading locations or poorly managed operations may create conflicts with:

- pedestrian and vehicle safety;
- traffic movements and parking;
- permanent businesses;
- public access;

- neighbouring residents;
- environmental values;
- maintenance of public open space; and
- the overall amenity of an area.

The proposed Policy establishes transparent processes for permit assessment, site allocation and ongoing compliance. It also recognises Council's obligation to receive an appropriate return for the private commercial use of public assets through the application of permit and site fees.

Importantly, the Policy does not seek to regulate planning matters that may separately require approval under the Planning Scheme. Rather, it complements existing legislative requirements by providing operational controls under Council's Local Law.

The Policy also provides flexibility for Council to support community events, festivals and public activities where multiple traders may operate under a single event permit, reducing unnecessary administrative burden while maintaining public safety.

Overall, the Policy improves consistency, transparency and accountability in Council's decision-making while providing greater certainty for applicants and the community.

RELEVANT LAW

Council has the authority to adopt and administer this Policy under the following legislation:

- *Local Government Act 2020*, including:
  - Section 8 – Role of Council;
  - Section 9 – Governance Principles;
  - Section 10 – General Power of Councils.
- Gannawarra Shire Council Community Amenity Local Law 2023, Part 4 – Business and Building Works, Division 1, section 38 (Trading on a road or Council land).
- *Food Act 1984*
- *Public Health and Wellbeing Act 2008*
- *Road Safety Act 1986*
- *Disability Discrimination Act 1992*
- *Australian Consumer Law and Fair Trading Act 2012* and associated regulations.

Whilst Council has broad powers to regulate activities occurring on Council controlled land, those powers must be exercised consistently with State and Commonwealth legislation and in accordance with the principles of procedural fairness and natural justice.

RELATED COUNCIL DECISIONS

Council previously adopted a Roadsides, Parks and Reserves Trading Policy to guide the management of itinerant trading activities within the municipality.

The proposed Policy has been reviewed and updated to:

- align with the Gannawarra Shire Council Community Amenity Local Law 2023;
- improve clarity regarding permit requirements;
- provide greater transparency in site allocation;
- strengthen compliance expectations;
- incorporate contemporary governance practices; and
- ensure consistency with current legislative requirements.

Upon adoption, this Policy will replace any previous version.

OPTIONS

Council has the following options available:

Option 1: Council adopts Policy No. 123 as presented (Recommended)

- This option: provides a contemporary governance framework; improves consistency and transparency; supports fair decision making; protects public amenity; supports local economic activity; provides certainty for applicants; and aligns with current legislation and Council's Local Law.

Option 2: Council may resolve to adopt the Policy subject to amendments identified during Council's consideration.

- This option allows refinement of the Policy while maintaining its overall intent.

Option 3: Council may determine not to adopt the Policy.

- This option is not recommended as it may result in inconsistent decision making, reduced transparency and reliance on administrative practices without an endorsed policy framework.

SUSTAINABILITY IMPLICATIONS

The proposed Policy promotes sustainable management of Council owned and controlled public land by balancing economic opportunities with the protection of environmental, social and community values.

Economic

The Policy supports local economic development by providing opportunities for itinerant traders while ensuring equitable access to Council land and appropriate cost recovery through permit and site fees. It also seeks to minimise unreasonable impacts on existing businesses by applying transparent assessment criteria.

Social

The Policy supports community wellbeing by encouraging appropriate commercial activity that contributes to vibrant public spaces while ensuring public safety, accessibility and equitable use of community assets. The Policy also provides consistency and fairness for all applicants through transparent assessment and allocation processes.

Environmental

The Policy assists in protecting parks, reserves and roadside environments by ensuring trading activities are appropriately located and managed. Permit conditions may address waste management, environmental protection, traffic management and the preservation of Council assets. Appropriate site selection also assists in minimising environmental impacts and supports the ongoing sustainable management of public land.

Climate Change

The Policy supports climate change adaptation by enabling Council to assess site suitability having regard to environmental risks, vegetation protection and the long-term management of public open space. Council retains discretion to refuse or relocate trading activities where environmental impacts or climate-related risks may adversely affect public land or community safety.

COMMUNITY ENGAGEMENT

The development of the Roadsides, Parks and Reserves Trading Policy has primarily involved an internal review of Council's existing administrative processes, legislative obligations and operational requirements.

The Policy has been developed to provide greater consistency, transparency and fairness in the assessment and management of itinerant trading permits across the municipality.

Given the Policy is administrative in nature and establishes Council's internal framework for the assessment and regulation of permit applications under the Gannawarra Shire Council Community Amenity Local Law 2023, formal community consultation has not been undertaken.

The Policy does, however, recognise the interests of local businesses, community groups and residents by requiring Council to consider any relevant concerns or submissions received during the assessment of individual permit applications, whilst ensuring decisions are made fairly and in accordance with the *Australian Consumer Law and Fair Trading Act 2012*.

INNOVATION AND CONTINUOUS IMPROVEMENT

The proposed Policy demonstrates Council's commitment to continuous improvement by establishing a modern, transparent and consistent framework for the management of itinerant trading throughout the municipality.

The Policy introduces clear assessment criteria, defined permit durations, transparent site allocation principles and consistent compliance requirements, improving governance and providing greater certainty for applicants, Council officers and the community.

The Policy also allows Council to respond to changing community expectations and emerging business opportunities while maintaining appropriate protections for public amenity and Council assets.

COLLABORATION

The preparation of this Policy has primarily involved collaboration between Council's Local Laws, Environmental Health, Planning and Governance functions to ensure consistency with legislative requirements and Council's operational practices.

The Policy has also been developed with consideration of relevant State legislation governing food safety, public health, road safety, building standards and consumer protection.

No formal collaboration with neighbouring municipalities, State Government agencies or other statutory authorities was required in the preparation of this Policy.

FINANCIAL VIABILITY

The adoption of the Policy is not expected to have any significant financial implications beyond existing operational resources.

The Policy supports Council's ongoing financial sustainability by providing for permit fees and trading site fees in accordance with Council's adopted Fees and Charges Schedule. These fees contribute towards the administrative costs associated with assessing applications, managing permits, monitoring compliance and maintaining Council-controlled public land.

The Policy also supports appropriate stewardship of Council assets by ensuring commercial use of public land provides a fair return to the community while minimising potential costs associated with damage, maintenance or enforcement activities.

Any future amendments to fees will continue to be considered through Council's annual budget process.

REGIONAL, STATE AND NATIONAL PLANS AND POLICIES

The proposed Policy has been prepared having regard to relevant State and Commonwealth legislation and supports Council's strategic planning and decision-making responsibilities.

Relevant legislation and policy considerations include:

- *Local Government Act 2020*, particularly the governance principles contained in section 9.
- Gannawarra Shire Council Community Amenity Local Law 2023.
- *Food Act 1984.*
- *Public Health and Wellbeing Act 2008.*
- *Road Safety Act 1986.*
- *Building Act 1993.*
- *Disability Discrimination Act 1992.*
- *Australian Consumer Law and Fair Trading Act 2012.*

The Policy also supports Council's broader strategic objectives of promoting safe, accessible and well managed public spaces, encouraging appropriate economic activity and protecting the amenity of the municipality.

COUNCIL PLANS AND POLICIES

Goal 3: Sustainability - Achieve long-term financial and environmental sustainability.
4. Ensure transparent, inclusive decision-making through effective leadership.

TRANSPARENCY OF COUNCIL DECISIONS

This report will be considered in an open Council Meeting.

CONFLICT OF INTEREST

The officer preparing this report declares that they have no conflict of interest in this matter.

ATTACHMENTS

1. 123RoadsidesParksandReservesTrading 1 (1) [**7.5.1** - 3 pages]

Roadsides, Parks and Reserves Trading

COUNCIL POLICY NO. 123

1. PURPOSE

Policy No. 123 – Roads, Parks and Reserves Trading (the Policy) specifies Council's requirements and expectations relating to authorisation of the use of public footpaths, roadside, parks or reserve areas for the purpose of operating an itinerant business and to ensure that such activities do not adversely impact on local residents or business operators.

2. DEFINITIONS

2.1 **Itinerant Trading –**

The temporary or regular offering of goods or services for sale for the benefit of a person, a company or organisation, in or on a public place, or a street or road, and from a vehicle, caravan, trailer, table, bicycle, stall or similar structure.

2.2 **Designated Areas –**

All locations within the Gannawarra Shire. Location to be limited, reviewable and allocated by transparent procurement processes.

2.3 **Permit Holder –**

A permit holder can be an individual, community group or commercial enterprise that is charged with the responsibility for a private function, commercial or public events. If the individual, community group or commercial enterprise holds a permit for an event, individual traders who participate in that event do not require a permit.

3. POLICY PROCESS

3.1 Fee structure

Fees will be applied in accordance with Gannawarra Shire Council's Fees and Charges Schedule and will include a trading site fee payable in full in advance at the same time as the permit fee.

3.2 Duration of permit

A permit will be issued for a period of not more than three (3) months per permit for the first application for any site by an applicant and a maximum of twelve (12) months for subsequent permits by the same applicant for the same site.

3.3 Hours of operation

Traders will be limited by the time on the permit but may be extended for special events by prior written agreement.

3.4 Risk assessment and insurance

Prior to a permit being issued, the applicant must provide evidence of:

- compliance with the *Food Act 1984* and other relevant legislation
- public liability insurance policy for at least $10 million
- risk management plan, including traffic control for both pedestrians and vehicles.

3.5 Compliance instrument

Council regulates itinerant (Roads, Parks and Reserves Trading) activity through the clauses and provisions of the Gannawarra Shire Council Community Amenity Local Law 2023.

Part 4– Business and Building works Division (1) Section 38 Trading on a road or Council land states:

A person must not, without a permit, erect or place on any road or Council land a vehicle, caravan, trailer, table, stall or other similar structure for the purpose of selling or offering for sale any goods or services.

Permit holders are required to comply with a range of State and Commonwealth legislation and associated regulations and Australian Standards including, but not limited to the *Food Act 1984*, the *Public Health and Wellbeing Act 2008*, the *Building Act 1993*, the *Disability Discrimination Act 1992* (Cth), and the *Road Safety Act 1986*.

3.6 Approval

Council's principle concern with itinerant trading is the protection of the amenity of the municipality including roads, streets and public places. Council is also obliged to ensure a fair return for the use of a public asset for private profit. Council will not grant permits where there is sufficient evidence to the Council, or its officers that granting the permit would have detrimental effects on an area or is not in accord with a surrounding public area, its general amenity, Council heritage codes or other Council codes.

Council will take into consideration any concerns, opinions or submissions of businesses or traders within the municipality without in any way whatsoever discriminating against the applicant or breaching conditions of the *Australian Consumer Law and Fair Trading Act 2012* and its associated regulations.

In considering any application, Council will make reasonable assessment of the type of itinerant trading, proposed hours of operation and season of operation.

Council will adopt a fair and transparent site allocation process for itinerant trading sites.

Council will consider any complaints or non-compliance by the permit holder from any itinerant trading site within the Shire in accordance with the discretion guidelines set out in within the Community Amenity Local Law 2023.

Council reserves the right to refuse to renew any permit or to change or cancel altogether any existing itinerant trading site location.

In addition to requiring a permit fee and an itinerant trading site fee for all itinerant trading applications, Council or its officers may impose any condition, separate to planning conditions which applications may be subjected to from time to time, which Council believes is necessary or which will increase the likelihood of trading activity being compatible with an area and municipal amenity.

4. POLICY REVIEW

Council will review this policy at least once every three (3) years, and within two (2) years of each general election of Council.

At the time it was developed, this policy was compliant with the *Victoria Charter of Human Rights and Responsibilities Act 2006*.

5. FURTHER INFORMATION

Members of the public may inspect all policies at Gannawarra Shire Council's Kerang and Cohuna office or online at www.gannawarra.vic.gov.au

Any enquiries in relation to this policy should be directed to the Manager Planning & Regulatory Services on (03) 5450 9333.

Revision History

Originally adopted:	18 November 2013
Reviewed:	21 December 2016
Reviewed:	20 April 2022
Reviewed:	19 August 2026
Next review:	August 2029
ECM Folder:	*3.000518*

7.6 COUNCIL POLICY NO. 121 - SMOKE AND VAPE FREE ZONES

Author: **Fiona Gormann, Manager Planning and Regulatory Services**
Authoriser: **Wade Williams (Director Infrastructure & Development)**

RECOMMENDATION

That Council adopt Council Policy No. 121 - Smoke and Vape Free Zones.

EXECUTIVE SUMMARY

The Smoke and Vape Free Zone Policy No 121 has been reviewed to ensure it remains effective and aligned with current public health legislation, Council's Community Amenity Local Law, and community expectations.

The revised policy strengthens Council's commitment to promoting healthy environments by expanding the scope of the policy to include vaping and clarifying designated smoke and vape free areas.

Adoption of the revised policy will support improved community health outcomes, reduce exposure to second-hand smoke, aerosol or vapour from vape products (also known as e-cigarettes), and provide clearer guidance for enforcement.

PURPOSE

The purpose of this report is to present the revised Smoke and Vape Free Zone Policy to Council for adoption. The updated policy aims to enhance public health protections and ensure consistency with legislative frameworks which include vaping.

DISCUSSION

Council's existing Smoke Free Zone Policy has been in place for several years. Community expectations, legislative changes, and increased awareness of the health impacts of both smoking and vaping have necessitated a review.

The revised policy:

- Maintains smoke-free areas consistent with Council's Community Amenity Local Law.
- Adds additional smoke and vape free zones around school crossing shelters.
- Introduces clear definitions and provisions relating to vaping.
- Improves clarity for authourised officers in enforcing Council's Community Amenity Local Law.
- Aligns with broader state and national public health legislation.
- Enhance educational opportunities across the community of the health impacts of vaping and addresses community concerns regarding both smoking and vaping in public places, particularly around children and vulnerable populations.

RELEVANT LAW

- *Tobacco Act 1987*
- Community Amenity Local Law 2023

RELATED COUNCIL DECISIONS

Previously reviewed and adoption of Policy No. 121 on 20 April 2022.

OPTIONS

Option 1: Adopt the revised policy (recommended)

- This option ensures Council maintains a proactive approach to public health and provides clear guidelines for the enforcement of Council's Community Amenity Local Law.

Option 2: Retain the existing policy

- This option would result in an outdated legal framework that does not include vaping or current community expectations and may limit Council's ability to enforce smoke-free environments effectively under Council's Community Amenity Local Law.

Option 3: Adopt the revised policy with amendments

- Council may choose to adopt the policy with minor amendments; however, this may delay implementation and require further review.

SUSTAINABILITY IMPLICATIONS

The revised policy contributes to social sustainability by promoting healthy public environments and reducing exposure to harmful substances. It supports long-term community wellbeing and aligns with preventative health legislation.

COMMUNITY ENGAGEMENT

Not applicable

INNOVATION AND CONTINUOUS IMPROVEMENT

The policy reflects and strengthens the requirements of the *Tobacco Act 1987*. In addition, the policy provides guidance for authourised officers in enforcing the declared Smoke Free Zones in Council's Community Amenity Local Law. The inclusion of vaping aligns with public health legislation. This ensures the policy remains adaptable and responsive to changing behaviours and regulatory environments, supporting Council's commitment to continuous improvement.

COLLABORATION

The policy review has involved consultation with relevant internal departments, including Local Laws and Environmental Health. Consideration has also been given to Victorian legislation to ensure alignment.

FINANCIAL VIABILITY

The implementation of the revised policy is expected to be managed within existing operational budgets. Signage will be updated at specified locations to be consistent to signage prescribed in the *Tobacco Act 1987* and this cost can be accommodated through future budget allocations.

REGIONAL, STATE AND NATIONAL PLANS AND POLICIES

The revised Smoke and Vape Free Zone Policy aligns with relevant Victorian Government legislation and public health frameworks, including the *Tobacco Act 1987* and associated regulations that restrict smoking and vaping in designated public areas.

The policy also supports state-wide public health objectives aimed at reducing smoking prevalence and limiting exposure to second-hand smoke. The inclusion of vaping is consistent with Victorian legislation.

COUNCIL PLANS AND POLICIES

Goal 3: Sustainability - Achieve long-term financial and environmental sustainability.
4. Ensure transparent, inclusive decision-making through effective leadership.

TRANSPARENCY OF COUNCIL DECISIONS

This report will be considered in an open Council meeting.

CONFLICT OF INTEREST

The officer preparing this report declares that they have no conflict of interest in this matter.

ATTACHMENTS

1. 121SmokeFreeZones [**7.6.1** - 3 pages]

Smoke and Vape Free Zones

COUNCIL POLICY NO. 121

1. POLICY OBJECTIVE

To support the community to become safer and healthier in a smoke and vape free environment.

2. DEFINITION

'Smoke and Vape free zone' means part of an outdoor area in which smoking and vaping is not permitted. The 'Smoke and Vape free zone' will be identified by the presence of one or more signs displaying the phrase 'No Smoking or Vaping'. Smoking means smoking or vaping, holding or otherwise having control over an ignited smoking or vaping product. Smoking and vaping product includes any tobacco or other product that is intended to be smoked or vaped.

3. POLICY

In the interests of providing a smoke and vape free environment, smoking and vaping will not be permitted in specified public places and Council controlled land, in particular, workplaces, other places used for recreation and places used by children.

The following location have been declared "smoke-free zones" at all times by Gannawarra Shire Council:

1. Council controlled infrastructure and buildings, including children centres:
   - (a) All indoor areas;
   - (b) All outdoor dining areas:
   - (c) Within four (4) metres of major thoroughfares and access points to buildings, such as doors, windows, air conditioning vents and air intakes.
2. Within four (4) metres of substantially enclosed courtyards and building surrounds, including school crossing shelters.
3. Within 10 metres of play equipment, including skate parks.
4. Inside the external fence of all swimming pools, including Koondrook and Quambatook swimming pools which are located on Crown land and managed by an appointed Committee of Management.
5. Within 10 metres of a sporting venue that is an outdoor public space during an organised underage sporting event or a training practice session to prepare for participation in an organised underage sporting event, or any break or interval during the course of the organised underage sporting event or training or practice session.

Council will erect and maintain in all proclaimed no smoking and vaping areas at pedestrian access points, signage that clearly indicates that the area has been declared a "Smoke and Vape free zone".

Adherence to Policy No. 121 – Smoke and Vape Free Zones will be enforced by Community Amenity Local Law 2023 Part 5 Liquor and Smoking Clause No.53. Declared Smoke and Vape Free Area and will attract a penalty in accordance with Clause 53 of Part 5 of the Community Amenity Local Law 2023.

Council will also enforce the requirements of the *Tobacco Act 1987,* and associated amendments, where this Act is applicable. This includes no smoking or vaping within enclosed workplaces, outdoor drinking and dining areas, children services, public swimming pools, children's play equipment, skate parks and outdoor sporting venues when organised underage sporting events, training or practice sessions are taking place.

4. POLICY REVIEW

Council will review this policy as required but always within two (2) years of each general election of Council.

At the time it was developed, this policy was compliance with the *Victorian Charter of Human Rights and Responsibilities Act 2006.*

5. FURTHER INFORMATION

Members of the public may inspect all policies at Gannawarra Shire Council's Kerang and Cohuna office or online at www.gsc.vic.gov.au. Any enquiries in relation to this policy should be directed to the Manager Planning & Regulatory Services on (03) 5450 9333.

Revision History

Originally adopted:	17 July 2013
Reviewed:	21 December 2016
Reviewed:	20 April 2022
Reviewed:	19 August 2026
Next review:	August 2029
ECM Folder:	*3.000518*

7.7 COUNCIL POLICY NO. 128 - ASSET DISPOSAL & RATIONALISATION

Author: **Dmitry Belyakov, Manager Council Assets**
Authoriser: **Wade Williams (Director Infrastructure & Development)**

RECOMMENDATION

That Council adopt Council Policy No. 128 - Asset Disposal and Rationalisation.

EXECUTIVE SUMMARY

Council Policy No. 128 – Asset Disposal and Rationalisation and the associated procedure have been reviewed to reflect current legislation, asset management practices and Council's organisational structure.

The review updates legislative references, clarifies roles and responsibilities, strengthens governance and asset management requirements, improves alignment with Council's Asset Management Policy and Asset Management Framework and incorporates requirements to ensure asset disposals are appropriately reflected within Council's Asset, GIS and financial systems.

Council is requested to adopt the revised Asset Disposal and Rationalisation Policy and note the updated supporting procedure.

PURPOSE

The purpose of this report is to seek Council's adoption of the revised Asset Disposal and Rationalisation Policy (Policy No. 128) and to note the associated updated Asset Disposal and Rationalisation Procedure.

DISCUSSION

Council's Asset Disposal and Rationalisation Policy had been reviewed as part of the scheduled policy review process.

The review revises the policy and supporting procedure to reflect current legislative requirements, organisational responsibilities and asset management practices. The revisions improve governance over asset disposal and rationalisation decisions while ensuring consistency with Council's Asset Management Policy, Asset Management Plans and corporate asset management framework.

Key updates include:

- updating legislative references, including the *Local Government Act 2020*;
- clarifying roles and responsibilities for Operational Area Asset Managers and the Manager Council Assets;
- strengthening governance and decision-making requirements for asset disposal and rationalisation;
- incorporating lifecycle, risk, service level and strategic planning considerations into disposal assessments;
- strengthening requirements for maintaining Council's Asset Register, GIS and financial records following disposal;
- improving disposal assessment documentation and approval processes; and
- updating terminology, position titles and administrative references to reflect Council's current organisational structure.

The revised policy and procedure provide a more structured and auditable framework for managing surplus and redundant assets while supporting sound financial management and long-term service delivery.

RELEVANT LAW

- *Local Government Act 2020*
- *Local Government Act 2020 Schedule 10*
- *Road Management Act 2004*
- *Planning and Environment Act 1987*

RELATED COUNCIL DECISIONS

Council adopted Policy No. 128 – Asset Disposal and Rationalisation on 15 July 2015, with subsequent reviews completed in September 2018 and May 2022.

OPTIONS

Council may:

- Adopt the revised Asset Disposal and Rationalisation Policy and note the updated procedure (recommended); or
- Request further amendments prior to adoption.

SUSTAINABILITY IMPLICATIONS

The revised policy supports sound financial management by ensuring assets are retained only where they continue to support agreed service levels and by promoting informed disposal and rationalisation decisions.

The policy encourages consideration of recycling, reuse and environmentally responsible disposal methods where appropriate.

The revised procedure includes consideration of climate resilience and environmental impacts where relevant to disposal and rationalisation decisions.

COMMUNITY ENGAGEMENT

Community engagement has not been undertaken as this report relates to the review of an internal governance policy. Where legislation requires community engagement for the disposal of land or other assets, those requirements will continue to be undertaken on a case-by-case basis.

INNOVATION AND CONTINUOUS IMPROVEMENT

The revised policy reflects current asset management practices and strengthens governance, lifecycle management and asset information management, supporting continuous improvement across Council's asset management framework.

COLLABORATION

The policy review has been informed by current local government asset management practices, applicable guidelines and legislative requirements.

FINANCIAL VIABILITY

The revised policy does not have any direct budget implications. The policy supports Council's ongoing financial sustainability through improved governance of asset rationalisation, disposal decisions and asset information management.

REGIONAL, STATE AND NATIONAL PLANS AND POLICIES

- Australian Accounting Standards, including AASB 116 Property, Plant and Equipment and AASB 13 Fair Value Measurement
- ISO 55001 Asset Management principles;
- IPWEA International Infrastructure Management Manual (IIMM);
- National Asset Management Assessment Framework (NAMAF).

COUNCIL PLANS AND POLICIES

Goal 1: Liveability - Enhance the wellbeing and liveability of the Gannawarra through infrastructure development and services.
2. Prioritise maintenance, renewal and improvement of assets including local roads, footpaths, and community infrastructure that support accessibility and safety.

Goal 2: Growth - Grow the Gannawarra through a diverse and broad economy.
3. Plan land use to enable growth and expand housing opportunities.

Goal 3: Sustainability - Achieve long-term financial and environmental sustainability.
1. Manage Council's budget responsibly by delivering cost-effective services, pursuing new revenue opportunities, and ensuring long-term financial sustainability.
4. Ensure transparent, inclusive decision-making through effective leadership.

TRANSPARENCY OF COUNCIL DECISIONS

This report will be considered in an open Council Meeting.

CONFLICT OF INTEREST

The officer preparing this report declares that they have no conflict of interest in this matter.

ATTACHMENTS

1. 128 Asset Disposaland Rationalisation 2026 [**7.7.1** - 3 pages]
2. 128 Procedure Asset Disposaland Rationalisation 2026 [**7.7.2** - 8 pages]

Asset Disposal & Rationalisation

COUNCIL POLICY NO. 128

1. POLICY PURPOSE

The purpose of this Policy is to establish a consistent, transparent and evidence-based approach to the disposal and rationalisation of Council assets throughout their lifecycle rationalisation of Council assets when the assets are no longer required to meet agreed services or when there is no clear need for Council to retain ownership of the asset. Council assets will not be automatically replaced at the end of their useful life or when they no longer serve the function for which they were intended. Disposal and rationalisation decisions will consider current and future service requirements, asset condition, risk, lifecycle costs, community benefit and financial sustainability.

This Policy defines the principles and decision-making framework to assist Asset Managers in identifying, assessing, approving and implementing asset disposal and rationalisation activities.

2. SCOPE

This policy applies to all asset classes owned by Council and identified as, but not limited to:

- real estate property,
- buildings or other fixed infrastructure,
- Infrastructure assets including roads, bridges, footpaths, drainage and open space assets
- light vehicles (cars and utes),
- heavy plant,
- tangible assets including artworks, office furniture and equipment and computers.

This policy does not apply where disposal processes are prescribed by legislation, grant funding agreements or other Council adopted policies/guidelines.

3. POLICY PRINCIPLES

Council must have regard to the following principles in its disposal or rationalisation of assets:

- Decisions are based on agreed service levels and whole-of-life asset management principles
- Open and effective competition
- Demonstrate Council's accountability and responsibility to ratepayers;
- Seek to be fair and equitable to all parties involved;
- Seek to ensure probity, accountability and transparency in all disposal processes;
- Seek to ensure that the best outcome is achieved for Council;
- Disposal decisions should maximise value to the community, recognising that best value is not always highest financial return;
- Council officers must carry out all phases of the disposal process with impartiality, fairness, independence, openness and integrity.

- Disposal decisions must demonstrate best value having regard to:
    - whole-of-life financial implications;
    - future maintenance liabilities;
    - service delivery impacts;
    - climate resilience where relevant;
    - utilisation levels;
    - community benefit;
    - environmental sustainability.

4. POLICY OBJECTIVES

To provide a systematic, transparent and accountable method for the disposal or rationalisation of Council owned assets in accordance with:

- Council Policy No. 078 - Councillor Code of Conduct
- Council Staff Code of Conduct
- Council Plan - 2025 - 2029
- Council's Strategic Resource Plan
- Long Term Financial Plan
- Council Policy No. 085 – Asset Management
- Council Policy No. 109 – Procurement
- Gannawarra Library Service Collection Development Guidelines
- *Local Government Act 1989 Schedule 10*
- *Local Government Act 2020*
- *Asset Management Strategy/Plans*
- *ISO 55001 Asset Management Principles*
- *IPWEA International Infrastructure Management Manual (IIMM)*
- All appropriate legislation and accounting standards.

5. CONSULTATION

Council must undertake public consultation in respect of its proposed disposal or rationalisation of land and/or buildings in accordance with the *Local Government Act 2020* and with the intent of the Council Plan 2025-2029.

6. ASSET REGISTER REQUIREMENTS

Following disposal or rationalisation, the responsible Asset Manager shall ensure:

- the Asset Register is updated,
- Asset Register associated financial records are adjusted,
- GIS records are updated where applicable,
- maintenance schedules are amended,
- Asset Management Plans are updated where required.

7. POLICY REVIEW

Council will review this policy as required but always within two years after a general election of the Council.

At the time it was developed, this policy was compliant with the *Victorian Charter of Human Rights and Responsibilities Act 2006.*

8. FURTHER INFORMATION

Members of the public may inspect all policies at Gannawarra Shire Council's Kerang and Cohuna office or online at www.gsc.vic.gov.au.

Any enquiries in relation to this policy should be directed to the Director Infrastructure & Development on (03) 5450 9333.

Altus ECM Folder: 3.000518			
Originally adopted:	15 July 2015	Minute Book Reference:	11833
Reviewed:	19 September 2018	Minute Book Reference:	12728
Reviewed:	18/05/2022		
Reviewed:	19/08/2026		
To be reviewed by:	2030		

Procedure:
Asset Disposal & Rationalisation

Enabling Policy: Policy No. 128

1. PURPOSE

The purpose of this procedure is to provide due diligence and direction to Council staff in the efficient and effective implementation of Council Policy 128 – Asset Disposal and Rationalisation. The effective application of this procedure will ensure that any disposal or rationalisation of Council's assets is carried out in a transparent, fair, independent and open manner. This procedure also ensures that all asset disposals and rationalisation decisions are reflected in Council's Asset Register, Geographic Information System (GIS) and financial records and that asset information remains accurate and auditable.

2. APPLICATION

This procedure applies to any person or persons responsible for the identification of assets that are no longer 'fit for purpose' and require disposal or rationalisation.

3. CONSIDERATIONS PRIOR TO REQUEST TO DISPOSE OF OR RATIONALISE AN ASSET

Before any request to dispose of or rationalise an asset, the relevant operational area Asset Manager and Manager Council Assets must ensure that the request is appropriate and must consider (where applicable) the following:

- Underutilisation of the asset;
- Usability of the asset;
- Effect on adopted Levels of Service;
- Consistency with relevant Asset Management Plans;
- Current market value of the asset;
- Whole-of-life costs of retaining versus disposing of the asset;
- Asset criticality and operational dependency;
- Policy change;
- Appropriate timing of disposal to maximise return to council;
- Any duplication of the asset or the service provided by the asset;
- Potential risk of ownership, e.g. contains environmentally sensitive or hazardous material;
- Current and future community demand;
- Any cultural or historical significance of the asset;
- Council's long-term plans and strategic direction;
- The remaining useful life of the asset;

- Compliance with Council's procurement policy;
- Alignment with Council Plan, Community Vision and Long-Term Financial Plan;
- Climate resilience and adaptation considerations;
- Donating or gifting of assets when the asset is no longer fit for Council purposes, or when the financial realisation of the asset is minimal (e.g. <$1,000) donation of assets to community groups/charities is permitted with Chief Executive Officer (CEO) approval;
- Risk analysis of the proposed asset disposal or rationalisation;
- Outcomes of any community consultations;
- Any restrictions on the proposed disposal or rationalisation;
- How identifying marks or insignia that directly relate to Council can be removed from the asset;
- The asset does not contain confidential documents, software, licencing implications or associated material;
- Hazardous materials (ensure that any dangerous goods are disposed of in an authorised manner);
- Conflict of interest (that the officers involved in the disposal process have no conflict of interest);
- Any other relevant Council policies or associated Service Level Plans;
- The zoning of land and whether any rezoning will be required; and
- Internal financial controls and prudent management;
- Financial reporting implications including written down value, asset revaluation reserve, impairment and disposal gains or losses.

4. METHODS OF DISPOSAL

Council officers will manage, where appropriate, the disposal or rationalisation of the asset in the most cost-effective manner, through one of the following methods:

Disposal Method	Rationale
Trade-In:	Trading in equipment as part of another purchase or plant rationalisation process
Expression of interest:	Seeking expressions of interest from buyers
Open tender:	Openly seeking bids through a tender process
Sale or Public auction:	Upon obtaining a current valuation, procure the services of a real estate agent or auctioneer and advertising for sale or auction through the local paper and where appropriate, a paper circulating in Victoria, ensuring open and effective competition that maximises returns for Council (following compliance with Council's Procurement Policy)
Demolish/Recycle:	Depending on the condition and usability of the asset, the value of the asset may be removed from the Asset Register following disposal and accounted for in accordance with applicable accounting standards, and the asset disposed of if the asset is beyond economical repair
Charity/Gifting:	Donation of Council owned assets to a non-profit organisation or another Government authority/agency
Land exchange:	A land exchange by private treaty between Council and another party will be considered when there is an identified mutual benefit that also contains significant community benefit and when the market value of the land is commensurate, or if not commensurate, then the community benefit is quantifiable to equalise the value in accordance with the *Local Government Act 2020.*

The disposal or rationalisation of an asset will be expedited in accordance with the Responsibility and Authorisation Matrix on Page 3 of this document and should include the development of an asset disposal or rationalisation proposal.
(Land Assessment - Attachment 1)
(Other Asset Assessment – Attachment 2).

Selection of a suitable disposal method will include consideration of:

- the public demand and interest in the asset;
- the method most likely to return best overall value to Council;
- the value of the asset;
- whether it is light vehicle or heavy plant and equipment;
- the costs of the disposal method compared to the expected returns; and
- compliance with statutory and other obligations.

Councillors and Council officers will not be permitted to purchase assets being disposed of by Council unless the purchase is via an open tender or public auction process and where no conflict of interest exists.

Purchasers or donation/charity recipients of assets must agree in writing before purchasing or being in receipt of any asset that no warranty is given or implied by Council in respect of the suitability and condition of the asset for the purchaser or recipient and that Council will not be responsible for the asset in any respect following the sale or donation.

Donations of surplus or redundant assets may only be made with the authority of the CEO or Council resolution and only after exploring all avenues for recouping a fair value for Council or any alternate use within Council. Council officers should only consider donations in response to a formal written submission. In considering any submission, officers should keep in mind the following:

- Community groups should receive equitable treatment to avoid possible claims of bias;
- The Manager Council Assets will investigate to ensure the group is not a disguised business operation providing funds or remuneration to the principals;
- The Manager Council Assets will investigate to ensure the group is non-profit and that the intended use of the asset is non-commercial (i.e. non-profit);
- Where the donation is seen as appropriate but there is a potential claim of bias, the matter should be referred to the operational area responsible Director, who will adjudicate the claim or refer the matter to the CEO; and
- The charity/community group should facilitate the removal of the asset themselves.

5. SALE OF LAND AND PROPERTY

To commence the process of selling land and property (including structures), a report to Council seeking a resolution under the *Local Government Act 2020* and outlining Council's obligations must be developed. Council officers must record and provide justification for utilising a specific disposal method where it uses a disposal method other than a tendering process.

A check must be carried out to ensure assets do not contain:

- Additional items not intended for sale;
- Confidential documents (records, files, papers);
- Documents on Council letterhead which may be used for fraudulent purposes;
- Hard drives with Council specific software still installed (which could lead to a breach of licences or contain confidential data);
- Hazardous materials;
- Any identifying Council logos or marks that must be removed prior to sale; and
- All spare parts relating to the asset for sale must be included in the advertised 'asset for sale' package.

Upon the sale of an asset, it is the responsibility of the operational area Asset Manager to inform Manager Council Assets, the Finance department, GIS & Asset Systems Officer and any other affected business system owners of the sale

to ensure that all financial and asset registers are updated to reflect the sale. Where disposal forms part of a capital project, disposal shall occur as part of the formal asset handover process.

6. CONSULTATION

Council must undertake public consultation in respect of its proposed disposals or rationalisation in accordance with the *Local Government Act 2020* and with the intent of the Council Plan 2025-2029.

7. DELEGATIONS

Authority to dispose of Council owned assets is as follows:

- Manager Council Assets/Operational Area Asset Managers/Manager Projects and Design
- Director
- CEO/Council

RESPONSIBILITY AND AUTHORISATION MATRIX				
Disposal Type	**$1 - $1,000**	**$1,000-$20,000**	**$20,001 - $100,000**	**$100,001 >**
Trade-in EOI Open Tender Sale Public Auction Demolish/Recycle	**Responsibility:** Operational Area Asset Managers **Authority:** Manager Council Assets	**Responsibility:** Operational Area Asset Managers **Authority:** Manager Council Assets	**Responsibility:** Manager Council Assets **Authority:** Director	**Responsibility:** Manager Council Assets **Authority:** Council resolution
Charity/Gifting	CEO	CEO	Council Resolution	Council Resolution
Land Exchange or Sale	Council Resolution	Council Resolution	Council Resolution	Council Resolution

8. BUYER'S RISK

Irrespective of the disposal method applied, all prospective buyers must be advised in writing that the asset is disposed of, with any faults, at the buyer's risk ('as is where is'). Buyers are to rely on their own investigations regarding the condition and function of the asset and Council will not be responsible for any repairs to or maintenance of the asset.

ATTACHMENT 1

LAND (PROPERTY) DISPOSAL OR RATIONALISATION ASSESSMENT AND EVALUATION REPORT

Asset identification: (Confirm system)	
Council Property No:	
Street Address:	
Parcel description: (Vacant/Non Vacant) (Attributes)	
Title Details:	
Total Area of Land:	
Zoning:	
Current Council Valuation:	$
Current land use:	
Estimated cost of disposal or rationalisation:	$
Estimated market value:	$
Proposed method of disposal or rationalisation:	

Recommendation: (Use appropriate descriptors to outline the recommendation fully) That the parcel of land as described is deemed to be no longer required to meet Council's agreed services or there is no clear need for Council to retain ownership of the asset.

Justification: (Additional comments and justification for proposing to dispose of or rationalise the asset)

Name of person making the assessment

……..Position……

Signature:…… ……Date____/____/_____

Approval of Manager Council Assets (Approval by Manager Council Assets confirms that the disposal has been assessed from an asset management, governance and asset register perspective)

……Date____/____/_____

DECISION: The above disposal/rationalisation is: (please circle) APPROVED NOT APPROVED

I,……certify that the above asset was disposed of/rationalised in accordance with Council Policy 128 – Asset Disposal and Rationalisation.

Signature:……Date____/____/_____

Approval of Director

Name:……Signature:……Date____/____/_____

Approval of Chief Executive Officer (if required)

Name:……Signature:……Date____/____/_____

Date and number of Council Resolution (if required)

Date____/____/_____ Resolution No……

ATTACHMENT 2

PHYSICAL (NON-PROPERTY) ASSET DISPOSAL OR RATIONALISATION ASSESSMENT AND EVALUATION REPORT

Asset Class / Asset Sub-class	
Asset identification: (Asset Register / Asset Vision system)	
Asset Location:	
Asset description: (Attributes)	
Ownership Details:	
Asset formally used for: (Describe)	
Valuation of Asset (Replacement cost / WDV):	Replacement Cost - $ WDV - $
Estimated cost of disposal or rationalisation:	$
Estimated market value:	$
Reason for Disposal or rationalisation:	
Proposed method of disposal or rationalisation:	

Recommendation: (Use appropriate descriptors to outline the recommendation fully) That the asset as described is deemed to be no longer required to meet Council's agreed services or there is no clear need for Council to retain ownership of the asset.

Justification: (Additional comments and justification for proposing to dispose of or rationalise the asset)

Name of person making the assessment

……..Position……

Signature:……..Date____/____/_____

Approval of Manager Council Assets (Approval by Manager Council Assets confirms that the disposal has been assessed from an asset management, governance and asset register perspective)

DECISION: The above disposal/rationalisation is: (please circle) APPROVED NOT APPROVED

I,……certify that the above asset can be disposed of/rationalised in accordance with Council Policy 128 – Asset Disposal and Rationalisation.

Signature:……..Date____/____/_____

Approval of Director

Name:……Signature:……..Date____/____/_____

Approval of Chief Executive Officer (if required)

Name:……Signature:……Date____/____/_____

Date of Council Resolution (if required)

Date____/____/_____

7.8 COUNCIL POLICY NO. 133 - APPOINTMENT OF ACTING CEO

Author: **Melissa Mathers, Manager People and Culture**
Authoriser: **Amanda Wilson (Director Corporate Services)**

RECOMMENDATION

That Council adopt Council Policy No. 133 – Appointment of Acting Chief Executive Officer.

EXECUTIVE SUMMARY

The purpose of this report is to present the revised Council Policy No. 133 – Appointment of Acting Chief Executive Officer for Council adoption.

The policy has undergone a legislative and governance review to ensure it reflects the requirements of the *Local Government Act 202*0, aligns with Council Policy No. 145 – CEO Employment and Remuneration and incorporates current organisational terminology and governance practices.

The proposed amendments are administrative and governance in nature and do not alter Council's existing authority regarding the appointment of an Acting Chief Executive Officer (Acting CEO). The revisions improve legislative accuracy, consistency between Council policies and clarity for future administration of Acting CEO appointments.

PURPOSE

The purpose of this report is to seek Council's approval to adopt the revised Council Policy No. 133 – Appointment of Acting Chief Executive Officer.

DISCUSSION

The policy provides the framework for appointing an Acting CEO during periods of leave or other absences of the Chief Executive Officer (CEO) and outlines the approval arrangements for CEO leave.

Following a review of the policy, several amendments have been made to ensure it reflects current legislative requirements and contemporary governance practices.

The key amendments include:

- updating legislative references from the *Local Government Act 1989* to the *Local Government Act 2020*;
- replacing references to "second tier manager" with "member of Council's Executive Team" to reflect Council's current organisational structure;
- updating references to Council's Instrument of Delegation to reference the current delegated authority;
- modernising the CEO leave approval provisions to align with the CEO's Contract of Employment;
- inserting a new "Related Documents" section identifying the relationship between this policy, Council Policy No. 145 – CEO Employment and Remuneration and the *Local Government Act 2020*;
- updating the policy review period to align with Council Policy No. 145 – CEO Employment and Remuneration by requiring review at least every four years;
- updating administrative references including Council's website and responsible officer.

The amendments improve consistency across Council's governance framework while maintaining the existing operational arrangements whereby:

- the CEO may appoint an Acting CEO under delegated authority for periods up to and including 28 days;
- appointments that will continue beyond the 28th day, being for 29 days of more, require a Council resolution; and
- appointments of an external Acting or Interim CEO require a Council resolution.

RELEVANT LAW

The proposed policy has been prepared having regard to:

- *Local Government Act 2020*, including:
    - section 11 – Council delegations;
    - section 44 – Chief Executive Officer; and
    - section 45 – CEO Employment and Remuneration Policy.
- *Victorian Charter of Human Rights and Responsibilities Act 2006*.

The revised policy aligns with Council Policy No. 145 – CEO Employment and Remuneration adopted pursuant to section 45 of the *Local Government Act 2020*.

RELATED COUNCIL DECISIONS

Council originally adopted the Appointment of Acting Chief Executive Officer Policy on 15 November 2017, with the most recent review undertaken in December 2020.

Council adopted the revised Council Policy No. 145 – CEO Employment and Remuneration Policy in December 2024, necessitating consequential amendments to this policy to ensure consistency across Council's governance framework.

OPTIONS

Option 1 (Recommended)

Adopt the revised Appointment of Acting Chief Executive Officer Policy.

This option ensures the policy:

- reflects current legislative requirements;
- aligns with Council Policy No. 145 CEO Employment and Remuneration;
- provides clear governance arrangements for Acting CEO appointments; and
- maintains contemporary policy terminology and administrative references.

Option 2

Resolve not to adopt the revised policy.

This option is not recommended as Council would continue operating under a policy containing outdated legislative references and inconsistencies with Council's current governance framework.

SUSTAINABILITY IMPLICATIONS

Economic: Nil.

Social: The policy promotes sound governance, accountability and continuity of organisational leadership during CEO absences.

Environmental: Not applicable.

Climate Change: Not applicable.

COMMUNITY ENGAGEMENT

Community engagement has not been undertaken as this report relates to an internal governance policy governing the appointment of an Acting CEO.

INNOVATION AND CONTINUOUS IMPROVEMENT

The review demonstrates Council's commitment to continuous improvement by ensuring its governance framework remains current, legally compliant and consistent with contemporary best practice.

COLLABORATION

The policy review has been undertaken internally with reference to Council's existing governance policies and current legislative requirements.

FINANCIAL VIABILITY

There are no direct financial implications arising from the adoption of the revised policy.

Appointments made under the policy will continue to be managed within Council's existing budget allocations and employment arrangements.

REGIONAL, STATE AND NATIONAL PLANS AND POLICIES

The report has been prepared having regard to the:

- *Local Government Act 2020*
- *Victorian Charter of Human Rights and Responsibilities Act 2006*

No regional or national plans are applicable.

COUNCIL PLANS AND POLICIES

Goal 3: Sustainability - Achieve long-term financial and environmental sustainability.
4. Ensure transparent, inclusive decision-making through effective leadership.

TRANSPARENCY OF COUNCIL DECISIONS

This report will be considered in an open Council Meeting.

CONFLICT OF INTEREST

The officer preparing this report declares that they have no conflict of interest in this matter.

ATTACHMENTS

1. Policy 133 Appointment of Acting CEO [**7.8.1** - 2 pages]

Appointment of Acting Chief Executive Officer

COUNCIL POLICY NO. 133

1. POLICY PURPOSE

The purpose of this Policy is to provide clear guidance on the provisions that apply to the appointment of a person as Acting Chief Executive Officer (Acting CEO) and allows for the approval of the Chief Executive Officer's (CEO) approved leave entitlements on behalf of Council in accordance with the CEO's Contract of Employment or other extended absences.

2. DEFINITIONS

In this policy, unless the context suggests otherwise, the following words and phrases shall mean:

Act means the *Local Government Act 2020*

Chief Executive Officer or **CEO** means the Chief Executive Officer of Council

Contract of Employment means the contract of employment between Council and the CEO, including any schedules.

Council means the Gannawarra Shire Council.

Mayor means the Mayor of Council

Policy means this Appointment of Acting Chief Executive Officer Policy.

3. POLICY

The requirement for a Council to appoint a natural person to be its CEO is currently prescribed under section 44 of the *Local Government Act 2020.*

3.1 Appointment of a person as Acting CEO

Only a member of Council's Executive Team may be appointed as Acting CEO under this Policy.

The CEO may, under delegated authority (S5 Instrument of Delegation to the CEO), appoint a member of Council's Executive Team as Acting CEO for a period of up to and including 28 days. Council may also make an appointment for this period by resolution.

An appointment that will continue beyond the 28th day, being for 29 days or more, must be made by Council resolution.

The appointment of a person who is not a current Council employee as Acting or Interim CEO must be made by Council resolution.

3.2 Periods of Leave

If the period of leave is five days or less, the CEO will appoint the Acting CEO under delegated authority.

If the period of leave is more than five days but no more than 28 days, inclusive of the 28th day, the CEO will liaise with the Mayor before appointing the Acting CEO under delegated authority.

If the period of leave will continue beyond the 28th day, being for 29 days or more, Council will appoint the Acting CEO by resolution. Council may appoint:

- a member of Council's Executive Team; or
- a suitably experienced and qualified person engaged under a short-term contract for the period of the CEO's absence.

3.3 Chief Executive Officer Leave Approval

An application for annual leave, long service leave, personal leave or an extended absence is to be approved by the Mayor on behalf of Council.

4. RELATED DOCUMENTS

This Policy should be read in conjunction with Council Policy No. 145 – CEO Employment and Remuneration and the *Local Government Act 2020*.

5. POLICY REVIEW

Council will review this Policy at least every four years.

At the time of review, this policy was compliant with the *Victorian Charter of Human Rights and Responsibilities Act 2006.*

6. FURTHER INFORMATION

Members of the public may inspect all Council policies at Gannawarra Shire Council's Kerang and Cohuna offices or online at www.gsc.vic.gov.au.

Any enquiries in relation to this policy should be directed to the Manager People and Culture on (03) 5450 9333.

ECM Folder & Ref #	3.000518 &INT20/68F500DC
Policy Developed:	15 November 2017 (Minute Book Reference 12610)
Revised	December, 2020, July 2026
To be reviewed:	2030

7.9 GANNAWARRA URBAN STORMWATER MANAGEMENT PLAN

Author: **Leigh Hollingworth, Manager Projects & Design**
Authoriser: **Wade Williams (Director Infrastructure & Development)**

RECOMMENDATION

That Council adopt the Gannawarra Urban Stormwater Management Plan 2026–2036.

EXECUTIVE SUMMARY

Council publicly exhibited the Draft Gannawarra Urban Stormwater Management Plan 2026–2036 following Council endorsement in April 2026. The exhibition period provided an opportunity for community members, government agencies, water authorities and other stakeholders to review the Draft Plan and provide feedback.

The Gannawarra Urban Stormwater Management Plan 2026–2036 provides a risk-based framework for managing stormwater across the municipality and meeting Council's obligations under the *Environment Protection Act 2017*. Following public exhibition and stakeholder consultation, several amendments were made to strengthen recognition of cultural heritage, Traditional Owner engagement and cultural values.

Adoption of the plan will guide Council's management of stormwater risks to human health, property, infrastructure and the environment over the next ten years.

PURPOSE

The purpose of this report is to present the final Gannawarra Urban Stormwater Management Plan 2026–2036 following public exhibition and consultation, outline amendments made as a result of feedback received, and seek Council adoption of the Plan.

DISCUSSION

Council endorsed the Draft Gannawarra Urban Stormwater Management Plan 2026–2036 for public exhibition at its Ordinary Council Meeting held on 15 April 2026. Following exhibition, Council officers sought and considered feedback from relevant stakeholders including government agencies, water authorities and environmental managers.

The Urban Stormwater Management Plan provides a municipality-wide framework for identifying stormwater risks and prioritising actions to minimise risks to human health and the environment so far as reasonably practicable. The Plan identifies municipal-wide and township-specific risks and establishes a structured implementation framework to guide operational activities, capital investment, planning controls, Water Sensitive Urban Design initiatives, community education and partnerships over the next decade.

The Plan has been prepared in response to legislative requirements introduced through the *Environment Protection Act 2017* and the Order for Obligations of Managers of Land or Infrastructure (Urban Stormwater Management and On-site Wastewater Management), gazetted on 7 May 2024. It provides a practical framework for managing risks associated with flooding, water quality, asset performance and climate change.

The final Plan retains the overall structure, objectives and implementation framework exhibited to the community. However, a number of amendments have been made in response to submissions and stakeholder feedback.

Council received five feedback submissions during the public consultation phase, a summary of these items is displayed in Table 1.

Table 1: Public Feedback Summary

Submission	Summary
Submission 1	The submission raised concerns regarding recurring flooding affecting residential properties in Cohuna during heavy rainfall events. The submission described stormwater flows passing through multiple properties, resulting in water entering backyards and accumulating beneath dwellings. Concerns were raised regarding inadequate drainage capacity, stagnant water, odour, stress on residents, and reliance on emergency pumping assistance. The submission requested drainage improvements and a more proactive pumping response during severe rainfall events.
Submission 2	The submission advised that heavy rainfall causes flooding within a residential cul-de-sac in Cohuna, resulting in water entering private driveways and affecting property access. The submission highlighted the need for improved local drainage performance in the area.
Submission 3	The submission supported the development of a long-term urban stormwater management framework but identified several strategic considerations for inclusion in the Plan. These included stronger recognition of Aboriginal cultural heritage obligations, Traditional Owner engagement, Native Title considerations, environmental protection responsibilities, climate resilience, infrastructure governance, and community engagement. The submitter advocated for earlier and more meaningful involvement of Traditional Owners in planning and decision-making processes, together with stronger environmental and governance measures.
Submission 4	The submission highlighted long-standing flooding issues in southern Kerang, particularly around Mitchell Street and the vicinity of a primary school crossing. The submission noted that flooding has persisted for several decades, affecting road access and pedestrian safety during rainfall events. Concerns were also raised regarding flooding in other southern parts of Kerang and whether drainage infrastructure has kept pace with residential development. The submission requested greater attention to these issues and improved drainage outcomes.
Submission 5	The submission provided historical observations and local knowledge regarding Kerang's existing stormwater drainage network, including drainage routes, discharge points, and pumping infrastructure. The submitter sought to contribute information to assist Council's understanding of the operation and history of the drainage system.

The majority of submissions related to localised flooding and drainage performance issues which are already reflected within the township risk assessments and proposed actions. Amendments incorporated into the final plan, following public and stakeholder feedback, are shown in Table 2.

These amendments improve the Plan's alignment with stakeholder expectations while strengthening Council's approach to cultural heritage management and engagement with Traditional Owners. They do not materially alter the strategic intent, priorities or implementation framework exhibited to the community.

Table 2: Amendment Log

Amendment	Response
Cultural Values (page 2, 6 and 13)	Strengthened wording throughout the Plan to recognise that receiving environments may also possess cultural value in addition to environmental value.
Glossary Updates (page 5)	Minor amendments made to improve clarity and consistency of terminology.
Objective S1 (page 7)	Amended Objective S1 to explicitly recognise protection of waterways, wetlands and downstream environments that hold environmental, community and cultural value.
Image Replacement (page 9)	Replacement of image on page 9 with an alternate image.
Cohuna Township Profile (Page 11)	Updated the description of Cohuna to clarify that the township is adjacent to Gunbower Forest rather than located within the Ramsar-listed forest area.
Recognition of Traditional Owners (page 12)	Added a new "Traditional Owners" section within the Policy and Strategic Alignment chapter acknowledging Traditional Owners and committing Council to appropriate cultural heritage due diligence and engagement where required.
Implementation Framework (page 29)	Added additional commentary within the "From Risks to Actions" section recognising that delivery of actions may require engagement with external stakeholders, regulatory authorities and approval agencies.
Cultural Heritage Considerations (page 29)	Added guidance regarding cultural heritage requirements and Traditional Owner engagement during planning and delivery of projects.
Monitoring and Review (page 32)	Added a monitoring measure relating to cultural heritage assessments and Traditional Owner engagement activities undertaken by Council.
New Action M-A17 (page 1 of the Action Table)	Introduced a new municipal-wide action requiring development of a Stormwater Cultural Heritage and Traditional Owner Engagement Protocol.

Key Features of the Adopted Plan

- Provides a ten-year planning horizon (2026–2036);
- Responds directly to statutory requirements under the *Environment Protection Act 2017*;
- Identifies municipal-wide and township-specific stormwater risks;
- Establishes objectives aligned with Council's Liveability, Growth and Sustainability goals;
- Includes a prioritised implementation framework linking risks to practical actions;
- Incorporates consideration of environmental, community and cultural values;
- Strengthens guidance regarding cultural heritage due diligence and Traditional Owner engagement;

- Assigns responsibilities, priorities, implementation timeframes and indicative costs for each action; and
- Establishes monitoring, reporting and review processes to support ongoing compliance and continuous improvement.

The Plan will assist Council to guide future investment decisions, support grant applications, improve strategic planning and demonstrate compliance with State regulatory requirements.

RELEVANT LAW

- *Local Government Act 2020* – Section 9 (Overarching governance principles and supporting principles).
- *Environment Protection Act 2017* – Section 25 (General Environmental Duty).
- Environment Protection Act 2017 – Order for Obligations of Managers of Land or Infrastructure (Urban Stormwater Management and On-site Wastewater Management) (Victorian Government Gazette, 7 May 2024).
- *Planning and Environment Act 1987* – Sections 4 and 60.
- *Aboriginal Heritage Act 2006* – establishes requirements relating to the protection and management of Aboriginal cultural heritage where applicable to future investigations and works.

RELATED COUNCIL DECISIONS

15 April 2026 Ordinary Council Meeting – Endorsement of the Draft Gannawarra Urban Stormwater Management Plan 2026–2036 for public exhibition.

OPTIONS

1. Adopt the Gannawarra Urban Stormwater Management Plan 2026–2036 (recommended).
2. Adopt the Plan subject to minor amendments.
3. Defer adoption and request further changes to the document.

SUSTAINABILITY IMPLICATIONS

Economic

The plan provides a risk-based framework to prioritise future investment in stormwater infrastructure, maintenance and renewal activities, supporting informed financial decision-making and improving Council's ability to pursue external funding opportunities for stormwater projects.

Social

The plan seeks to improve community safety, wellbeing and resilience by reducing the risks associated with flooding, stormwater pollution and infrastructure failure, while supporting the liveability of Gannawarra's townships. It also recognises cultural values associated with waterways and incorporates consideration of Traditional Owner engagement and cultural heritage requirements.

Environmental

The plan promotes improved stormwater quality and reduced pollutant discharge to waterways, wetlands and other receiving environments through implementation of targeted management actions and Water Sensitive Urban Design initiatives. It also recognises the environmental, community and cultural value of receiving environments throughout the municipality.

Climate Change
The plan seeks to addresses climate change risks by promoting climate-resilient stormwater planning, design and asset management practices. Actions within the plan support adaptation to increasing rainfall intensity, more frequent extreme weather events and other projected climate-related impacts on stormwater infrastructure and management.

COMMUNITY ENGAGEMENT

The Draft Gannawarra Urban Stormwater Management Plan 2026–2036 was publicly exhibited following Council endorsement. Feedback received from community members and stakeholders was reviewed and considered in preparation of the final document. Consultation outcomes informed amendments relating primarily to cultural heritage considerations, Traditional Owner engagement, recognition of cultural values and clarification of township descriptions and implementation processes.

INNOVATION AND CONTINUOUS IMPROVEMENT

The plan adopts a structured monitoring and review framework including annual monitoring and a formal review at least every five years.

COLLABORATION

The Gannawarra Urban Stormwater Management Plan has been developed through consultation with relevant stakeholders, including the North Central Catchment Management Authority, water corporations and Council officers from multiple service areas. This collaborative approach has helped ensure the Plan reflects local stormwater management challenges, regulatory requirements, environmental considerations and operational priorities, while supporting coordinated implementation across Council and key external agencies.

FINANCIAL VIABILITY

The plan provides a prioritised framework to support future operational planning, capital budgeting and grant funding applications. Adoption of the Plan does not commit Council to immediate expenditure beyond existing budget allocations. Individual actions will be subject to future Council budget and funding decisions.

REGIONAL, STATE AND NATIONAL PLANS AND POLICIES

North Central Catchment Management Authority (NCCMA) Regional Catchment Strategy
Supports coordinated management of waterways, wetlands, floodplains and catchments to improve environmental health, resilience and sustainable land and water management outcomes.

Integrated Water Management (IWM) Framework for Victoria
Promotes collaborative and integrated management of all water resources to deliver environmental, community, liveability and economic benefits.

Water for Victoria
Provides the Victorian Government's long-term policy framework for managing water resources, improving water security and adapting to climate change.

***Environment Protection Act 2017* and Urban Stormwater Management Order**
Establishes Council's obligations to identify and manage risks to human health and the environment arising from urban stormwater.

Victorian Climate Change Adaptation and Mitigation Frameworks
Support planning and investment decisions that improve resilience to climate change and reduce future climate-related risks.

Murray–Darling Basin environmental management policies and Ramsar obligations
Promote protection of internationally significant waterways, wetlands and ecological values that may be influenced by urban stormwater discharges.

COUNCIL PLANS AND POLICIES

Goal 1: Liveability - Enhance the wellbeing and liveability of the Gannawarra through infrastructure development and services.
2. Prioritise maintenance, renewal and improvement of assets including local roads, footpaths, and community infrastructure that support accessibility and safety.

Goal 2: Growth - Grow the Gannawarra through a diverse and broad economy.
3. Plan land use to enable growth and expand housing opportunities.

Goal 3: Sustainability - Achieve long-term financial and environmental sustainability.
2. Protect our environment and prepare our community for a changing climate.
3. Advance local sustainability and waste initiatives.
4. Ensure transparent, inclusive decision-making through effective leadership.

TRANSPARENCY OF COUNCIL DECISIONS

This report will be considered in an open Council Meeting.

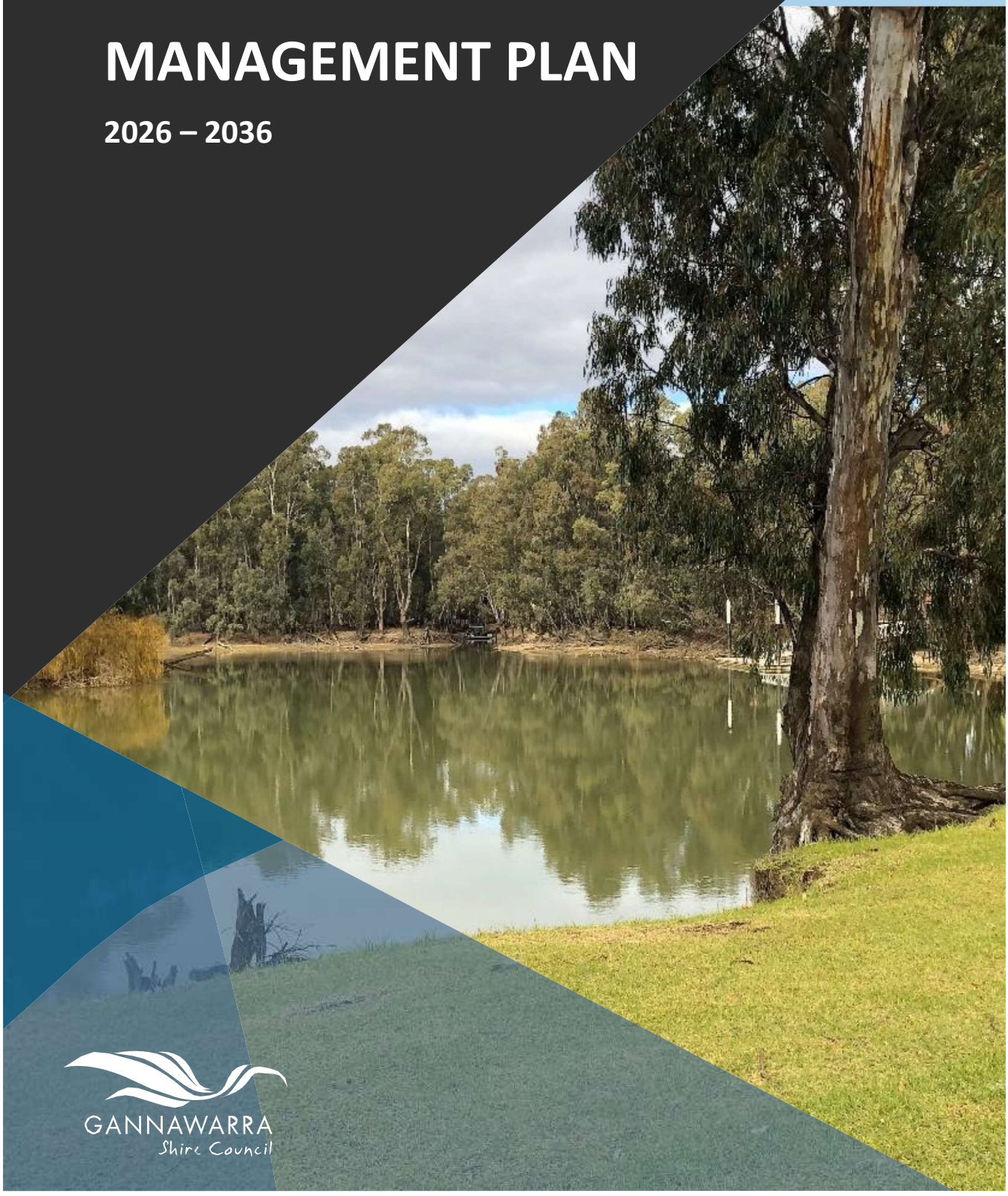
CONFLICT OF INTEREST

The officer preparing this report declares that they have no conflict of interest in this matter.

ATTACHMENTS
1. MK R 00929 Ganawarra Urban Stormwater Management Plan Final [**7.9.1** - 37 pages]

URBAN STORMWATER MANAGEMENT PLAN

2026 – 2036



GANNAWARRA
Shire Council

EXECUTIVE SUMMARY

Gannawarra Shire Council has prepared this Urban Stormwater Management Plan (the Plan) to provide a coordinated, risk-based approach to managing urban stormwater across the municipality. The Plan has been developed to meet Council's obligations under the Environment Protection Act 2017 (Vic) and the Order for Obligations of Managers of Land or Infrastructure (Urban Stormwater Management and On-site Wastewater Management), published in the Victorian Government Gazette on 7 May 2024.

The Plan applies to the townships of Kerang, Cohuna, Koondrook, Leitchville, Murrabit, Quambatook and Lalbert. It is intended to guide how Council plans, prioritises, delivers and reviews stormwater management activities over the next 10 years, while remaining flexible to respond to funding availability, climate change, growth pressures and emerging risks.

Urban stormwater poses risks to human health, property, infrastructure and the environment. In Gannawarra, these risks are influenced by flat topography, reliance on pumped drainage systems, ageing infrastructure, open drains and unsealed areas, legacy planning and drainage arrangements, and proximity to environmentally and culturally significant waterways such as the Murray River, Gunbower Creek and the Kerang Lakes. Climate change is expected to exacerbate these challenges through more intense rainfall events and longer dry periods, increasing both flooding and water quality risks.

The Plan identifies municipal-wide and township-specific stormwater risks and establishes a clear set of actions to minimise those risks so far as reasonably practicable. Actions focus on:

- reducing stormwater flooding through improved system capacity, asset management, maintenance and planning controls
- improving stormwater quality by minimising pollutant generation and transport
- managing stormwater volumes and velocities through Water Sensitive Urban Design (WSUD)
- strengthening Council's asset data, governance, operational procedures and decision-making frameworks
- supporting safe and appropriate future development.

The Plan is structured around individual township profiles, recognising that stormwater challenges, opportunities and priorities vary across the municipality. Each township section outlines local conditions, key risks, constraints and a targeted set of actions to address those risks. This approach supports more transparent prioritisation and clearer alignment between local issues and Council investment decisions.

The Plan has been developed through consultation with relevant stakeholders, including Catchment Management Authorities, water corporations and Council officers across multiple service areas. It is intended to operate alongside existing strategies, studies and asset management plans, including drainage studies, flood investigations, planning scheme controls and the Stormwater Asset Management Plan.

Implementation of the Plan will be led by Council and delivered through a combination of operational activities, capital works, planning controls, advocacy, partnerships and grant funding. Progress against actions will be reviewed annually, with a formal review and update of the Plan to occur at least every five years, in accordance with legislative requirements.

Overall, this Plan provides Council with a practical and adaptable framework to manage urban stormwater risks, protect community health, environmental and cultural values, and support the long-term liveability and resilience of Gannawarra's townships.

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GLOSSARY

AEP (Annual Exceedance Probability): A way of describing the likelihood of a rainfall or flooding event occurring in any given year. For example, a 1% AEP event has a 1% chance of occurring in any year.

Asset data: Information about stormwater infrastructure such as its location, size, condition, age and material, usually stored in Council systems.

Backflow: Water flowing in the reverse direction, for example when a river level is high and water pushes back into stormwater pipes or drains.

Backflow prevention device: A flap gate, valve or similar device installed at an outlet to stop river water flowing back into the stormwater network.

Catchment: An area of land where rainfall drains into a common outlet such as a river, creek, wetland, or stormwater system.

CMA (Catchment Management Authority): A regional body responsible for catchment and waterway health, floodplain management and environmental programs. For this Plan, this includes the North Central CMA.

Council: Refers to Gannawarra Shire Council as the responsible manager of municipal stormwater assets and the body required to prepare this Plan under the Environment Protection Act 2017 (Vic).

Detention basin: A basin that temporarily stores stormwater during rainfall and releases it slowly to reduce peak flows and flooding downstream.

Drainage network: The network of roads, kerbs, channels, pits, pipes, pumps, drains, retention basins and wetlands used to transport stormwater.

Environment Protection Act 2017 (VIC): The primary legislation establishing obligations to minimise risks of harm to human health and the environment, including requirements for stormwater management planning.

Floodplain: Low-lying land adjacent to a watercourse or wetland that is subject to flooding during extreme rainfall events.

Gross Pollutant Trap (GPT): A stormwater treatment device designed to capture litter, debris, and coarse sediment before entering waterways.

Levee: An embankment constructed to reduce the risk of flooding by preventing water from entering an area from a river, creek or floodplain.

Municipality: The geographic area governed by Gannawarra Shire Council, including the townships of Kerang, Cohuna, Koondrook, Leitchville, Murrabit, Quambatook, and Lalbert.

Pollutant Load: The total quantity of a pollutant, such as sediment, nutrients, or litter, transported in stormwater runoff over a period of time.

Ramsar: Refers to an International Convention on Wetlands that was signed in 1971, in Ramsar, Iran.

Runoff: Water from rainfall or other sources that flows over the land surface and into stormwater systems or waterways, rather than infiltrating into the ground.

Shared Socioeconomic Pathways (SSPs): Climate change scenarios used to assess future greenhouse gas emissions and climate impacts under different global development pathways.

Stormwater: Rainfall that runs off surfaces such as roofs, roads, and pavements, collected and conveyed through drainage systems to receiving environments such as rivers, creeks, and wetlands.

Tailwater: High downstream water levels in a river, drain or channel that reduce the ability of stormwater to discharge, sometimes causing backflow and reduced drainage performance.

Water Sensitive Urban Design (WSUD)
An approach to urban planning and design that integrates the urban water cycle into the built environment. WSUD aims to reduce stormwater impacts, enhance water quality, and improve urban amenity and biodiversity through measures such as rain gardens, wetlands, and permeable pavements.

Waterway
A river, creek, channel, or wetland that conveys or holds water, either permanently or intermittently

INTRODUCTION

WHAT IS STORMWATER?

Stormwater is rainfall that runs off roofs, roads, driveways, footpaths, lawns, and other surfaces rather than soaking into the ground. As it flows, it travels through gutters, pits, and pipes before entering creeks, rivers, wetlands, and eventually, bays or the ocean.

Stormwater differs from:

- Sewage – wastewater from homes and businesses that is conveyed to a treatment plant via the sewer network
- Groundwater – water that infiltrates soil and accumulates within rock and sediment layers to form aquifers, which can discharge to rivers, wetlands, and bores

As stormwater moves over urban surfaces, it can collect pollutants such as litter, sediment, nutrients, oils, heavy metals, detergents, and microplastics. Without management, these pollutants degrade local waterways, wetlands, and ecosystems.

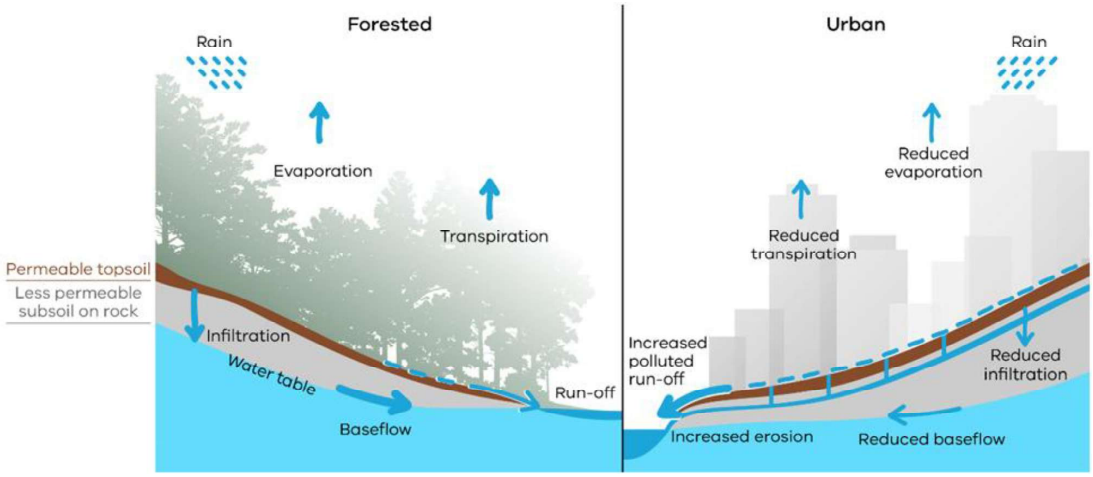
WHY DOES IT NEED MANAGEMENT?

In natural landscapes, most rainfall infiltrates into the soil, is taken up by vegetation or evaporates back into the atmosphere, with only a small proportion becoming surface runoff.

Urban development alters this natural water cycle by replacing permeable surfaces with hard, impervious surfaces such as roads, roofs and pavements. This reduces infiltration, increases runoff volumes and velocities, and removes natural processes that filter and slow water movement. The use of piped drainage systems further accelerates runoff and concentrates flows.

As a result, stormwater volumes and flow velocities increase, elevating flood risk, erosion, and pollutant transport. Managing stormwater is therefore essential to:

- Reduce flooding and erosion impacts;
- Remove pollutants before they reach natural waterways; and
- Protect the health and cultural values of downstream ecosystems, including the Kerang Lakes and Gunbower Forest Ramsar sites.



Impacts of urban development on the water cycle (EPA Victoria 2021)

PURPOSE AND OBJECTIVES

The purpose of the Urban Stormwater Management Plan (the Plan) is to provide a clear, strategic framework for managing urban stormwater in a way that protects communities, supports sustainable growth and safeguards the environment across Gannawarra Shire. The Plan focuses on identifying, prioritising and addressing stormwater risks through practical, achievable actions that improve system performance and long-term resilience.

At the core of the Plan are nine stormwater management objectives aligned with Council's overarching goals of liveability, growth and sustainability. These objectives represent the primary intent of the Plan and are used as the basis for assessing risks, prioritising actions and guiding implementation and review.

LIVEABILITY

- **L1** - Reduce the frequency, duration and severity of stormwater flooding and nuisance ponding in urban areas, with priority given to established residential areas and known flooding hotspots.
- **L2** - Improve the reliability and performance of stormwater infrastructure to protect public safety, property and access during rainfall events.
- **L3** - Minimise community exposure to contaminated stormwater runoff to protect human health and maintain the amenity of streets, open space and public assets.

GROWTH

- **G1** - Ensure new development and subdivision can be serviced by stormwater systems that do not increase flood risk to existing properties or infrastructure.
- **G2** - Integrate stormwater management and WSUD requirements into land use planning and development assessment to support orderly and sustainable urban growth.
- **G3** - Prevent the transfer of stormwater volumes, velocities and pollutant loads from new development to downstream environments and existing urban areas.

SUSTAINABILITY

- **S1** - Reduce pollutant generation, mobilisation and discharge from urban stormwater systems to protect waterways, wetlands and sensitive downstream environments with environmental, community and cultural value.
- **S2** - Improve the long-term resilience and adaptability of stormwater infrastructure to climate change, including increased rainfall intensity and more frequent extreme events.
- **S3** - Deliver stormwater infrastructure and management practices that are cost-effective over their lifecycle and aligned with Council's asset management principles.

These objectives guide the identification of risks, development of actions and prioritisation of investment throughout the Plan. They also provide a consistent framework for monitoring performance and reviewing progress over time.

In delivering these objectives, the Plan satisfies Council's obligations under the *Environment Protection Act 2017* (Vic) and the associated *Order for Obligations of Managers of Land or Infrastructure – Urban Stormwater Management* (Government Gazette No. S 226, 7 May 2024), ensuring that risks to human health and the environment from urban stormwater are identified, assessed and managed so far as reasonably practicable.

HOW THE PLAN WILL BE USED

This Plan is intended to be used as a practical, risk-based decision-support tool that guides how Council identifies stormwater risks, plans and prioritises actions, delivers improvements, and monitors and reviews outcomes across the municipality.

Specifically, the Plan will be used to:

Identify risks

The Plan documents municipal-wide and township-specific stormwater risks to human health, property and the environment. These risks provide the evidence base for decision-making and enable early identification of emerging issues.

Plan and prioritise actions

The identified risks and objectives are used to develop and prioritise operational, capital, investigation and policy actions. This supports transparent and consistent prioritisation of works and investment, ensuring limited resources are directed to areas of greatest risk and community benefit.

Deliver improvements

Delivery of stormwater improvements, including maintenance activities, capital works, WSUD initiatives and planning controls, will be undertaken in accordance with the priorities and actions set out in this Plan and through Council's existing capital works, operational and planning processes.

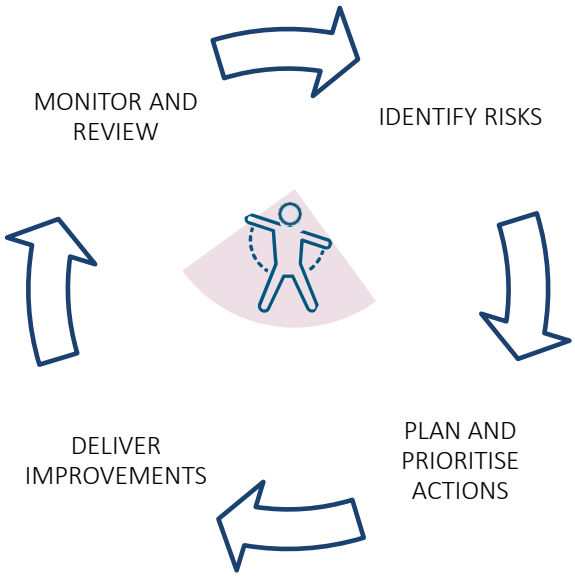
Support coordinated decision-making

The Plan provides a shared reference point for Council teams involved in infrastructure, planning, environment, asset management and finance, helping to align stormwater-related decisions and avoid fragmented or reactive responses.

Monitor and review

The Plan establishes a framework for monitoring implementation and reviewing outcomes over time. This supports internal reporting, informs future updates to the Plan, and enables Council to demonstrate how stormwater risks are being managed and reduced.

The Plan is not intended to replace detailed drainage studies, flood modelling or design work. Rather, it provides the strategic context for when and where those more detailed assessments are required, and how their outcomes should be prioritised and applied.



BACKGROUND AND CONTEXT

GEOGRAPHIC AND ENVIRONMENTAL SETTING

Gannawarra Shire is located in north-west Victoria within the Loddon Mallee region, covering approximately 3,700 square kilometres. The municipality is predominantly rural, characterised by irrigated and dryland agriculture, riverine landscapes, and nationally significant wetlands. Its low-lying topography strongly influences local drainage behaviour and flood risk.

Key transport corridors such as the Murray Valley Highway and Loddon Valley Highway connect townships and support economic activity. While urban growth remains modest, the Gannawarra's Urban Growth Strategy (2024) identifies opportunities for infill development, town centre revitalisation, and planned expansion.

This environmental and settlement context underpins the need for a coordinated, climate-resilient approach to managing stormwater across the Shire.

CLIMATE AND FLOOD HISTORY

Gannawarra experiences a semi-arid climate, marked by hot, dry summers and cool winters. Long-term climate trends indicate increased temperature extremes and declining average rainfall, consistent with broader regional climate projections for northern Victoria.

The municipality has experienced several major flood events, notably in 2011, 2022, and 2023–24, which have caused significant inundation and infrastructure impacts across multiple townships. These events highlight the increasing need for adaptive and resilient stormwater infrastructure capable of managing both short-duration, high-intensity rainfall and prolonged wet periods.

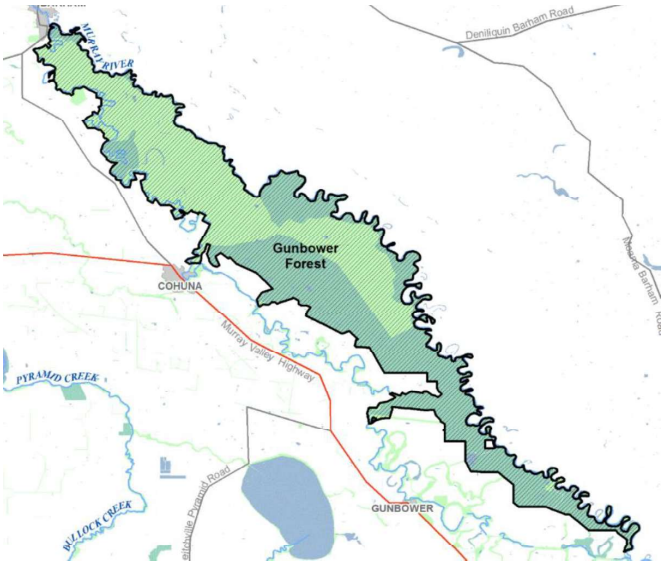
Urban Flooding - Kerang

RAMSAR SITES AND WATERWAYS

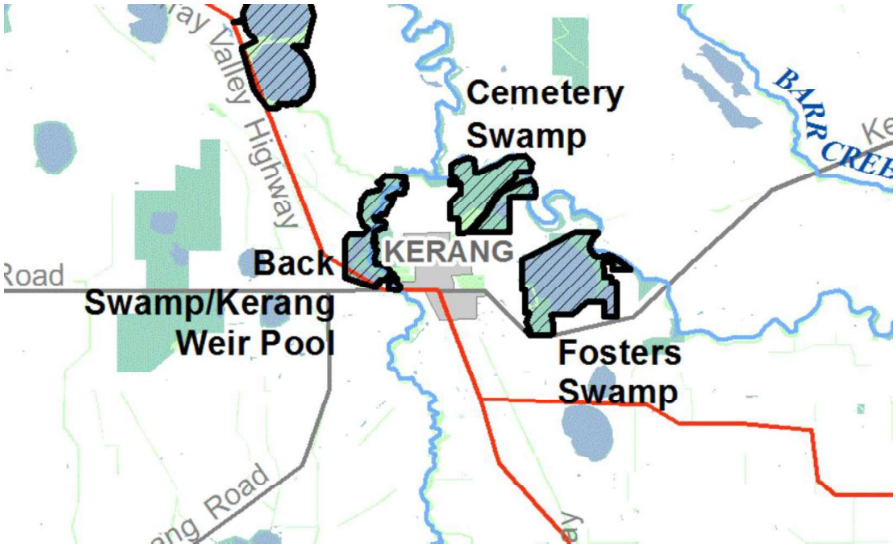
The Shire includes sections of the Murray, Loddon, and Avoca Rivers, along with two internationally recognised wetlands:

- Kerang Lakes Ramsar Site – a complex network of lakes and wetlands that support significant ecological values.
- Gunbower Forest Ramsar Site – a large red gum forest along Gunbower Creek that provides important floodplain storage, groundwater recharge, and biodiversity habitat.

These systems play a vital role in regulating regional hydrology, supporting biodiversity, and influencing local drainage and stormwater behaviour.



Gunbower Forest extents



Kerang Lakes extents

TOWNSHIPS

The Plan applies to the seven townships of Kerang, Cohuna, Koondrook, Leitchville, Murrabit, Quambatook, and Lalbert, each with distinct stormwater challenges and environmental settings.

Kerang

As the Shire's primary service centre, Kerang is located within a low-lying floodplain connected to the Loddon River and Kerang Lakes Ramsar Site. Stormwater management relies heavily on pumped infrastructure, with flat topography and limited water quality treatment contributing to localised flooding and downstream environmental sensitivity.

Cohuna

Cohuna is situated adjacent Gunbower Creek, a highly sensitive Ramsar-listed environment. Drainage is constrained by flat terrain, GMW channels and limited acceptable discharge locations, with recent WSUD-focused developments demonstrating opportunities to improve water quality outcomes.

Koondrook

Koondrook is a small township on the Murray River with an ageing and undersized drainage network influenced by river levels and limited hydraulic capacity. Stormwater flooding is generally localised, with future improvements focused on network capacity, discharge management and water quality protection.

Leitchville

Leitchville is a compact rural township with a sealed road network and pit and pipe drainage system discharging to an open drain. Stormwater issues are generally minor and localised, with flat grades at the outlet requiring ongoing maintenance to manage ponding and vegetation growth.

Murrabit

Murrabit is a small township serviced by a modern pit and pipe network draining to a detention basin with a pumped outlet to a GMW channel. Stormwater risks are localised and manageable, with priorities centred on sediment control, basin maintenance and addressing isolated drainage issues.

Quambatook

Located on the Avoca River and protected by a levee, Quambatook drains via a pit and pipe system to a pumped river outfall. With no growth anticipated, stormwater management is focused on liveability, outlet performance and protecting downstream recreational environments.

Lalbert

Lalbert is the smallest township in the municipality, with a simple stormwater system draining to a retention and reuse pond. With no off-site discharge and no growth pressures, stormwater risks are low and management is focused on pump operation and safe reuse of stored stormwater.

Gannawarra Shire townships (Council Plan 2025)

POLICY AND STRATEGIC ALIGNMENT

LEGISLATIVE FRAMEWORK

Council's responsibilities for stormwater management are guided by several key legislative frameworks. These include powers and obligations relating to land use planning, flood management, infrastructure delivery, and environmental protection.

The Plan specifically fulfils Council's obligations under the Environment Protection Act 2017 (Vic) and the associated Order for Obligations – Urban Stormwater Management Plans (Government Gazette No. S226, 7 May 2024).

The Order requires Councils to:

- Identify and minimise risks of harm to human health and the environment from urban stormwater;
- Minimise the generation and transport of pollutants; and
- Minimise the generation, velocity, and volume of stormwater flows.

TRADITIONAL OWNERS

Council recognises that stormwater planning, maintenance, renewal and capital works may intersect with Aboriginal cultural heritage, culturally significant waterways, and Traditional Owner interests.

Traditional Owners maintain longstanding cultural connections to the lands, waterways, wetlands and floodplains within the municipality. Stormwater infrastructure investigations, upgrades and new works have the potential to interact with areas of cultural significance and may be subject to statutory obligations under relevant legislation.

Council will incorporate appropriate cultural heritage due diligence, early engagement with relevant Traditional Owner representatives, and project-specific statutory processes into stormwater investigations, planning, design and delivery where required.

COUNCIL PLAN (2025)

The Urban Stormwater Management Plan has been developed with objectives that are aligned with the three strategic goals of the Council Plan 2025 - 2029: Liveability, Growth, and Sustainability. This ensures the intent and direction of the Plan supports Council's broader strategic priorities.

Once actions have been developed in detail and the associated implementation parameters defined, each action will be aligned with a relevant Plan objective, providing a clear line of sight back to the Council Plan and supporting strategic decision-making.

Goal	Relevance to the Urban Stormwater Management Plan
Liveability	Enhances community safety and wellbeing through effective drainage, flood protection, and integration of WSUD in public open spaces.
Growth	Guides sustainable urban development and subdivision design to ensure stormwater infrastructure supports future expansion and economic development.
Sustainability	Improves water quality, reduces flood risk, and delivers climate-resilient stormwater systems consistent with Council's environmental priorities.

URBAN GROWTH STRATEGY (2024)

The Plan complements the Urban Growth Strategy by ensuring stormwater planning and infrastructure delivery is integrated with future township growth and land use change. It supports a coordinated approach to drainage and WSUD outcomes in new development areas by strengthening the link between strategic

planning, subdivision design requirements, and downstream network capacity constraints.

The proposed actions focus on improving development controls, design guidance and compliance processes to ensure growth is supported by fit-for-purpose and climate-resilient stormwater infrastructure. This approach helps minimise future flood risk, reduces adverse downstream impacts, and ensures stormwater systems are planned and delivered in a manner consistent with Council's long-term growth objectives.

CLIMATE CHANGE ADAPTATION AND MITIGATION STRATEGY (2022)

The Plan supports the objectives of the Climate Change Strategy by addressing stormwater-related climate risks.
It does this by proposing actions that:

- Reduce stormwater flood risk through prioritised drainage upgrades and mitigation works;
- Set guidelines for designing infrastructure informed by future climate projections; and
- Promote WSUD which aid in sustaining green infrastructure and community amenity during hot and dry periods.

PARTNERSHIPS AND GOVERNANCE

Delivering sustainable stormwater outcomes requires strong collaboration between Council and regional partners responsible for land, water, and environmental management.

Water Authorities

- Coliban Water, Lower Murray Water, and Grampians Wimmera Mallee Water deliver urban water and wastewater services within their service areas. Collaboration with these authorities ensures alignment between stormwater and water infrastructure planning.
- Goulburn-Murray Water (GMW) manages the region's irrigation and raw water supply network. Coordination with GMW supports integrated drainage management, flood mitigation, and stormwater harvesting opportunities.

Catchment Management

- The North Central Catchment Management Authority (NCCMA) oversees waterway health, floodplain management, and catchment-scale environmental programs. Partnerships with the NCCMA ensures that stormwater initiatives contribute to broader catchment and water quality and cultural value objectives.

Land and Environmental Management

- Parks Victoria manages most Crown land reserves adjoining the townships, including significant wetlands and forested floodplains. Collaboration helps ensure stormwater discharges protect these sensitive environments.
- The Department of Energy, Environment and Climate Action (DEECA) provides policy direction, regulatory oversight, and guidance to ensure the USMP aligns with state water, climate, and environmental frameworks, including the Environment Protection Act 2017 and Water for Victoria. They are also responsible for the management of Gunbower Forest.

MUNICIPAL WIDE RISKS

Municipal-wide risks are those that affect multiple townships across Gannawarra Shire and arise from shared physical, environmental, operational and governance conditions. These risks influence the performance of stormwater systems across the municipality and inform the prioritisation of actions within this Plan.

MAINTENANCE LIMITATIONS

Council faces a municipality-wide risk associated with maintaining an ageing and geographically dispersed stormwater network across its townships. Limited operational budgets and competing service demands can restrict the frequency of inspection, cleansing and proactive maintenance activities.

Inadequate maintenance can result in blocked pits and pipes, reduced hydraulic capacity, sediment accumulation and accelerated asset deterioration. These issues increase the likelihood of localised flooding, prolonged ponding and water quality impacts, particularly in the flat catchments of Gannawarra Shire.

Without a structured and risk-based maintenance approach, stormwater infrastructure performance and reliability will continue to decline, increasing risks to public safety, property and the environment.

ASSET DATA

Incomplete or outdated stormwater asset data presents a municipal risk to effective planning, response and long-term management. Gaps in GIS records, condition assessments and asset attributes limit Council's ability to accurately understand network capacity, identify critical assets and prioritise renewal or upgrade works.

Poor data quality also constrains Council's ability to respond efficiently to flooding or pollution incidents and undermines evidence-based decision-making. This risk is compounded in areas with legacy infrastructure and undocumented private drainage connections.

Improving asset data quality is essential to reducing uncertainty and supporting investment decisions.

INDUSTRIAL LAND USE

Industrial land uses across the municipality present an elevated stormwater pollution risk due to the nature of activities undertaken and the scale of vehicle movements. Unsealed or degraded yards, outdoor material storage and frequent truck traffic contribute to the generation and mobilisation of sediment, hydrocarbons and other contaminants.

Sediment and pollutants are often tracked from private industrial sites onto public roads and subsequently washed into Council's drainage network. In some cases, high levels of suspended solids can block drainage infrastructure, reducing system capacity and increasing maintenance requirements.

Without targeted management, education and monitoring, industrial land uses will continue to contribute disproportionately to stormwater pollution and infrastructure performance issues.

RESIDENTIAL LAND USE

Residential areas contribute to municipal stormwater risks through common domestic activities such as car washing, gardening, waste disposal and poor maintenance of private drainage infrastructure. Pollutants including detergents, nutrients, sediment and litter are readily transported into the stormwater system during rainfall events.

In addition, illegal or inappropriate private stormwater connections, including connections to sewer infrastructure, can create risks to both stormwater and wastewater systems. Cumulatively, residential runoff degrades water quality, increases Council maintenance burdens and reduces the effectiveness of downstream treatment or natural systems.

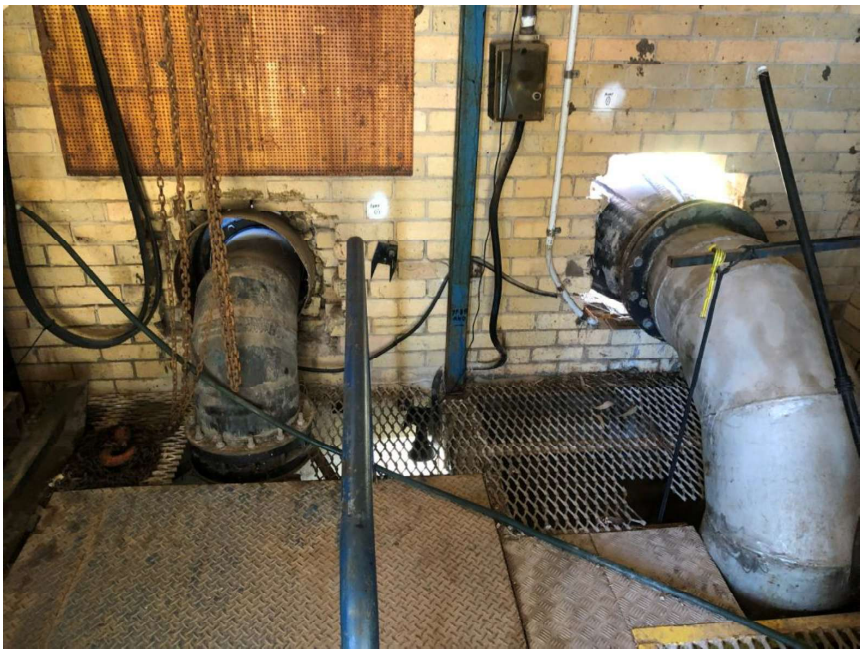
Addressing residential contributions to stormwater pollution requires ongoing education, clear guidance and integration with broader water management initiatives.

PUMPS

Due to flat topography and downstream constraints, most urban areas across the municipality rely on pump stations to manage stormwater discharge. This reliance introduces a municipal risk associated with mechanical failure, power outages and operational complexity.

Pump failures or interruptions can result in rapid and widespread flooding, particularly during high rainfall events. The consequences of failure are amplified by limited storage, minimal system redundancy and the interconnected nature of drainage catchments.

Mechanical systems also impose ongoing operational and maintenance costs and require specialised knowledge to manage effectively, increasing long-term risk if not adequately resourced.



Pump outlets at Wyndham Street, Kerang

CLIMATE CHANGE

Climate change represents a significant and escalating municipal risk to stormwater management across Gannawarra Shire. Future climate projections are commonly described using Shared Socioeconomic Pathways (SSPs), which represent different global emissions trajectories. Lower-emissions pathways (such as SSP1-2.6) assume strong global mitigation, while higher-emissions pathways (such as SSP5-8.5) assume continued growth in greenhouse gas emissions.

Across Victoria, projections consistently indicate that short-duration, high-intensity rainfall events will increase under all SSPs, with the magnitude of change increasing toward the end of the century. By 2100, design rainfall intensities are expected to increase by approximately:

- 12–22% under lower-emissions scenarios, and
- 41–86% under higher-emissions scenarios, particularly for short, intense storm events that drive urban flooding.

These changes are expected to be accompanied by longer dry periods between rainfall events, increasing pollutant build-up on urban surfaces and resulting in higher pollutant loads when storms occur.

Existing drainage systems, many of which were not designed for these conditions, are likely to be exceeded more frequently. In Gannawarra's flat catchments, even modest increases in rainfall intensity can substantially increase flood extent, flood duration and reliance on pumped drainage systems.

Without adaptive planning and climate-informed decision-making that considers a range of SSP futures, stormwater risks to communities, infrastructure and the environment are expected to continue to increase over time.

DATA, EDUCATION AND COMMUNITY AWARENESS GAPS

Limited community understanding of stormwater impacts, private drainage responsibilities and pollutant pathways presents a municipality-wide risk to stormwater outcomes. Poor awareness can contribute to illegal connections, inappropriate discharges, inadequate private infrastructure maintenance and behaviours that increase pollutant generation.

These issues place additional pressure on Council's drainage system and complicate compliance and enforcement activities. Addressing education and awareness gaps is critical to achieving sustained improvements in stormwater performance and water quality.

TOPOGRAPHY

The predominantly flat topography across Gannawarra's townships, particularly in Kerang, Cohuna, Koondrook and Murrabit, creates an elevated municipal risk of inefficient stormwater drainage and prolonged surface ponding. Limited natural relief restricts hydraulic gradients within both natural and constructed drainage systems, resulting in reduced flow velocities and delayed runoff conveyance following rainfall events.

The very flat road grades across Gannawarra's urban centres mean that even minor surface level changes caused by pavement deterioration or settlement of kerb and channel can lead to persistent ponding. This accelerates pavement damage, creates localised nuisance flooding, and reduces effective drainage capacity. Limited hydraulic gradients also restrict runoff conveyance, encouraging sediment and pollutant accumulation within pits, pipes and open drains, which further degrades system performance and contributes to downstream water quality impacts.

Stormwater ponding during light rain at Fehring Court, Cohuna

UNSEALED ROADS AND UNVEGETATED AREAS

Unsealed roads, road verges, open drains and other unvegetated surfaces across urban areas are a significant source of sediment entering Council's stormwater network. During rainfall events, fine sediments are readily mobilised from these surfaces and transported into pits, pipes, open drains and detention basins.

Sediment accumulation reduces the effective hydraulic capacity of underground drainage infrastructure, leading to increased ponding, localised flooding and more frequent blockages.

Sediment-laden runoff also increases maintenance demands and operational costs, requiring more frequent pit cleaning, jetting and desilting of basins. Where sediment is discharged to downstream waterways, it can contribute to water quality degradation and increased nutrient transport.

The extent of unsealed roads and unvegetated areas within several townships means sediment generation is a persistent, system-wide risk rather than an isolated issue.

Unsealed road, Koondrook

ILLEGAL WASTEWATER AND TRADE WASTE CONNECTIONS

Legacy illegal or inappropriate connections between wastewater systems and the stormwater network present an ongoing risk to human health and the environment. These connections typically arise from historical plumbing practices, unsewered or partially sewered areas, informal trade waste discharges, or property modifications undertaken without appropriate approvals.

Illegal connections can introduce sewage, greywater or trade waste into the stormwater system, leading to direct discharge of contaminants to receiving waterways during both dry weather and rainfall events. This poses risks to public health, particularly where stormwater drains discharge near recreational areas, open space or sensitive waterways.

In addition to water quality impacts, wastewater discharges can cause blockage of pits and pipes through the accumulation of fats, oils, solids and organic matter, increasing maintenance requirements and the likelihood of system failure. These issues are often difficult to detect, with problems only becoming apparent following complaints, odour issues or downstream impacts.

MUNICIPAL RISKS SUMMARY

ID	Risk	Description	Type
M01	Maintenance limitations	Limited budgets restrict inspection and maintenance frequency, leading to blocked pits, reduced network capacity, and increased flooding and pollutant accumulation.	Human Health & Environmental
M02	Asset data	Incomplete or inaccurate GIS data for pits, pipes, and pumps limits Council's ability to plan renewals and respond effectively to flooding or pollution events.	Human Health
M03	Industrial land use	Industrial sites contribute sediment, hydrocarbons, and nutrients through unsealed yards, heavy vehicle traffic and illegal discharge of trade waste, increasing pollution and maintenance needs.	Environmental
M04	Residential land use	Common domestic activities such as car washing and gardening introduce pollutants into drains, reducing system performance and degrading water quality.	Environmental
M05	Pumps	Many townships rely on pumped systems due to flat terrain, increasing flood risk and maintenance demand due to potential power outages or failures.	Human Health & Environmental
M06	Climate change	More intense rainfall and prolonged dry periods will exacerbate flooding, asset deterioration, and pollutant loads, threatening community health and ecosystem resilience.	Human Health & Environmental
M07	Data, education, and community awareness gaps	Public understanding of stormwater impacts and asset responsibilities can contribute to poor private drain maintenance and pollutant discharge.	Environmental
M08	Unsealed roads and unvegetated areas	Significant quantities of open swale drains, unsealed road verges and unvegetated areas contribute to sediment mobilisation and deposition within underground stormwater networks, reducing hydraulic capacity and increasing maintenance requirements.	Human Health & Environmental
M09	Illegal wastewater and trade waste connections	Historic illegal or inappropriate connections between wastewater systems and the stormwater network, particularly in unsewered residential areas, continue to pose risks to stormwater quality and downstream receiving environments.	Human Health & Environmental

TOWNSHIP RISKS

KERANG

Kerang is the administrative and primary service centre of Gannawarra Shire, accommodating the largest proportion of the municipal population and a broad mix of residential, commercial and industrial land uses. The township is located within a low-lying landscape connected to the Loddon River, Pyramid Creek and the Kerang Lakes Ramsar Site, which provides significant environmental value but also presents substantial stormwater management challenges.

Growth

Kerang is projected to remain the primary focus for urban growth, with population forecast to increase from approximately 3,757 people in 2021 to between 3,850 and 4,009 by 2046. Growth is expected to occur through a combination of residential infill, redevelopment and expansion of industrial land, particularly in areas already constrained by drainage capacity.

Stormwater, flooding and water quality issues

Kerang experiences frequent nuisance flooding and periodic property flooding due to extremely flat topography, clay soils and limited natural drainage gradients. Stormwater runoff is slow to drain and relies heavily on mechanical pumping to discharge to the Loddon River. Known flooding hotspots include Ninth Street, Redgum Drive, Marne Street, parts of the Tate Drive industrial area, and sections of the central township around Murray Street and Wyndham Street. Water quality treatment within the township is limited, with most stormwater discharged with minimal treatment to downstream waterways connected to Ramsar-listed wetlands.

Existing infrastructure and constraints

The township is serviced by an extensive underground piped network that is largely undersized by contemporary standards, with much of the system providing less than a 50% AEP level of service. Multiple pump stations are required to manage stormwater due to the presence of levees and rail embankments that restrict overland flow paths. The main outfall at Wyndham Street comprises three electric pumps with a backup diesel unit, creating a high reliance on power availability and operational oversight. As growth continues, the combination of flat topography, constrained outlets and ageing infrastructure will increase flood risk, maintenance demand and the consequences of pump or power failure unless mitigated through staged upgrades and complementary non-structural measures.

Drainage Characteristics

- Predominant drainage type: pumped underground pipe network
- Key constraints: very flat topography, levees, rail embankments and limited outfalls
- Primary flooding mechanisms: network surcharge, lack of overland relief and pump dependence.
- Water quality considerations: limited treatment prior to discharge to the Loddon River and Kerang Lakes Ramsar Site
- Operational challenges: high reliance on electrical power, ageing assets and complex pump system operation

Risks

ID	Risk	Description	Type
KE01	Complex pumped stormwater network	Multiple interlinked pump systems make operation dependent on staff expertise, with knowledge loss posing system performance and safety risks.	Human Health
KE02	Dependence on electricity supply	Pump stations rely on power and are vulnerable to outages, as seen in the 2023 floods, creating widespread flooding risk.	Human Health
KE03	Undersized and ageing infrastructure	Legacy drainage assets are undersized, limiting capacity and requiring major upgrades for measurable improvement.	Human Health
KE04	Flat topography	Minimal gradient restricts gravity drainage, resulting in regular ponding and nuisance flooding.	Human Health
KE05	Redgum Drive basin	The basin and associated pump are inadequate for current catchment demands, constraining upstream development and increasing flood risk.	Human Health
KE06	Property flooding	Known hotspots such as Ninth Street experience repeat inundation due to system under-capacity.	Human Health
KE07	Legacy paved road widths	Wide sealed roads unnecessarily increase run-off volumes leading to additional pollution generation.	Environment
KE08	Railway and levee barriers	Drainage outlets are restricted by the rail line and levee, causing trapped overland flows and prolonged inundation.	Human Health
KE09	Erosion at pump outlets	Inadequate outlet protection causes scour and sedimentation in downstream channels.	Environment
KE10	Driveway culverts in LDRZ areas	Uneven or undersized driveway culverts impede flow, leading to ponding and local flooding.	Human Health
KE11	Future growth and drainage constraints	Planned growth areas sit upstream of networks already at capacity or beside levees that trap flows, constraining development.	Environment
KE12	Water quality degradation	Minimal WSUD or treatment systems exist within Kerang. Stormwater runoff carries sediment and pollutants directly to the Loddon River/Ramsar wetland sites, posing a risk to water quality and aquatic ecosystems.	Environment

COHUNA

Cohuna is the second-largest township in Gannawarra Shire and functions as a key service hub for the eastern part of the municipality. The township is located on Gunbower Creek, a tributary of the Murray River within the Gunbower Forest Ramsar Site, placing it within a highly sensitive environmental and water supply context.

Growth

Cohuna is projected to experience the strongest population growth in the municipality, increasing from approximately 2,139 people in 2021 to between 2,410 and 2,746 by 2046. Growth is occurring through residential expansion in established and emerging estates, increasing the importance of coordinated stormwater and WSUD planning to manage cumulative impacts.

Stormwater, flooding and water quality issues

Stormwater drainage in Cohuna is constrained by flat terrain and limited outfall options. The primary trunk drainage system runs along Channel Street and discharges to Barr Creek, a heavily modified waterway with known salinity issues. While localised flooding is generally less severe than in Kerang, kerb ponding and slow drainage are common following rainfall events.

Gunbower Creek is recognised by Coliban Water, NCCMA and DEECA as an extremely high-value waterway, supporting environmental, recreational and potable water supply functions. Stakeholders have expressed a clear position that no additional untreated stormwater should be discharged to the creek.

Existing infrastructure and constraints

Newer residential areas have incorporated alternative drainage treatments, including flush kerb profiles draining to shallow swales supported by pit and pipe systems. While these approaches demonstrate improved WSUD outcomes, their delivery in a fragmented, stage-by-stage manner has resulted in multiple small basins and a growing maintenance burden for Council.

GMW channels crossing the northern part of Cohuna further constrain drainage by requiring stormwater to pass beneath them via siphons, which are difficult to inspect and maintain. As growth continues, these structural and environmental constraints will limit discharge opportunities and increase reliance on distributed storage, treatment and source control measures.

Drainage Characteristics

- Predominant drainage type: gravity pipe network into GMW drainage channels
- Key constraints: flat terrain, GMW channels, siphons and limited environmentally acceptable outfalls
- Primary flooding mechanisms: slow conveyance, kerb ponding and tailwater effects
- Water quality considerations: Gunbower Creek and Barr Creek sensitivity, potable water offtake location
- Operational challenges: maintenance of multiple basins and siphon crossings

Risks

ID	Risk	Description	Type
C01	Discharge to high-value waterway	Gunbower Creek holds significant ecological and recreational value, and stakeholders have expressed concern about additional stormwater discharges that may impact its environmental condition.	Environment
C02	Flat terrain and limited outfall capacity	Flat grades and minimal drainage slope cause slow runoff and persistent kerb ponding across residential areas.	Human Health
C03	Tailwater constraints from GMW drains	High tailwater in GMW channels impedes discharge, causing backwater effects and localised flooding.	Human Health
C04	Siphons beneath GMW channels	Siphon crossings are difficult to maintain and prone to blockage, increasing flood risk.	Human Health
C05	Water quality degradation	Few WSUD measures exist, most stormwater enters waterways untreated.	Environment
C06	Future growth and drainage constraints	Additional development will increase runoff to already constrained outfalls and raise Council's WSUD maintenance burden.	Human Health & Environment
C07	Maintenance of third-party drainage assets	Stormwater discharges to GMW managed drains create dependency on external maintenance, increasing flood and compliance risks if assets are not managed consistently.	Human Health & Environment

KOONDROOK

Koondrook is a small township located on the Murray River opposite Barham (NSW), with a strong connection to river-based recreation and nature-based tourism associated with Gunbower Island and surrounding waterways. The township services a predominantly residential and rural catchment.

Growth

Koondrook is projected to experience moderate growth, with population increasing from approximately 927 people in 2021 to between 1,027 and 1,040 by 2046. Growth is expected to occur through limited infill and expansion in identified development areas, subject to servicing and drainage constraints.

Stormwater, flooding and water quality issues

Koondrook's stormwater system is constrained by very flat topography and limited hydraulic capacity. The township drains primarily via a single trunk pipe network discharging at Vine Street to the Murray River, supplemented by minor outlets to Gunbower Creek and local roadside swales. Hydraulic modelling undertaken in 2019 indicates the system provides only a 63% AEP level of service, resulting in frequent localised flooding during moderate rainfall events.

Flooding hotspots are widespread across the township, with shallow inundation commonly occurring along streets and within properties where culverts are undersized or poorly maintained.

Existing infrastructure and constraints

The drainage network is undersized and ageing, with pipe capacity rather than outfall capacity identified as the primary system constraint. While the Vine Street pump upgrade has been implemented, modelling confirms that further pump upgrades alone will not materially reduce flooding without broader network augmentation.
Koondrook is protected from Murray River flooding by levees, although their ownership, condition and performance are uncertain. Existing planning controls, including the Land Subject to Inundation Overlay, are based largely on riverine flooding and may not accurately reflect stormwater flood risk. Continued growth without coordinated trunk drainage upgrades will increase both flooding frequency and maintenance demand.

Drainage Characteristics

- Predominant drainage type: gravity pipe network with reliance on pumps when Murray River levels are high
- Key constraints: flat topography, undersized pipes, levees and limited overland flow path
- Primary flooding mechanisms: pipe surcharge, culvert blockages and lack of system capacity
- Water quality considerations: direct discharge to the Murray River and Gunbower Creek
- Operational challenges: ageing assets, reliance on private culvert maintenance and limited storage

Risks

ID	Risk	Description	Type
K01	Underperforming WSUD asset	The failed WSUD project at Koondrook Environmental Reserve adds maintenance burden and discourages further initiatives.	Environment
K02	Undersized drainage network	Existing pipes convey only ~63 % AEP flows, causing frequent flooding during moderate storms.	Human Health & Environment
K03	Levee and floodplain constraints	The levee prevents natural discharge to the Murray River, requiring pumps and backflow devices that elevate maintenance and flood risk.	Human Health & Environment
K04	Poor maintenance and private drainage issues	Blocked or unaligned driveway culverts reduce system efficiency and increase local flooding.	Human Health & Environment
K05	Outdated planning controls	Flood overlays reflect riverine rather than local stormwater risk.	Human Health
K06	Future growth and drainage constraints	Northern and southern growth areas lack trunk drainage, increasing flooding and pollutant loads downstream.	Human Health & Environment
K07	Water quality degradation	Untreated runoff enters the Murray River and Gunbower Creek, impacting aquatic ecosystems.	Environmental

LEITCHVILLE

Leitchville is a small rural township located approximately 15 kilometres south-east of Cohuna in northern Gannawarra Shire. With a population of around 550, it functions as a local service centre for the surrounding agricultural district. The township is compact and predominantly residential, supported by limited commercial and light-industrial activity and key community facilities including a recreation reserve and travellers rest area.

Growth

Leitchville is not expected to experience population or urban growth. Stormwater management actions should therefore be focused on maintaining existing infrastructure, supporting liveability and managing localised drainage performance rather than accommodating expansion.

Stormwater, flooding and water quality issues

Stormwater drainage in Leitchville is generally well defined, with sealed roads and kerb and channel directing runoff to an underground pit and pipe network. Localised ponding can occur near the township outlet due to very flat grades and vegetation growth within the receiving open drain, although broader flooding and water quality risks are limited.

Existing infrastructure and constraints

The drainage network falls toward the north-west and discharges to a constructed open drain along the southern side of Leitchville–Kerang Road. While the system is largely adequate for current conditions, the low gradient of the outfall drain reduces conveyance efficiency and increases reliance on routine maintenance to manage vegetation and standing water. There is no direct discharge to sensitive waterways, with Kow Swamp located outside the township drainage catchment.

Drainage Characteristics

- Predominant drainage type: pit and pipe network servicing sealed roads with kerb and channel
- Key constraints: very flat outfall drain and vegetation growth
- Primary flooding mechanisms: localised ponding near the outlet
- Water quality considerations: no direct discharge to sensitive waterways
- Operational considerations: outlet maintenance

Risks

ID	Risk	Description	Type
L01	Flat outfall and drain maintenance	The main outfall along Leitchville–Kerang Road has minimal grade, causing sediment build-up and ponding.	Human Health
L02	Lack of WSUD measures	No formal treatment assets exist, incidental filtration occurs via open drains only.	Environmental
L03	Aging underground network	Old pit and pipe infrastructure is prone to blockages and reduced capacity.	Human Health
L04	Former industrial site redevelopment	Any redevelopment of the old factory site could increase impervious area and pollutant runoff.	Human Health & Environment

MURRABIT

Murrabit is a small urban township located in the north-east of the Gannawarra municipality, approximately 1.5 kilometres west of the Murray River. The township supports a stable residential community and local recreational facilities, with surrounding land uses predominantly agricultural in nature.

Growth

Murrabit is not identified for growth within the Gannawarra Urban Growth Strategy and is not expected to experience any meaningful urban expansion.

Stormwater, flooding and water quality issues

Stormwater runoff in Murrabit is influenced by unsealed local roads, flat terrain and limited drainage redundancy. While the primary road network is sealed, gravel roads generate sediment-laden runoff that discharges to the stormwater system and contributes to maintenance and water quality issues. Localised flooding occurs at several locations, including Forbes Street, where infilling of a roadside swale has redirected flows into private property, and Browning Avenue, where stormwater from the road verge drains into an adjacent low-lying allotment.

Existing infrastructure and constraints

The township is serviced by a relatively new pit and pipe drainage network that conveys stormwater to a single end-of-line detention basin before being pumped to a GMW-managed drainage channel adjacent to Murrabit West Road. While the basin shows signs of embankment scour and limited vegetation, these issues are generally localised and manageable, with current risks largely contained and not considered to pose a significant risk to human health or the environment.

Drainage Characteristics

- Predominant drainage type: modern gravity pit and pipe network discharging to an end-of-line detention basin with a pumped outlet
- Key constraints: flat topography with sediment sources primarily associated with unsealed local roads
- Primary flooding mechanisms: localised issues related to roadside drainage modifications and low points rather than system-wide capacity
- Water quality considerations: sediment management within the network prior to discharge to GMW drainage infrastructure
- Operational challenges: routine maintenance opportunities including embankment stabilisation, vegetation establishment and sediment control

Risks

ID	Risk	Description	Type
MU01	Detention basin embankment scour	The detention basin shows embankment erosion and limited vegetation, increasing sediment runoff and inlet blockage risk.	Environment
MU02	Unsealed roads	Unsealed surfaces generate sediment-laden runoff that can block pits and pipes.	Environment
MU03	Localised stormwater flooding	Poor surface grading causes localised flooding near Forbes Street and Browning Avenue.	Human Health
MU04	Dependence on stormwater pump	A single pump station manages township discharge, failure could cause widespread flooding despite basin storage.	Human Health

QUAMBATOOK

Quambatook is a small township located in the south-west of Gannawarra Shire on the Avoca River. The town supports a stable residential community and a range of local recreational facilities, including the Quambatook Weir Reserve and Community Swimming Pool, which are important assets for residents and visitors.

Growth

Quambatook is not identified as a growth area within the Gannawarra Urban Growth Strategy and is not expected to experience population growth.

Stormwater, flooding and water quality issues

Localised flooding occurs along Tennyson Street, primarily due to outlet constraints and backflow prevention during elevated river levels. Road drainage is generally well managed through kerb and channel or vegetated swales, with sediment generation limited to isolated locations such as Cobden Street where adjacent gravel areas exist.

Stormwater currently receives limited water quality treatment prior to discharge to the Avoca River and downstream recreational areas. Given the township's modest scale and lack of growth pressures, these risks are generally contained and can be managed through targeted improvements, maintenance and investigation of reuse or treatment opportunities.

Existing infrastructure and constraints

Stormwater is managed via a pit and pipe network discharging to an end-of-line pump station adjacent to the Community Swimming Pool before release to the Avoca River. The township is protected from riverine flooding by a recently constructed levee.

A former stormwater harvesting scheme pumped runoff to a storage pond behind the sporting field east of the Avoca River. While decommissioned, it demonstrates the feasibility of stormwater reuse and presents an opportunity for future Integrated Water Management initiatives.

Drainage Characteristics

- Predominant drainage type: gravity pit and pipe network discharging via a pumped outlet
- Key constraints: flat topography, reliance on an end-of-line pump station and river tailwater levels
- Primary flooding mechanisms: localised outlet constraints and backflow during high river levels
- Water quality considerations: direct discharge to the Avoca River and downstream recreational areas
- Operational considerations: pump operation, outlet management and sediment control in isolated locations

Risks

ID	Risk	Description	Type
Q01	Discharge to high-value waterway	Stormwater drains directly to the Avoca River conveying pollutants that pose a risk to ecology, public amenity and recreation as flows ultimately discharge to the Quambatook Weir Reserve.	Environment
Q02	Flood levee backflow device operation	Manual and flap gates protecting outfalls may fail or be mis-operated, causing flooding or backflow.	Human Health
Q03	Existing flooding along Tennyson Street	Flat topography and levee constraints cause localised flooding during heavy rainfall.	Human Health
Q04	Dependence on stormwater pump	A single pump station discharging to the Avoca River creates reliance on mechanical operation for flood protection.	Human Health

LALBERT

Lalbert is the smallest township within the Gannawarra municipality, with a population of approximately 138 people. It is located in the north-west of the Shire and supports a small, low-density residential community with limited commercial activity.

Growth

Lalbert is not expected to experience population or urban growth. Stormwater management considerations are therefore focused on maintaining the performance of existing infrastructure rather than accommodating future development

Stormwater, flooding and water quality issues

Stormwater is managed through a localised pit and pipe drainage network with minimal flood risk. As stormwater is retained within the township and reused for irrigation, there is limited potential for downstream environmental impacts.

Existing infrastructure and constraints

The drainage network conveys runoff to an end-of-line pump station that discharges to a stormwater retention pond located south of the Lalbert Recreation Reserve, where water is reused for irrigation. As there is no direct discharge to receiving waterways, environmental risks are low. Ongoing stormwater management is primarily dependent on effective pump operation and appropriate management of potential public health risks associated with the retention pond.

Drainage Characteristics

- Predominant drainage type: pit and pipe network with pumped discharge to a retention and reuse system
- Key constraints: reliance on a single pump and storage pond
- Primary flooding mechanisms: minimal under current conditions
- Water quality considerations: localised reuse with no off-site discharge
- Operational considerations: pump maintenance, monitoring and pond management

Risks

ID	Risk	Description	Type
LA01	Reuse of untreated stormwater	Stormwater reused for irrigating sports fields is untreated, posing potential health risks to field users.	Human Health
LA02	Grain storage site runoff	Poor onsite drainage at the grain facility may discharge sediment or hydrocarbons into surrounding land or drains.	Environment
LA03	Negative growth impacts	Population decline reduces investment in drainage upkeep, leading to asset deterioration and higher flood risk.	Human Health & Environment
LA04	Reliance on pumped network	The town's pumped drainage system may fail unnoticed due to its isolation and small population, causing prolonged flooding.	Human Health

IMPLEMENTATION FRAMEWORK

OVERVIEW

The Implementation Framework sets out how the Urban Stormwater Management Plan will be translated into prioritised, deliverable actions to manage the risks posed by urban stormwater to human health, property, infrastructure and the environment.

The framework provides a clear and transparent process that links identified risks to defined actions, assigns responsibility for delivery, and establishes priorities, timeframes, costs and funding pathways. While the framework supports Council's obligations under the Environment Protection Act 2017 (Vic) Order for Obligations of Managers of Land or Infrastructure, it is primarily intended to guide practical, risk-based decision-making and investment across Council operations, capital programs and planning processes.

Actions identified through the Plan are consolidated in an Actions Table included in **Appendix A**. The table provides a consistent structure for implementing and reviewing actions over the life of the Plan.

FROM RISKS TO ACTIONS

The Implementation Framework follows a structured process:

1. Urban stormwater risks have been identified at both a municipal-wide and township-specific level.
2. One or more actions have been developed to address each identified risk.
    a. Some actions address multiple risks and may apply across the municipality.
    b. Other actions are specific to individual townships or localised issues.
3. Each action is described clearly and assigned an action type to provide context on the nature of the response, using the action type categories defined in this Plan.
4. Actions are explicitly linked back to the risks they address, ensuring a clear line of sight between risk identification and implementation.

This approach recognises that many stormwater risks are interconnected and that a single action may contribute to the management of multiple risks.

Implementation of actions may require engagement with external stakeholders and approval authorities. Where works involve Crown land, waterways, wetlands or third-party assets, Council will engage with the relevant stakeholders and obtain any required approvals prior to delivery.

Council will also consider cultural heritage requirements and Traditional Owner engagement, where relevant, during the planning and delivery of stormwater projects.

ACTION TYPES

To provide clarity on the nature of each response and how actions are intended to be delivered, all actions within the Implementation Framework have been assigned to one of the following action types. These action types reflect the primary delivery pathway and function of each action.

Operations & maintenance

Actions focused on the day-to-day operation, inspection and maintenance of Council's stormwater assets to maintain service levels, manage flood risk and respond to incidents. This includes routine and risk-based maintenance, pump operation, emergency response procedures and operational planning.

Asset data & systems improvement

Actions that improve the accuracy, completeness and accessibility of stormwater asset data and supporting systems. This includes asset data capture, GIS improvements, condition assessments, documentation and

knowledge management to support informed decision-making and reduce reliance on individual staff knowledge.

Investigations & studies

Actions that develop the technical evidence base required to understand risks, identify constraints and inform future planning, design and investment decisions. This includes drainage and flood studies, modelling, concept and detailed designs, condition assessments and investigations related to growth or climate change.

Capital works & infrastructure upgrades

Physical works to renew, upgrade or expand stormwater infrastructure to improve system capacity, performance, safety and resilience. This includes drainage upgrades, pump station works, detention basins, renewals and flood mitigation infrastructure.

Water quality & WSUD implementation

Actions aimed at reducing pollutant loads and improving the quality of stormwater discharges to receiving environments. This includes WSUD measures, stormwater treatment systems, erosion and sediment control and stormwater harvesting or reuse initiatives.

Planning & development controls

Actions delivered through planning schemes, policies and development assessment processes to manage stormwater impacts from new development and redevelopment. This includes drainage and WSUD requirements, overlay controls, development staging and protection of downstream infrastructure capacity.

Risk management & resilience

Actions that strengthen Council's ability to anticipate, manage and respond to stormwater-related risks, including flooding, asset failure and climate change impacts. This includes emergency planning, system redundancy, resilience measures and integration with broader risk and emergency management frameworks.

Community education & behaviour change

Actions that support improved community understanding of stormwater impacts and responsibilities, and encourage behaviours that reduce flooding, pollution and asset damage. This includes education campaigns, guidance on private drainage maintenance and source-control initiatives.

Partnerships & advocacy

Actions delivered in collaboration with external stakeholders or that require coordination, funding or policy support beyond Council. This includes working with Catchment Management Authorities, water corporations, State agencies, neighbouring councils and the community, as well as advocacy for funding or regulatory change.

ROLES AND RESPONSIBILITIES

For each action, a responsible Council unit has been assigned, aligned with Council's organisational structure. This ensures accountability for delivery and supports coordinated implementation across Council.

The Council units involved in implementation include:

Assets & Property

Responsible for management of Council-owned stormwater assets, including asset data, condition, lifecycle planning and integration with asset management plans.

Operational Services

Responsible for day-to-day operation and maintenance of the stormwater network, including inspections, reactive works and emergency response.

Planning & Regulatory

Responsible for planning scheme controls, development assessment, WSUD requirements and regulatory processes that manage stormwater impacts from new development.

Projects & Design

Responsible for investigations, concept and detailed design, and delivery of stormwater capital works and upgrade projects.

Community Health

Supports consideration of public health risks associated with flooding, water quality and environmental conditions.

PRIORITY SETTING

Each action has been assigned a priority rating of low, medium, high or very high. Priorities have been determined based on:

- the level of risk to human health as the primary consideration
- the level of risk to the environment as a secondary consideration
- the consequence of inaction
- the extent to which the action addresses multiple risks.

This risk-based prioritisation supports transparent decision-making and assists Council to focus resources on actions that deliver the greatest risk reduction.

TIMEFRAMES

Each action has been assigned an indicative implementation timeframe:

- **Short term**: 1–3 years
- **Medium term**: 3–6 years
- **Long term**: 6–10 years
- **Ongoing**: actions intended to be embedded into Council policies, procedures or business-as-usual operations.

Timeframes have been selected having regard to the complexity, cost and delivery requirements of each action. Longer timeframes have been applied to more complex or higher-cost actions to allow for appropriate planning, design, approvals and funding to occur in advance of delivery.

INDICATIVE COSTS AND FUNDING SOURCES

Indicative, high-level cost bands have been assigned to each action to support integration with Council's budgeting and financial planning processes. These cost bands are not detailed estimates but provide an order-of-magnitude indication to inform prioritisation and resourcing decisions.

Each action has also been linked to one or more potential funding sources:

- **Operational budgets:** Funding for routine operations, maintenance, inspections, programs and ongoing activities delivered through Council's annual operating budgets.
- **Capital works program**: Funding for renewal, upgrade or construction of stormwater infrastructure delivered through Council's capital works planning and budget processes.
- **External grants and funding programs**: Funding from State or Commonwealth programs, or other external sources, typically for design and construction of capital works.

LINK TO PLAN OBJECTIVES

All actions within the Implementation Framework are explicitly aligned with one or more of the Plan's objectives. This ensures that implementation contributes directly to improving liveability, supporting safe and sustainable growth, and protecting the environment, while maintaining a clear line of accountability between actions and the outcomes the Plan seeks to achieve.

MONITORING AND REVIEW

Monitoring and review will ensure the Urban Stormwater Management Plan remains effective, current and aligned with Council's obligations under the Environment Protection Act 2017 (Vic). Council will monitor progress on implementation of actions on an annual basis, using existing operational reporting, capital works tracking and asset management systems.

Annual monitoring will focus on:

- progress against the actions and timeframes set out in the Implementation Framework
- changes in identified stormwater risks, including flooding incidents and water quality issues
- performance and condition of key stormwater assets, particularly pumps, basins and outlets
- the number of projects screened for cultural heritage and Traditional Owner engagement requirements, and where engagement was undertaken during investigation or concept design stages
- lessons learned from investigations, capital works, storm events and implementation of cultural heritage due diligence and engagement processes.

Outcomes of the annual review will be used to refine priorities, adjust delivery timeframes and inform future budget and grant funding decisions. In accordance with the EPA Order for Obligations – Urban Stormwater Management, Council will undertake a formal review and update of the Plan at least every five years and publish a report on implementation outcomes. This approach supports continuous improvement and ensures stormwater risks to human health and the environment are managed so far as reasonably practicable.

REFERENCES

Engeny (2019) *Koondrook Stormwater and Drainage Strategy*. Report prepared for Gannawarra Shire Council, June.

Environment Protection Authority Victoria (EPA Victoria) (2023) *Urban stormwater: Managing stormwater to protect the environment*. EPA Victoria, Melbourne.

Gannawarra Shire Council (2021) *Asset Management*. Council Policy No. 085 (reviewed 20 October 2021).

Gannawarra Shire Council (2022) *Asset Protection*. Council Policy No. 124 (reviewed 20 April 2022).

Gannawarra Shire Council (2022) *Climate Change*. Council Policy No. 146 (reviewed 17 May 2023).

Gannawarra Shire Council (2022) *Council Future Use Investments*. Council Policy No. 126 (reviewed 20 April 2022).

Gannawarra Shire Council (2022) *Fixed Assets*. Council Policy No. 134 (reviewed 20 July 2022).

Gannawarra Shire Council (2022) *Private Works*. Council Policy No. 135 (reviewed 20 July 2022).

Gannawarra Shire Council (2022) *Compliance*. Council Policy No. 127 (reviewed 18 May 2022).

Gannawarra Shire Council (2022) *Asset Disposal and Rationalisation*. Council Policy No. 128 (reviewed 18 May 2022).

Gannawarra Shire Council (2022) *Climate Change Adaptation and Mitigation Strategy*.

Gannawarra Shire Council (2022) *Asset Plan 2022–2032*.

Gannawarra Shire Council (2024) *Gannawarra Urban Growth Strategy*. Dated 8 August 2023.

Gannawarra Shire Council (2024) *Onsite Wastewater Management Plan 2024–2029*.

Gannawarra Shire Council (2025) *Stormwater Asset Management Plan 2025*.

Gannawarra Shire Council (2025) *Council Plan 2025–2029*.

Gannawarra Shire Council (2025) *Annual Report 2025*.

Maker Consulting Services (2026) *Kerang Stormwater Drainage Study.* Report prepared for Gannawarra Shire Council, February.

Victorian Government Gazette (2024) *Environment Protection Act 2017: Obligations of Managers of Land or Infrastructure (Urban Stormwater Management and On-site Wastewater Management) Order in Council*. *Victoria Government Gazette*, Special No. S 226, 7 May.

APPENDIX A – ACTION TABLE

ACTION TABLE

Municipal Wide

ID	Action Description	Risk Addressed	Action Type	Responsible Council Unit	Priority	Implementation Timeframe	Indicative Cost	Funding Source	Plan Objective Achieved
M-A01	Develop a proactive stormwater maintenance schedule for each township, prioritising assets based on their risk/criticality ranking. (Correlates with Task 5 of the Stormwater Asset Management Plan Improvement Plan).	M01, L03, MU02, LA03, K04, L01, L03	Operations & maintenance	Operational Services	Low	Short term (1-3 years)	<$5k	Operational budgets	S3
M-A02	Prepare procedure for capturing asset data from other planned Council activities, such as condition assessments, capital works and stormwater and flooding studies.	M02	Asset data & systems improvement	Assets & Property	Low	Short term (1-3 years)	<$5k	Operational budgets	L2
M-A03	Update the Asset Protection Policy to also cover operational activities related to domestic, industrial and commercial land use.	M03, M09, LA02	Planning & development controls	Projects & Design	Low	Short term (1-3 years)	<$5k	Operational budgets	L2
M-A04	Review the Asset Protection Permit System policy and previous non-conformance occurrences to confirm whether the $200 bond adequately covers the cost of repairing stormwater assets damaged during demolition or building works.	M03,M04	Asset data & systems improvement	Projects & Design	Low	Short term (1-3 years)	<$5k	Operational budgets	L2
M-A05	Partner with the EPA to develop a formal procedure and warning system for managing non-compliance with stormwater management on industrial sites, including processes for monitoring, education, warnings, enforcement and infringements.	M03, LA02	Planning & development controls	Operational Services	Medium	Short term (1-3 years)	<$5k	Operational budgets	S1
M-A06	Deliver community education campaigns on: - Stormwater pollution prevention from domestic activities such as car washing, and garden chemical use. - Private drainage responsibilities and their benefits	M04, M07, K04	Community education & behaviour change	Projects & Design	Medium	Medium term (3-6 years)	$10k-$25k	Operational budgets	S1
M-A07	Progress a staged program to improve resilience of critical stormwater pump systems across the municipality, including remote monitoring, enhanced maintenance and contingency measures for power outages and pump failures.	M05, MU04, K03, Q04, LA04	Operations & maintenance	Operational Services	High	Short term (1-3 years)	$10k-$25k	Operational budgets	L2
M-A08	Require new subdivisions to consider integrated drainage planning, accounting for downstream capacity limits and future upstream development. Leverage other planning works such as township structure plans and rezonings including design and development overlays.	KE11, C06, K06	Planning & development controls	Planning & Regulatory	Low	Ongoing	<$5k	Operational budgets	G1, G3
M-A09	Develop stormwater specific design note or guideline outlining how new designs must consider climate change horizons in accordance with the latest ARR guidelines.	M06	Planning & development controls	Projects & Design	High	Short term (1-3 years)	$10k-$25k	Capital works program	S2
M-A10	Ensure new permits for LDRZ subdivisions require driveway and culvert works to be completed and satisfactory AS-CON data provided prior to issuing the Statement of Compliance.	KE10	Planning & development controls	Planning & Regulatory	Low	Ongoing	<$5k	Operational budgets	L2
M-A11	Ensure road renewal projects consider integrated WSUD measures to reduce impervious areas and promote stormwater treatment.	M08, KE07, KE12, C05, K07	Water quality & WSUD implementation	Projects & Design	Low	Ongoing	<$5k	Capital works program	L3
M-A12	Explore partnership opportunities with Coliban Water, Lower Murray Water and Grampian Wimmera Mallee Water for checking for illegal connections of sewer to stormwater systems and vice versa.	M09	Partnerships & advocacy	Projects & Design	Low	Short term (1-3 years)	<$5k	Operational budgets	S1
M-A13	Prepare WSUD Engineering Guidelines specific for Gannawarra Shire Council outlining minimum requirements for new developments.	M03, M04, M06, M08, L04, KE11, KE12, C05, C06, K06, K07	Planning & development controls	Projects & Design	Very High	Short term (1-3 years)	$10k-$25k	Operational budgets	G2, G3
M-A14	Provide informative signage at popular recreation areas explaining the water cycle, benefits of WSUD, impacts of pollutants etc.	M04, M07	Community education & behaviour change	Community Health	Low	Medium term (3-6 years)	$5k-$10k	Capital works program	L3
M-A15	Identify key pollutants generated by Council assets and operations and implement targeted work methods and environmental risk controls to minimise their mobilisation into the stormwater system, including timing and frequency of activities such as street sweeping to align with periods of high pollutant generation.	M01, M03, M04, KE12, C05, K07	Operations & maintenance	Operational Services	Medium	Short term (1-3 years)	$5k-$10k	Operational budgets	S1
M-A16	Actively promote and support individual dwelling WSUD initiatives, such as rainwater tanks, raingardens and swales, through targeted guidance, incentives and integration with planning and building processes.	M04, M06, M07, KE12, C05, K07	Community education & behaviour change	Planning & Regulatory	Medium	Ongoing	<$5k	Operational budgets	S1
M-A17	Develop and implement a stormwater cultural heritage and Traditional Owner engagement protocol. The protocol will include early identification of projects with potential cultural heritage implications, engagement pathways with relevant Traditional Owner groups and organisations, referral pathways for specialist advice where required, and consideration of statutory approvals and assessment requirements.	N/A (Consultation Outcome)	Partnerships & advocacy	Projects & Design	Medium	Short term (1-3 years)	<$5k	Operational budgets	S1

Kerang

ID	Action Description	Risk Addressed	Action Type	Responsible Council Unit	Priority	Implementation Timeframe	Indicative Cost	Funding Source	Plan Objective Achieved
K-A01	Prepare and maintain a consolidated Operations and Maintenance Manual for the Kerang stormwater network to support consistent operations, staff handover and emergency response, including procedures for power outages, pump failures and system exceedance events.	KE01, KE02, M05	Operations & maintenance	Operational Services	Medium	Short term (1-3 years)	$5k-$10k	Operational budgets	L2, S2
K-A02	Support delivery of Action K-A01 by undertaking a targeted knowledge capture and transfer exercise for the Kerang stormwater network, led by senior staff, to inform and validate the Operations and Maintenance Manual and reduce reliance on individual expertise.	KE01	Operations & maintenance	Operational Services	Medium	Short term (1-3 years)	<$5k	Operational budgets	L2
K-A03	Progress a staged program of capital drainage upgrades in priority locations identified by the Kerang Drainage Study, subject to funding availability and detailed design confirmation, to incrementally improve system performance and reduce flood risk.	KE03, KE06, KE11	Capital works & infrastructure upgrades	Projects & Design	High	Medium term (3-6 years)	$2M-$3M	Capital works program	L1, S3
K-A04	Investigate opportunities to improve stormwater outfall operation and conveyance associated with the railway and levee barriers as part of any related works, including levee assessments, drainage upgrades, or development-led stormwater management strategies.	KE08	Capital works & infrastructure upgrades	Projects & Design	Low	Ongoing	NIL	Operational budgets	L2, G1
K-A05	Partner with landcare and community groups to prevent further erosion at stormwater outfall locations within the Loddon River reserve.	KE09	Partnerships & advocacy	Projects & Design	Low	Medium term (3-6 years)	$25k-$50k	External grants and funding programs	S1

ACTION TABLE

K-A06	Prepare high level water quality model using MUSIC for Kerang to enable cost-benefit analysis of possible WSUD initiatives.	KE12	Investigations and studies	Projects & Design	Medium	Medium term (3-6 years)	$25k-$50k	Capital works program	L3
K-A07	Prepare plan for delivery of cost-positive options identified by K-A06 and include relevant actions in the next revision of the Urban Stormwater Management Plan.	KE12	Investigations & studies	Projects & Design	Medium	Medium term (3-6 years)	$5k-$10k	Operational budgets	L3
K-A08	Upgrade the Riverside Park irrigation basin to increase storage volumes and improve water supply reliability during periods of low rainfall.	KE12	Capital works & infrastructure upgrades	Projects & Design	Medium	Short term (1-3 years)	$100k-$250k	External grants and funding programs	S2, S3
Cohuna									
ID	**Action Description**	**Risk Addressed**	**Action Type**	**Responsible Council Unit**	**Priority**	**Implementation Timeframe**	**Indicative Cost**	**Funding Source**	**Plan Objective Achieved**
C-A01	Prevent direct stormwater discharges to Gunbower Creek unless treatment is provided in accordance with Urban Stormwater Management Guidelines (EPA Victoria June 2021).	C01, C05	Planning & development controls	Planning & Regulatory	High	Ongoing	NIL	Operational budgets	S1
C-A02	Prepare the Cohuna Drainage Study to validate network capacity and localised flooding issues and recommended mitigation measures. Include high-level water quality modelling for the township as part of the project to inform future WSUD initiatives including cost-benefit analysis.	C02, C05, C06	Investigations and studies	Projects & Design	Medium	Medium term (3-6 years)	$100k-$250k	Capital works program	S3
C-A03	Liaise with GMW to improve performance and avoid high tailwater levels along the Tolls Lane and Roviras Road drainage outfall channels, including identification of critical monitor and maintenance locations. Develop Memoranda of Understanding with GMW to establish maintenance responsibilities and expectations.	C03, C07	Partnerships & advocacy	Operational Services	Medium	Short term (1-3 years)	NIL	Operational budgets	L2
C-A04	Minimise developments that propose to increase discharge to siphon locations. Investigate options to redirect flows to alternative outlets and/or provide relief points in the event of siphon blockage.	C04	Planning & development controls	Planning & Regulatory	Low	Ongoing	NIL	Operational budgets	G3
C-A05	Prepare a delivery plan for delivery of WSUD initiatives identified by the Cohuna Drainage Study.	C05	Water quality & WSUD implementation	Projects & Design	Medium	Medium term (3-6 years)	$5k-$10k	Operational budgets	S1
Koondrook									
ID	**Action Description**	**Risk Addressed**	**Action Type**	**Responsible Council Unit**	**Priority**	**Implementation Timeframe**	**Indicative Cost**	**Funding Source**	**Plan Objective Achieved**
KO-A01	Undertake additional community consultation to inform rehabilitation of the Koondrook Environmental Reserve, ensuring that grant limitations are explained.	K01, K07, M07	Community education & behaviour change	Projects & Design	Medium	Short term (1-3 years)	<$5k	Operational budgets	S1
KO-A02	Subject to community support, prepare an IWM functional design for the redevelopment of the Koondrook Environmental Reserve to support eligibility for grant funding. The design should also aim to improve local stormwater capacity by incorporating an OSD component, where feasible.	K01, K02, K07	Capital works & infrastructure upgrades	Projects & Design	Medium	Short term (1-3 years)	$25k-$50k	Capital works program	L3, S1, S2
KO-A03	Subject to grant funding, deliver a rehabilitation project for the Koondrook Environmental Reserve.	K01, K02, K07	Capital works & infrastructure upgrades	Projects & Design	Medium	Medium term (3-6 years)	$500k-$1M	External grants and funding programs	L3, S1, S2
KO-A04	Subject to grant funding, implement priority drainage upgrades identified in the Koondrook Stormwater and Drainage Strategy, with consideration of complementary road sealing and footpath improvements where they support drainage outcomes.	K02, K06	Capital works & infrastructure upgrades	Projects & Design	Medium	Medium term (3-6 years)	$5M+	External grants and funding programs	L1
KO-A05	Develop and implement an operating procedure for the main Koondrook pump station, including defined trigger levels for closing the manual penstock and starting pumps during high flows (replacing reliance on weekly visual inspection against bridge pier caps), and confirm availability and deployment requirements for portable pumps at the south-east Gunbower Creek outlets when flap gates are closed.	K03	Operations & maintenance	Operational Services	High	Short term (1-3 years)	$25k-$50k	Operational budgets	L2
KO-A06	In partnership with NCCMA, progressively remove the LSIO as the township levee is upgraded in accordance with the Koondrook Levee Study. Consider conversion of LSIO to SBO for land where stormwater flooding is known to occur or shown to occur in the Koondrook Stormwater and Drainage Strategy.	K05	Planning & development controls	Planning & Regulatory	Low	Medium term (3-6 years)	$10k-$25k	Operational budgets	G1
KO-A07	Prepare high level water quality model for the town to enable cost-benefit analysis of possible WSUD initiatives, expanding on works undertaken as part of the Koondrook Stormwater and Drainage Strategy.	K07	Investigations & studies	Projects & Design	Medium	Medium term (3-6 years)	$25k-$50k	Capital works program	S1
KO-A08	Prepare plan for delivery of cost-positive options identified by KO-A07 and include relevant actions in the next revision of the Urban Stormwater Management Plan.	K07	Investigations & studies	Projects & Design	Medium	Medium term (3-6 years)	$5k-$10k	Operational budgets	S1
Murrabit									
ID	**Action Description**	**Risk Addressed**	**Action Type**	**Responsible Council Unit**	**Priority**	**Implementation Timeframe**	**Indicative Cost**	**Funding Source**	**Plan Objective Achieved**
MU-A01	Regrade and stabilise detention basin embankments and establish deep-rooted vegetation to reduce erosion and sediment runoff.	MU01	Capital works & infrastructure upgrades	Projects & Design	Low	Medium term (3-6 years)	$50k-$100k	Capital works program	S1
MU-A02	Investigate opportunities to upgrade the existing Murrabit detention basin to support stormwater harvesting for irrigation of the adjacent sporting field.	M06	Investigations & studies	Projects & Design	Low	Medium term (3-6 years)	$5k-$10k	External grants and funding programs	S2
MU-A03	Prepare a concept design for open drain and culvert upgrades along Kerang–Murrabit Road near Forbes Street and, where feasible, deliver construction works to improve drainage performance and reduce private property flooding.	MU03	Investigations & studies	Projects & Design	High	Short term (1-3 years)	$50k-$100k	Capital works program	L1
MU-A04	Investigate the feasibility of regrading the nature strip adjacent to 1 Browning Avenue and, where feasible, implement minor works to improve overland flow paths and direct local runoff to the existing stormwater pit.	MU03	Investigations & studies	Projects & Design	High	Short term (1-3 years)	$10k-$25k	Capital works program	L1
MU-A05	Prepare a basic MUSIC model to assess the water quality performance of the existing stormwater system and identify potential opportunities for improved pollutant removal where best-practice targets are not achieved, subject to future prioritisation and available funding.	MU05	Investigations & studies	Projects & Design	Low	Short term (1-3 years)	$5k-$10k	Capital works program	S1

ACTION TABLE

Quambatook									
ID	Action Description	Risk Addressed	Action Type	Responsible Council Unit	Priority	Implementation Timeframe	Indicative Cost	Funding Source	Plan Objective Achieved
Q-A01	Investigate options to retrofit the stormwater outlet to the Avoca River with a gross pollutant trap, trash screen or similar device to reduce litter, sediment and debris entering the receiving waterway.	Q01	Investigations & studies	Projects & Design	Medium	Short term (1-3 years)	$5k-$10k	Capital works program	S1
Q-A02	Prepare a Quambatook levee and drainage operations manual that documents standard, pre-flood and post-flood operating procedures, including requirements for manually operated backflow prevention devices.	Q02	Operations & maintenance	Projects & Design	High	Short term (1-3 years)	$5k-$10k	Operational budgets	L2
Q-A03	Prepare a concept design to improve drainage along Tennyson Street and, where feasible and funding permits, implement drainage upgrades to improve discharge to the Avoca River and reduce localised flooding.	Q03	Investigations & studies	Projects & Design	Low	Medium term (3-6 years)	$10k-$25k	Capital works program	L1
Lalbert									
ID	Action Description	Risk Addressed	Action Type	Responsible Council Unit	Priority	Implementation Timeframe	Indicative Cost	Funding Source	Plan Objective Achieved
LA-A01	Assess the existing stormwater harvesting process against the Australian Guidelines for Water Recycling: Stormwater Harvesting and Reuse to ensure risks to human health are identified and addressed.	LA01	Investigations & studies	Community Health	Medium	Medium term (3-6 years)	$5k-$10k	Capital works program	L3

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Council Meeting Agenda
19 August 2026

7.10 DRAFT GROW GANNAWARRA CHILDREN AND YOUTH STRATEGY 2026-2030

Author: **Narelle O'Donoghue, Manager Community Health**
Authoriser: **Paul Fernee (Director Community Wellbeing)**

RECOMMENDATION

That Council:

1. **Endorse the Draft GROW Gannawarra Children and Youth Strategy 2026-2030 for community feedback.**
2. **Invite feedback from the community from Thursday 20 August until Friday 18 September 2026.**

EXECUTIVE SUMMARY

The draft *GROW Gannawarra Children and Youth Strategy 2026–2030* outlines Council's commitment to supporting children, young people and their families.

Informed by consultation with children, young people, community stakeholders, service providers and partner organisations, together with evidence from *The State of Gannawarra Children and Young People Report 2023*, the draft strategy provides a coordinated framework to improve outcomes for young people aged 0–24 years across the municipality.

Children and young people comprise approximately one quarter of Gannawarra's population, making their wellbeing, participation and development critical to the Shire's long-term resilience, sustainability and prosperity. The draft strategy recognises that investing in children and young people today contributes to stronger communities and better outcomes for future generations.

Consultation to develop the draft strategy highlighted community strengths, including strong social connections, engaged families, committed service providers, and a willingness to collaborate. It also identified key challenges affecting local children, young people and families, including workforce shortages, limited access to specialist and allied health services, mental health concerns, transport barriers, social isolation, educational engagement and opportunities for meaningful participation in decision-making.

Guided by the Australian Research Alliance for Children and Youth (ARACY) *Nest* framework, the draft strategy focuses on six key wellbeing domains: Valued, Loved and Safe; Material Basics; Healthy; Learning; Participating; and Identity and Culture.

The draft strategy positions Council as a leader, facilitator, partner and advocate, working collaboratively with community, government and service providers to strengthen systems, services and opportunities that support children, young people and families.

The draft strategy establishes an action plan for 2026–2030 and supports the guiding principles of the *Gannawarra Community Vision 2040* – connection, liveability, equity, wellbeing, resilience, and growth. Through partnership, advocacy and collective action, the draft strategy provides a roadmap for ensuring every child and young person in Gannawarra is connected, supported and empowered to thrive.

PURPOSE

The purpose of this report is to present the draft *GROW Gannawarra Children and Youth Strategy 2026–2030* for endorsement to seek feedback from the wider community.

DISCUSSION

The draft *GROW Gannawarra Children and Youth Strategy 2026–2030* responds to current demographic trends, emerging community needs and the findings of *The State of Gannawarra Children and Young People Report 2023*.

Gannawarra is home to more than 2,600 children and young people aged 0–24 years, representing 24.4% of the municipality's population as at the last Census in 2021. While local data demonstrates a number of positive outcomes for children and young people, challenges remain.

Positive outcomes identified include:

- Strong parental engagement in education
- Positive maternal and childhood development indicators
- Lower developmental vulnerability compared to Victorian averages on some indicators
- Lower rates of mortgage and rental stress than many Victorian communities

Key challenges identified include:

- Higher rates of single-parent and jobless families
- Elevated exposure to family violence
- Youth unemployment
- Lower secondary school completion rates
- Greater levels of speech, language and behavioural concerns
- Limited access to specialist and allied health services
- Geographic isolation and transport barriers affecting service access and participation

Community consultation also identified:

- Limited social and recreational opportunities outside organised sport
- Reduced face-to-face connection following the COVID-19 pandemic
- Increased reliance on digital devices
- Limited access to youth mental health supports
- Food insecurity affecting some children and young people

Young people identified a desire for:

- More leadership opportunities
- Greater involvement in decision-making
- More inclusive and welcoming spaces
- Increased low-cost and free activities
- Improved transport options
- Stronger support for wellbeing and cultural inclusion

The draft strategy adopts the ARACY *Nest* framework, Australia's first evidence-based wellbeing framework for children and young people. The framework recognises that optimal outcomes are achieved when children and young people are supported across six interconnected domains:

1. **Valued, Loved and Safe:** Ensuring children feel valued in loving and secure environments.
2. **Material Basics:** Supporting access to essential material needs like food, housing, transport and other essentials.
3. **Healthy:** Promoting good physical and mental health.
4. **Learning:** Encouraging effective learning and development opportunities from early childhood through to adult life.

5. **Participating:** Engaging children and young people in decision-making processes that affect them.
6. **Identity and Culture:** Supporting a strong sense of self and belonging, including cultural identity and values.

The draft *GROW Gannawarra Children and Youth Strategy 2026–2030* replaces the previous *Early Years Plan 2015–2018* and *Children and Youth Strategy 2016–2020*. Key projects achieved from these previous strategic documents have been reported in Council's Annual Report and include the installation of All Abilities Play Spaces at Kerang, Cohuna and Koondrook, outdoor exercise equipment and skate park activation including the extended Skate Park at Apex Park, Cohuna and upgrades to Kerang's Atkinson Park and Sir John Gorton Library Precinct to provide a safer and more useable space for local young people including installation of Wi-fi, CCTV cameras and improved lighting.

In addition, Council provided funding support for youth events such as Summer Swimming Pool Parties and musical festivals such as the Summerwave Youth Festival. These events have engaged young people in decision making and leadership and provided an important platform for young local musicians and young people who may not be engaged in organised sports. Through the Creative Gannawarra program, Council has also provided a number of art and cultural experiences for children and young people across Gannawarra each year.

Year 6 students have been supported by Council to attend the GRIP Leadership Program each year in Bendigo. GRIP encourages leadership qualities in students and helps support the implementation of projects within their own school communities.

Council is also the provider of a large range of services for children and families, including Maternal and Child Health, long day care, family day care, kindergartens, immunization services, supported playgroup, new parent groups, and a year-round learn to swim program.

In addition, the Gannawarra Library Service provides storytime, school holiday programs, and after school creative programs. Instilling a love of reading and literacy in our youngest residents has been an ongoing program priority across all service areas.

Feasibility studies for long-day care and facility development in Cohuna have been undertaken. New kindergarten facilities have been constructed at Leitchville, Koondrook and Kerang South, and a new Early Years Centre is currently under construction at Cohuna.

The 2025-2029 Council Plan has a priority to support career pathways for young people and Council works closely with the three relevant Local Learning and Employment Networks and local educational providers to support employment and career opportunities for young people. An example was the funding of two Youth Takeover Programs, the first in partnership with Cohuna Secondary College and Cohuna District Hospital, and the second in partnership with Kerang Technical High School and Nutrien Ag Solutions. Council also partnered with a range of agencies to host a Youth Mental Health Expo in 2025 and a Grow Your Own Career Expo in 2026 with all three local high schools participating.

Understanding that transport is a barrier to participation for young people, Council has been able to fund bus transport to connect schools into events and activities. This has provided children and young people with the opportunity to engage with events and a critical opportunity for children and young people to connect with students from other schools and communities. This strengthens connections and resilience across Gannawarra.

Council maintains strong partnerships with local Neighbourhood Houses in Kerang, Cohuna and Quambatook, local schools, and Northern District Community Health who run indigenous children and youth programs as well as provide a large array of services into our children services, including Smiles 4 Miles oral health program, Speech Literacy, Aboriginal cultural programs, and programs to encourage healthy eating and physical activity.

The draft strategy provides a framework to enable Council to strengthen existing partnerships and to explore new opportunities for children, young people and families living in Gannawarra into the future.

The draft strategy also highlights the importance of maintaining a strong evidence base through ongoing data collection, monitoring, and evaluation.

RELEVANT LAW

There is no legislative requirement for local government to develop a Children and Youth Strategy, however the *Local Government Act 2020* requires Council to plan for community wellbeing, engage with communities (including children and young people) and deliver equitable, inclusive services.

As a provider of children services, Council has legislated responsibilities to ensure that the health, wellbeing and safety of children and young people is protected and promoted.

The draft strategy is supported and informed by a broad legislative and policy framework as highlighted on pages 10-11 of the document.

A Gender Impact Assessment has been undertaken consistent with the requirements of the *Gender Equality Act 2020*, and relevant considerations have been incorporated into the draft strategy. In addition, recommended considerations for implementation of the strategy include:

Ensuring the proposed Youth Voice includes diverse and balanced representation.

1. Considering gender and intersectional impacts when planning annual actions, programs, budgets and partnerships.
2. Applying inclusive approaches to program access, safety, communications, workforce development and service referrals.
3. Undertaking targeted consultation with under-represented children, young people and families.

RELATED COUNCIL DECISIONS

Council Adoption of Early Years Plan 2015–2018

Council Adoption of Children and Youth Strategy 2016–2020

Council Meeting September 2024 - Adoption of Reconciliation Action Plan

Council Meeting July 2025 – Adoption of 2025-2029 Council Plan and Community Vision 2040

Council Meeting June 2026 – Adoption of Thriving Together 2026-2030 – a plan for a diverse, inclusive and resilient Gannawarra

OPTIONS

Council may endorse the draft *GROW Gannawarra Children and Youth Strategy 2026–2030* as presented and seek community feedback on the draft document.

Council may reject the draft *GROW Gannawarra Children and Youth Strategy 2026–2030* and request further revision prior to community consultation.

SUSTAINABILITY IMPLICATIONS

- The draft strategy contributes to long-term social sustainability by:
- Supporting positive outcomes for children and young people
- Strengthening community resilience and wellbeing
- Promoting equitable access to services and opportunities
- Supporting early intervention and prevention approaches
- Building community capacity through partnerships
- Supporting stronger educational, employment and participation outcomes
- Enhancing inclusion and cultural safety

These initiatives increase community resilience, reduce vulnerability, and support healthier, more connected communities that benefit children and young people over the long term.

The draft *GROW Gannawarra Children and Youth Strategy* supports the Council Plan goals: liveability, growth and sustainability. It contributes to long-term community wellbeing outcomes, particularly for children, young people and families and provides the strategic direction for achieving sustainable and long-term outcomes by working in partnership with the Gannawarra community and through formalised, long-term and sustainable partnerships.
Importantly, the draft strategy enables Council to lead the way in supporting all children and young people to reach their full potential and thrive.

COMMUNITY ENGAGEMENT

The draft *GROW Gannawarra Children and Youth Strategy* was informed by consultation with children, young people, stakeholders and community members.

As part of consultation undertaken for the development of the 2025-2029 Council Plan, Community Vision 2040 and Thriving Together 2026–2030, Council directly engaged with 96 children and young people across local early years settings, primary schools and secondary schools.

In parallel, Council worked with approximately 40 stakeholders from education, health, community services and government to develop a Gannawarra Family and Community Engagement Plan. Two formal workshops were held in November 2024 and March 2026. These sessions explored service gaps, emerging challenges and opportunities for collaboration.

Stakeholder consultation identified:

- Workforce shortages and recruitment challenges
- Limited specialist and allied health services
- Transport barriers and geographic isolation
- Ongoing funding uncertainty
- The need for stronger collaboration and advocacy

Children and young people highlighted:

- The need for more activities outside sport
- Better transport options
- Improved mental health supports
- More opportunities for leadership and decision-making
- Greater social connection and inclusion

These consultations, together with *The State of Gannawarra Children and Young People Report 2023*, informed the priorities, focus areas and actions contained within the draft *GROW Gannawarra Children and Youth Strategy 2026-2030.*

INNOVATION AND CONTINUOUS IMPROVEMENT

The draft strategy supports innovation through:

- Youth-led engagement and decision-making approaches
- Exploring a Youth Voice mechanism
- Strengthened cross-sector collaboration
- Data-driven planning and evaluation
- Flexible rural service models
- Early intervention and prevention initiatives
- Ongoing monitoring and annual reporting

Council identified the finalisation of the *GROW Gannawarra Children and Youth Strategy 2026-2030* in the 2025-2029 Council Plan, Action Plan Year Two. This process included a review of the *Early Years Plan 2015-2018* and the *Children and Youth Strategy 2016-2020.*

The result of the review process is a modern and relevant strategy that responds to the current needs of the Gannawarra community. The draft strategy responds to what Gannawarra residents have told Council through various consultation processes, and the next step of the process will enable the draft strategy to be tested with the community.

The draft strategy includes Council facilitating an annual forum involving stakeholders and young people to review progress and guide future implementation.

An annual review will be reported through Council's Annual Report, with a final evaluation undertaken in 2030, ensuring continuous improvement.

COLLABORATION

The draft *GROW Gannawarra Children and Youth Strategy 2026-2030* highlights that achieving the full vision outlined in the plan is not something that Council can do alone.

Achieving the vision will require continued collaboration with Council working alongside:

- Children, young people and families
- Health services
- Education providers
- Government (local, state and federal)
- First Nations communities
- Community organisations and networks

Existing formalised partnership platforms will also be used to support the implementation of the strategy:

- Gannawarra Local Agency Meeting (GLAM)
- Buloke, Loddon, Gannawarra Wellbeing Executive
- Gannawarra Community Resilience Committee
- Gannawarra Neighbourhood House Network
- Kerang Elders and Leaders Group
- Gannawarra Community Planning Groups across 9 communities

In addition, the draft strategy recognises that collective action and coordinated responses are required to address challenges affecting children, young people and families.

By working together, listening to young people and responding to their needs, Gannawarra can create the conditions for future generations to grow, lead and contribute to a strong, vibrant and sustainable community.

FINANCIAL VIABILITY

Implementation of some of the actions within the draft *GROW Gannawarra Children and Youth Strategy 2026-2030* are incorporated into Council's annual operational planning and budgeting processes, others rely on partnership approaches and collaborative delivery models that maximise community and external resources.

External funding opportunities will be pursued where appropriate to support delivery of specific initiatives. As an example, Council has recently been announced as one of 17 rural and regional councils selected to partner with VicHealth over the next two years to improve outcomes for children and young people.

The Gannawarra VicHealth *Stronger Together* project complements the implementation of the *GROW Gannawarra Children and Youth Strategy* and will support the amplification of existing partnerships, programs and initiatives to activate local neighbourhoods while strengthening social connections, mental wellbeing and a sense of belonging for children and young people.

Council identified the finalisation of the *GROW Gannawarra Children and Youth Strategy* as an action to be achieved in the 2025-2029 Council Plan, Action Plan Year Two.

Implementation of community engagement activities associated with consultation on the draft strategy will be undertaken within existing officer resources. A dedicated Stronger Together Project Officer funded by VicHealth will support the implementation of the *GROW Gannawarra Children and Youth Strategy* for the two-year funding period.

REGIONAL, STATE AND NATIONAL PLANS AND POLICIES

The draft *GROW Gannawarra Children and Youth Strategy 2026-2030* aligns with, and supports delivery of the Gannawarra Community Vision 2040, 2025-2029 Council Plan, which incorporates the Municipal Public Health and Wellbeing Plan, Gannawarra Reconciliation Action Plan, Gannawarra Community Resilience Action Plan, *Thriving Together 2026-2030* – a plan for a diverse, inclusive and resilient Gannawarra, Gannawarra Local Agency Meeting (GLAM) and the Buloke Loddon Gannawarra (BLG) Health Executive partnership priorities.

At a state level, the draft strategy aligns with the *Victorian Youth Strategy 2022-2027 – Our* Promise*, Your Future* and the *Early Years Compact 2017-2027*, a ten-year agreement between the Victorian Government and local government. Particularly relevant to Maternal and Child Health, kindergarten, early intervention and family services, the Compact focuses on improving outcomes for children and families through stronger coordination, planning and service integration.

The draft *GROW Gannawarra Children and Youth Strategy 2026–2030* aligns with Australia's national evidence-based child and youth wellbeing framework, *The Nest*, developed by the Australian Research Alliance for Children and Youth (ARACY). In addition, the draft strategy supports the objectives of the Australian Government's *Early Years Strategy 2024–2034* and broader national approaches to youth participation, wellbeing and development.

These frameworks collectively reinforce Council's responsibility to promote equity, inclusion, cultural safety, human rights, and community resilience. Importantly, the strategy supports Council's commitment to creating opportunities for every child and young person in Gannawarra to reach their full potential and thrive.

COUNCIL PLANS AND POLICIES

Goal 1: Liveability - Enhance the wellbeing and liveability of the Gannawarra through infrastructure development and services.
1. Celebrate our diverse identity and maximise community health, wellbeing and safety.

TRANSPARENCY OF COUNCIL DECISIONS

This report will be considered in an open Council Meeting.

CONFLICT OF INTEREST

The officer preparing this report declares that they have no conflict of interest in this matter.

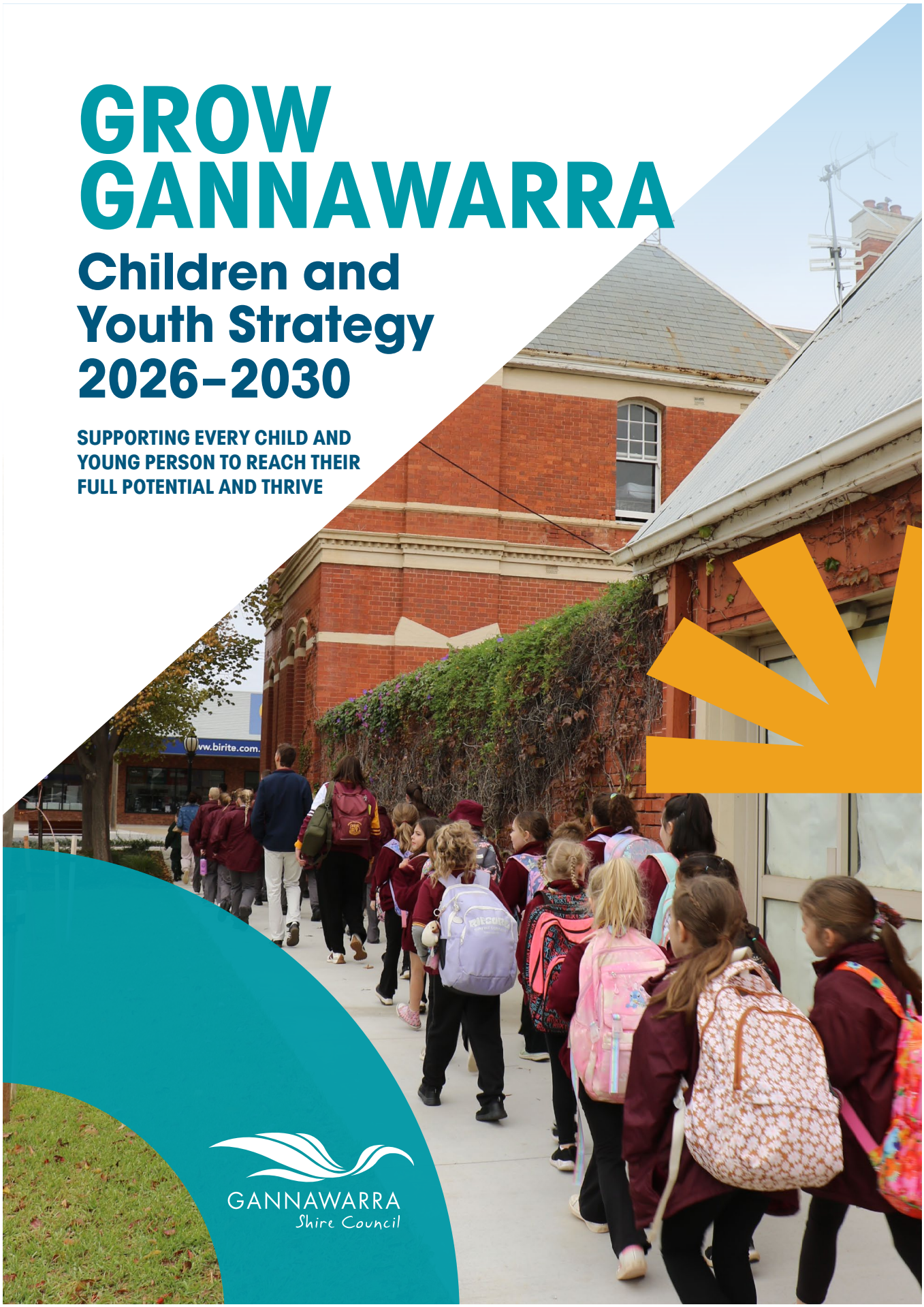
ATTACHMENTS

1. Draft GROW Gannawarra Children and Youth Strategy 2026-2030 [**7.10.1** - 24 pages]

GROW GANNAWARRA

Children and Youth Strategy 2026–2030

SUPPORTING EVERY CHILD AND YOUNG PERSON TO REACH THEIR FULL POTENTIAL AND THRIVE



ACKNOWLEDGEMENT OF COUNTRY

Gannawarra Shire Council acknowledges the Barapa Barapa, Yorta Yorta and Wamba Wamba peoples as the traditional owners of the land now known as Gannawarra. We pay our respects to Elders past, present and emerging and acknowledge their rich culture and connection to Country.

INTRODUCTION

The *GROW Gannawarra Children and Youth Strategy 2026-2030* outlines Council's commitment to supporting children, young people and their families by creating opportunities for every child and young person to reach their full potential and thrive.

The Strategy defines Council's role as a leader, facilitator, partner and advocate, working collaboratively to strengthen connections that support children, young people and their families to grow and succeed within their communities.

Building on the previous Early Years Plan 2015-2018 and Children and Youth Strategy 2016-2020, this Strategy strengthens these foundations by incorporating current community priorities and insights. It responds to the strengths and challenges identified in *The State of Gannawarra's Children and Young People Report 2023* and aligns with the six domains from *The Nest* - Australia's first evidence-based framework to enhance the wellbeing of children and young people.

The Strategy complements the Council Plan 2025-2029 and sets out a clear action plan for achieving the guiding principles of the Gannawarra Community Vision 2040 – connection, liveability, equity, wellbeing, resilience and growth.

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EXECUTIVE SUMMARY

The G*ROW Gannawarra Children and Youth Strategy 2026–2030* outlines Council's commitment to improving outcomes for children and young people aged 0–24 years across the municipality. Children and young people make up around a quarter of Gannawarra's population, making their wellbeing critical to the region's long-term resilience, sustainability and prosperity.

The Strategy has been informed by consultation with children and young people, local stakeholders and community partners, alongside insights from *The State of Gannawarra's Children and Young People Report 2023*. Engagement highlighted strong community connections and a willingness to collaborate, alongside key challenges including access to services, youth mental health, transport barriers, educational engagement and participation in decision-making.

Guided by the Australian Research Alliance for Children and Youth (ARACY) *Nest* framework, the Strategy focuses on six domains essential to wellbeing: being valued, loved and safe; having material basics; being healthy; learning; participating; and having a strong sense of identity and culture.

The Strategy positions Council as a leader, facilitator, partner and advocate, working collaboratively with community and service providers to strengthen systems that support children, young people and their families. It places a strong emphasis on family-centred approaches, early intervention and equity, particularly in response to the unique challenges of rural communities.

Building on existing strengths and partnerships, this Strategy provides a coordinated framework for action over the next four years, supporting children and young people in Gannawarra to feel connected, supported and empowered to reach their full potential and thrive.

BACKGROUND

Council plays an important role in supporting children, young people and their families across Gannawarra through a range of services, partnerships and community initiatives.

Council delivers a broad suite of early years and family services, including Maternal and Child Health, early childhood education and care, immunisation and aquatic programs. It also supports youth development and engagement through leadership opportunities, creative and cultural programs, community events and partnerships with schools and local organisations.

Council works closely with key partners including neighbourhood houses, schools, health services and community organisations to deliver programs that support literacy, health, wellbeing and cultural connection. Collaborative initiatives such as youth leadership programs, mental health expos and community events provide opportunities for young people to connect, participate and build skills.

Council also recognises the importance of improving access and inclusion, particularly in a rural context. Initiatives such as transport support and cross-community programming help address barriers to participation and strengthen connections across Gannawarra.

The Council Plan 2025–2029 identifies supporting career pathways for young people as a priority, with partnerships across education and industry enabling local employment and training opportunities.

The GROW Gannawarra Children and Youth Strategy 2026–2030 builds on these strengths and provides a framework to strengthen partnerships, address service gaps and expand opportunities for children and young people to participate, develop and thrive.

"Leadership starts at school, partner and support schools to build leaders"

- GANNAWARRA YOUNG PERSON

COMMUNITY PROFILE

OUR COMMUNITY

10,683 PEOPLE LIVED IN GANNAWARRA AT THE LAST CENSUS IN 2021

3,736 SQUARE KILOMETRES AREA COVERED BY GANNAWARRA SHIRE

There are two main townships - Kerang and Cohuna and numerous smaller townships including Koondrook, Leitchville, Quambatook, Lalbert, Lake Charm, Macorna, Murrabit, and Mystic Park.

Approximately 3 hours from Melbourne, with larger regional centres of Swan Hill 40 minutes to the north, Echuca 60 minutes to the east and Bendigo 90 minutes to the south.

OUR DEMOGRAPHICS

51 YEARS
THE MEDIAN AGE OF THE GENERAL POPULATION
compared to the median age for Australia of 38 years*

25 IS THE MEDIAN AGE FOR ABORIGINAL AND TORRES STRAIT ISLANDER PEOPLE, WITH 50.75% UNDER 25 (136 PEOPLE).
This highlights the need to support cultural continuity and address disparities in life expectancy*

THE BIRTH RATE WAS
90 IN 2024/25, 100 IN 2023/24 AND 92 IN 2022/23.
The birth rate has reduced over time - it was 165 in 1999***

84.4% OF RESIDENTS WERE BORN IN AUSTRALIA AND
93.3% SPEAK ONLY ENGLISH AT HOME*

2.5% OF THE POPULATION (268 PEOPLE) IDENTIFY AS ABORIGINAL AND TORRES STRAIT ISLANDER.
This is higher than the state average of 1.0%*

4.2% OF 0-24-YEAR-OLDS (110 PEOPLE) REQUIRED ASSISTANCE WITH DAILY LIVING DUE TO A LONG-TERM HEALTH CONDITION OR DISABILITY*

78.8% OF SINGLE PARENT FAMILIES (297 FAMILIES) HAD A FEMALE AS THE PRIMARY CARER*

GANNAWARRA HAS A SEIFA INDEX OF SOCIO-ECONOMIC DISADVANTAGE
SCORE OF 952
- based on income, education, unemployment, skill levels - placing Gannawarra as the 14th most disadvantaged LGA in Victoria*

$590 MEDIAN WEEKLY PERSONAL INCOME compared to $803 for Victoria.

$1,417 MEDIAN WEEKLY FAMILY INCOME compared to $2,316 for Victoria*

240 FAMILY VIOLENCE INCIDENTS 2024/25^

12.5% OF PREP CHILDREN WERE VULNERABLE ON TWO OR MORE DOMAINS
compared to 11.8% for Victoria.**

9.8% OF GANNAWARRA RESIDENTS AGED 15 YEARS AND OVER HAD COMPLETED YEAR 12 OR AN EQUIVALENT QUALIFICATION,
compared to 14.9% for Victoria, indicating a lower rate of secondary school completion*

16.7% A HIGHER PROPORTION OF RESIDENTS HOLD CERTIFICATE III QUALIFICATIONS. GANNAWARRA HAS A STRONG VOCATIONAL WORKFORCE,
compared with Victoria (10.9%)*

DATA SNAPSHOT

0-4 YEARS
4.6%*

5-9 YEARS
5.3%*

10-14 YEARS
5.8%*

15-19 YEARS
4.6%*

20-24 YEARS
4.1%*

GANNAWARRA IS HOME TO MORE THAN 2600 CHILDREN AND YOUNG PEOPLE

6.2%
OF FAMILY HOUSEHOLDS (175 HOUSEHOLDS) LIVE ON LESS THAN $500 PER WEEK WITH 66 FAMILIES LIVING ON LESS THAN $300 PER WEEK*

30.2%
AGED 65 AND OVER COMPARED TO 16.8% FOR VICTORIA*

24.4%
AGED 24 AND UNDER COMPARED TO 29.9% FOR VICTORIA*

1,324
FAMILIES WITH CHILDREN 0-15YEARS*

13.3%
OF FAMILIES WERE SINGLE PARENT FAMILIES COMPARED TO 15.2% FOR VICTORIA*

24%
OF PREP CHILDREN WERE VULNERABLE ON ONE OR MORE DOMAINS**

*2021 ABS CENSUS
^ CRIME STATISTICS VICTORIA
**2024 AEDC (111 children measured)
~2019-21 PHIDU
^^ 2022 School Entrant Health Questionnaire (SECQ) DET
***2025 COUNCIL DATA

The State of Gannawarra Children and Young Person Report 2023 and data released since this report was developed, show that while Gannawarra performs strongly in several indicators compared with the Victorian average, significant challenges remain.

THE STATE OF GANNAWARRA CHILDREN AND YOUNG PEOPLE REPORT IDENTIFIED POSITIVE LOCAL OUTCOMES INCLUDING:

Lower developmental vulnerability compared with the Victorian average on some indicators measured through the Australian Early Development Census

Strong parental engagement in education

Positive maternal and childhood development indicators

Lower rates of mortgage and rental stress

SIGNIFICANT CHALLENGES WERE IDENTIFIED, INCLUDING:

Higher rates for single-parent and jobless families

Elevated family violence exposure

Higher youth unemployment

Lower high school participation

Greater rates of speech, language and behavioral concerns

Limited access to specialist and allied health services

The State of Gannawarra Children and Young People Report 2023 provided comprehensive data and identified key areas requiring greater focus, partnerships and advocacy to support every child and young person to reach their full potential and thrive.

Access to data helps us better understand what is working well and what needs to be improved. It also helps to identify gaps where data is needed to inform decision making.

DATA CAN HELP US TO:

Plan our efforts and resources

Advocate for our needs

Measure our progress over time

A key priority in this Strategy is to ensure that the most up to date data is available to inform evidence-based decision making and to be able to track improvements over-time.

GROW GANNAWARRA 2026-2030

- SUPPORTING EVERY CHILD AND YOUNG PERSON TO REACH THEIR FULL POTENTIAL AND THRIVE

COMMUNITY VISION

The Gannawarra Community Vision 2040 is a community vision for the future that sets down the guiding principles for the Gannawarra community-connection, liveability, equity, wellbeing, resilience and growth.

Together, we are Gannawarra, a community that is proud, connected, inclusive and future focused.

THE COMMUNITY VISION HIGHLIGHTS STRENGTHS AND CHALLENGES AND FIVE KEY OBJECTIVES TO GUIDE COUNCIL DECISION MAKING OVER THE NEXT 15 YEARS:

A connected and welcoming place: Everyone feels supported and included, from early years to older age. Towns are vibrant, public spaces are safe, and people can connect with each other, services, and opportunities.

A thriving and diverse economy: Gannawarra's economy is innovative and evolving from agriculture and tourism to renewables and manufacturing. Strategic investment supports local jobs and future industries.

A great place to live and participate: People enjoy Gannawarra for its quality of life, housing, recreation, and affordability. Community spirit, creativity, and learning opportunities are valued and celebrated.

Strong leadership and financial sustainability: Council makes transparent and well-informed decisions. Services and infrastructure are delivered responsibly, ensuring long-term sustainability across all our communities.

A protected and prepared environment: Our natural environment is treasured and well cared for. We are prepared for climate change, reduce our environmental footprint, and act on shared responsibility for land and water.

The GROW Gannawarra Children and Youth Strategy 2026-2030 aligns with these objectives.

The following principles will ensure that every child and young person is supported to reach their full potential and thrive:

Empowerment: enabling children and young people to influence decisions that shape their lives.

Purposeful Engagement: providing meaningful opportunities that lead to genuine outcomes.

Inclusiveness: ensuring equitable access for all children and young people.

Partnership: recognising children and young people as authorities on their own lives and working alongside them.

Safety and Respect: creating culturally safe, trauma-informed environments where young people are heard and valued.

Transparency and Accountability: demonstrating how contributions inform decisions and outcomes.

**Youth Affairs Council of Victoria (YACVic) and Victorian Commission for Children and Young People.*

LEGISLATION AND POLICY FRAMEWORKS

There is no set mandate for local government to develop a Children and Youth Strategy.

The Local Government Act 2020 however requires Council to plan for community wellbeing, engage with communities (including children and young people), and deliver equitable, inclusive services.

As a provider of children services, Council has a number of legislated responsibilities to ensure that the health, wellbeing and safety of children and young people is protected and promoted.

Council prides itself on engagement with its partners and residents- including children, young people and their families – and commits to the principles and requirements of legislation, policy, frameworks, standards and regulatory requirements.

INTERNATIONAL

UN Convention on the Rights of the Child
Referenced widely in Victorian policy with participation as a core right

STATE

Victorian Commission for Children and Young People frameworks
Includes engagement and participation guidance

Local Government Act 2020
Requires councils to plan for community wellbeing, engage with communities (including children and young people), and deliver equitable, inclusive services

Public Health and Wellbeing Act 2008
Requires councils to prepare Municipal Public Health and Wellbeing Plans including population health priorities for children and young people

Gender Equality Act 2020
Requires councils to undertake a Gender Impact Assessment when developing or reviewing any policy, program or service that has a direct impact on the public, including children and young people

Emergency Management Act 2013 and Community Resilience Framework for Emergency Management
Guides the development of safer and more resilient communities across Victoria

Planning and Environment Act 1987
Supports child-friendly communities through land use planning, open space, and infrastructure

Children, Youth and Families Act 2005 (Vic)
The principal legislation governing child protection, family services and youth justice, prioritising the safety, wellbeing and best interests of children

Child Wellbeing and Safety Act 2005 (Vic)
Establishes principles for child wellbeing, the Child Safe Standards, and the Reportable Conduct Scheme

Victorian Child Safe Standards
Legally binding standards that apply to all organisations working with children, requiring proactive measures to prevent harm and abuse

Reportable Conduct Scheme
Requires organisations, including councils, to report and investigate allegations of child abuse involving staff or volunteers

Mandatory reporting obligations
Certain professionals must report suspected child abuse or neglect

Education and Training Reform Act 2006
Governs schools, early childhood education and care systems

Education and Care Services National Law / Regulations
Applies to early childhood services delivered or supported by councils

LEGISLATION AND POLICY FRAMEWORKS

VICTORIAN POLICIES AND FRAMEWORKS

THESE ARE NOT LAWS, BUT CRITICAL FOR STRATEGY ALIGNMENT AND FUNDING OPPORTUNITIES:

- Victorian Public Health and Wellbeing Plan 2023–2027
- Early Years Compact 2017-2027
- Victorian Youth Strategy 2022-2027
- The Orange Door / Family Services framework
- Aboriginal Children and Young People Agreement
- Roadmap for Reform: Strong Families, Safe Children

GANNAWARRA SHIRE

- Charter of Human Rights
- Council Plan 2025-2029 (incorporating the Municipal Public Health and Wellbeing Plan)
- Community Vision 2040
- The State of Gannawarra Children and Young People Report 2023
- Communications and Engagement Strategy
- Diversity Policy
- Children's Services Policy
- Fair Access Policy
- Child Safe Standards
- Municipal Emergency Management Plan
- Community Resilience Action Plan
- Free from Family Violence Action Plan
- Reconciliation Action Plan
- Gannawarra Wellbeing Framework
- Cohuna Childcare Advocacy paper
- Exploring Care and Education in Cohuna
- Creative Gannawarra Strategy
- Aquatics Strategy
- Community Safety Plan
- Sport and Recreation Strategy
- Thriving Together – a plan for a diverse, inclusive and resilient Gannawarra

To access these documents visit: www.gannawarra.vic.gov.au or call into Council's offices in Kerang or Cohuna.

CONSULTATION PROCESS

This Strategy is informed by engagement with children, young people, stakeholders and the broader community, ensuring that local voices shape priorities and actions.

As part of the development of the Council Plan 2025–2029, Community Vision 2040 and Thriving Together – a plan for a diverse, inclusive and resilient Gannawarra 2026–2030, Council undertook a broad community consultation program. This included direct engagement with 96 children and young people across local secondary schools, primary schools and early years settings.

In parallel, Council worked with approximately 40 stakeholders from education, health, community services and government through workshops held in 2024 and 2026. These sessions explored service gaps, emerging challenges and opportunities for collaboration. The outcomes, captured in a background document, underpin this Strategy.

KEY INSIGHTS FROM STAKEHOLDERS

Challenges identified included:
Workforce shortages and recruitment challenges
Limited access to specialist and allied health services
Transport barriers and geographic isolation
Uncertainty of ongoing program funding

Priorities identified included:
Stronger cross-sector collaboration
Advocacy for rural service models and local solutions
Improved data sharing and evidence use
Increased youth participation in decision-making
Expanded mental health support and early intervention
Improved access to health and allied health services
Family violence prevention and response
Improved transport options

KEY INSIGHTS FROM CHILDREN AND YOUNG PEOPLE

Children and young people shared valuable insights about their experiences of living in Gannawarra.

Key challenges identified were:
Limited social and recreational opportunities outside of sport
Reduced face-to-face connection following the pandemic
Barriers to participation due to transport limitations
Increased reliance on digital devices
Limited access to mental health support
Food insecurity affecting some students

Young people suggested solutions including:
Increasing opportunities for leadership, volunteering and decision-making
Expanding low-cost or free community activities
Improving transport options and access to events
Creating more inclusive and welcoming spaces
Supporting healthy eating and wellbeing
Promoting cultural connection and inclusion

These insights highlight the importance of connection, inclusion, access and opportunity in supporting children and young people to thrive.

The priorities identified through consultation directly informed the focus areas and actions of the GROW Gannawarra Children and Youth Strategy 2026–2030.

"Don't disregard young people and what they can contribute"

- GANNAWARRA YOUNG PERSON

ACTION PLAN 2026-2030

GOAL

FOR EVERY CHILD AND YOUNG PERSON TO REACH THEIR FULL POTENTIAL AND THRIVE.

OBJECTIVES

PARTNER WITH COMMUNITIES TO IMPROVE ACCESS TO SERVICES AND CREATE SAFE, INCLUSIVE ENVIRONMENTS.

ENSURE COMMUNITY VOICES INFORM ACTIONS THAT IMPROVE HEALTH, WELLBEING, LEARNING AND PARTICIPATION OUTCOMES FOR CHILDREN AND YOUNG PEOPLE.

ACTION PLAN

The GROW Gannawarra Children and Youth Strategy 2026-2030 is focused on the six domains of Australian Research Alliance for Children and Youth (ARACY), the Nest, Australia's first evidence-based framework to enhance wellbeing of children and young people.

TO HAVE EVERYTHING THEY NEED FOR THE BEST START IN LIFE, A CHILD OR YOUNG PERSON NEEDS TO BE ADEQUATELY RESOURCED IN ALL SIX DOMAINS:

1. VALUED, LOVED AND SAFE:
ENSURE CHILDREN FEEL VALUED IN LOVING AND SECURE ENVIRONMENTS.

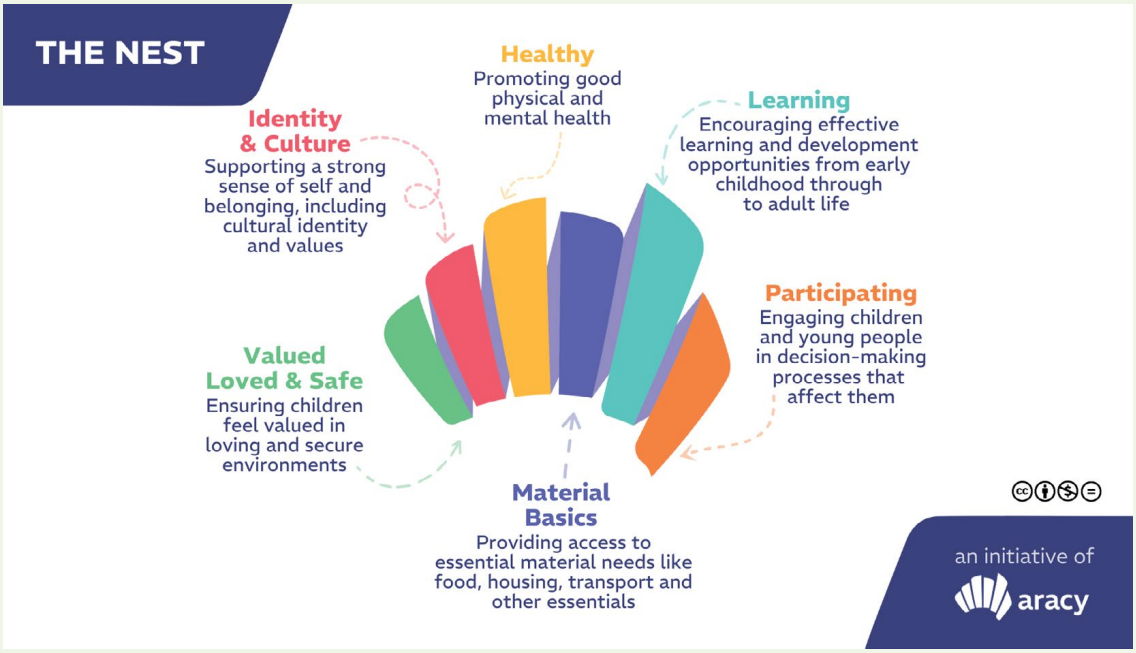
2. MATERIAL BASICS:
PROVIDE ACCESS TO ESSENTIAL MATERIAL NEEDS LIKE FOOD, HOUSING, TRANSPORT AND OTHER ESSENTIALS.

3. HEALTHY:
PROMOTE GOOD PHYSICAL AND MENTAL HEALTH.

4. LEARNING:
ENCOURAGE EFFECTIVE LEARNING AND DEVELOPMENT OPPORTUNITIES FROM EARLY CHILDHOOD THROUGH TO ADULT LIFE.

5. PARTICIPATING:
ENGAGE CHILDREN AND YOUNG PEOPLE IN DECISION-MAKING PROCESSES THAT AFFECT THEM.

6. IDENTITY AND CULTURE:
SUPPORT A STRONG SENSE OF SELF AND BELONGING, INCLUDING CULTURAL IDENTITY AND VALUES.



FOCUS AREA 1

VALUED, LOVED AND SAFE

GOAL:

ENSURE CHILDREN FEEL VALUED IN LOVING AND SECURE ENVIRONMENTS.

KEY ACTIONS	EXPECTED OUTCOMES
1.1 Foster community connection and belonging by celebrating children, young people and families across the community.	Children, young people and families are valued and celebrated.
1.2 Support the implementation of the Gannawarra Free from Family Violence Action Plan 2025-2029.	Action Plan implementation.
1.3 Engage priority populations in emergency preparedness activities as opportunities arise.	Enhanced preparedness to emergency events.

SUCCESS MEASURES

- % of young people reporting they feel safe in the community (survey-based)
- Number of community safety and connection initiatives delivered annually
- Number of partners supporting implementation of the Free from Family Violence Action Plan

PROMOTING OF SAFE, INCLUSIVE AND SUPPORTIVE ENVIRONMENTS FOR ALL CHILDREN, YOUNG PEOPLE AND FAMILIES.

FOCUS AREA 2

MATERIAL BASICS

GOAL:

SUPPORT ACCESS TO ESSENTIAL MATERIAL NEEDS LIKE FOOD, HOUSING, TRANSPORT AND OTHER ESSENTIALS.

KEY ACTIONS	EXPECTED OUTCOMES
2.1 Strengthen cross-agency collaboration to respond to gaps in food security, housing, transport, digital access and financial hardship.	Stronger partnerships working on shared local solutions.
2.2 Assess resource requirements to meet diverse community and workforce needs.	Resourced community and workforce to support children, young people and families.

SUCCESS MEASURES

Number of cross-sector initiatives addressing food security, transport or digital access

Increased community-led transport options that enable connection to services, activities and events

Number of advocacy submissions or funding applications addressing service gaps and workforce needs

SUPPORTING PARTNERSHIPS THAT IMPROVE EQUITABLE ACCESS TO ESSENTIAL SERVICES FOR CHILDREN, YOUNG PEOPLE AND FAMILIES.

FOCUS AREA 3

HEALTHY

GOAL:

PROMOTE GOOD PHYSICAL AND MENTAL HEALTH.

KEY ACTIONS	EXPECTED OUTCOMES
3.1 Expand access to community-based allied health, early intervention, primary care and prevention services.	Better access to early intervention, prevention and allied health services.
3.2 Facilitate child and youth mental health programs such as Youth Mental Health First Aid and suicide prevention.	Improved mental health and wellbeing.
3.3 Explore flexible rural health models such as multi-use active recreation spaces and low-cost community-based programs such as art, music, theatre and physical activity.	More accessible opportunities tailored to local needs.
3.4 Increase health promoting opportunities for children, young people, and families through schools, community programs, and partnerships.	Improved rates of physical activity, healthy eating and reduced rates of smoking/vaping.

SUCCESS MEASURES

Number of health and wellbeing programs delivered

Participation rates in health, physical activity and wellbeing programs

Increased access points to allied health or early intervention services (e.g. outreach sessions)

ENHANCING ACCESS TO HEALTH AND WELLBEING OPPORTUNITIES THROUGH LOCALLY RELEVANT, PREVENTION-FOCUSED AND COMMUNITY-BASED HEALTH INITIATIVES.

FOCUS AREA 4

LEARNING

GOAL:

ENCOURAGE EFFECTIVE LEARNING AND DEVELOPMENT OPPORTUNITIES FROM EARLY CHILDHOOD THROUGH TO ADULT LIFE.

KEY ACTIONS	EXPECTED OUTCOMES
4.1 Increase access and engagement in early childhood education and care.	Children start school ready to learn.
4.2 Support schools to identify attendance risk early and access interventions.	Increased school attendance.
4.3 Expand career pathway opportunities and job readiness for young people.	Improved pathways to training and employment.
4.4 Support safe and effective use of technology for learning.	Equitable access to learning opportunities.

SUCCESS MEASURES

Participation rates in early childhood education and care programs

Number of partnerships supporting education, training and employment pathways

Number of young people participating in career pathway or job readiness initiatives

STRENGTHENING PATHWAYS FROM EARLY CHILDHOOD THROUGH TO EDUCATION, TRAINING AND EMPLOYMENT.

FOCUS AREA 5

PARTICIPATING

GOAL:

ENGAGE CHILDREN AND YOUNG PEOPLE IN DECISION-MAKING PROCESSES THAT AFFECT THEM.

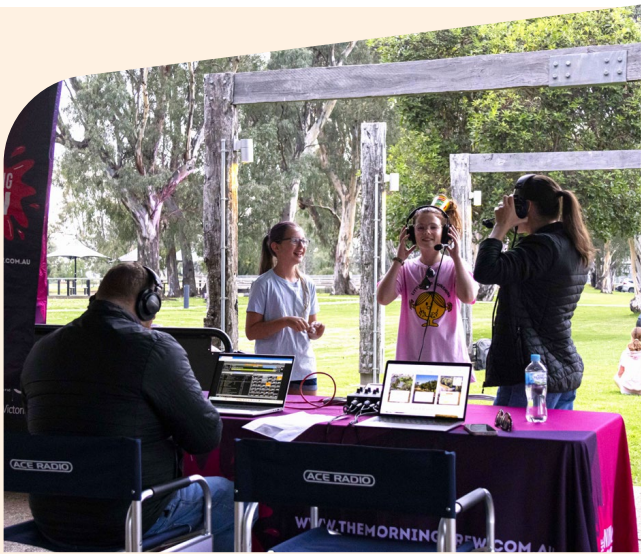
KEY ACTIONS	EXPECTED OUTCOMES
5.1 Support youth engagement in decision-making by exploring the establishment of a Youth Voice to strengthen opportunities for leadership.	A diverse and balanced Youth Voice in decision making.
5.2 Improve connection to health, education, support services, and community activities.	Increased access to services.
5.3 Provide family friendly opportunities that support community connections that are culturally safe and inclusive.	More family friendly opportunities.

SUCCESS MEASURES

Establishment of a Youth Voice mechanism by July 2027

Number of children and young people engaged in decision-making processes

Number of youth-led initiatives supported



PROVIDING MEANINGFUL OPPORTUNITIES FOR CHILDREN AND YOUNG PEOPLE TO PARTICIPATE IN DECISION-MAKING AND COMMUNITY LIFE.

FOCUS AREA 6

IDENTITY AND CULTURE

GOAL:

SUPPORT A STRONG SENSE OF SELF AND BELONGING, INCLUDING CULTURAL IDENTITY AND VALUES.

KEY ACTIONS	EXPECTED OUTCOMES
6.1 Support and encourage self-determination.	Increased sense of belonging and cultural pride.
6.2 Celebrate diversity through a range of multicultural, intergenerational and community-led events, programs and activities that foster belonging and social cohesion across communities.	Enhanced cultural safety across services.
6.3 Support cultural safety and trauma informed practice training across agencies.	Improved equity and inclusion across services.
6.4 Explore sustainable funding for Aboriginal children and youth programs.	Sustainable cultural programs.
6.5 Deliver on the children and youth specific actions within the Gannawarra Reconciliation Action Plan.	Delivery of Gannawarra Reconciliation Action Plan.

SUCCESS MEASURES

Number of cultural, community and inclusion programs delivered

Participation rates across diverse groups

Number of partners participating in cultural safety or trauma-informed training

ENCOURAGING INCLUSIVE AND CULTURALLY SAFE COMMUNITIES THAT CELEBRATE DIVERSITY, SUPPORT SELF-DETERMINATION AND STRENGTHEN A SENSE OF BELONGING FOR ALL CHILDREN AND YOUNG PEOPLE.

IMPLEMENTATION

Council plays an important leadership role in supporting children, young people and families in Gannawarra; however, achieving the vision of this Strategy is not something that Council can do alone. Achieving better outcomes for children and young people will require strong partnerships, shared advocacy and collective action across the community.

Council will work collaboratively with key partners including local health services, education providers, community organisations and government agencies to deliver coordinated, evidence-informed actions that respond to local needs and areas of disadvantage.

A coordinated and inclusive approach will ensure resources are aligned, system capability is strengthened, and services remain flexible and responsive within a rural context.

KEY IMPLEMENTATION PRIORITIES

- Use local data and service mapping to identify gaps and inform decision-making
- Focus on priority populations based on evidence and lived experience, ensuring gender equality and intersectionality are considered
- Strengthen partnerships to deliver actions and shared outcomes
- Build workforce capacity through collaboration and shared learning
- Embed lived and living experience in planning and delivery
- Identify and pursue sustainable funding opportunities
- Advocate collectively for resources to meet community needs

KEY STAKEHOLDERS

SUCCESSFUL IMPLEMENTATION WILL INVOLVE COLLABORATION WITH:

- Children, young people and families
- Health services
- Education providers
- Government (local, state and federal)
- First Nations communities
- Community organisations and networks

PRIORITY GROUPS INCLUDE:

- Aboriginal children and young people
- Children and young people experiencing disadvantage
- Rural and isolated communities
- Young people with disability
- Culturally and linguistically diverse young people
- LGBTIQA+ young people

COUNCIL WILL ALSO LEVERAGE EXISTING PARTNERSHIP PLATFORMS TO SUPPORT THE IMPLEMENTATION OF THIS GROW GANNAWARRA CHILDREN AND YOUTH STRATEGY:

- Gannawarra Local Agency Meeting (GLAM)
- Buloke, Loddon, Gannawarra Health and Wellbeing Executive (BLG)
- Gannawarra Community Resilience Committee
- Gannawarra Neighbourhood House Network
- Kerang Elders and Leaders Group
- Gannawarra Community Planning Groups across 9 communities.

Actions will be embedded within Council's annual operational plans and budgets, with external funding pursued to support delivery.

MONITORING & EVALUATION

PROGRESS WILL BE MONITORED AND MEASURED USING:

COMMUNITY OUTCOME INDICATORS:

- Initiatives delivered
- Participation in events and programs
- Accessibility of opportunities
- Feedback from children, young people and families
- Stakeholder surveys

COMMUNICATION AND ENGAGEMENT INDICATORS:

- Marketing and promotion
- Reach of communications across multiple platforms
- Awareness levels of programs and services
- Priority group engagement
- Case Studies to capture work undertaken
- Learnings incorporated into future actions

COMMUNITY WELLBEING INDICATORS

- Changes in service access and wellbeing indicators
- Advocacy efforts and policy changes
- Changes in disaggregated data and reporting
- Child and youth voice in decision making

COUNCIL COMMITS TO FACILITATE AN ANNUAL FORUM OF STAKEHOLDERS AND YOUNG PEOPLE TO MONITOR PROGRESS AND MAKE DECISIONS AS TO THE ONGOING IMPLEMENTATION OF THIS STRATEGY

WE WILL ASK:

1. How much did we do?
2. How well did we do it?
3. Is anyone better off?
4. Has equity and inclusion improved?
5. What does the evidence tell us?
6. What do we need to change?

Council will publish an annual review in its Annual Report and a final evaluation in 2030.

CONCLUSION

The GROW Gannawarra Children and Youth Strategy 2026–2030 represents a shared commitment to ensuring every child and young person in Gannawarra is supported to thrive. Grounded in community voice, evidence and strong partnerships, the Strategy sets a clear direction for building inclusive, connected and resilient communities where children and young people are safe, supported and empowered to reach their full potential.

Achieving this vision will require continued collaboration across Council, community, services and all levels of government. By working together, listening to young people and responding to their needs, Gannawarra can create the conditions for future generations to grow, lead and contribute to a strong, vibrant and sustainable community.

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7.11 2026 RESIDENTIAL KERBSIDE REFORM SURVEY AND GLASS ADVOCACY

Author: **Leigh Hollingworth, Manager Projects & Design**
Authoriser: **Wade Williams (Director Infrastructure & Development)**

RECOMMENDATION

That Council:

1. **Receive and note the results of the 2026 Residential Kerbside Reform Survey.**
2. **Endorse the attached advocacy letter regarding the Victorian Government's proposed mandatory standalone kerbside glass recycling service.**
3. **Authorise the Mayor and Chief Executive Officer to sign and forward the letter to:**
    a. **The Minister for Environment**
    b. **The Minister for Local Government**
    c. **The Member for Murray Plains**
    d. **Members for Northern Victoria Region of the Legislative Council**
    e. **The Department of Energy, Environment and Climate Action (DEECA).**

EXECUTIVE SUMMARY

Council's 2026 Residential Kerbside Reform Survey generated 1,269 responses, representing the highest level of community participation in a Council engagement activity. The strong response demonstrates the high level of community interest in waste and recycling services and provides Council with a robust, locally informed evidence base for future decision-making.

The survey captured valuable insights into household waste behaviours, service preferences and community priorities. A significant finding was that 89% of respondents did not support the introduction of a standalone glass kerbside recycling bin, highlighting strong community concerns regarding the cost, practicality and suitability of the proposed service in a rural municipality. The survey also identified strong support for practical education initiatives to improve waste and recycling outcomes.

The survey results have strengthened Council's ability to advocate on behalf of the community. In accordance with Council's resolution of 18 February 2026, advocacy correspondence has been prepared for distribution to the Victorian Government, local Members of Parliament and DEECA regarding the proposed mandatory standalone glass recycling service. The survey provides clear local evidence supporting Council's position that alternative approaches to glass recovery should be considered.

This survey represents a significant achievement in community engagement and will help ensure future waste and resource recovery planning, service delivery and advocacy are informed by the views, needs and experiences of Gannawarra residents.

PURPOSE

To present the outcomes of Council's 2026 Residential Kerbside Reform Survey and highlight the key findings that will help inform future waste education, communications, service planning and advocacy. The report also seeks Council endorsement of advocacy correspondence giving effect to Council's previously adopted resolution regarding the Victorian Government's proposed mandatory kerbside glass recycling reforms.

This report does not seek approval to implement new waste services, change current service levels or alter existing waste charges.

DISCUSSION

Survey Overview

The survey was undertaken to better understand residents' current waste management practices, identify areas for improvement, and gather feedback on potential future waste services. It also provides a baseline of community behaviours, knowledge and preferences to support implementation and monitoring of Council's Resource Recovery and Waste Management Strategy 2026–2036.

Residents were invited to participate through Council's website, social media channels, Gannawarra Connect and hard copies mailed to each residence within the municipality, with the survey open from the 19 February to 26 March 2026.

Respondent Profile

As shown in Figure 1, responses were received from across the municipality, with the largest number of responses received from the Kerang, Cohuna and Koondrook townships. Most respondents were homeowners, and two-person households represented the largest household cohort, providing a strong representation of key waste service users.

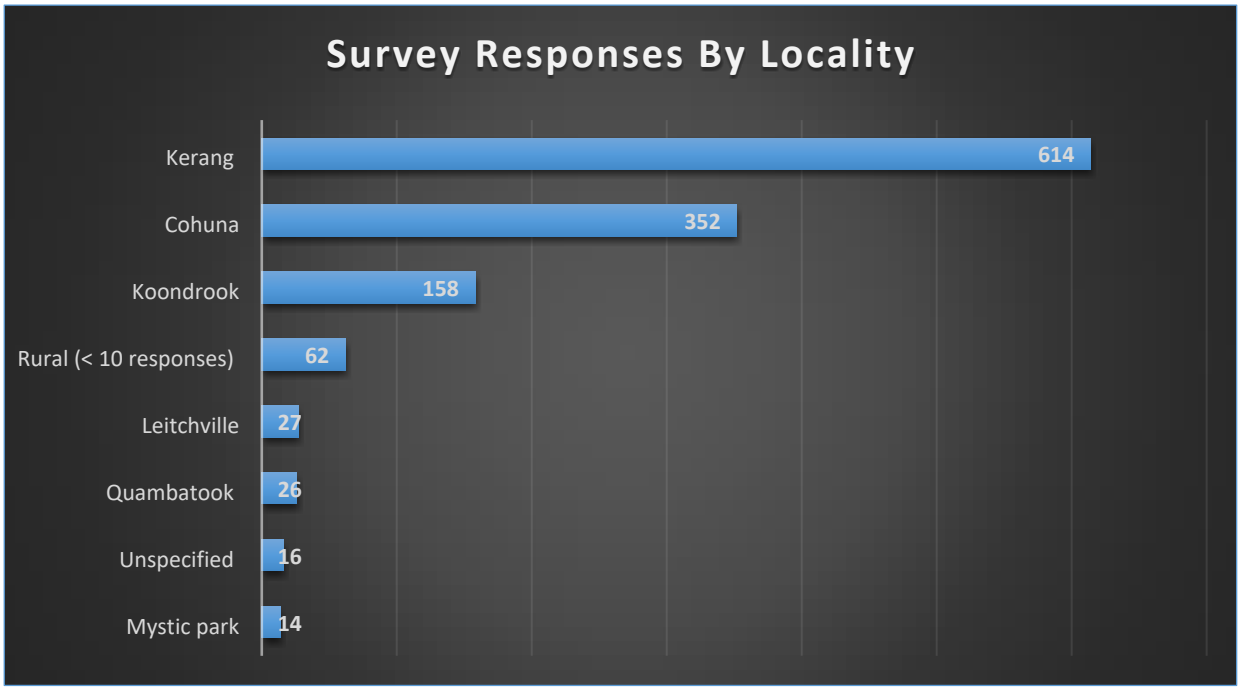

Figure 1: Survey respondents by locality (locations with fewer than 10 respondents have been grouped as rural areas).

Waste Sorting Confidence and Education Preferences

Figure 2 shows that residents generally reported confidence in sorting household waste, with 66% selecting "Very confident – I rarely have trouble sorting my waste". However, this self-reported confidence should be considered alongside Council's waste audit data, which identified that 27% of material in the general waste bin was recyclable and 16% of material in the recycling bin was general waste. Organics also represented approximately 30% of both bin contents, highlighting a significant opportunity for future landfill diversion through FOGO.

Figure 2: Level of confidence when sorting household waste.

Residents identified clear bin labels as the most useful education resource, selected by 58% of respondents. Educational materials such as brochures, fridge magnets, videos and guides were selected by 27% of respondents. These results, shown in Figure 3, indicate that residents are seeking practical, visible and easy-to-use guidance rather than general messaging alone.

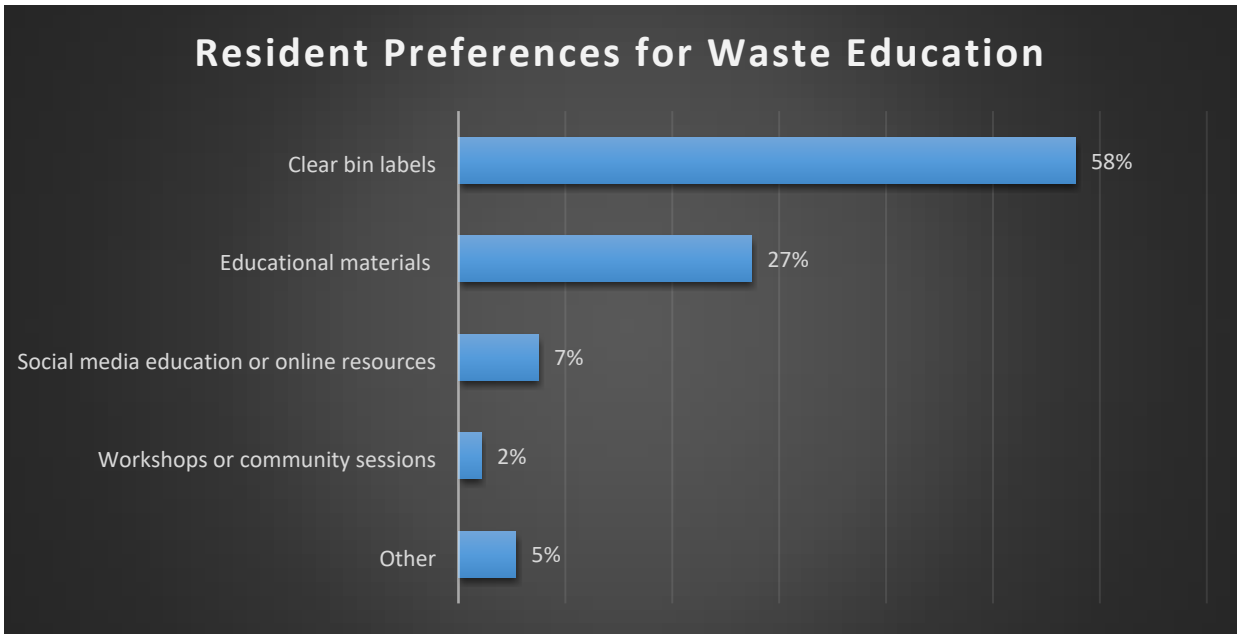

Figure 3: Resident preferences for waste education.

Current Kerbside Waste Services

The survey confirmed strong use of existing kerbside services. The majority of respondents have a red-lid general waste bin had a 120L service, and most respondents present their waste bin weekly. Bin fullness results are shown in Figure 4 and suggest that a substantial proportion of households are using most of their available general waste capacity, with 33% reporting their red bin was full and 28% reporting it was three-quarters full on collection day.

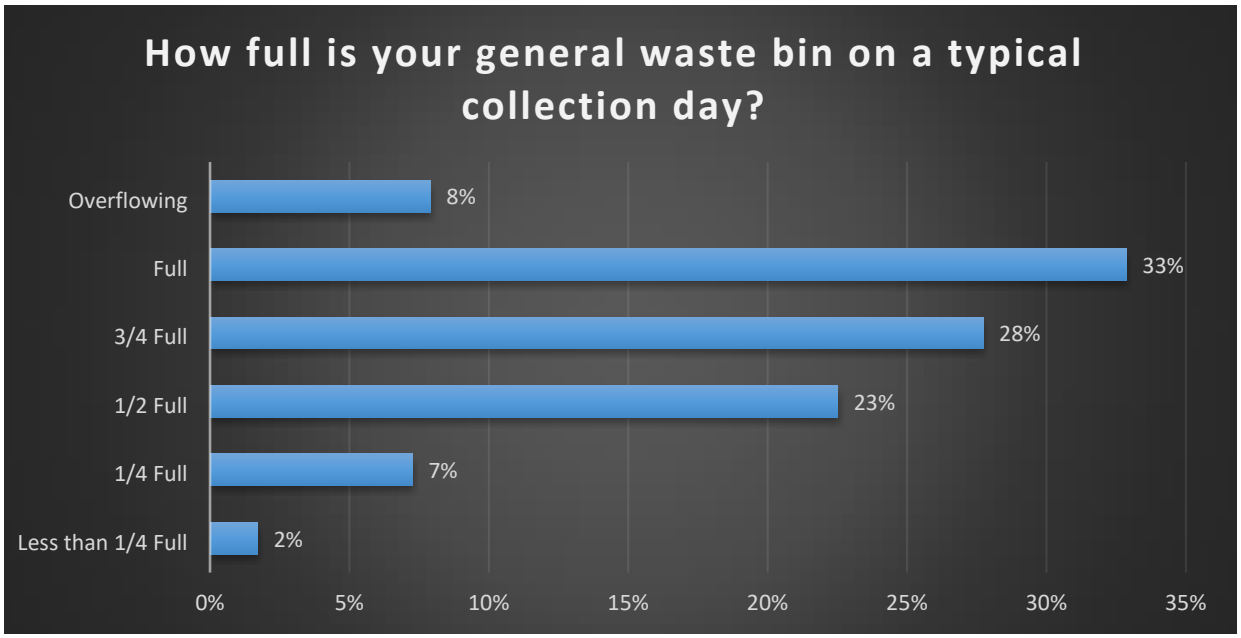

Figure 4: General waste bin fullness levels on a typical collection day.

Participation in the recycling service was strong, with 88% of respondents reporting they present their recycling bin for collection as scheduled each fortnight. As shown in Figure 5, most respondents indicated their recycling bins are substantially utilised at collection time, with around two-thirds reporting their bins are either full or three-quarters full. This suggests the existing recycling service is well used and continues to play an important role in supporting resource recovery across the municipality.

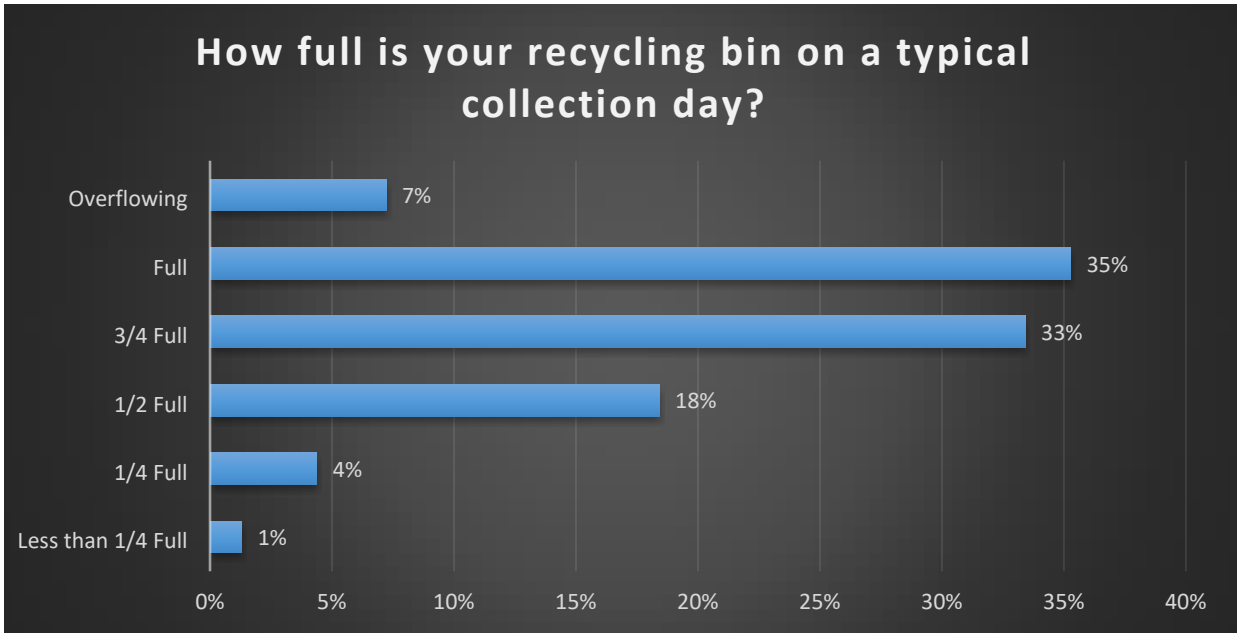

Figure 5: Recycling bin fullness levels on a typical collection day.

The garden organics service is well utilised by participating households. Survey results indicate that more than half of eligible households in Kerang, Cohuna and Koondrook are currently subscribed to the service, with most participants presenting their bin regularly and reporting high levels of bin utilisation. As shown in Figure 6, the findings demonstrate strong demand for the service and suggest it is effectively supporting the diversion of organic material from landfill.

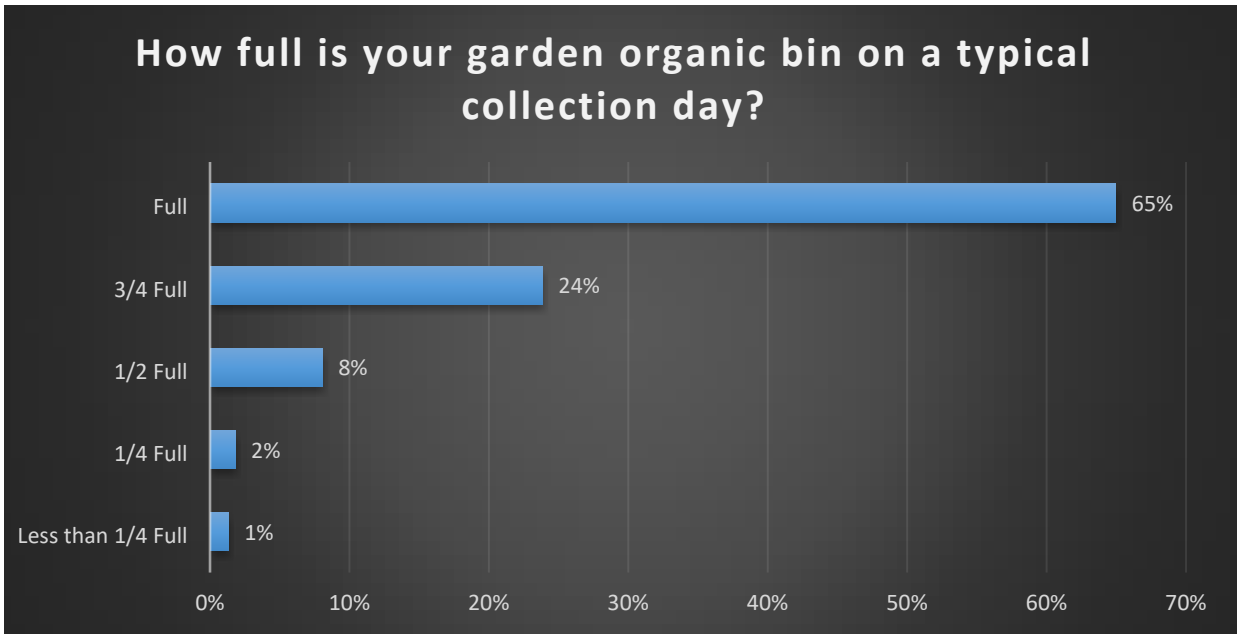

Figure 6: Garden organic bin fullness levels on a typical collection day.

FOGO

The results shown in Figure 7 indicate that food scraps are currently managed in a range of ways. The most common response was disposal in the general waste bin followed by home composting and food scraps fed to animals. These results confirm that there is both a significant landfill-diversion opportunity, and a need to recognise existing low-waste and home-composting behaviours in future service planning.

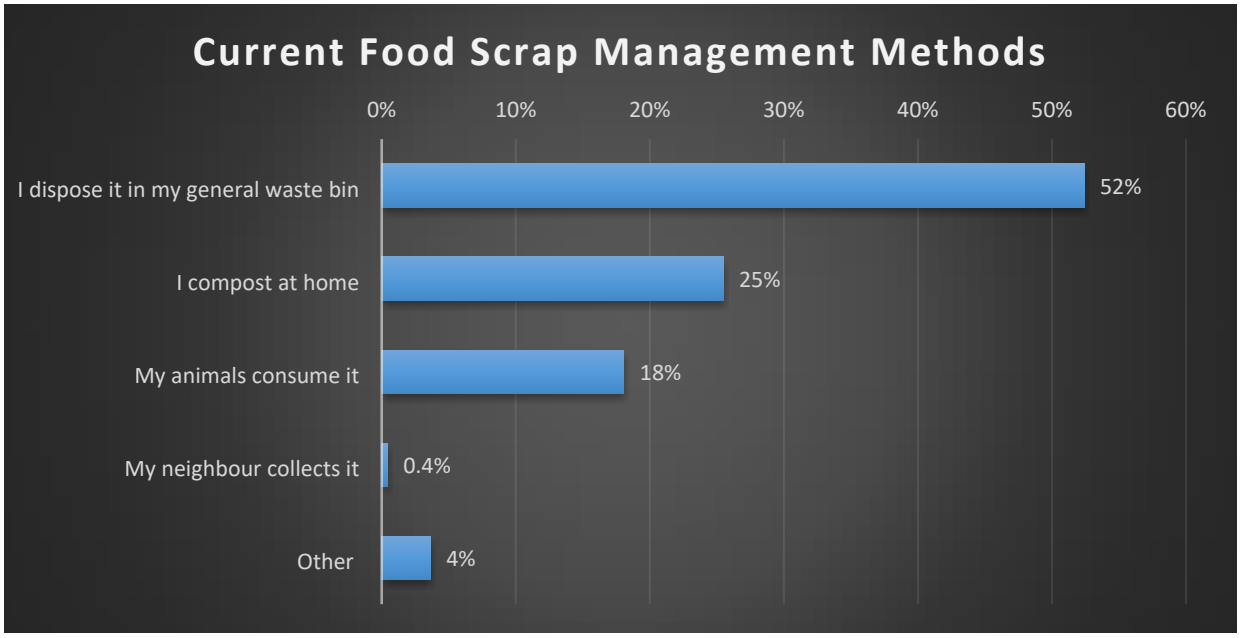

Figure 7: Current food scrap management methods.

Residents identified lower costs and seeing compost used locally as the strongest motivators for correct use of a future FOGO service, as displayed in Figure 8. This suggests that future communications should explain both the financial drivers and local resource recovery benefits of FOGO, while providing clear guidance on contamination and correct bin use.

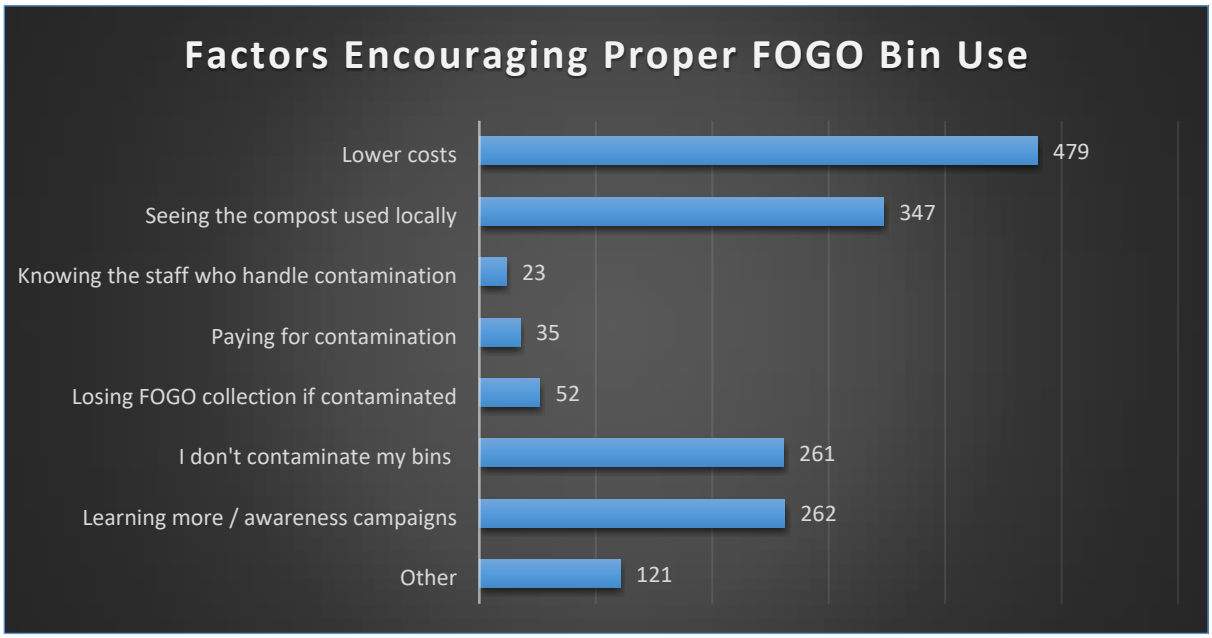

Figure 8: Factors that would encourage residents to correctly use a future FOGO service.

Glass Recycling

As shown in Figure 9, 37% of respondents reported placing glass in their yellow-lid recycling bin, making it the most common disposal method. A further 27% indicated they manage glass through the Container Deposit Scheme.

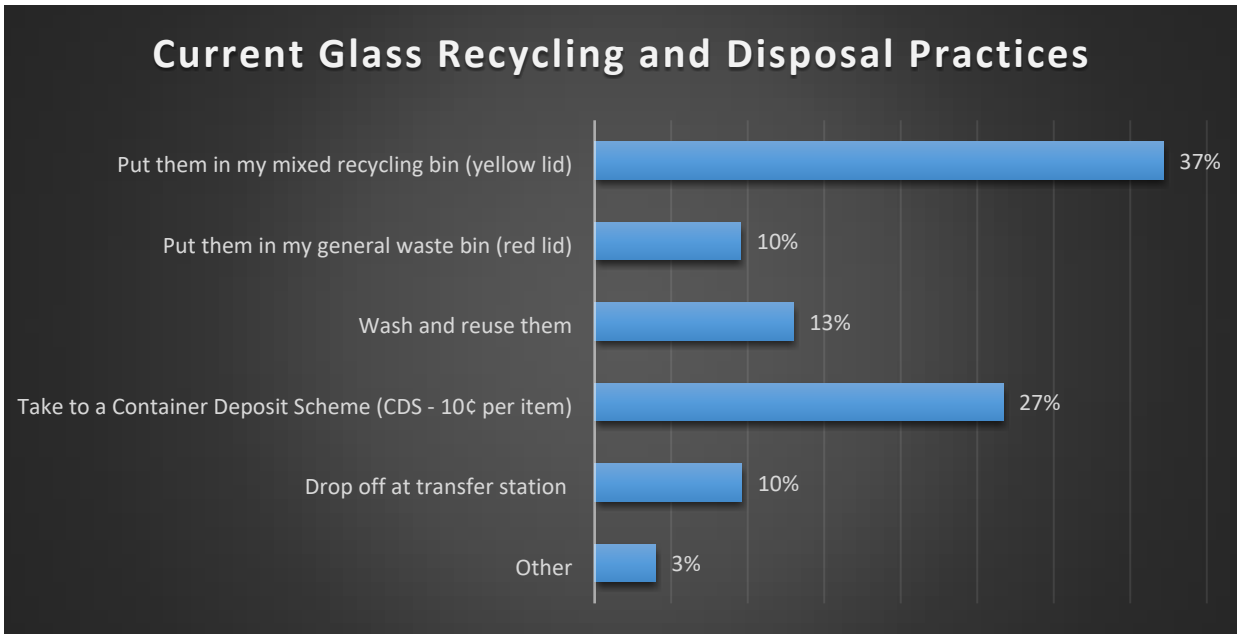

Figure 9: Current glass management methods.

When asked about future glass recycling services, respondents showed a clear preference for expanding existing glass recovery options, such as community drop-off points and Council transfer stations, rather than introducing an additional kerbside glass bin. As shown in Figure 10, 89% of residents surveyed did not support the rollout of the Glass Kerbside Bin. The survey also indicated that many residents would support a less frequent glass collection service, suggesting community willingness to consider alternative service models where they help reduce costs and environmental impacts.

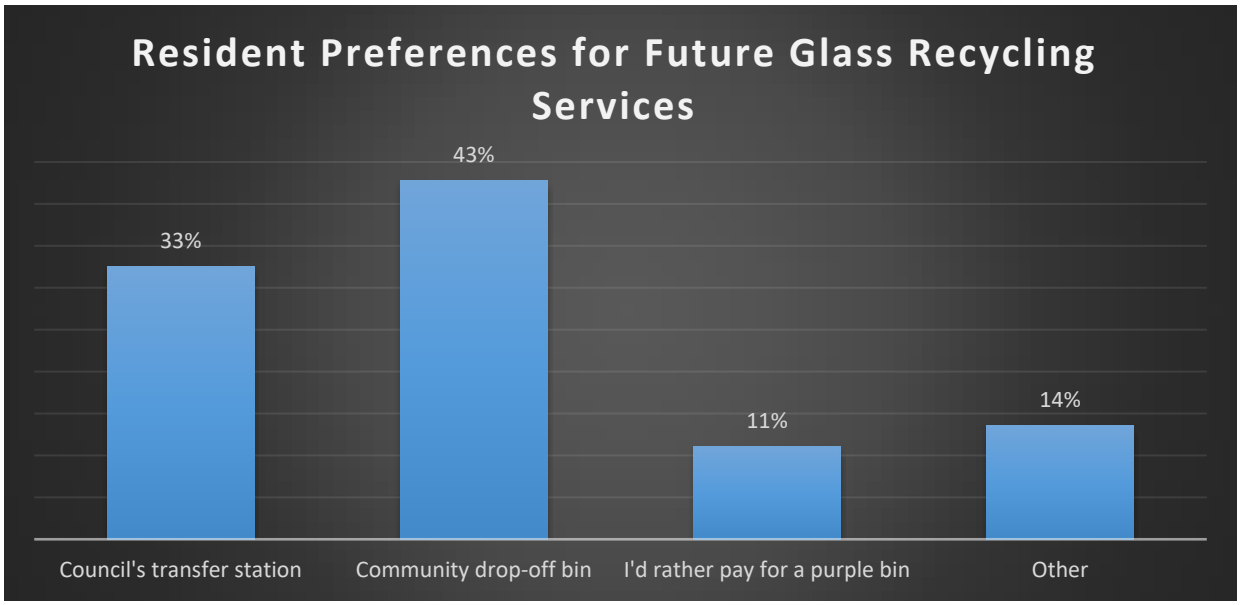

Figure 10: Preferred future glass recycling service options.

Future Bin Size and Collection

Survey responses shown in Figure 11 indicate different preferences for future FOGO and glass bin sizes. For a future FOGO service, the largest proportion of respondents preferred a 240L bin, reflecting likely demand for additional organics capacity. For glass, the strongest preference was for a 120L bin, although a substantial proportion of respondents indicated that a glass bin was not needed.

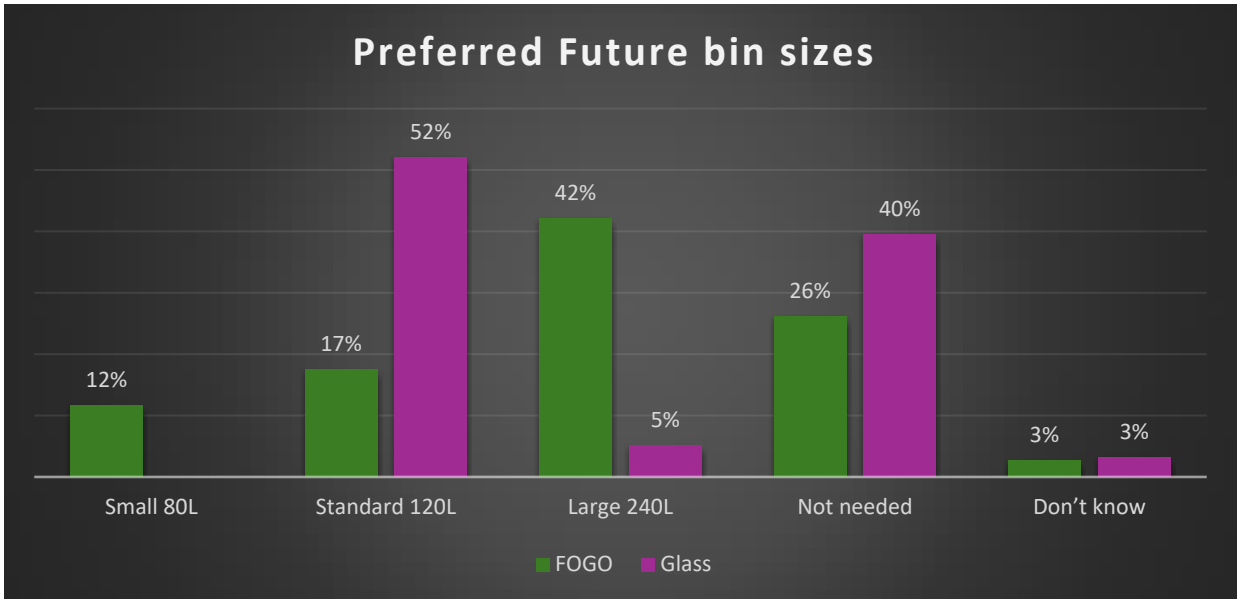

Figure 11: Resident preferences for future FOGO and glass bin sizes.

Figure 12 shows the responses to the question on collection frequency where Scenario 3 was the preferred future collection frequency option. This scenario retains weekly general waste collection, provides fortnightly mixed recycling, introduces weekly FOGO collection, and provides monthly glass collection. While Scenario 3 received the highest level of support, the survey also shows that some residents preferred the current service or selected "Other", with comments commonly relating to cost, flexibility and concerns about additional bins.

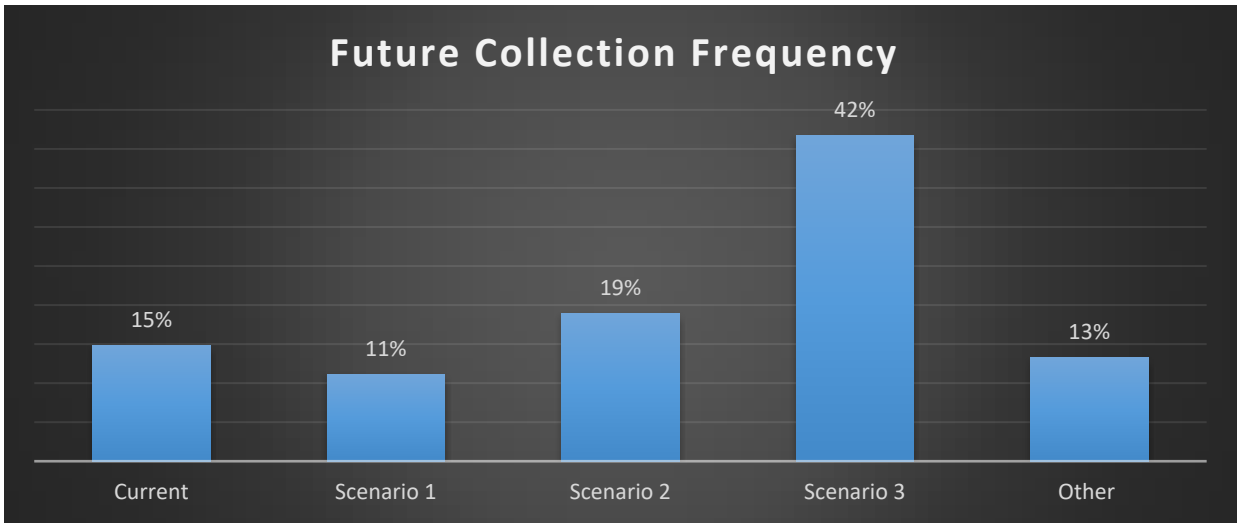

Figure 12: Respondent preferences for future kerbside collection frequencies.

The scenario comparison table in Figure 13 outlines the current service and three potential future service models that residents were asked to comment on, including changes to general waste, recycling, FOGO and glass collection frequencies, as well as indicative annual cost increases which have not yet been confirmed.

	Red (general waste)	Yellow (mixed recycling)	Food Organics & Garden Organics (FOGO)	Glass	Transfer station drop-off services	Cost Increase ESTIMATES ONLY*
Current (base case)	Weekly	Fortnightly	Fortnightly (garden organics only)	N/A	• General waste • Recycling • Garden organics • Glass	-
Scenario 1	Fortnightly	Fortnightly	Weekly	Monthly	• General waste • Recycling • Garden organics • **FOGO** • **Glass**	$164
Scenario 2	Fortnightly	Fortnightly	Fortnightly	Monthly	• General waste • Recycling • Garden organics • **FOGO** • **Glass**	$102
Scenario 3	Weekly	Fortnightly	Weekly	Monthly	• General waste • Recycling • Garden organics • **FOGO** • **Glass**	$160

Figure 13: Illustration of the three proposed kerbside collection service scenarios.

Waste Challenges and Key Feedback Themes

Figure 14 illustrates that household hazardous waste, e-waste and bulky waste are the most problematic waste streams for residents, alongside bulky waste with some comments supporting the introduction of a hard waste collection service.

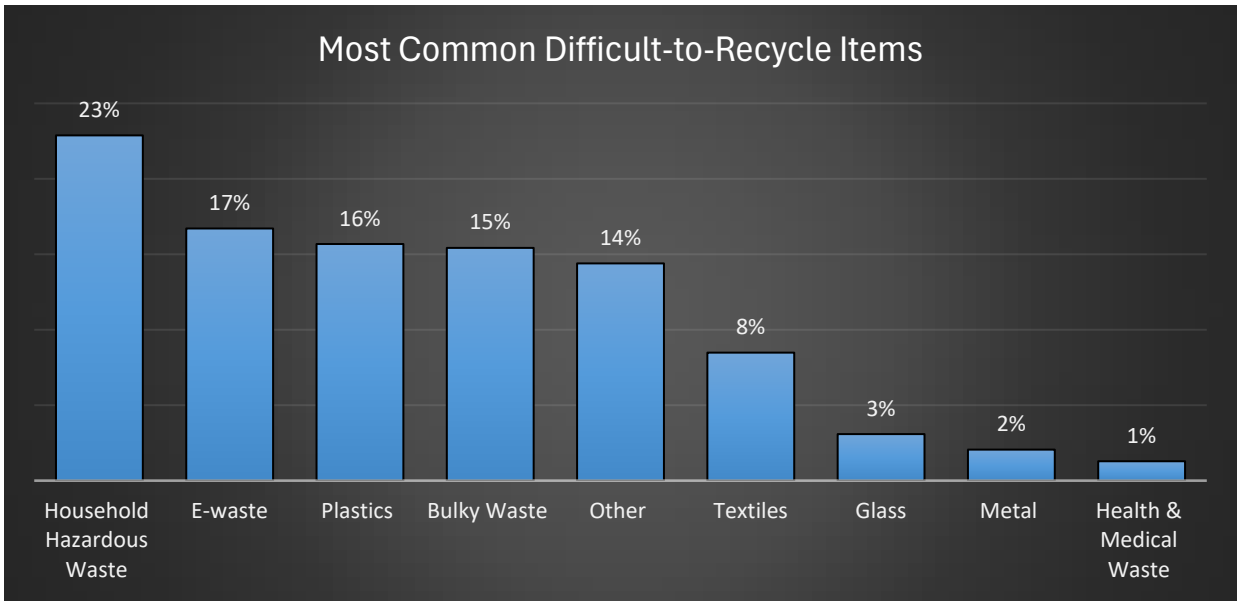

Figure 14: Most common difficult-to-recycle items.

Final comments provided by residents were grouped into key themes. The strongest themes are displayed in Table 1 and include requests for hard rubbish or bulky waste collection, support for maintaining weekly red-bin collections, concern about additional bins and the four-bin system, cost concerns, transfer station fees, glass bin concerns, green waste improvements, and the need for improved recycling education and information.

Table 1: Key Response Themes

Theme	Count	Summary
Hard rubbish / bulky waste collection requested	45	Requests for annual, twice-yearly, quarterly or booked hard rubbish collections; concerns for elderly residents and residents without trailers or vehicles
Keep red bin weekly collection	42	Support for weekly general waste collection due to nappies, food waste, smells, pests and summer heat
Concerns about additional bins / four-bin system	41	Concerns about cost, storage space, rural circumstances and whether additional bins are necessary
Cost concerns / no rate increases	39	Concerns about affordability, increased rates and additional waste charges
Transfer station fees too expensive	38	Requests to reduce or remove fees, particularly for green waste and bulky items
Glass recycling concerns	36	Opposition to mandatory glass bins; preference for drop-off points, optional services or other alternatives
Green waste service improvements	31	Requests for cheaper or free green waste disposal, green bins, seasonal increases and mulch or compost options
Recycling education and clearer information needed	25	Requests for better instructions, bin labels, calendars, fridge magnets and clearer contamination guidance
Need more transfer station opening hours/access	24	Requests for longer hours, more operating days, weekend access, and improved accessibility for workers and rural residents.
FOGO concerns / not required	22	Some residents do not want FOGO bins due to composting at home, rural properties, cost or lack of need.

Summary of Results
The survey results indicate that Council's future waste planning should focus on practical education, affordability, flexible service design, improved glass and organics recovery, transfer station accessibility, and options for bulky or difficult-to-dispose waste streams. The results will be used alongside technical, financial, regulatory and environmental assessments before any future service model is presented to Council for decision.

Any future service changes, including those relating to Food Organics and Garden Organics (FOGO), glass recycling, hard waste or transfer station services, will be subject to further analysis and a separate Council decision.

Correspondence
At the 18 February 2026 Ordinary Council Meeting, Council resolved that it would not commit to implementation of a mandatory standalone kerbside glass collection service until the required service standards under the *Circular Economy (Waste Reduction and Recycling) Act 2021* are released and understood. Council also resolved to advocate for alternative approaches to glass diversion and to write to the relevant Ministers, Members of Parliament and DEECA outlining its position.

The correspondence formally communicates Council's position on the proposed glass recycling reforms, advocating for greater flexibility, evidence-based decision-making and consideration of alternative glass recovery approaches that better reflect the needs of rural communities. It also supports broader sector advocacy being undertaken by regional and rural Victorian councils.

RELEVANT LAW

1. *Local Government Act 2020* – establishes Council's role in delivering services and infrastructure that meet community needs, while ensuring transparency, accountability and community engagement in decision-making.
2. *Environment Protection Act 2017* – establishes Victoria's environmental protection framework and the general environmental duty, requiring risks of harm to human health and the environment to be minimised so far as reasonably practicable.
3. *Circular Economy (Waste Reduction and Recycling) Act 2021* – underpins Victoria's transition to a circular economy and provides the legislative framework for Recycling Victoria reforms, including regulation of household waste and recycling services through the proposed Service Standards.
4. *Gender Equality Act 2020* – requires defined entities, including councils, to consider the different impacts policies, programs and services may have on people of different genders. Future waste service changes and communications should continue to consider accessibility, affordability and inclusion impacts across the community.

RELATED COUNCIL DECISIONS

17 September 2025 Ordinary Council Meeting – Council resolved to adopt Policy 060 – Waste Management, providing an updated framework to guide waste management services and align with current practices.

18 February 2026 Ordinary Council Meeting – Council endorsed the Draft Gannawarra Resource Recovery and Waste Management Strategy for public exhibition and endorsed the Residential Kerbside Reform Survey for release and resolved to write to relevant Ministers, Members of Parliament and DEECA outlining Council's position.

17 June 2026 Ordinary Council Meeting – Council adopted the Gannawarra Resource Recovery and Waste Management Strategy 2026–2036.

OPTIONS

1. Receive and note the results of the 2026 Residential Kerbside Reform Survey.
2. Not receive and note the results of the 2026 Residential Kerbside Reform Survey.
3. Endorse the proposed advocacy letter and authorise its distribution to the Minister for Environment, the Minister for Local Government, the Member for Murray Plains, Members for Northern Victoria Region of the Legislative Council and the Department of Energy, Environment and Climate Action (DEECA). This option gives effect to Council's adopted position and supports ongoing sector advocacy efforts.
4. Amend the proposed letter prior to endorsement to reflect any additional concerns or advocacy positions.
5. Decide not to proceed with the correspondence.

SUSTAINABILITY IMPLICATIONS

Economic
The survey identified affordability as a key consideration for residents, with many respondents expressing concern about potential increases in waste charges, the cost of additional bins, and transfer station fees.

Social
The survey highlights the importance of accessible and practical waste services that meet the needs of a diverse community, including elderly residents, people with disabilities, renters, rural residents and households with limited space for additional bins.

Environmental
The survey identified opportunities to improve resource recovery, with findings indicating that food waste and recyclable materials continue to be disposed of in general waste bins.

Climate Change
Improved waste diversion and resource recovery can contribute to reduced greenhouse gas emissions associated with landfill disposal and the extraction of virgin materials.

COMMUNITY ENGAGEMENT

The strong survey response demonstrates significant community interest in the future of waste and recycling services and provides Council with a robust evidence base for future planning and advocacy.

Residents were invited to participate through Council’s website, social media channels, Gannawarra Connect and hard copies mailed to each residence within the municipality, with the survey open from the 19 February to 26 March 2026. To encourage participation, respondents were offered entry into a prize draw to win one of six $50 vouchers. The random prize draw has been completed, successful recipients have been notified, and all vouchers have been distributed.

The proposed correspondence seeks to ensure community expectations and the challenges of rural service delivery are considered in future State Government decisions regarding glass recycling services.

INNOVATION AND CONTINUOUS IMPROVEMENT

The survey provides baseline data that can be used to monitor changes in community waste behaviours and attitudes over time. It also identifies practical opportunities for continuous improvement, including clearer bin labels, more targeted education, improved difficult-waste pathways, and better data to support future service review.

COLLABORATION

Future actions arising from the survey will require collaboration with neighbouring councils, regional waste and circular economy groups, state agencies, contractors and the broader waste sector. Collaboration will be particularly important in relation to glass recovery, FOGO processing and difficult-to-recycle materials.

The advocacy letter aligns with the position of numerous Victorian councils seeking greater flexibility and evidence-based implementation of future glass recycling reforms.

FINANCIAL VIABILITY

Residents consistently raised concerns about increased waste charges, additional bins, transfer station fees and the cost impacts of future service changes. Any future service model will need to be supported by detailed cost modelling, clear assessment of operational impacts, and consideration of affordability for ratepayers. The advocacy seeks to minimise potential future financial impacts associated with mandatory service implementation.

REGIONAL, STATE AND NATIONAL PLANS AND POLICIES

Australia's Circular Economy Framework (2024)
Provides a national framework to improve resource efficiency, reduce waste generation and support the transition to a circular economy where materials are kept in use for as long as possible.

National Waste Policy Action Plan (2024)
Sets national priorities and actions for reducing waste, increasing recycling and resource recovery, and improving environmental outcomes across Australia.

Loddon Mallee Regional Circular Economy Plan (2022)
Identifies regional opportunities to reduce waste, strengthen resource recovery and support circular economy initiatives across the Loddon Mallee region.

Recycling Victoria: A New Economy (2020)
Establishes Victoria's long-term vision for transforming the waste and recycling sector, including the introduction of four-stream household waste and recycling services and increased resource recovery.

COUNCIL PLANS AND POLICIES

Goal 3: Sustainability - Achieve long-term financial and environmental sustainability.
3. Advance local sustainability and waste initiatives.
4. Ensure transparent, inclusive decision-making through effective leadership.

Policy 060 – Waste Management.

Gannawarra Shire Council Resource Recovery and Waste Management Strategy 2026–2036.

TRANSPARENCY OF COUNCIL DECISIONS

This report will be considered in an open Council Meeting.

CONFLICT OF INTEREST

The officer preparing this report declares that they have no conflict of interest in this matter.

ATTACHMENTS

1. GSC Glass Recyling Position [**7.11.1** - 2 pages]

Our Ref: 3.000537
IN26/2A3766BC
LH:GR
19 August 2026

To whom it may concern,

Council Position on Proposed Mandatory Kerbside Glass Recycling Service

Gannawarra Shire Council is increasingly concerned that local government is being asked to make significant financial and operational commitments toward a mandated glass collection service without the information necessary to make informed decisions. The continued delay in releasing the Household Waste and Recycling Service Standards has left councils across Victoria in an untenable position, expected to budget, plan and procure for a service without knowing the final requirements that will govern its delivery.

Council supports efforts to improve resource recovery and reduce waste to landfill. However, any reform must be supported by sound evidence, practical implementation pathways and demonstrated value for the communities expected to fund it. Based on the information currently available, Council is not satisfied that the proposed mandatory glass-only kerbside service meets those tests.

Recent community consultation has reinforced this view. Council's Community Waste Survey achieved the highest participation rate of any engagement process undertaken by Council, with approximately one-third of households providing feedback. When asked about their preferred method of glass recovery, only 11% of respondents supported paying for a standalone kerbside glass collection service. The overwhelming majority favoured alternative approaches such as transfer station drop-off facilities and community collection points. Council believes these views should be carefully considered before imposing a service that will ultimately be funded by ratepayers.

From a rural council perspective, the proposal raises serious questions regarding cost, efficiency and environmental benefit. Gannawarra Shire covers approximately 3,736 square kilometres and would require additional vehicle movements across large distances to collect comparatively small volumes of glass. At the same time, participation in the Container Deposit Scheme continues to reduce the amount of glass entering kerbside recycling streams. Council is concerned that the costs incurred by households and councils may outweigh the practical benefits achieved.

These concerns are not unique to Gannawarra. A growing number of Victorian councils have publicly questioned the merits of a mandatory glass-only bin service, citing high implementation costs, low presentation rates, duplication of existing recovery pathways and ongoing uncertainty resulting from the delayed release of the Service Standards.

Council is therefore calling on the Victorian Government to pause further progression of the mandatory glass-bin rollout until the Service Standards have been released, a transparent review of the supporting business case has been undertaken, and alternative approaches—including expansion of the Container Deposit Scheme to include wine and spirit bottles—have been fully assessed. Council believes a flexible,

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evidence-based approach will deliver better environmental, financial and community outcomes than a one-size-fits-all mandate.

Ultimately, Council's position is straightforward: if communities are being asked to fund a new service, there must be a clear and compelling case that it is necessary, effective and represents value for money. At present, Council does not believe that case has been made.

Yours sincerely

Cr Garner Smith
MAYOR

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TEL: (03) 5450 9333 FAX: (03) 5450 3023 council@gsc.vic.gov.au | ABN 98 993 182 937

7.12 CHRISTMAS CLOSURE 2026

Author: **Melissa Mathers, Manager People and Culture**
Authoriser: **Amanda Wilson (Director Corporate Services)**

RECOMMENDATION

That Council:

1. **Approve the closure of Council offices to the public over the Christmas/New Year period from 12:30pm on Thursday, 24 December 2026 through to Friday, 1 January 2027 inclusive, with business resuming as usual on Monday, 4 January 2027.**
2. **Give notice of the amended office hours by publishing the details in the local newspaper, on Council's website, on social media and in Council newsletters, including all emergency contact details.**

EXECUTIVE SUMMARY

Gannawarra Shire Council has historically closed its offices over the Christmas/New Year holiday period. It is proposed that Council close its main administration offices, libraries, Gannawarra Shire Children's Centre administration and Works Depot from 12:30pm on Thursday, 24 December 2026 and reopen on Monday, 4 January 2027.

PURPOSE

To seek approval for Council to close its offices over the Christmas/New Year holiday period and to advertise the alteration of operating hours over this period.

DISCUSSION

In 2026, Christmas Day falls on Friday, 25 December and Boxing Day falls on Saturday, 26 December. As Boxing Day falls on a weekend, the additional public holiday will be observed on Monday, 28 December 2026. New Year's Day falls on Friday, 1 January 2027.

The Christmas and New Year period is generally characterised by low levels of customer enquiries and minimal operational deadlines across the organisation. It is therefore recommended that Council's main administration offices, libraries, the administration function of the Gannawarra Shire Children's Centre and the Works Depot close from 12.30 pm on Thursday, 24 December 2026.

The facilities will remain closed over the Christmas and New Year period and reopen for normal operations on Monday, 4 January 2027.

The closure period comprises the following:

- Christmas Day public holiday on Friday, 25 December 2026
- the weekend of Saturday, 26 December and Sunday, 27 December 2026
- the observed Boxing Day public holiday on Monday, 28 December 2026
- three organisational closure days from Tuesday, 29 December to Thursday, 31 December 2026, as provided for under the Gannawarra Shire Council Enterprise Bargaining Agreement No. 11 (2025)
- New Year's Day public holiday on Friday, 1 January 2027; and
- the weekend of Saturday, 2 January and Sunday, 3 January 2027.

Although the identified offices and facilities will be closed, essential and emergency services will continue to be maintained. This will include Local Laws services and emergency call-out arrangements for fires, floods, storms and other significant incidents.

Relevant employees will remain on call and available to respond to incidents arising during the closure period. Details of service arrangements and emergency contact information will be communicated to the community before the closure.

RELEVANT LAW

The proposed annual closure is consistent with clause 13 of the Gannawarra Shire Council Enterprise Bargaining Agreement No. 11 (2025), which provides:

'The closure of the organisation between Christmas and the New Year without employees having to use their annual leave (up to a maximum of three days) will continue under this Agreement. This clause will not apply to Early Childhood Teachers (Kindergarten teachers).'

RELATED COUNCIL DECISIONS

Council considers the proposed Christmas and New Year closure arrangements annually. In 2025, Council approved a closure consistent with the arrangements in this report.

OPTIONS

Council has the following options:

- Close the offices from 12:30pm on Thursday, 24 December 2026, returning on Monday, 4 January 2027 (six and a half day closure inclusive of Public Holidays and EBA days).
- Close the offices for a period greater than six and a half days, which would require consultation with staff before the Council determines an outcome.

It is to be noted that Staff still have the option to take extra leave other than the closures that Council permits in accordance with approval from Supervisors/Managers and accrued leave.

SUSTAINABILITY IMPLICATIONS

Nil.

COMMUNITY ENGAGEMENT

The outcome will be advertised to the community via local media and social media channels, including emergency contact details.

INNOVATION AND CONTINUOUS IMPROVEMENT

Not applicable.

COLLABORATION

Any closure greater than the three days between Christmas and New Year would require appropriate negotiation with staff.

FINANCIAL VIABILITY

Employee costs associated with the three organisational closure days provided under the Gannawarra Shire Council Enterprise Bargaining Agreement No. 11 (2025) are accommodated within Council's adopted operational budget. Any costs associated with maintaining essential and

emergency services during the closure period will also be managed within existing operational budgets. No additional budget allocation is required.

REGIONAL, STATE AND NATIONAL PLANS AND POLICIES

Not applicable.

COUNCIL PLANS AND POLICIES

Goal 3: Sustainability - Achieve long-term financial and environmental sustainability. 4. Ensure transparent, inclusive decision-making through effective leadership.

TRANSPARENCY OF COUNCIL DECISIONS

This report will be considered in an open Council Meeting.

CONFLICT OF INTEREST

The officer preparing this report declares that they have no conflict of interest in this matter.

ATTACHMENTS

Nil

8 URGENT BUSINESS

Nil

9 NOTICES OF MOTION

Nil

10 QUESTION TIME

Question Time provides an opportunity for members of the public to submit questions, in advance, to gain a response at the Council meeting.

QUESTIONS FROM THE GALLERY

Completed Question Time forms must be submitted to the Chief Executive Officer via email council@gsc.vic.gov.au no later than 5:00pm on the day prior to the Council meeting.

A maximum number of two questions may be submitted in writing by any one person.

Questions will be read by the author, Mayor or Chief Executive Officer.

The Mayor or Chief Executive Officer may indicate that they require further time to research an answer. In this case, an answer will be provided in writing generally within ten (10) business days.

Questions will be answered at the meeting, or later in writing, unless the Mayor of Chief Executive Officer has determined that the relevant question seeks confidential information defined in section 3 of the *Local Government Act 2020* such as:

- Council business information
- security information
- land use planning information
- law enforcement information
- legal privileged information
- personal information
- private commercial information
- confidential meeting information
- internal arbitration information
- Councillor Conduct Panel confidential information
- an issue outside the Gannawarra Shire Council core business

or if the question is:

- defamatory, indecent, abusive or objectionable in language or substance
- repetitive of a question already answered (whether at the same or an earlier meeting)
- asked to embarrass a Councillor or Council officer.

No debate or discussion of questions or answers shall be permitted and all questions and answers shall be a brief as possible.

11 DELEGATES REPORTS

11.1 DELEGATES REPORTS

Author: **Jodie Basile, Executive Assistant to the Chief Executive Officer**
Authoriser: **Geoff Rollinson (Chief Executive Officer)**

EXECUTIVE SUMMARY

Council has memberships with peak Local Government associations, local and regional forums, along with statutory committees. Some memberships require that a Councillor be appointed to act as a delegate to formally represent Council, typically in a voting capacity.

This Agenda item provides an opportunity for Council appointed delegates to present a verbal update on any pertinent matters arising from Council's membership with the following associations.

COUNCILLOR COMMITTEES 2025/2026	
COMMITTEE	**COUNCILLOR**
Murray River Group of Councillors (MRGC)	Cr Garner Smith, Mayor
Loddon Campaspe Group of Councils (LCGC)	Cr Garner Smith, Mayor
Central Victorian Greenhouse Alliance (CVGA)	Cr Daniel Bolitho
Municipal Fire Management Planning Committee (MFMPC)	Cr Lisa Farrant
Municipal Emergency Management Planning Committee (MEMPC)	Cr Keith Link
Municipal Association of Victoria (MAV)	Cr Ross Stanton
Audit and Risk Committee (ARC) (x2)	Cr Garner Smith Cr Ross Stanton
Transport Connections	Cr Pat Quinn
Rural Councils Victoria (RCV)	Cr Charlie Gillingham
Timber Towns Victoria (TTV)	Cr Pat Quinn
Community Halls Community Asset Committee	Cr Keith Link
Community Resilience Committee	Cr Keith Link

Geoff Rollinson, Chief Executive Officer		
July 2026	1 July 2026	Wimmera Mallee 9 Council Alliance Meeting Online
		Executive Leadership Team Meeting
		Kerang Golf Club Opening of new rooms
	2 July 2026	Murray River Group of Councils CEO Meeting online
		RDV Meeting Online
		Weekly Meeting with Mayor
	3 July 2026	Resource Ready Strategy Meeting Online
		Murray River Group of Councils Tourism Review Online
	6 July 2026	July Council Briefing Session in Kerang
	7 July 2026	Cohuna Aerodrome Opening with the Hon Michael McCormick MP and Dr. Anne Webster in Cohuna
	8 July 2026	Executive Leadership Team Meeting
		VNI West CRG Meeting #16
	9 July 2026	Meeting with British Solar Renewables
		Weekly Meeting with Mayor
	10 July 2026	Meeting with Iberdrola re Resource Ready
	13 July 2026	Murray River Group of Councils Meeting Online
		Joint Meeting online with Gannawarra Shire Council and DEECA
	14 July 2026	Meeting with Brian Hansen, VHM
		Meeting with ACDC Minerals
		Murray River Group of Councils Meeting online with Geoff Turner re Sustainable Communities Fund
	15 July 2026	Executive Leadership Team Meeting July Council Meeting in Kerang
	16 July 2026	Loddon Campaspe Councils CEO Meeting online
		RCV Election Advocacy Meeting Online
	17 July 2026	Murray River Group of Councils Meeting Online
		VNI West Meeting
		Weekly Meeting with Mayor
	20 July 2026	MAV Monday Connect Meeting Online

		Presentation to One Nation on the Resource Ready Strategy with Rikkie Lee Tyrell MP
		Murray River Group of Councils Meeting Online
	22 July 2026	MAV Regional Meeting Loddon Campaspe Online
		Executive Leadership Meeting
	23 July 2026	Council Consultation Online re Commonwealth Governments Disaster Recovery Funding Framework
		Weekly Meeting with Mayor
	24 July 2026	Meeting with Cohuna Lions Club
		Meeting with Kerang Rotary Club
	27 July 2026	Internal Director Meetings
	29 July 2026	Executive Leadership Team Meeting
		Connect with Council Session at Murrabit
	30 July 2026	Weekly Meeting with Mayor in Cohuna
	31 July 2026	Gannawarra Careers Expo at The Glasshouse in Kerang
Cr Garner Smith, Mayor		
July 2026	1 July 2026	Wimmera Mallee 9 Council Alliance Meeting Online
	2 July 2026	Weekly Meeting with CEO
	6 July 2026	July Council Briefing Session in Kerang
	8 July 2026	NGSC Transmission Forum Meeting Online
	9 July 2026	Weekly Meeting with CEO
	14 July 2026	Murray River Group of Councils Meeting online with Geoff Turner re Sustainable Communities Fund
	15 July 2026	July Council Meeting in Kerang
	17 July 2026	Weekly Meeting with CEO
	20 July 2026	MAV Monday Connect Meeting Online
		Presentation to One Nation on the Resource Ready Strategy with Rikkie Lee Tyrell MP
		Murray River Group of Councils Meeting Online
	22 July 2026	MAV Regional Meeting Loddon Campaspe Online
	23 July 2026	3SH/MIXX FM Interview
		Weekly Meeting with CEO

	29 July 2026	Connect with Council Session at Murrabit
	30 July 2026	3SH/MIXX FM Interview Weekly Meeting with CEO
Cr Ross Stanton, Deputy Mayor		
July 2026	6 July 2026	July Council Briefing Session in Kerang
	14 July 2026	Koondrook Development Committee Association Meeting
	15 July 2026	July Council Meeting in Kerang
	22 July 2026	MAV Regional Meeting Loddon Campaspe Online
	29 July 2026	Council Connect Session at Murrabit
Cr Daniel Bolitho		
July 2026	6 July 2026	July Council Briefing Session in Kerang
	8 July 2026	NGSC Transmission Forum Online
	15 July 2026	July Council Meeting in Kerang
	22 July 2026	Kerang Progress Association Meeting
Cr Lisa Farrant		
July 2026	6 July 2026	July Council Briefing Session in Kerang
	7 July 2026	Cohuna Aerodrome Opening with the Hon Michael McCormick MP and Dr. Anne Webster in Cohuna
	15 July 2026	July Council Meeting in Kerang
Cr Charlie Gillingham		
July 2026	6 July 2026	July Council Briefing Session in Kerang
	8 July 2026	Kerang Lakes Development Meeting
	15 July 2026	July Council Meeting in Kerang
	29 July 2026	Council Connect Session at Murrabit
Cr Keith Link		
July 2026	6 July 2026	July Council Briefing Session in Kerang
	15 July 2026	July Council Meeting in Kerang
	20 July 2026	Cohuna Progress Association Meeting
Cr Pat Quinn		
July 2026	6 July 2026	July Council Briefing Session in Kerang
	8 July 2026	NGSC Transmission Forum Online
	15 July 2026	July Council Meeting in Kerang

12 CONFIDENTIAL ITEMS

Nil