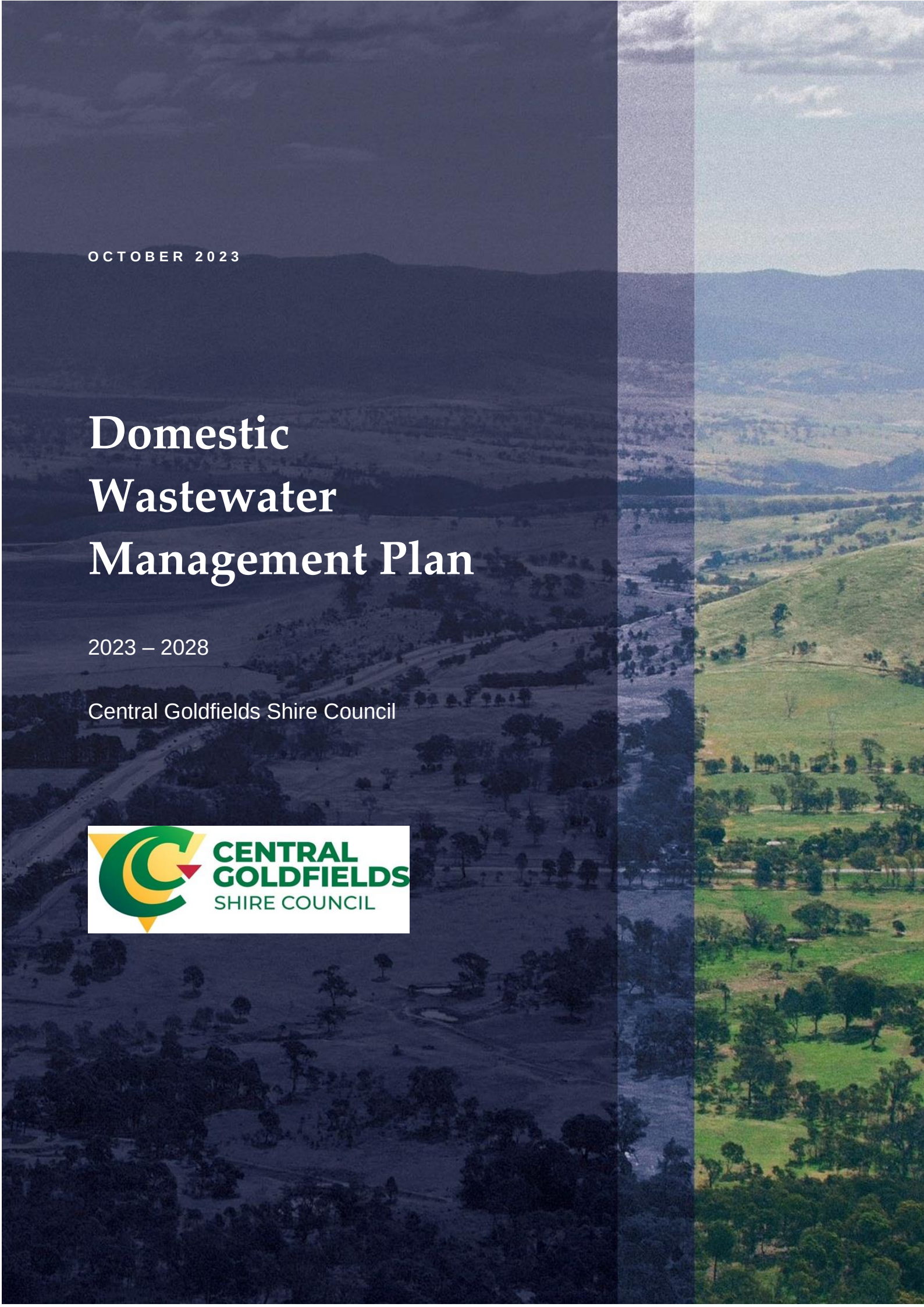

OCTOBER 2023

Domestic Wastewater Management Plan

2023 – 2028

Central Goldfields Shire Council

CENTRAL GOLDFIELDS SHIRE COUNCIL

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1 Introduction

1.1 PURPOSE OF THIS DOCUMENT

The purpose of this Domestic Wastewater Management Plan (DWMP) is to guide and support the management of domestic wastewater across the Central Goldfields Shire local government area (LGA), in a manner that provides a healthy environment, a prosperous economy and thriving community, now and into the future.

The objectives of the DWMP are to:

- Protection of Potable Water Resources in the LGA
- Identify current and emerging domestic wastewater management issues within the LGA.
- Develop a proactive approach to effectively manage potential risks.
- Support greater consistency in planning and development decision making.
- Provide guidance to key stakeholders with a role in domestic wastewater management.
- Meet legislative responsibilities and achieve ongoing compliance with relevant legislation.
- Provide direction on technical guidance for key stakeholders such as plumbers and developers and a strategy for community education.
- Provide guidance on a framework for the regulation of wastewater management performance.

ACKNOWLEDGEMENT OF COUNTRY

We acknowledge the Dja Dja Wurrung people as the Traditional Owners of the Country on which this project was conducted. We recognise their continuing connection to land, waters and culture and pay our respects to their Elders past, present and emerging. Moreover, we express gratitude for the knowledge and insight that Traditional Owner and other Aboriginal and Torres Strait Islander people contribute to our shared work.

1.2 COUNCIL RESPONSIBILITY

Municipal councils have statutory responsibilities for overseeing the installation, use and management of onsite wastewater management systems (OWMS) within their LGA.

Under the *Environment Protection Regulations 2021*, OWMS are prescribed permission activity (A20), and this is a permit activity that is administered by the council in whose municipal district the OWMS is located.

The EPA *Code of practice – onsite wastewater management 2016,* identifies Council's statutory responsibilities in relation to the planning and management of OWMS. These include to develop a Domestic Wastewater Management Plan (DWMP) as provided by this document.

Details of specific legislative responsibilities for domestic wastewater management and requirements for the development of DWMPs is provided in Section 2.3.

1.3 RISK MANAGEMENT APPROACH

The goal of wastewater management is to protect the natural environment, community health, social wellbeing and economic stability against the risks posed by wastewater.

Wastewater can contain nutrients, pathogens, and other pollutants. If existing OWMS have deteriorated, are poorly maintained, and/or of insufficient size, this can lead to wastewater discharging offsite and polluting nearby land and waterways.

Design and installation of new OWMS, and ongoing maintenance of existing OWMS is technical in nature, and there is a risk that poorly conceived or poorly designed schemes, and/or poorly maintained OWMS can become problematic for many years to come.

A risk management framework has been applied to development of this DWMP and is outlined in Section 3.

1.4 KEY CONCEPTS

Key concepts and terminology used through this management plan include:

Domestic wastewater comes from toilets, kitchens and laundries. While the term suggests wastewater from domestic households only, it also covers commercial premises (e.g., offices/shops/public buildings) where wastewater is mainly from toilets and kitchens.

Onsite wastewater management systems (OWMS) are standalone systems designed to treat and contain waste within a property's boundaries. These are used for management of wastewater from residential, community and business premises in locations where a sewer network is not available. Onsite systems include a wastewater treatment plant and all connected sewers, drains, pipes, fittings, appliances and land used. Onsite systems are the responsibility of the property owner. New EPA regulations refer to these systems as OWMS, so this DWMP has adopted that terminology.

Domestic Wastewater Management Plan (DWMP) – A plan that sets out how a Council proposes to manage the OWMS in its LGA over the next five years.

Sewer is the network of pipes, pumps and equipment that transfers sewage (including domestic wastewater) from homes and businesses to a central treatment plant. Sewer systems are operated by water corporations.

Alternative services are systems and servicing approaches, that are different to traditional sewer and onsite solutions, but treat and manage wastewater in a way that provides equivalent environmental and public health outcomes to sewer. Very few of these currently exist in Victoria, but some[1] are being trialled.

Blackwater is toilet waste, while **greywater** comes from showers, baths, hand basins, washing machines, laundry troughs and kitchens.

1.5 SCOPE

The focus of this DWMP is all types of OWMS in the LGA with a maximum daily loading capacity of 5000 L including blackwater and/or greywater, generated from domestic (including multi-dwellings) and/or commercial premises. All OWMS with a daily loading capacity greater 5000 L are administered by EPA.

Under the Environment Protection Regulations 2021, operating an OWMS (maximum daily loading capacity of 5000 L) is a prescribed permission activity A20 (On-site wastewater management systems). It applies to proposed new systems and alterations to existing systems, which includes alterations that increase the system's flow or load, such as a house extension or installation new plumbing fixtures, outbuildings, etc.. Prescribed permission activity A20 is a permit activity that is administered by the council for OWMS in their LGA.

[1] https://www.water.vic.gov.au/__data/assets/pdf_file/0039/548877/DWM-Case-Study-5-Penshurst.pdf

Onsite wastewater management systems that can treat more than 5,000 litres per day are classified as prescribed permission activity A03 (Sewage treatment) and need an EPA development licence and operating licence (unless an exemption applies). This applies to both proposed new systems and existing systems. Landholders deal directly with EPA Victoria on these larger systems. The volumetric threshold of 5,000 litres per day relates to the design capacity OR the actual flow rate.

This DWMP recommends that Council include all OWMS in the LGA in their database, recognising that the larger ones are overseen by the EPA.

1.6 CONCEPTUAL FRAMEWORK

The following matrix shows the conceptual framework for this DWMP. Elements of domestic wastewater management fall within one of the four cells of the matrix. Note that the top half of the matrix, is focussed on proactive management of existing systems, while the bottom half aims to prevent future issues. And the left-hand half relates to unsewered land, which is the main focus of the DWMP.

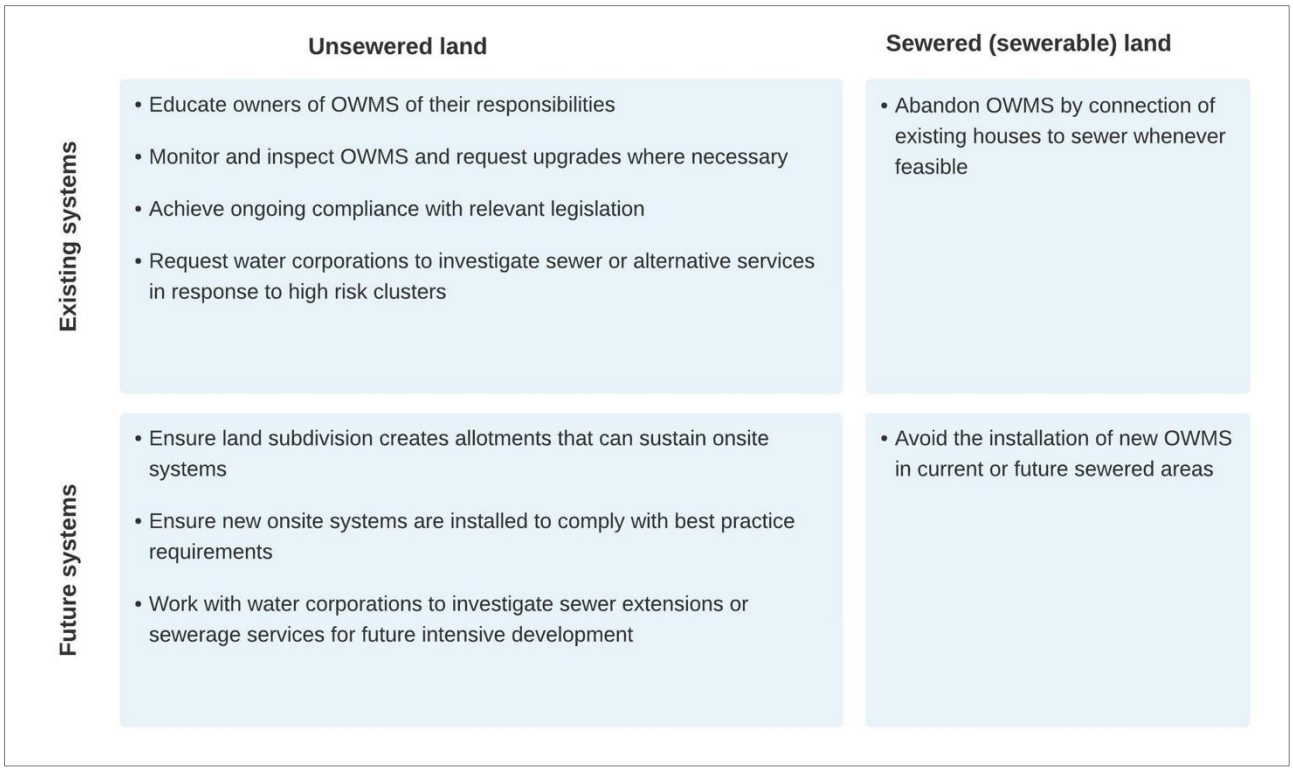

Figure 1-1: Four categories of onsite wastewater management

1.7 STAKEHOLDER AND COMMUNITY ENGAGEMENT

Council has the key statutory responsibility for overseeing the management of OWMS, but the following stakeholders are also relevant to the preparation and implementation of the DWMP:

- Goulburn Murray Water (GMW)
- Central Highlands Water (CHW)
- Coliban Water
- Victorian Environmental Protection Authority (EPA)
- Department of Environment, Land, Water and Planning (DELWP)
- Department of Health (DH)
- Residents and visitors to the Central Goldfields Shire
- Owners and operators of OWMS

- Plumbers and installers of OWMS
- Developers and land capability assessors
- Neighbouring Councils.

Engagement with key stakeholders occurred via phone and video conferencing to focus on individual stakeholder needs. A workshop will be held with key stakeholders to share and seek feedback on the draft DWMP and support ongoing relationship development.

An important step in implementing the DWMP is community engagement. The intent is to inform the community of existing and proposed programs in relation to OWMS and test that policy settings are appropriate.

Engagement with the community will be managed by Central Goldfields Shire Council and will occur once the draft DWMP has been developed.

Action 1: Continue to engage with key stakeholders including:

- Collaborate with Central Highlands Water and Coliban Water on the coverage of existing and possible expansion of sewer networks, and on approval referrals processes for OWMS.
- Share knowledge across agencies to improve information on the location of existing OWMS, share resources and implementation capacity and advocate for improvements to state-wide domestic wastewater management frameworks.

This is an ongoing task. During planning, water authorities are notified, and their referral is considered when dealing with planning application. EHO also shares information with and consults both the EPA, Water Authorities and other Councils as required. Once the DWMP is adopted, it will be shared with relevant stakeholders as required.

2 Central Goldfields Shire Context

2.1 THE REGION

The Central Goldfields Shire is located approximately 150 km northwest of Melbourne and has an estimated population of approximately 13,000 people. The LGA covers an area of 1,532 km^2 and includes Maryborough with population of around 8,000 and smaller townships of Bealiba, Carisbrook, Dunolly, Majorca, Talbot, Bowenvale-Timor and Daisy Hill.

The gold rush greatly influenced the landscape of the region and led to the development of several bustling townships which feature iconic heritage architecture and streetscapes.

Several creeks including the Bet Bet, Emu, Timor, Tullaroop and McCallums creeks traverse the Shire while the Avoca River forms part of its western boundary with the Pyrenees and northern Grampians Shire.

A significant proportion of the Shire is covered by one of four open potable water supply catchments including Cairn Curran, Loddon River (Laanecoorie), Bealiba Reservoir and Tullaroop Reservoir catchments. The LGA features areas of protected remnant Box-Ironbark forests, particularly along the northern boundary and a central corridor which includes forested areas around the main centre of Maryborough.

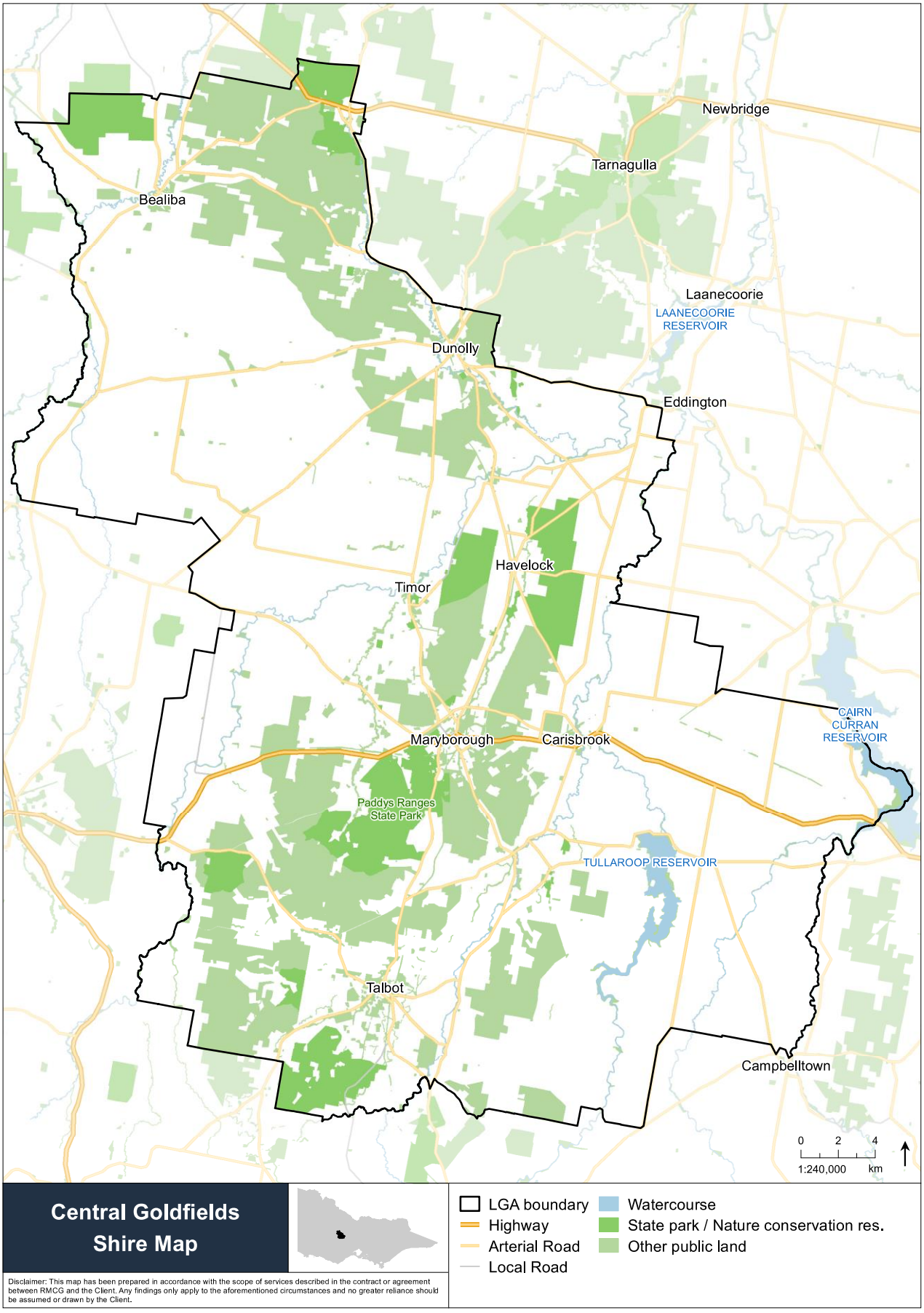

Figure 2-1: Map of Central Goldfields Shire

2.1.1 POPULATION GROWTH

Over the last decade, the LGA has seen only moderate and variable population growth, including some declines in population prior to 2006. From 2011 to 2016 the population growth increased to an average of 0.8% per year.

Nearly 70% of housing development approvals between 2009 and 2019 were in Maryborough, Carisbrook and surrounding areas. Both Maryborough and Carisbrook are serviced by reticulated sewerage infrastructure.

The Council's Population Housing and Residential Settlement Strategy (2020) suggests that the trend of moderate growth appears to be continuing and identifies the potential for this trend to change if strong growth continues in Melbourne, Bendigo and Ballarat. The strategy considers plausible growth scenarios of between 815 to 1,925 additional people and a demand for between 713 and 1,304 additional dwellings in the region by 2036.

Most of these additional dwellings will occur in sewered towns, but there will be demand for new OWMS in unsewered areas. New OWMS in rural and rural-residential areas with Lots larger than 1 ha are generally low risk, but ongoing housing developments in unsewered centres such as Talbot and Bealiba are expected to be moderate (CGSC, 2020).

There are recent examples of strong interest in the development of new dwellings on small vacant lots in unsewered centres. This type of growth creates challenges for domestic wastewater management, because these existing lots may be unsuitable for OWMS due to their size, proximity to waterways and/or other risk factors.

2.1.2 WATER SUPPLY CATCHMENTS

A significant proportion of the Shire is covered by one of four open potable water supply catchments including Cairn Curran, Loddon River (Laanecoorie), Bealiba Reservoir and Tullaroop Reservoir catchments.

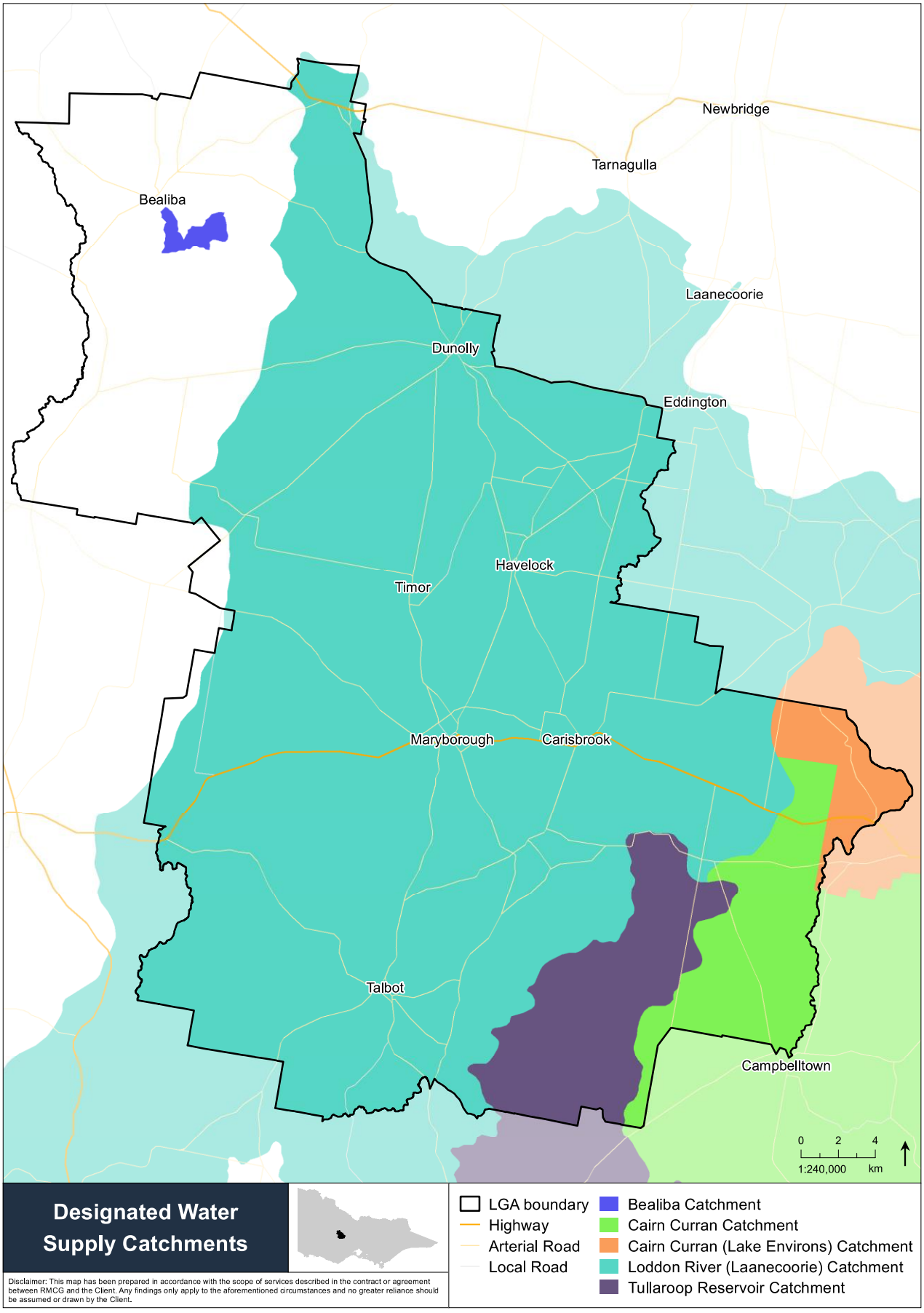

Figure 2-2: Designated water supply catchment areas in the Central Goldfields Shire

2.2 CURRENT ONSITE WASTEWATER SITUATION

NUMBER OF SYSTEMS AND GROWTH

Most townships within the LGA are unsewered except for the main business centre of Maryborough and parts of Dunolly and Carisbrook.

It is estimated that there are well over 1000 OWMS in operation throughout the LGA. However, Council records currently account for only around 150 of these systems. The shortfall in records is partly due to the large number of systems in older settlements and rural areas, where a large portion of housing stock was built before permit and service requirements were introduced.

Council receives approximately 20 new applications for permits to install new OWMS annually.

2006 DOMESTIC WASTEWATER MANAGEMENT PLAN

A DWMP was developed for the Central Goldfields Shire in 2006. The 2006 DWMP was prepared under the State Environment Protection Policy (Waters of Victoria) (SEPP WoV) 2003 which has since been replaced by the new Environment Protection Amendment Act 2018.

Some recommendations have been implemented, but many strategies and actions set out in the 2006 DWMP were not able to be implemented in full due the actions not being considered fit-for-purpose given resource capacity.

CURRENT DOMESTIC WASTEWATER MANGAEMENT PLAN

This new Central Goldfields Shire Council DWMP has been prepared in accordance with recent legislative changes and contemporary domestic wastewater issues. This includes issues relating to the expected growth in population and development of unsewered areas and specific requirements for domestic wastewater management in potable water supply catchment areas (DSE, 2012), and new EPA legislation.

The limitations which prevented full implementation of the 2006 DWMP have also been considered in the development of this document. The new DWMP provides actions and directions matched to the resourcing capacity and risk profile of domestic wastewater management in the Shire.

2.3 POLICY AND STRATEGIC CONTEXT

COUNCIL PLAN AND VISION

The Central Goldfields Shire Council Plan (2021-2025) is the key strategic document guiding decision making and resource allocation over the next four years.

It provides a shared vision *“to be an engaged, flourishing, lively and inclusive community”* and captures the purpose of the Council *“to seek, capture and develop opportunities to make our Shire a place of choice to live, work and enjoy”* (CGSC, 2021).

There are four Strategic Objectives and 20 strategic priorities. Improving onsite wastewater management can help in achieving the following priorities:

- 1.4) Encourage, support and facilitate healthy and safe communities
- 2.1) Retain, grow and attract our population
- 3.2) Provide infrastructure to meet community need
- 3.4) Manage and reduce waste
- 3.5) Care for the natural environment and take action on climate change.

COUNCIL PLANNING SCHEME

The planning process, and the Planning Scheme, play an important role in onsite wastewater management. Council has within its control many of the tools and powers to ensure that development occurs in a manner consistent with the constraints and opportunities provided by onsite wastewater management.

The following extracts from the Central Goldfields Planning Scheme illustrate key clauses related to onsite wastewater management. These are the existing objectives, policies and provisions relating to onsite wastewater management and provide the framework for Council domestic wastewater operations.

Strategic Direction

02.03-3 Environmental risks and amenity

Council seeks to address environmental risks and amenity by:

- *Minimising the potential impact of development on water pollution, land degradation, and risk of salinity and erosion.*
- *Ensuring land capability supports land use and development, particularly in environmental risk areas.*

02.03-9 Infrastructure

New development in Central Goldfield's requires the provision of infrastructure to service and support future development.

Some townships are unsewered which can inhibit physical growth and contribute to regional water quality problems.

Council aims to support the efficient delivery of infrastructure by:

- *Ensuring development can be provided with an adequate level of infrastructure.*

State Policy

11 Settlement: Planning is to facilitate sustainable development that takes full advantage of existing settlement patterns and investment in transport, utility, social, community and commercial infrastructure and services.

11.02-3S Managing Growth: Sequencing of development: Ensure that planning for water supply, sewerage and drainage works receives high priority in early planning for areas of growth.

14.02-1S Catchment planning and management: Ensure land use and development minimises nutrient contributions to water bodies and the potential for the development of algal blooms.

14.02-2S Water quality: Ensure that land use activities potentially discharging contaminated runoff or wastes to waterways are sited and managed to minimise such discharges and to protect the quality of surface water and groundwater resources, rivers, streams, wetlands, estuaries and marine environments.

16.01-3S Rural residential development: Encourage the consolidation of new housing in existing settlements where investment in physical and community infrastructure and services has already been made.

19.03-3S Integrated water management: Ensure that the use and development of land identifies and appropriately responds to potential environmental risks and contributes to maintaining or improving the environmental quality of water and groundwater.

Local Provisions

11.02-1S Managing Growth: Supply of urban land: Planning for urban growth should consider: The limits of land capability and natural hazards and environmental quality.

11.02-3S Managing Growth: Sequencing of development: Ensure that planning for water supply, sewerage and drainage works receives high priority in early planning for areas of growth.

19.03-3L Infrastructure: Integrated water management – Central Goldfields: Ensure effluent disposal systems can be contained within the site. Minimise the potential for pollution if reticulated sewerage is not available.

Zones

Low Density Rural Zone (LDRZ), Town Zone (TZ), Rural Living Zone (RLZ), Rural Conservation Zone (RCZ), Farm Zone (FZ)

32.03 LDRZ: To provide for low-density residential development on lots which, in the absence of reticulated sewerage, can treat and retain all wastewater.

32.03-1 LDRZ, 32.05-3 TZ, 35-03-2 RLZ, 35.06-2 RCZ, 35.07-2 FZ: Use for one or two dwellings or a dependent person's unit: Each dwelling must be connected to reticulated sewerage, if available. If reticulated sewerage is not available, all wastewater from each dwelling must be treated and retained within the lot in accordance with the requirements in the Environment Protection Regulations under the Environment Protection Act 2017 for an on-site wastewater management system.

32.03-3 LDRZ: Subdivision: Any area specified must be at least 0.4 hectare for each lot where reticulated sewerage is not connected.

32.05-5 TZ: Subdivision: Each lot must be provided with reticulated sewerage, if available. If reticulated sewerage is not available, the application must be accompanied by:

- *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 Environment Protection Regulations under the Environment Protection Act 2017.*
- *A plan which shows a building envelope and effluent disposal area for each lot.*

32.03-5 LDRZ: Application requirements: Subdivision: An application must be accompanied by a site analysis, documenting the site in terms of landform, 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: In the absence of reticulated sewerage, an effluent disposal area.*

32.03-6 LDRZ, 32.05-13 TZ Decision guidelines: 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.

32.03-5 RLZ, 35.06-6 RCZ Decision guidelines: Before deciding on an application to use or subdivide land, construct a building or construct or carry out works… the responsible authority must consider, as appropriate: The location of on-site effluent disposal areas to minimise the impact of nutrient loads on waterways and native vegetation.

Particular Provisions

56.07-3 Wastewater management objective: To provide a wastewater system that is adequate for the maintenance of public health and the management of effluent in an environmentally friendly manner.

Wastewater 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 wastewater management plan adopted by the relevant council.*

ENVIRONMENT PROTECTION LEGISLATION

Recent changes in Victoria's environmental laws strengthen and clarify the onsite wastewater management obligations for landowners and Councils.

The amended *Environment Protection Act 2017* came into effect in Victoria on 1 July 2021. These new environment protection laws, and supporting regulations, focus on preventing waste and pollution impacts, rather than managing impacts after they have occurred.

The **general environmental duty** is a centrepiece of the new laws and regulations. It applies to all Victorians. If you conduct activities that pose a risk to human health and the environment, you must understand those risks. You must also take reasonably practicable steps to eliminate or minimise them. Onsite wastewater management systems can be a risk to human health and the environment if they are poorly installed or maintained.

The general environmental duty is underpinned by the *Environment Protection Regulations 2021* which set out duties and obligations for persons in management or control of land where an onsite wastewater management system is located. These include requirements for the landholder or land manager to:

- Take all reasonable steps to operate the system so it does not pose a risk to human health or the environment.
- Take all reasonable steps to maintain the system in good working order (for residential properties, this applies to the owner but not to a renter)
- Check for signs the system may be failing or is not in good working order and, from 1 July 2022, notify council if this is the case.

- Respond to system failures.
- Provide information to occupiers regarding the correct operation and maintenance of the system.
- Keep maintenance records and, on request, provide them to council.

Onsite wastewater management systems are a prescribed permission activity under the new environment protection regulations:

- A permit from the local Council is required to construct, install, or alter an onsite wastewater management system with flow rates of up to 5,000 litres per day on any day. Under the regulations this is prescribed permission activity A20 (as set out in item 28 in the Table in Schedule 1 of the regulations). It applies to proposed new systems and alterations to existing systems, which includes alterations that increase the system's flow or load, such as a house extension or installation of a spa.
- Onsite wastewater management systems that can treat more than 5,000 litres per day are classified as prescribed permission activity A03 (Sewage treatment) and need an EPA development licence and operating licence (unless an exemption applies). This applies to both proposed new systems and existing systems.

Councils can refuse a permit if the onsite wastewater management system doesn't meet EPA's specifications.

The Regulations also set offences and allow councils to order system maintenance and enforce breaches of duties (regulation 163 and 169). These Regulations apply to all existing onsite wastewater systems, including older systems installed before installation permits were introduced. People may still operate old systems, but they must take all reasonable steps to ensure the system is maintained in good working order and operated so as not to pose a risk to human health or the environment.

Further guidance on on-site wastewater management includes:

- Code of practice – onsite wastewater management (EPA Publication 891)
- Guidance for owners and occupiers of land with an OWMS ≤ 5000 litres on any day (including septic tank systems) (EPA Publication 1976)
- Regulating onsite wastewater management systems: local government toolkit (EPA Publication 1974)
- Victorian land capability assessment framework (Municipal Association of Victoria).

The EPA *Code of practice – onsite wastewater management* clearly identifies Council's statutory responsibilities in relation to the planning and management of onsite wastewater systems. These include:

- Assessing land development applications to determine the suitability of a site for an onsite wastewater management system where reticulated sewerage is not available.
- Assessing onsite wastewater management permit applications to ensure systems are designed in accordance with the relevant Victorian regulations and the Australian Standard
- Issuing Permits to Install/Alter and Certificates to Use onsite wastewater management systems.
- Refusing to issue permits for a proposed development where wastewater cannot be contained within the boundaries of the site and reticulated sewerage is not available or will not be provided at the time of subdivision.
- Overseeing the installation of onsite wastewater systems to ensure compliance with legislative requirements.
- Ensuring systems are managed in accordance with their permit, and the relevant Australian Standard and Victorian regulations, through relevant compliance and enforcement programs.
- Developing Domestic Wastewater Management Plans
- Investigating issues with onsite wastewater systems that may be causing impact to public health, amenity and/or the environment.
- Referring high-risk unsewered areas to water authorities so they can be investigated for connection to either a sewer system or an alternative service.

In relation to site access, Council authorised officers (i.e., Council employees appointed as authorised officers under section 242(2) of the Environment Protection Act 2017) have powers of entry under the Environment Protection Act 2017. However, for residential premises, entry for inspections can only occur:

- With the consent of the occupier
- If the authorised officer reasonably believes that a person has contravened, is contravening or is about to contravene a provision of the Act or Regulations; or
- If the authorised officer reasonably believes there is an immediate risk of material harm to human health or the environment.

If one of the last two points applies, the authorised officer can only investigate the part of the residential premises necessary to determine the suspected contravention. For example, this may only require the authorised officer to enter the land surrounding a house to inspect the system.

REQUIREMENTS FOR WATER SUPPLY PROTECTION AREAS

Ministerial guidelines (2012) are in force in Victoria to guide the assessment of planning permit applications within open water supply protection areas. The guidelines specify that where a planning permit is required to use land for a dwelling or subdivide land within a water supply protection area, the density of dwellings should be no greater than one dwelling per 40 hectares, unless exemptions apply.

Exemptions apply where:

- Catchment or water quality protection is not an objective in the Environmental Significance Overlay
- A planning permit is not required.
- The proposed development will be connected to reticulated sewerage.
- A Catchment Policy has been prepared for the catchment and endorsed by the water corporation in consultation with key stakeholders and the proposed development is consistent with the Policy.
- Certain conditions are met, including the preparation, adoption, and implementation of a DWMP meeting requirements specified in the guidelines.

This DWMP has been prepared in accordance with the conditions and requirements of the last exemption (see Chapter 5.3 for more details).

3 Risk assessment

3.1 RISK FRAMEWORK

"Risk is the effect of uncertainty on objectives"[2]. In other words, risk arises where there is uncertainty about achieving an objective. Risk management assists in making informed decisions and setting strategy in the face of uncertainty. This section provides a risk assessment approach that is informed by the Australian Standards (AS/NZS ISO 31000:2018) and the Victorian Government Risk Management Framework Practice Guide (VMIA, 2016).

Wastewater is a source of risk as it contains contaminants that have potential to impact on:

- Public health – through contamination of drinking water and recreational water bodies with human pathogens
- The environment – via pollution of surface waters and groundwater, with nutrients, pathogens and other pollutants, which can cause harm to aquatic fauna and indigenous vegetation.
- Amenity – including offensive odours and unsightly discharges leading to reduced amenity and potential impact on property values.

In relation to onsite wastewater management, these impacts can occur due to runoff or leaching of poorly treated or excess wastewater. This is more likely when onsite systems have deteriorated, are poorly maintained, are not fit for purpose (e.g., inadequately sized), or are not properly located.

There can be uncertainty as to the extent of the impact occurring, particularly when considering the cumulative impact across a town or the LGA as a whole. As such, there is a need to take a risk management approach in determining the actions Council should take to improve wastewater management.

Once the level of risk has been determined, priority risks should be dealt with first. That is, the higher the risk the higher the priority. Also, risk is dynamic and therefore managing risk is iterative. This risk assessment and the selected risk treatments (actions) need to be monitored and reviewed on a regular basis.

The risk assessment considers established practices at Central Goldfields Shire Council. As such, the assessment is of residual risk.

3.2 CURRENT RISK

The DWMP uses a four-sector approach to capture all aspect of onsite wastewater management. Key considerations for risk using this approach include:

- **Existing systems** typically present risks where they are poorly maintained, no longer meet treatment requirements, or are inappropriately sited (including in sewered areas). The absence of information on the location and status of these systems may also increase the level of risk.
- **Future systems** tend to present greater risks due to development in sensitive areas, or growth areas where there may be clusters of new systems built over time. Onsite wastewater management is embedded in planning schemes and procedures to ensure proper process is followed. However domestic wastewater management planning can help to further mitigate against these risks.

An overview of the relative risk according to the four-sector approach is provided below for the Central Goldfields Shire.

[2] Australian Standard AS/NZS ISO 31000:2018 Risk Management – Guidelines

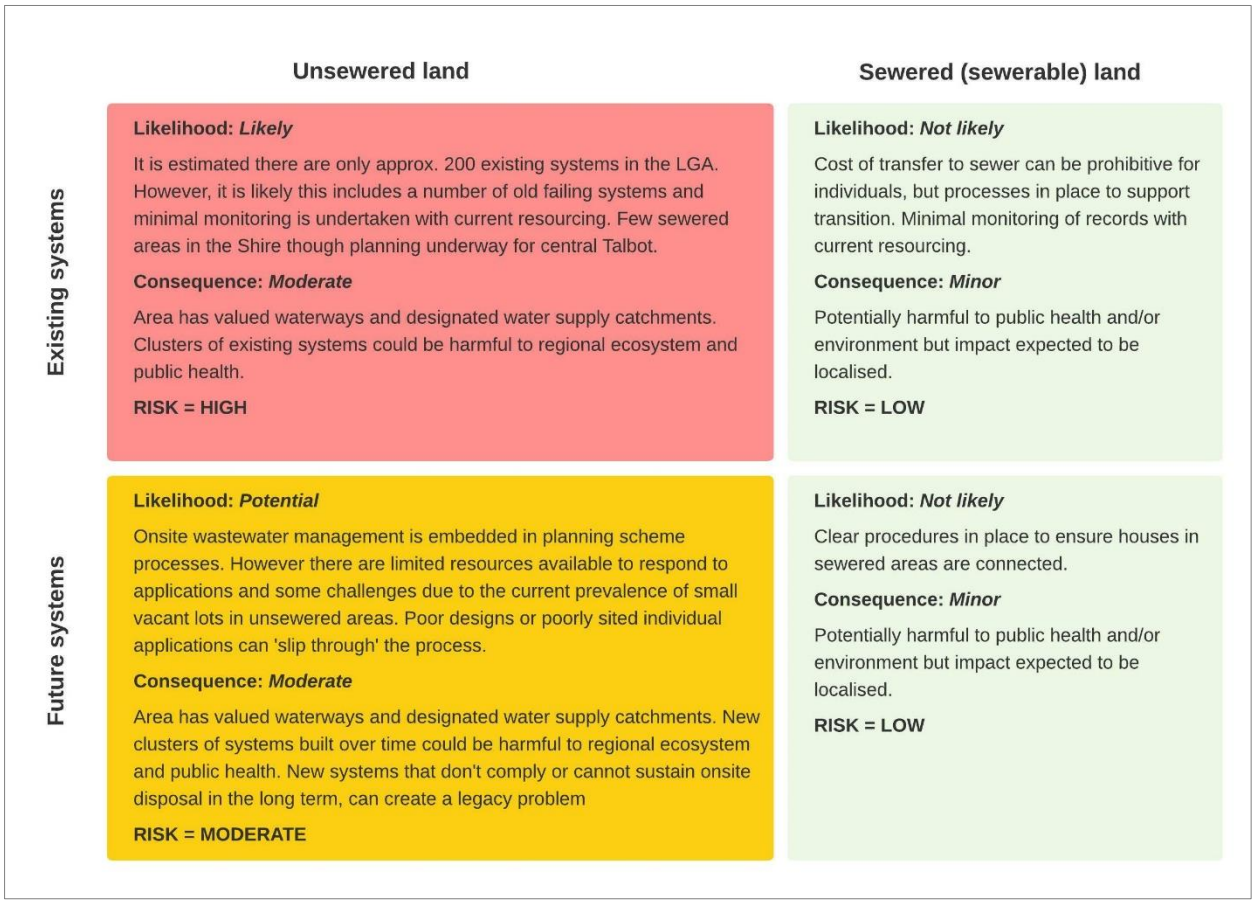

Figure 3-1: Level of risk associated with four categories of onsite wastewater management.

3.3 PRELIMINARY SPATIAL RISK ASSESSMENT

Many of the risks associated with onsite wastewater management vary spatially. This is of importance when investigating the cumulative risk associated with onsite systems. Therefore, a preliminary spatial risk assessment has been undertaken. This is a mapping exercise that combines various types of geographic information.

The preliminary spatial risk assessment draws on recent approaches used by other councils in Victoria, and particularly the Edis Method that was developed for Mansfield Shire in 2014 (MAV 2014) but is tailored to local conditions in the Central Goldfields Shire.

Risk factors which have informed the assessment include:

- Development risks associated with Planning Scheme zones.
- Soil risks associated with landform and soil type.
- Water risks associated with proximity to ground- and surface water systems.
- The location and extent of existing sewer systems.

These risk factors were combined to form the overall risk rating presented in Figure 3-2. Details of the method and the full results from the preliminary spatial risk assessment are presented in Appendix 1.

The preliminary spatial risk assessment highlights the combined level of risk in areas that are currently unsewered. This includes both the risk associated with existing and future systems. The combined level of risk in currently sewered areas is an important issue dealt with in subsequent sections of the DWMP.

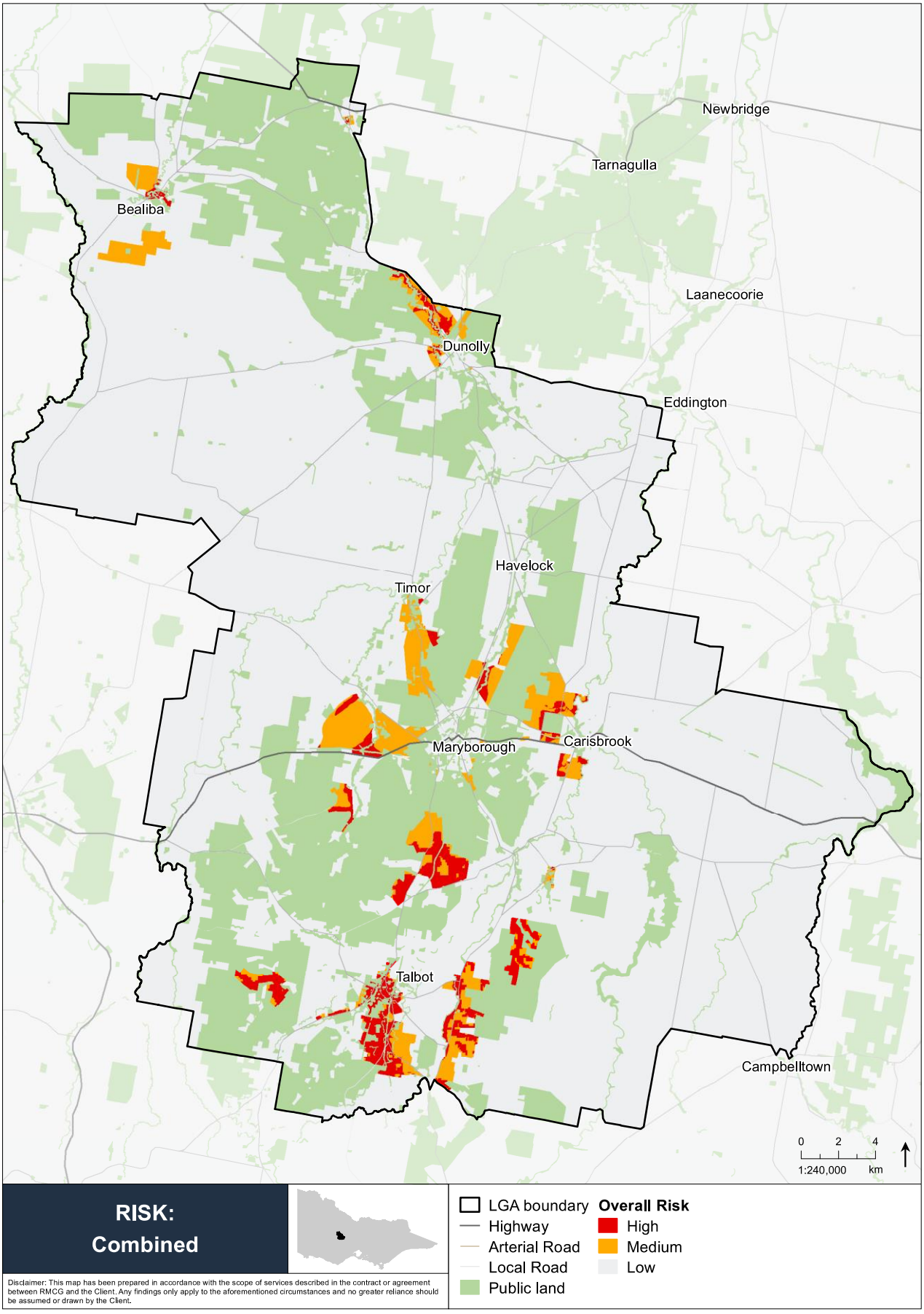

Figure 3-2: Overall risk based on assessment of development, soil and water risk factors in the Central Goldfields Shire.

Conclusions drawn from the spatial risk assessment and confirmed with Council include:

- For sewered townships, high risk areas occur adjacent to the outer edges of each town. The status of many existing systems in these areas is not currently known. Many of these areas may currently be low density, however there is potential for development on vacant lots, or further subdivision within the LDRZ.
- For unsewered townships, high risk areas occur in town centres, where small lot sizes occur. The status of many existing systems in these areas is not currently known and their risk profile manifests in different ways due to their existing characteristics and growth potential of the townships:
  - **Talbot:** High risk areas occur across a more extensive area in Talbot due to higher numbers of occupied small lots occurring in high density, compared to other unsewered townships. While the permanent population remains small, the township also attracts a larger number of visitors from surrounding areas on 'market days' and for heritage-based tourism. These reasons and others support the current proposal for sewerage development being considered through Central Goldfields Shire and Central Highlands Water investigations.
  - **Bealiba, Timor, Bowenvale, Moliagul:** High risk areas occur across a more limited in these townships, primarily driven by lot size combined with risk factors such as proximity to waterways and soil type.

3.4 ADDITIONAL RISK FACTORS

In addition to the spatial risk assessment, the following risk factors have been considered:

Growth trends and township based risks: Growth trends (including in-fill and greenfield development) may exacerbate risks, especially where small lots occur. Examples of some of the current growth patterns, and local domestic wastewater management planning risk factors are described by township below (Table 3-2).

Location, density and age of existing systems: The higher level of risk associated with existing systems is exacerbated if systems are inappropriately located or need replacement or repair. Proximity to other existing systems (clustering), proximity to waterways and the age of existing systems may be used as proxies for identifying high risk locations within this category.

Current lot size: In addition to zoning, current lot size provides an indication of the level of risk associated with both existing and future onsite systems in unsewered areas. Lot sizes smaller than 0.4 ha present the highest level of risk, however it is not uncommon to face challenges ensuring the sustainable management of wastewater on lots smaller than 1.0 ha. Current lot size also determines likely pathways for permit or building applications which are an important consideration for the use of controls to manage domestic wastewater.

3.5 SIMPLIFIED RISK TRIGGERS

Table 3-1 sets out a simplified set of risk categories for the purposes of this DWMP.

Table 3-1: Simplified risk-based triggers used in this DWMP.

RISK CATEGORY	RISK TRIGGERS
Low Risk	All sites not considered Moderate Risk or High Risk as defined below.
Moderate Risk	All sites not considered High Risk as per definition below AND ▪ Site is between 0.4 ha and 1.0 ha OR ▪ Site is mapped as moderate or high risk to water environments OR ▪ Slope is steeper than 10% OR ▪ Site is mapped as medium-risk soil type OR ▪ Site where there is a moderate density (between 20 and 40 dwellings/km2) of existing onsite systems (e.g., Bealiba) OR ▪ Site with OWMS aged between 20-years and 40-years old OR ▪ Site with an OWMS located within an area where reticulated sewerage is available.
High Risk	▪ Site is smaller than 0.4 ha OR ▪ Site is mapped as high-risk soil type OR ▪ Site where there is a high density (greater than 40 dwellings/km2) of existing onsite systems (e.g., Talbot) OR ▪ Site where a commercial residential development is proposed OR ▪ Site with an OWMS aged more than 40-years old OR ▪ Site with an OWMS closer than 50 m to a waterway.

3.6 APPLYING THE RISK FRAMEWORK

The findings from this preliminary spatial risk assessment have been used to inform the actions throughout this document. A summary of the risk-based triggers that apply to specific actions is provided in Chapter 8.

There is an opportunity to refine the spatial risk assessment by incorporating data on the location of existing systems, current lot size and growth trends in the next iteration of the risk-based approach.

Details of the preliminary spatial risk assessment method are contained in Appendix 1.

Task to initiate closer to the revision period.

The DWMP provides a risk framework which divides the Shire's managed areas into Low, Moderate or High Risk depending upon the following factors:

- Site Size
- Danger to Environments
- Soil Type
- Slope
- Population Density
- Existence of a Historical OWMS.

Action 2: Review and refine the risk assessment at least every five years (prior to DWMP review), to incorporate improved datasets (such as location and density of existing OWMS) and changing circumstances.

Table 3-2: Likely growth patterns and local risk factors by township (CGSC 2020)

TOWN	LIKELY GROWTH[3]	EXAMPLES OF LIKELY GROWTH PATTERNS	LOCAL RISK FACTORS
Maryborough – Carisbrook	High	▪ Broadacre subdivision development in RLZ around Carisbrook, between Maryborough-Carisbrook, Simson ▪ Low density / rural residential development in RLZ around Carisbrook, between Maryborough-Carisbrook, Simson, Moonlight Flat/Alma, Adelaide Lead	Tullaroop Creek, Four Mile Creek, soil type (Moonlight Flat)
Dunolly	Medium	▪ Low density / rural residential development in RLZ along Dunolly-Moliagul Rd corridor, north and west of Dunolly	Burnt Creek and tributaries, soil type (NE and SE)
Bealiba	Low	▪ In-fill development of existing small lots ▪ Low density / rural residential development in RLZ	Cochranes Creek, soil type, Small Lots
Timor – Bowenvale	Low	▪ In-fill development of existing small lots ▪ Low density / rural residential development in RLZ along Dunolly-Timor Rd	Bet-Bet Creek, Timor Creek, Small Lots
Moliagul	Very low	▪ In-fill development of existing small lots	Burnt Creek, Mia Mia Creek, soil type
Talbot	Medium	▪ In-fill development of existing small lots ▪ Low density / rural residential development in RLZ south of Talbot	Back Creek, Small Lots
Daisy Hill, Red Lion, Majorca	Very low	▪ Low density / rural residential development in RLZ.	McCallum Creek, soil type (Daisy Hill,

[3] Indicative assessment informed by CGSC's settlement strategy (CGSC, 2020)

4 Existing systems in unsewered areas

4.1 INTRODUCTION

This chapter focuses on existing onsite wastewater systems in Central Goldfields Shire's unsewered areas and identifies actions for improved management.

These systems present the highest level of risk, particularly where onsite systems are clustered together on small lots. Older existing systems present a higher risk both because of the risk of failure and because information on these systems is limited. Monitoring of existing systems is currently limited.

4.2 ONSITE SYSTEM DATABASE

A comprehensive database is essential to effective monitoring and compliance of onsite systems.

Council collects records of onsite systems including applications, planning permits, service reports, complaints and decommissioning reports, and periodically collates information to report on the status of existing onsite systems. However, there is currently limited comprehensive database capturing all onsite systems in the Shire.

The Council will develop a database of existing onsite systems for succinctly capturing and updating relevant details of existing systems (e.g., location, building use – residential/commercial/government, type of system, installation date, last service date, complaints received). The database will be populated with existing records and improved over time, working towards full coverage of existing systems. Where possible, the proposed database would integrate with Council's existing property and assets systems.

Opportunities to improve the extent of information on existing systems over time include:

- Ongoing collation of information through applications, planning permits, service reports, complaints, and decommissioning reports
- Deduce an approximate number and location of existing systems with an initial focus on high-risk areas followed by medium-risk areas (see Table 3-1) through analysis of detailed satellite imagery and collating other Council Records.

The database will attempt to include all onsite wastewater systems with flow rate of less than 5000 L/day, whether they are private residences, commercial, Council owned, or State government owned.

Action 3: Develop, populate, maintain, an OWMS Database and utilise it for improved management of existing systems and an information system for storing details of new systems as they are installed.

4.3 EXISTING SYSTEM PERFORMANCE

Existing onsite systems may present risks to sensitive local environments and human health due to:

- Ageing septic tanks
- Inadequate onsite disposal areas
- Lack of system maintenance
- Offsite discharge, including into drains, creeks, and rivers.

These issues may require different approaches. Measures include education, non-compliance action or further investigation if issues are causing impact to public health, amenity and/or the environment.

At present non-compliances are dealt with, as Council becomes aware of issues through complaints or when there are major alterations (such as house extension) requiring planning and/or building permits. Other sources of information on these issues might include service or plumbing assessment reports, however this information is less likely to be available for older systems.

This plan recommends a proactive, targeted inspection program of a substantial sample of high risk OWMS each year (resource dependant, inspection numbers to be determined after completion of Action 3). The following towns exhibit higher risk factors (small lots, proximity to waterways, soil types) and are recommended as the priority for an inspection program:

- Talbot – highest priority in the event sewering of the township does not proceed in a timely manner.
- Bealiba – primarily in town centre.
- Timor, Bowenvale, and Moliagul.

High-risk areas in the combined spatial risk assessment, older systems that are not in the current database, systems on lots smaller than 0.4 ha and those close to a waterway will be targeted as high priority in the initial monitoring and compliance program (see Table 3-1).

Inspection protocols developed by other neighbouring Councils and the inspection form in the Australian Standards (AS 1547, Appendix U) can be used as the basis of a checklist.

Initially, site selection for the inspection program will need to be broader than the list of existing systems accounted for in Council records. This is especially important given current data gaps are understood to coincide with higher risk locations (e.g., Talbot). In these cases, site selection based on level of risk (see Table 3-1) will ensure good coverage of existing systems irrespective of the extent of current records.

Officers undertaking inspections will need to be mindful of the requirements in relation to site access under section 242(2) of the Environment Protection Act 2017.

Action 4: Design and implement a targeted inspection program, targeting onsite wastewater systems in high-risk areas each year [resourcing dependent, inspection numbers to be confirmed after completion of Action 3].

Action 5: Use compliance and enforcement tools as appropriate within statutory powers to respond to inspection findings and record in the onsite system database.

4.4 SEWERING HIGH-RISK AREAS

Planning is currently underway to sewer the high-risk township of Talbot.

The need for the project was first established in a 2005 study that provided evidence of sullage and wastewater (diluted sewerage) within the gutters and drains around Talbot. At the time testing found that level of the bacteria E.coli found in the drains around Talbot were higher than the levels considered to be ‘a significant risk of illness transmission’ by the National Health and Medical Research Council (NHMRC).

In addition to significant health and environmental risks, the inability of allotments to contain wastewater within the property boundaries within GMW’s water supply area has led to development restrictions particularly affecting the development of small lots and subdivisions. Council settlement strategies prepared over the past ten years (CGSC, 2012; CGSC, 2020) have highlighted the significant limitation this has placed on the growth of the town.

An options assessment, concept design and business case have been completed for the Talbot scheme (AECOM, 2010; CGSC, 2010; HDS Australia, 2013). However, further progress has been limited by concerns that the system will be prohibitively expensive and may not be supported by Talbot residents (CGSC, 2020).

Council continues to investigate options for improving the cost-effectiveness of the scheme with Central Highlands Water. As well as connecting existing high risk OWMS, consideration should be given to providing sewerage service capacity for infill development as well as perhaps a new medium density development area.

Action 6: Hasten the progress of a decision in relation to Talbot sewer investigations with Central Highlands Water to ensure health, environmental and town planning risks can be either mitigated with sewerage as soon as possible, or long-term planning for non-sewered development can be confidently pursued.

4.5 ONSITE SYSTEMS ON SMALL LOTS

There are many small lots with existing dwellings in unsewered areas in the Central Goldfields Shire. Small Lots for the purposes of this plan are lots less than 0.4 ha in area.

Council will work with existing landowners through educational efforts to identify sustainable solutions. Options, in order of preference[4] include:

- There may be an opportunity to reduce wastewater volumes through water saving fixtures or other measures (not installing a bath, or other wastewater producing facilities, etc.)
- Upgrading to secondary treatment.
- Where there are clusters of existing systems, consideration could be given to sewerage services in consultation with the relevant water authority.

Council encourages the consolidation of small lots to prevent smaller lots being sold separately in the future (depending on ownership), to ensure compliance with zoning conditions and for onsite wastewater management. This is usually facilitated at the time of the planning or building application to assist with management of future onsite systems (see Chapter 5.7). However, Council may apply the same approach to existing systems where multiple neighbouring vacant small lots are currently being used to assist with onsite wastewater management.

Action 7: Work with existing landowners on small lots to educate them in OWMS management, wastewater reduction and adoption of a higher quality effluent systems.

4.6 COMMUNITY EDUCATION

Council provides information to help residents manage their onsite systems. Information on Councils' webpage needs to be kept up to date and should target high-risk areas and challenges. Areas of focus for community education could include:

- The new EPA regulations and the General Environmental Duty with links on Council's website to important pages on EPA's website.
- Water conservation, as a key method in minimising risk from wastewater, by minimizing the volume produced.

[4] Preference order reflects principles of the waste hierarchy, practicality and long-term sustainability of solution.

- Use of cleaning products that are suited to the onsite treatment system in place. Chemicals that contain large amounts of antibacterial compounds can kill the good bacteria inside the wastewater system that help to break down the waste.
- Avoiding food waste, oils and fats going down the kitchen sink as these can block pipes and decrease the function of the onsite system.
- Encouraging regular maintenance of onsite systems as appropriate to the type of system installed.
- Protecting effluent disposal and irrigation areas from inappropriate development (e.g., driveways, sheds) and diversion of stormwater around the area.
- EHO to work with Planning and Communications to develop an effective welcome information pack for new residents and land developers.
- EHO to work with communications and add OWMS factsheets to the Council Website.
- Develop materials for a road show or be a part of community events such as Talbot Market to engage the community and educating in Wastewater Management.
- Prepare standard responses for staff when they receive phone calls from prospective property buyers and developers in relation to OWMS feasibility on lots.
- Communicate with Real Estate Agents regarding necessity of declaring OWMS requirements.

Council will seek to reach all owners of onsite systems via broadcast methods such as the Council web page. Target campaigns also provide an opportunity to impart a greater depth of understanding in specific groups.

A particular opportunity for targeted education is when properties change hands. It is important to ensure that owners not previously familiar with onsite systems are made aware of the importance of correct operation and management of their onsite system.

Section 32 Vendor Statements provide a mechanism to inform prospective new owners of properties reliant upon onsite wastewater systems. Vendor Statements must disclose services that are not connected – i.e. not connected to reticulated sewerage.

In addition, Council could provide information on its website targeted to new buyers and send information regarding onsite wastewater management to new owners of properties in unsewered areas. Nearby Councils have developed similar resources to assist with alerting new buyers to their management requirements and there is an opportunity to share resources and ideas to save on costs and learn from best-practice approaches.

Wherever possible, linking to primary sources is encouraged. e.g. provide a link to EPA's website for explanation of the General Environmental Duty rather than writing a page on Council's website.

Action 8: Continue to provide community education via the Council web page on the correct operation and maintenance of onsite wastewater systems, as well as water conservation.

Action 9: Publish the endorsed Domestic Wastewater Management Plan on the Central Goldfields Shire website.

Action 10: Alert new buyers to the existence of onsite systems and the associated wastewater management requirements through a new buyer 'Welcome Pack' or targeted website campaign.

4.7 SHIRE OWNED ONSITE WASTEWATER SYSTEMS

Central Goldfields Shire Council manages properties with onsite wastewater systems across the Shire. These are associated with public halls, recreation reserves and public toilets. Council wants to lead by example and ensure these onsite wastewater systems are adequately maintained and upgraded where required.

There are high visitation tourist areas within the LGA which will require particular attention.

The Talbot Farmers Market attracts more than 100 stall holders and 3,000 visitors each month and over 40,000 visitors annually (CGSC, 2010). Council managed public toilet facilities (Pioneer Park and RSL Park) are utilised by visitors and it is understood the event places significant pressure on the current onsite systems associated with the facilities (Pers. Comms., Amy Boyd, May 2022). The Council will review the performance of these and other high use Council systems and investigate options for upgrading / replacing onsite systems where necessary to meet visitation capacity at the sites.

Action 11: Conduct an audit of Council owned properties reliant on OWMS.

5 Future onsite systems in unsewered areas

5.1 INTRODUCTION

This chapter sets out the approach Council will take to ensure best practice for the installation and management of future onsite systems.

5.2 AVOIDING POORLY CONCEIVED NEW OWMS

Creation of new OWMS that are poorly designed, or sites is a risk factor that can lead to non-compliant, unsustainable systems at the lot and neighbourhood scale and legacy problems for future management. Once a poorly conceived OWMS is constructed, it is impossible to remove unless the site becomes connected to reticulated sewerage. New OWMS need to be compliant from Day 1. Good domestic wastewater management aims to avoid these problems.

Resources and processes are in place to respond to new applications in accordance with the planning scheme and other legislative responsibilities. For this reason, provided these processes are followed every time, the risk associated with future development is moderate.

The long-term goals for future onsite wastewater systems in unsewered are:

- Ensure dwellings requiring onsite wastewater systems are developed sustainably.
- Ensure land subdivision creates allotments that can sustain onsite systems.

Action 12: Avoid poorly conceived new OWMS through the implementation of sound internal approvals processes for new dwellings and small lot subdivisions.

Planning and EHO will work together to achieve this task. There are set policies in the Council in relation to new developments. Help is also provided to people enquiring about new developments in areas where planning permits do not trigger. Land Capability Assessment is a pre-requisite for a majority of Septic Applications. EHO can also legally request a Land capability Assessment and seek referral from Catchment Authorities.

5.3 ONSITE SYSTEMS IN WATER SUPPLY CATCHMENTS

Domestic wastewater management planning must be undertaken in accordance with specified requirements in the Ministerial guideline: *Planning permit applications in open, potable water supply catchment areas – November 2012*. The requirements apply:

- To the area under designated water supply catchments shown in Figure 2-2
- Where a planning permit is needed to use land for a dwelling or to subdivide, and
- The proposed development will not be connected to reticulated sewerage.

The guidelines limit development to a maximum density of 1 house per 40 ha (*Guideline 1*), with the exception that water corporations will consider allowing higher density where certain exemption conditions are met. The approach Council will take to meet the exemption conditions is set out in the table below. More information on how this DWMP meets the requirements for providing a basis for relaxation of Guideline 1 is provided in Appendix 3.

Table 5-1: Conditions required to be met to allow higher density development in open, potable water supply catchment areas.

EXEMPTION CONDITIONS	HOW EXEMPTIONS WILL BE MET
The minimum lot size area specified in the zone for subdivision is met in respect of each lot.	Addressed in statutory planning assessment processes.
The water corporation is satisfied that the relevant Council has prepared, adopted, and is implementing a Domestic Wastewater Management Plan (DWMP) in accordance with the DWMP Requirements.	GMW are involved in the development and review of this plan. Council will continue to engage GMW in ensuring the agreed action plan is carried out and adapted where required. This DWMP has been prepared in accordance with the specified requirements in the Ministerial Guidelines. See Appendix 3 for more details.
The proposal does not present an unacceptable risk to the catchment having regard to: ▪ The proximity and connectivity of the proposal site to a waterway or a potable water supply source (including reservoir) ▪ The existing condition of the catchment and evidence of unacceptable water quality impacts ▪ The quality of the soil ▪ The slope of the land ▪ The link between the proposal and the use of the land for a productive agricultural purpose ▪ The existing lot and dwelling pattern in the vicinity of site ▪ Any site remediation and/or improvement works that form part of the application. ▪ The intensity or size of the development or use proposed and the amount of run-off that is likely to be generated.	The DWMP includes spatial risk assessment tool informs of high-risk areas and ensure Council monitors and implements appropriate controls for development of these areas. The DWMP includes a risk-based approach to Land Capability Assessments that ensures technical assessment of proposed new OWMS focuses on higher risk proposals.

The above approach is not required to obtain an exemption to the Ministerial Guidelines in situations where a planning permit is not required. However, the approach constitutes best practise for new developments requiring onsite wastewater systems. This DWMP applies this approach in these situations through Chapter 5.4, which includes risk-based recommendations for Land Capability Assessments, while Chapter 5.7 deals with the use of a risk-based framework for the development of existing vacant small lots.

5.4 LAND CAPABILITY ASSESSMENTS

A Land Capability Assessment (LCA) is a report that assesses the viability of onsite wastewater management on a site where there is no reticulated sewerage.

LCAs are required across most of the Shire due to the extensive coverage of Special Water Supply Catchment areas across the municipality (see Figure 2-2).

Under the Code of Practice and Victorian Land Capability Assessment Framework, the requirement for LCAs is as follows:

- LCAs are required for subdivisions, new buildings with onsite wastewater disposal and alterations increasing flows rates.
- LCAs may also be required at EHO discretion for other alteration applications.
- LCAs are to be submitted at the planning stage, or building permit stage, if a planning permit is not required.

In addition to the above, Council has adopted a risk-based approach to the inclusions required for LCAs (Table 5-2). This considers the level of risk associated with the proposed development or subdivision. Council will communicate directly with land capability assessors about the risk-based approach required for LCAs under this DWMP.

Table 5-2: Risk-based approach to LCA inclusions required.

RISK	LCA INCLUSIONS	CONDITIONS
Low	Description of proposed onsite treatment, land application and management strategies, including design maximum peak daily hydraulic flow and organic load. Plan of proposed onsite system, (including location of reserve land application area where absorption/transpiration trenches/beds are proposed). Confirmation that setback distances meet requirements in EPA Code of Practice (see Table 5 in Code).	Landowners must comply with conditions on permits granted by Council.
Moderate	As above, plus: Soil profiling and texture assessment in line with site-and-soil evaluation procedures detailed in AS/NZS 1547:2012.	As above, plus: Secondary wastewater treatment standard preferred where there is high risk to water environments.
High	As above, plus: Full feature survey of the site. Detailed soil analysis, including in-situ permeability testing. Water and nutrient balance calculations. Reserve disposal area shown on plans.	As above, plus: Council will prioritise monitoring of high-risk areas to ensure routine maintenance is undertaken by landowners into the future.

The DWMP should be provided to LCA assessors usually involved in Development projects within the shire. This will allow Council to communicate to land capability assessors the expectations from LCA reports and the challenges that can be faced by developers in terms of constructing and maintaining OWMS.

Action 13: Communicate the risk-based approach for LCAs under this DWMP directly with land capability assessors.

5.5 LCA VERIFCATION AND TRAINING

Under Section 1.8.3 of the EPA Code of Practice LCA providers are required to have the necessary qualifications, experience, professional membership, professional indemnity, and independence. Council Environmental Health Officers (EHOs) also need to have the skills, qualifications and experience to interpret LCAs and determine site suitability.

Council has in the past verified LCA providers and published a list on its website. Council continues to assess the quality of LCAs received. LCA assessors usually readily avail their qualifications and professional suitability to Councils.

Council will support training and development opportunities for land capability assessors and Council EHOs. This includes supporting participation in the Environmental Health Professionals Association (EHPA), attending relevant forums and other training.

Central Goldfields Shire is part of the Loddon Mallee Community of Practice EHPA group and Council will continue to provide EHOs and other relevant practitioners with the opportunity to participate in this forum.

Council will also seek to collaborate with neighbouring municipalities through sharing of resources and support for combined land capability assessor and EHO training and development events.

Council EHO and Planners usually keep in touch with other councils and professionals through various Professional associations, regular meetings organised through state government representatives and phone calls or meetings for consultation purposes.

It is recommended that a Policy be implemented by the Council to provide EHOs with Land capability Assessment Training or refreshers as required to allow current and future EHOs to be able to interpret and apply LCAs effectively.

Action14: Verify LCA providers listed by Council on its website and continue to assess the quality of LCAs received.

Action 15: Work with neighbouring municipalities and the Loddon Mallee Community of Practice to establish regular knowledge sharing and training events for EHOs and land capability assessors.

5.6 MINIMUM SUBDIVISION RULES

Some restrictions on subdivision and dwelling development in the Planning Scheme already support outcomes for sustainable onsite wastewater management, even if they were not set for this purpose. For example, subdivision rules limit small lots in farming, rural living, and rural conservation zones to protect agricultural land, and environmental and landscape values respectively. Yet these rules also support the types of lower density development suitable for managing wastewater in unsewered areas.

However, there are areas where minimum subdivision rules may not support sustainable management of wastewater. In the Low-Density Residential Zone (LDRZ), each lot must be 0.4 ha where reticulated sewerage is not connected (see Cl. 32.03-3 in Central Goldfields Planning Scheme) while the Township Zone (TZ) does not specify a minimum lot size.

There are challenges ensuring the sustainable management of wastewater particularly on lots smaller than 0.4 ha. This is reflected in the EPA Code of practice for onsite wastewater management which considers 1.0 ha a suitable risk threshold for the sustainability of onsite systems:

> *The feasibility of providing a reticulated sewerage system should be seriously considered for the development of individual lots and for subdivision proposals that would result in allotments smaller than 10,000 m^2 (1.0 hectare). This area should not be seen as a minimum lot size but as a risk threshold, as lots smaller than 10,000 m^2 may be unable to retain all wastewater onsite.*

It is recommended that the average lot size in unsewered subdivisions should be higher to provide greater flexibility to landholders and a degree of conservatism that reduces risk and need for management input from Council.

Any future rezoning or subdivision proposals in unsewered areas for proposed or allowable lot sizes less than 1.0 ha will be referred to the Environmental Health team. The Planning Scheme requires that all subdivision applications in the LDRZ and TZ include an LCA, building envelope and effluent disposal area. This information will be considered when determining whether the lot is suitable for the treatment and retention of wastewater in accordance with the requirements of the Environment Protection Regulations under the *Environment Protection Act 2017*.

Council will also provide early advice to prospective subdivision proponents of the higher level of domestic wastewater management assessment requirements and controls that typically apply to applications for subdivision into lot sizes smaller than 1.0 ha without provision of sewerage.

Tools exist for Planning to implement lot consolidation both as part of Planning Policies and Legislation and also in consultation with both the Water Authorities and EHO. Council will consider the need for more policies or re-design of sub-division methodology or zoning.

Council will also consider some basic training for planners in wastewater management. As the Council has only one EHO (and will remain so for foreseeable future) it will be worth the effort of reducing referral workload on the EHO and to make addressing wastewater related enquiries and decisions easier.

Action 16: Continue to build strong referral processes between Council's Planning and Environmental Health teams for rezoning or subdivision proposals that would create lots smaller than 1.0 ha in unsewered areas.

5.7 VACANT LOTS

Over recent years, virtually all construction of new dwellings on rural residential land has been on existing lots (CGSC, 2020). Assuming this trend continues, many applications for future onsite systems are likely to arise from existing vacant lots, rather than from new subdivisions of rural residential land.

The majority of the estimated 980 vacant lots are situated within areas not serviced by reticulated sewerage infrastructure (Figure 5-1). Future development will be dependent upon the sustainable use of domestic wastewater management system.

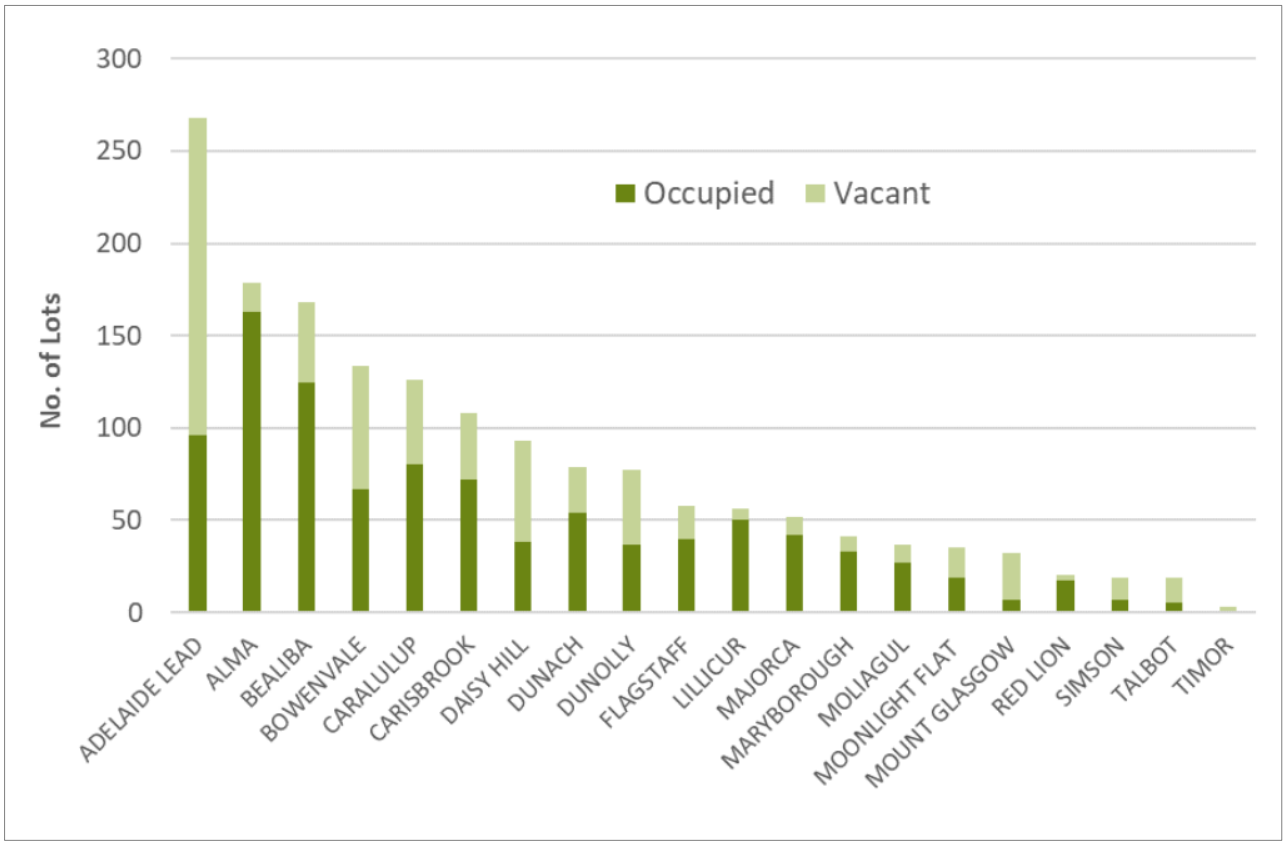

Figure 5-1: Rural residential allotments in the Central Goldfields Shire (CGSC, 2020)

There are challenges for domestic wastewater management associated with the development of vacant lots in Central Goldfields Shire.

Firstly, there are many vacant lots smaller than 0.4 ha in the Central Goldfields Shire in unsewered areas, including in Township and Low-Density Rural Living Zone areas of Talbot, Bealiba, Timor, Bowenvale, and Moliagul.

Usually, it is the requirement for a Planning Permit to subdivide land in an unsewered areas that first triggers the assessment of a development by GMW and Council for its suitability for onsite wastewater management. However, in the case of existing vacant small lots, a Planning Permit may not be required, and new or potential new buyers may erroneously assume that the land is suitable for development. Individuals may be unaware of the onsite wastewater management constraints and can be surprised to find out when making enquiries to Council that it may be impossible to comply with requirements. In other words, where sewerage is not available, some small blocks are not large enough to be house blocks because the land area is insufficient to accommodate the OWMS along with the house, driveway and yard areas.

Meanwhile, in the absence of a requirement for a planning permit, Council may not have access to the technical advice provided by GMW through the referral process and will need to provide robust justification for any decision to refuse an application for an onsite wastewater system.

This DWMP provides a clear framework for identifying high-risk proposals for the development of vacant lots (see Table 3-1).

The following conditions will be considered as a guide to enable existing small lots to treat and retain all wastewater onsite:

- Onsite soil analysis provides evidence of higher permeability than clay dominated Category 6 soils.
- The wastewater volume to be generated is minimised through use of water saving fixtures.
- Secondary treatment with nutrient reduction is used to improve wastewater quality irrigated.
- Subsurface drip irrigation is used to effectively dispose effluent in poor soils.

Other constraints, such as dwelling size may also be considered for high-risk proposals given the number of bedrooms is used as a measure of occupancy, and therefore daily wastewater production rate, under EPA regulations.

Council will also continue to facilitate the consolidation of neighbouring small lots for the purpose of sustainable onsite wastewater management through the planning process.

Reticulated sewerage services could also be considered where there is desire for development, in consultation with the relevant water authority. Likely suitable sewer expansion areas are discussed in Chapter4.4.

As previously noted, Section 32 Vendor Statements must disclose that a property is not connected to mains sewerage. Council could also provide information on its website targeted to new buyers and send information regarding onsite wastewater management to new owners of properties in unsewered areas (see Chapter 4.6).

Council will also provide early advice to prospective new buyers of the higher level of domestic wastewater management assessment requirements and controls that may apply to applications for allowable lot sizes of less than 1.0 ha in unsewered areas.

5.8 SEWERAGE TO ENABLE DEVELOPMENT

Installing sewerage in high-risk areas where there are clusters of existing onsite systems is discussed in Chapter 4.4.

The other potential benefit of sewerage is that it can enable more intensive future housing development. This is the case for the sewerage proposal for Talbot which is identified as a priority in Chapter 4.4.

The other main opportunities for sewered development in the Central Goldfields Shire are the edges of Maryborough and Carisbrook, and to a lesser extent, Dunolly, which are the areas identified as most likely to experience growth in the short term. It is also usually easier to expand an existing sewerage system than to create a new system.

Under the DWMP, the Council will establish and maintain clear servicing advice from Coliban Water and Central Highlands Water and advice regarding industrial buffers from the EPA. This will inform the identification of suitable expansion areas, including consideration of any opportunities to rezone Low-Density Residential and other land for higher density developments.

This is an ongoing task. Council may set up an annual meeting schedule between Planning and Water Corporations to discuss any concerns.

Action 17: Monitor development trends and maintain clear understanding between Council and Coliban Water / Central Highlands Water on which land can be sewered to identify suitable expansion areas.

6 Sewered areas

6.1 INTRODUCTION

In densely developed areas, onsite systems may not be able to sustain the effective management of wastewater and provision of sewerage may be required. Sewerage systems significantly reduce the health and environmental risks compared with onsite wastewater systems.

Under the Planning Scheme, premises should be connected to the sewer whenever it is available (e.g. Clause 32.03-1). Sound understanding of the sewer network, and effective communication between Central Goldfields Shire Council and the relevant urban water corporations is essential for reducing current and potential future domestic wastewater risks in these areas.

6.2 EXISTING ONSITE SYSTEMS IN SEWERED AREAS

There are limited records on the operation of existing onsite systems within sewered areas in the Central Goldfields Shire. Premises with failed or high-risk onsite systems in sewered areas should be connected to sewerage as a priority. EPA regulations and agency powers provide a framework for the connection process.

Council facilitates the decommissioning of onsite systems in sewered areas by ensuring owners connect to sewer wherever feasible. Upgrades to onsite systems in these areas should be actively discouraged by not issuing permits for onsite wastewater systems and transferring applicants to Coliban Water or Central Highlands Water for provision of sewerage connection.

Existing systems in sewered areas are assessed on a case by case basis however it is assumed that they will be medium risk Table 3-1 so Council will prioritise the location of these systems and enter them into the database of existing systems (see Action 3).

Where onsite systems in sewered areas comply with EPA regulation, the urgency for facilitating connection is not as great. These systems can be resolved over time through opportunistic connection aligned with sewer connections to new neighbouring properties.

There may be some dwellings on the outskirts of sewered towns not connected to mains sewer. Educational campaigns may also bring attention to this requirement.

Action 18: Identify through development of the OWMS Database whether any high-risk onsite systems occur within sewered areas and facilitate connection to sewerage as a priority.

6.3 FUTURE HOUSES IN SEWERED AREAS

New dwellings constructed inside declared sewered districts are required to connect to the reticulated sewer network unless connection is proven non-feasible to Council and the relevant water corporation. This also applies to development on the fringe of sewered areas, where the sewer is readily available.

Clear understanding needs to be established and maintained between sewerage planning engineers at Coliban Water and Central Highlands Water and town planners at Central Goldfields Shire Council about which land can be sewered. As such, it should be rare for any new houses to be installed in these areas without connecting to sewer. Generally, this risk is self-regulated because land developers recognise access to reticulated sewerage services as incentive to develop land into small sewered parcels.

7 Implementing the DWMP

7.1 RESOURCING

This plan is written in a way that makes the implementation part of normal planning, health and environmental routines. Where additional resources are required for actions related to programs and studies, these have been costed and may require extra resources or funding.

Resource allocation and budgeting will be required for the following tasks:

- OWMS Database - Provision of Admin Support to the EHO. Budget requirements of the appointment of staff if hiring new personnel.
- Targeted Inspection Program – Provision of additional staff to assist in the Targeted Inspections.
- Education campaign - Allocation of existing council resources (staff and website) to develop factsheets, website information. Staff may also be required to work 3-6 weekend days over a 3-6 month period to participate in local events to conduct educational sessions regarding OWMS management. Some budget allocation will be required to pay for additional salaries/payments, hiring display materials gazebos, posters, etc. Staff allocation will be required to conduct targeted mail-outs and phone calls for surveillance purposes.
- Community consultation - Council staff and resources will also be required for community consultation of the DWMP before adoption.

Estimated costs for implementing the plan are approximately $65,000 as set out in Appendix 4.

7.2 REVIEW AND UPDATE

Council recognises the importance of monitoring and evaluating this DWMP for continuous improvement. Periodic review and improvement of this DWMP, will be undertaken including:

- Annual review of the action plan. Based on annual review, determine priorities for implementation and recommend to Council for consideration via the regular budget process
- Three-year (mid-term) report to Council and stakeholders on progress, including results of monitoring program.
- A full review of the DWMP (including independent audit) five years after its adoption by Council.

Council will report back to the community on the implementation of the DWMP via the website.

Action 19: Undertake annual review of the DWMP action plan.

Action 20: Undertake an independent audit of the implementation three years after adoption by Council.

Action 21: Undertake a full review of this DWMP, including the spatial risk assessment, five years after its adoption by Council.

8 Action plan

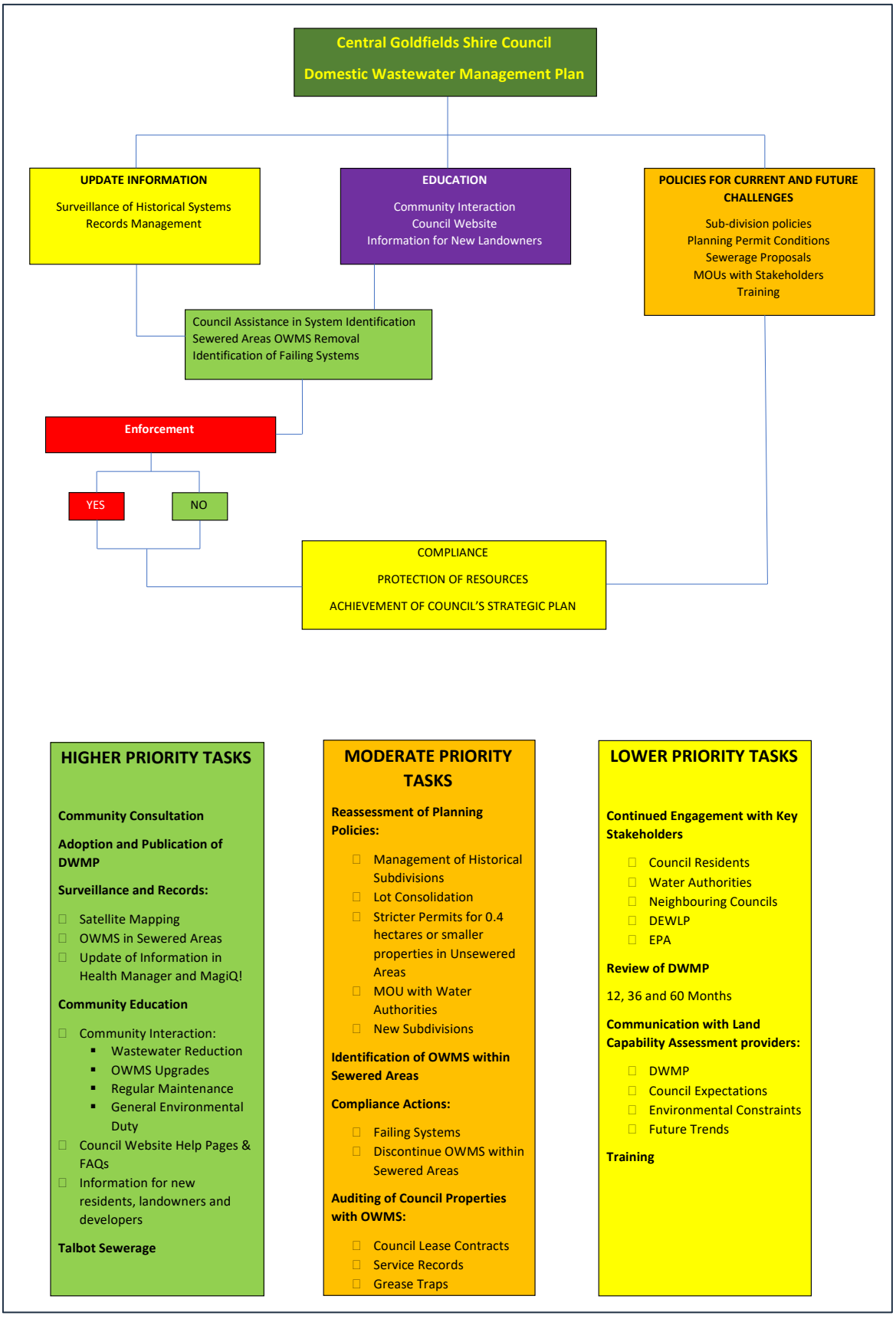

Figure 8-1 Action Plan Overview

Table 8-1: Central Goldfields Shire Council DWMP Action Plan

ACTION	PRIORITY	TIMING
Action 1: Continue to engage with key stakeholders including: ▪ Collaborate with Central Highlands Water and Coliban Water on the coverage of existing and possible expansion of sewer networks, and on approval referrals processes for OWMS. ▪ Share knowledge across agencies to improve information on the location of existing OWMS, share resources and implementation capacity and advocate for improvements to state-wide domestic wastewater management frameworks.	LOW	Ongoing since August 2023
Action 2: Review and refine the risk assessment at least every five years (prior to DWMP review), to incorporate improved datasets (such as location and density of existing OWMS) and changing circumstances.	LOW	2028
Action 3: Develop, populate, maintain, an OWMS Database and utilise it for improved management of existing systems and an information system for storing details of new systems as they are installed.	HIGH	First Quarter 2024
Action 5: Design and implement a targeted inspection program, targeting a substantial number of onsite wastewater systems in high-risk areas each year [resourcing dependent, yearly inspection numbers to be determined after completion of Action 3]. **Action 4**: Design and implement a targeted inspection program, targeting onsite wastewater systems in high-risk areas each year [resourcing dependent, inspection numbers to be confirmed after completion of Action 3]. **Action 5**: Use compliance and enforcement tools as appropriate within statutory powers to respond to inspection findings and record in the onsite system database.	HIGH	Second Quarter 2024
Action 6: Hasten the progress of a decision in relation to Talbot sewer investigations with Central Highlands Water to ensure health, environmental and town planning risks can be either mitigated with sewerage as soon as possible, or long-term planning for non-sewered development can be confidently pursued.	HIGH	Ongoing since June 2023
Action 7: Work with existing landowners on small lots to educate them in OWMS management, wastewater reduction and adoption of a higher quality effluent systems.	HIGH	Last Quarter 2023 – First Quarter 2024
Action 8: Continue to provide community education via the Council web page on the correct operation and maintenance of onsite wastewater systems, as well as water conservation.	HIGH	
Action 9: Publish the endorsed Domestic Wastewater Management Plan on the Central Goldfields Shire website.	HIGH	Completed
Action 10: Alert new buyers to the existence of onsite systems and the associated wastewater management requirements through a new buyer 'Welcome Pack' or targeted website campaign.	HIGH	Initiate Last Quarter 2023 and

ACTION	PRIORITY	TIMING
		then ongoing
Action 11: Conduct an audit of Council owned properties reliant on OWMS.	MODERATE	First Quarter 2024
Action 12: Avoid poorly conceived new OWMS through the implementation of sound internal approvals processes for new dwellings and small lot subdivisions.	MODERATE	Ongoing
Action 13: Communicate the risk-based approach for LCAs under this DWMP directly with land capability assessors.	LOW	Last Quarter 2023
Action14: Verify LCA providers listed by Council on its website and continue to assess the quality of LCAs received.	LOW	Last Quarter 2023
Action 15: Work with neighbouring municipalities and the Loddon Mallee Community of Practice to establish regular knowledge sharing and training events for EHOs and land capability assessors.	LOW	Ongoing
Action 16: Continue to build strong referral processes between Council's Planning and Environmental Health teams for rezoning or subdivision proposals that would create lots smaller than 1.0 ha in unsewered areas.	MODERATE	Ongoing
Action 17: Monitor development trends and maintain clear understanding between Council and Coliban Water / Central Highlands Water on which land can be sewered to identify suitable expansion areas.	LOW	Ongoing
Action 18: Identify through development of the OWMS Database whether any high-risk onsite systems occur within sewered areas and facilitate connection to sewerage as a priority.	MODERATE	First Quarter 2024
Action 19: Undertake annual review of the DWMP action plan.	LOW	Last Quarter 2024
Action 20: Undertake an independent audit of the implementation three years after adoption by Council.	LOW	Last Quarter 2026
Action 21: Undertake a full review of this DWMP, including the spatial risk assessment, five years after its adoption by Council.	LOW	1st Quarter 2029

References

Department of Sustainability and Environment, 2012, Planning permit applications in open, potable water supply catchment areas: November 2012. Victorian Government, East Melbourne, Victoria.

Central Goldfields Shire Council, 2006, Central Goldfields Shire Council: Domestic Wastewater Management Plan: September 2006. Prepared for Central Goldfields Shire Council by Halcrow Pacific Pty Ltd, Melbourne, Victoria.

Municipal Association of Victoria, 2014, Mansfield Shire DWMP Pilot Project.

Appendix 1: Preliminary Risk Mapping

Introduction

A preliminary risk mapping exercise was undertaken as part of the development of this DWMP and has been used to support the actions and implementation of the DWMP.

There are more sophisticated approaches that could be implemented if Council has the resources and if the findings from the three-year and five-year review support further refinement of the risk assessment.

This Appendix explains the methodology followed and presents the results of the preliminary risk mapping.

Method – Risk Factors Mapped

Three risk factors were identified and combined spatially to arrive at an overall risk. The three risk factors and the way that they have been combined is shown in Figure A1-1.

More details of each risk factor are presented on the following pages.

Development	Soil	Water	Combined
H	H	H	H
H	H	L	H
H	H	M	H
H	L	H	H
H	L	L	M
H	L	M	M
H	M	H	H
H	M	L	M
H	M	M	H
L	All	All	L
M	H	H	H
M	H	L	M
M	H	M	H
M	L	H	M
M	L	L	L
M	L	M	M
M	M	H	H
M	M	L	M
M	M	M	M

Figure A1-1: Combination of three main risk factors

Development Risk Factor

The development risk factor used the Planning Zone maps as follows:

- Township Zone is considered High Risk
- Rural Living Zone and Low Density Residential Zone were considered Medium Risk

Soil Risk Factor

The best soils information available for the Central Goldfields LGA is land systems mapping for the Loddon and Avoca catchments. This data set is useful for OWMS risk mapping because it accounts both for the underlying soils and the topography of the land, both of which are relevant.

Further information about the data sets is available at the following links.

- http://vro.agriculture.vic.gov.au/dpi/vro/nthcenregn.nsf/pages/nthcen_landform_geo_loddon_land
- http://vro.agriculture.vic.gov.au/dpi/vro/nthcenregn.nsf/pages/nthcen_landform_avoca_river

RMCG coded the risk of each land system as explained in Figure A1-2.

Proximity to Water Environments Risk Factor

Three data sets were combined to develop a risk associated with proximity to water environments.

- Groundwater – Visualising Victoria's Groundwater (https://www.vvg.org.au) maps the quality and depth of groundwater across Victoria. Shallow good quality water is at greater risk to OWMS than deep poor-quality water. Figure A1-3 summarises the classification used for groundwater risk in this spatial risk assessment.
- Distance to a water course – The Victorian Government has digital maps of water courses across Victoria (https://discover.data.vic.gov.au/dataset/watercourse-network-1-25000-vicmap-hydro). For this spatial risk assessment, land closer than 30 m to a watercourse has been mapped High Risk and between 30 and 100 m from a watercourse is considered Moderate Risk.
- Flood Overlays – the land subject to inundation overlay was used as a third water-related spatial layer.

The three water related data sets were combined as follows:

- <5m Depth and <1000mg/L TDS, or <30m from a watercourse, or In LSIO = High Risk
- 5-10m Depth and <1000mg/L TDS, or <5m Depth and 1000-3500mg/L TDS, or 30-60m from a watercourse, and Not in LSIO = Medium Risk.

Preliminary Risk Mapping

The sequence of twelve maps shown on the following pages provides the results of the preliminary spatial risk assessment. The data layers have been made available and can be incorporated into Council's GIS system.

While the preliminary work is useful for this DWMP, in future (once the OWMS Database has been developed) this risk mapping can be refined by adding in the density of existing onsite systems as a fourth dimension to the analysis.

LANDUNIT	ASC_OSO	Risk Rating RMCG	SURVEY	LU_CODE	Soil Description
C	SOAA	High	EastWimmera	EastWimmera_C	The main soils included in this association are the hard alkaline red, yellow and mottled-yellow duplex soils.
BR	RUCY	High	Avoca	Avoca_BR	shallow stony uniform loam
BR	RUCY	High	Avoca	Avoca_BR	shallow stony uniform loam
Ce	KUAB	Medium	Avoca	Avoca_Ce	mottled reddish yellow duplex
Ce	KUAB	Medium	Avoca	Avoca_Ce	mottled reddish yellow duplex
Ce	KUAB	Medium	Avoca	Avoca_Ce	mottled reddish yellow duplex
De	SOAA	High	Avoca	Avoca_De	red sodic duplex
EB	TEDS	High	LoddonRiver	LoddonRiver_EB	Shallow stony red or brown soils predominate; they are frequently reddish brown structured uniform loams on the steeper slopes, containing abundant stone, but better-developed and deeper red-reddish brown gradational soils on the gentler slopes; shallow, dark, well-structured uniform clay soils occur in the north, and deeper alluvial soils on the occasional alluvial flats
EB	TEDS	High	LoddonRiver	LoddonRiver_EB	Shallow stony red or brown soils predominate; they are frequently reddish brown structured uniform loams on the steeper slopes, containing abundant stone, but better-developed and deeper red-reddish brown gradational soils on the gentler slopes; shallow, dark, well-structured uniform clay soils occur in the north, and deeper alluvial soils on the occasional alluvial flats
L/HrS	TEDS	High	LoddonRiver	LoddonRiver_L/HrS	Uniform stony loam soils dominating the steeper slopes and sharper crests are shallow, contain copious quantities of fragmented stone, and have loamy textures
L/HrS	TEDS	High	LoddonRiver	LoddonRiver_L/HrS	Uniform stony loam soils dominating the steeper slopes and sharper crests are shallow, contain copious quantities of fragmented stone, and have loamy textures
L/HrS	TEDS	High	LoddonRiver	LoddonRiver_L/HrS	Uniform stony loam soils dominating the steeper slopes and sharper crests are shallow, contain copious quantities of fragmented stone, and have loamy textures
L/HrS	TEDS	High	LoddonRiver	LoddonRiver_L/HrS	Uniform stony loam soils dominating the steeper slopes and sharper crests are shallow, contain copious quantities of fragmented stone, and have loamy textures
L/HrS	TEDS	High	LoddonRiver	LoddonRiver_L/HrS	Uniform stony loam soils dominating the steeper slopes and sharper crests are shallow, contain copious quantities of fragmented stone, and have loamy textures
L/HrS	TEDS	High	LoddonRiver	LoddonRiver_L/HrS	Uniform stony loam soils dominating the steeper slopes and sharper crests are shallow, contain copious quantities of fragmented stone, and have loamy textures
L/HrS	TEDS	High	LoddonRiver	LoddonRiver_L/HrS	Uniform stony loam soils dominating the steeper slopes and sharper crests are shallow, contain copious quantities of fragmented stone, and have loamy textures
L/HrS	TEDS	High	LoddonRiver	LoddonRiver_L/HrS	Uniform stony loam soils dominating the steeper slopes and sharper crests are shallow, contain copious quantities of fragmented stone, and have loamy textures
VB	FEAA	Low	LoddonRiver	LoddonRiver_VB	Red or occasionally brown gradational soils, typically strongly structured, non-mottled with silty loam-clay loam surface textures and clayey subsoils
VB	FEAA	Low	LoddonRiver	LoddonRiver_VB	Red or occasionally brown gradational soils, typically strongly structured, non-mottled with silty loam-clay loam surface textures and clayey subsoils
SH	RUCY	High	Avoca	Avoca_SH	shallow stony uniform loam
SH	RUCY	High	Avoca	Avoca_SH	shallow stony uniform loam
RgT	RUCY	Medium	LoddonRiver	LoddonRiver_RgT	Uniform sands predominate, usually with an apedal grey or brown sand or loamy sand topsoil and frequently including a pale or bleached A2 horizon overlying a cemented sandy or gravelly C horizon
RgT	RUCY	Medium	LoddonRiver	LoddonRiver_RgT	Uniform sands predominate, usually with an apedal grey or brown sand or loamy sand topsoil and frequently including a pale or bleached A2 horizon overlying a cemented sandy or gravelly C horizon
RgT	RUCY	Medium	LoddonRiver	LoddonRiver_RgT	Uniform sands predominate, usually with an apedal grey or brown sand or loamy sand topsoil and frequently including a pale or bleached A2 horizon overlying a cemented sandy or gravelly C horizon
Rr	SOAA	High	Avoca	Avoca_Rr	reddish brown calcareous sodic duplex
Rr	SOAA	High	Avoca	Avoca_Rr	reddish brown calcareous sodic duplex
RgT	RUCY	Medium	LoddonRiver	LoddonRiver_RgT	Uniform sands predominate, usually with an apedal grey or brown sand or loamy sand topsoil and frequently including a pale or bleached A2 horizon overlying a cemented sandy or gravelly C horizon
PgB2	FEAA	Low	LoddonRiver	LoddonRiver_PgB2	Structured red gradational soils occur on the better- drained broad crests and slopes
PgB2	SOAA	Medium	LoddonRiver	LoddonRiver_PgB2	Red duplex soils occur in conjunction with the red gradational soils on the better-drained parts of the plain
PgB3	VEAB	Medium	LoddonRiver	LoddonRiver_PgB3	Uniform cracking clay soils common, especially on the flatter parts of the plain
PgB3	VEAB	Medium	LoddonRiver	LoddonRiver_PgB3	Uniform cracking clay soils common, especially on the flatter parts of the plain
PgB5	VEAD	High	LoddonRiver	LoddonRiver_PgB5	Grey, or less commonly brown, calcareous cracking clay soils predominate
PgB5	VEAD	High	LoddonRiver	LoddonRiver_PgB5	Grey, or less commonly brown, calcareous cracking clay soils predominate
PgB5	VEAD	High	LoddonRiver	LoddonRiver_PgB5	Grey, or less commonly brown, calcareous cracking clay soils predominate
PgB5	VEAD	High	LoddonRiver	LoddonRiver_PgB5	Grey, or less commonly brown, calcareous cracking clay soils predominate
PgB5	VEAD	High	LoddonRiver	LoddonRiver_PgB5	Grey, or less commonly brown, calcareous cracking clay soils predominate
Rg/uS1	SOAA	High	LoddonRiver	LoddonRiver_Rg/uS1	Red duplex soils on the gentle slopes and crests, with loamy, poorly structured, hardsetting topsoils that frequently contain fragments of sedimentary rock; subsoils are coarsely structured, acidic to neutral and sometimes mottled; the soils are usually less than 1 m deep, and overlie fractured and frequently weathered bedrock. Yellow to brown mottled sodic duplex soils on the lower slopes and in depressions which are essentially poorer-drained variants of the red duplex soils.
Rg/uS1	SOAA	High	LoddonRiver	LoddonRiver_Rg/uS1	Red duplex soils on the gentle slopes and crests, with loamy, poorly structured, hardsetting topsoils that frequently contain fragments of sedimentary rock; subsoils are coarsely structured, acidic to neutral and sometimes mottled; the soils are usually less than 1 m deep, and overlie fractured and frequently weathered bedrock. Yellow to brown mottled sodic duplex soils on the lower slopes and in depressions which are essentially poorer-drained variants of the red duplex soils.
Rg/uS1	SOAA	High	LoddonRiver	LoddonRiver_Rg/uS1	Red duplex soils on the gentle slopes and crests, with loamy, poorly structured, hardsetting topsoils that frequently contain fragments of sedimentary rock; subsoils are coarsely structured, acidic to neutral and sometimes mottled; the soils are usually less than 1 m deep, and overlie fractured and frequently weathered bedrock. Yellow to brown mottled sodic duplex soils on the lower slopes and in depressions which are essentially poorer-drained variants of the red duplex soils.
Rg/uS1	SOAA	High	LoddonRiver	LoddonRiver_Rg/uS1	Red duplex soils on the gentle slopes and crests, with loamy, poorly structured, hardsetting topsoils that frequently contain fragments of sedimentary rock; subsoils are coarsely structured, acidic to neutral and sometimes mottled; the soils are usually less than 1 m deep, and overlie fractured and frequently weathered bedrock. Yellow to brown mottled sodic duplex soils on the lower slopes and in depressions which are essentially poorer-drained variants of the red duplex soils.
Rg/uS1	SOAA	High	LoddonRiver	LoddonRiver_Rg/uS1	Red duplex soils on the gentle slopes and crests, with loamy, poorly structured, hardsetting topsoils that frequently contain fragments of sedimentary rock; subsoils are coarsely structured, acidic to neutral and sometimes mottled; the soils are usually less than 1 m deep, and overlie fractured and frequently weathered bedrock. Yellow to brown mottled sodic duplex soils on the lower slopes and in depressions which are essentially poorer-drained variants of the red duplex soils.
Rg/uS1	SOAA	High	LoddonRiver	LoddonRiver_Rg/uS1	Red duplex soils on the gentle slopes and crests, with loamy, poorly structured, hardsetting topsoils that frequently contain fragments of sedimentary rock; subsoils are coarsely structured, acidic to neutral and sometimes mottled; the soils are usually less than 1 m deep, and overlie fractured and frequently weathered bedrock. Yellow to brown mottled sodic duplex soils on the lower slopes and in depressions which are essentially poorer-drained variants of the red duplex soils.
Rg/uS2	SOAC	High	LoddonRiver	LoddonRiver_Rg/uS2	Mottled or whole-coloured yellow-brown duplex soils, frequently with red subsoils; a pale or bleached A2, especially on the lower slopes and depressions
PgB5	VEAD	High	LoddonRiver	LoddonRiver_PgB5	Grey, or less commonly brown, calcareous cracking clay soils predominate
RgB3	DEAB	Medium	LoddonRiver	LoddonRiver_RgB3	Stony red, or less commonly brown, gradational soils in all landscape positions – frequently shallow, with numerous fragments of basalt throughout; only in flatter areas, such as limited area to the north of Holcombe Hill or on the colluvial slopes near Mount Franklin, do they become deep enough for cropping: these soils are well drained, well structured, and usually acidic throughout
RgB3	DEAB	Medium	LoddonRiver	LoddonRiver_RgB3	Stony red, or less commonly brown, gradational soils in all landscape positions – frequently shallow, with numerous fragments of basalt throughout; only in flatter areas, such as limited area to the north of Holcombe Hill or on the colluvial slopes near Mount Franklin, do they become deep enough for cropping: these soils are well drained, well structured, and usually acidic throughout
RgC	SOAA	Medium	LoddonRiver	LoddonRiver_RgC	Moderately deep non-mottled red duplex soils predominate: adjacent to the metamorphic hills, the topsoils are shallow, stony, brown and loamy, but on the lower slopes they become deeper and may have a pale A2 with colluvial stone fragments
RgC	SOAA	Medium	LoddonRiver	LoddonRiver_RgC	Moderately deep non-mottled red duplex soils predominate: adjacent to the metamorphic hills, the topsoils are shallow, stony, brown and loamy, but on the lower slopes they become deeper and may have a pale A2 with colluvial stone fragments
RgC	SOAA	Medium	LoddonRiver	LoddonRiver_RgC	Moderately deep non-mottled red duplex soils predominate: adjacent to the metamorphic hills, the topsoils are shallow, stony, brown and loamy, but on the lower slopes they become deeper and may have a pale A2 with colluvial stone fragments
LrS1	RUCY	High	LoddonRiver	LoddonRiver_LrS1	Yellowish brown soils of gradational texture trend, usually shallow (commonly less than 0.5 m deep), contain fragments of bedrock throughout the profile; topsoils are loamy and the thin A2 horizons are pale or bleached; subsoils are acidic to neutral
LrS1	RUCY	High	LoddonRiver	LoddonRiver_LrS1	Yellowish brown soils of gradational texture trend, usually shallow (commonly less than 0.5 m deep), contain fragments of bedrock throughout the profile; topsoils are loamy and the thin A2 horizons are pale or bleached; subsoils are acidic to neutral
LrS1	RUCY	High	LoddonRiver	LoddonRiver_LrS1	Yellowish brown soils of gradational texture trend, usually shallow (commonly less than 0.5 m deep), contain fragments of bedrock throughout the profile; topsoils are loamy and the thin A2 horizons are pale or bleached; subsoils are acidic to neutral
RgB3	DEAB	Medium	LoddonRiver	LoddonRiver_RgB3	Stony red, or less commonly brown, gradational soils in all landscape positions – frequently shallow, with numerous fragments of basalt throughout; only in flatter areas, such as limited area to the north of Holcombe Hill or on the colluvial slopes near Mount Franklin, do they become deep enough for cropping: these soils are well drained, well structured, and usually acidic throughout
RgB3	DEAB	Medium	LoddonRiver	LoddonRiver_RgB3	Stony red, or less commonly brown, gradational soils in all landscape positions – frequently shallow, with numerous fragments of basalt throughout; only in flatter areas, such as limited area to the north of Holcombe Hill or on the colluvial slopes near Mount Franklin, do they become deep enough for cropping: these soils are well drained, well structured, and usually acidic throughout
RgB3	DEAB	Medium	LoddonRiver	LoddonRiver_RgB3	Stony red, or less commonly brown, gradational soils in all landscape positions – frequently shallow, with numerous fragments of basalt throughout; only in flatter areas, such as limited area to the north of Holcombe Hill or on the colluvial slopes near Mount Franklin, do they become deep enough for cropping: these soils are well drained, well structured, and usually acidic throughout
RgB3	DEAB	Medium	LoddonRiver	LoddonRiver_RgB3	Stony red, or less commonly brown, gradational soils in all landscape positions – frequently shallow, with numerous fragments of basalt throughout; only in flatter areas, such as limited area to the north of Holcombe Hill or on the colluvial slopes near Mount Franklin, do they become deep enough for cropping: these soils are well drained, well structured, and usually acidic throughout
RgB3	DEAB	Medium	LoddonRiver	LoddonRiver_RgB3	Stony red, or less commonly brown, gradational soils in all landscape positions – frequently shallow, with numerous fragments of basalt throughout; only in flatter areas, such as limited area to the north of Holcombe Hill or on the colluvial slopes near Mount Franklin, do they become deep enough for cropping: these soils are well drained, well structured, and usually acidic throughout
NY	SOAA	High	Avoca	Avoca_NY	red calcareous sodic duplex soils
LSYS250_RsP4-2	RUCY	Medium	LSYS250	LSYS250_RsP4-2	
Rg/uG1	SOAA	High	LoddonRiver	LoddonRiver_Rg/uG1	Red duplex soils, with a non-mottled acidic to neutral red subsoil and a bleached A2 horizon, usually overlying a siliceous hardpan at 0.5-1.5 m below the surface; surface textures are sandy loams
Rg/uG2	KUAC	Medium	LoddonRiver	LoddonRiver_Rg/uG2	Yellow-grey duplex soils; the frequently hard-setting topsoils usually moderately deep (greater than 20 cm) and sandy, with a well-developed pale to bleached A2 horizon; the mottled yellow-grey subsoils have sandy clay textures and are weakly to moderately well structured; subsoils acidic to neutral
Lu/rS	CHAB	Low	LoddonRiver	LoddonRiver_Lu/rS	Yellow duplex soils with red brown mottled, especially on the gentler slopes and in depressions; the brown and loamy topsoils, with A2 horizons that may be pale, sporadically bleached or bleached, may contain some buckshot or stone fragments; the subsoils are usually acidic or neutral and overlie weathering Ordovician parent material, varying in depth from 0.5 to 1.5 m
PlA6	VEAD	Medium	LoddonRiver	LoddonRiver_PlA6	Grey calcareous clay soils are most common, usually deep well structured and often with carbonate nodules in the subsoil; a dark-grey loam topsoil may overlie the clay in some areas
Wa	SOAA	High	Avoca	Avoca_Wa	red sodic duplex, coarsely structured
Wa	SOAA	High	Avoca	Avoca_Wa	red sodic duplex, coarsely structured
Wk	VEAE	High	Avoca	Avoca_Wk	grey calcareous sodic uniform clay
Pl/gA	CHAA	Medium	LoddonRiver	LoddonRiver_Pl/gA	Whole-coloured red duplex soils predominate, with mottled-yellow duplex soils occurring less frequently
Pl/gA	CHAA	Medium	LoddonRiver	LoddonRiver_Pl/gA	Whole-coloured red duplex soils predominate, with mottled-yellow duplex soils occurring less frequently
VB	FEAA	Low	LoddonRiver	LoddonRiver_VB	Red or occasionally brown gradational soils, typically strongly structured, non-mottled with silty loam-clay loam surface textures and clayey subsoils
VB	FEAA	Low	LoddonRiver	LoddonRiver_VB	Red or occasionally brown gradational soils, typically strongly structured, non-mottled with silty loam-clay loam surface textures and clayey subsoils
VB	FEAA	Low	LoddonRiver	LoddonRiver_VB	Red or occasionally brown gradational soils, typically strongly structured, non-mottled with silty loam-clay loam surface textures and clayey subsoils
VB	FEAA	Low	LoddonRiver	LoddonRiver_VB	Red or occasionally brown gradational soils, typically strongly structured, non-mottled with silty loam-clay loam surface textures and clayey subsoils
VB	FEAA	Low	LoddonRiver	LoddonRiver_VB	Red or occasionally brown gradational soils, typically strongly structured, non-mottled with silty loam-clay loam surface textures and clayey subsoils
VB	FEAA	Low	LoddonRiver	LoddonRiver_VB	Red or occasionally brown gradational soils, typically strongly structured, non-mottled with silty loam-clay loam surface textures and clayey subsoils
PgB2	FEAA	Low	LoddonRiver	LoddonRiver_PgB2	Structured red gradational soils occur on the better- drained broad crests and slopes
PgB2	FEAA	Low	LoddonRiver	LoddonRiver_PgB2	Structured red gradational soils occur on the better- drained broad crests and slopes
X	NA	Blank	LoddonRiver	LoddonRiver_X	Probably a lake or reservoir?
X	NA	Blank	LoddonRiver	LoddonRiver_X	Probably a lake or reservoir?
X	NA	Blank	LoddonRiver	LoddonRiver_X	Probably a lake or reservoir?

Figure A2-1: Land System Risk Classification

Salinity	Salinity range	DN	Depth range	Risk RMCG
500	<500 mg/L	5	< 5m	High
1000	500 -1,000 mg/L	5	< 5m	High
3500	1,000 -3,500 mg/L	5	< 5m	Medium
7000	3,500 - 7,000 mg/L	5	< 5m	Low
13000	>7,000 mg/L	5	< 5m	Low
500	<500 mg/L	10	5 - 10 m	Medium
1000	500 -1,000 mg/L	10	5 - 10 m	Medium
3500	1,000 -3,500 mg/L	10	5 - 10 m	Low
7000	3,500 - 7,000 mg/L	10	5 - 10 m	Low
13000	>7,000 mg/L	10	5 - 10 m	Low
500	<500 mg/L	20	> 10m	Medium
1000	500 -1,000 mg/L	20	> 10m	Low
3500	1,000 -3,500 mg/L	20	> 10m	Low
7000	3,500 - 7,000 mg/L	20	> 10m	Low
13000	>7,000 mg/L	20	> 10m	Low
500	<500 mg/L	50	> 10m	Low
1000	500 -1,000 mg/L	50	> 10m	Low
3500	1,000 -3,500 mg/L	50	> 10m	Low
7000	3,500 - 7,000 mg/L	50	> 10m	Low
13000	>7,000 mg/L	50	> 10m	Low
500	<500 mg/L	100	> 10m	Low
1000	500 -1,000 mg/L	100	> 10m	Low
3500	1,000 -3,500 mg/L	100	> 10m	Low
7000	3,500 - 7,000 mg/L	100	> 10m	Low
13000	>7,000 mg/L	100	> 10m	Low

Figure A1-3: Groundwater Risk Classification

Appendix 2: Wastewater Design Flow Allowances

Table A2-1 provides the daily flow rates per person associated with various combinations of water supply and types of fixtures. Figures were derived from AS/NZS 1547:2012.

The Australian Standard recommends an allowance of 25% extra domestic wastewater flow be made for residential premises connected to reticulated water supplies. There is evidence that houses with access to reticulated water use more water compared to those reliant on onsite rainwater tank supplies. A number of the unsewered townships across the Central Goldfields Shire have access to potable water supplies so the implications for domestic wastewater management have been addressed in this plan.

Table A2-1: Typical Domestic Wastewater Design Flow Allowances (L/day per person)

	RETICULATED WATER SUPPLY[5]	ONSITE WATER TANK SUPPLY
All wastewater (standard water fixtures)	180	150
All wastewater (water saving fixtures)	150	120

Volume of wastewater produced is proportional to the number of household occupants. EPA regulations use the number of bedrooms within a house as a measure of the number of occupants. A house with fewer bedrooms is likely to produce less wastewater and therefore require a smaller area for treated wastewater application. To calculate total wastewater flow rates, multiply the figures in the table above by the number of bedrooms plus 1. For instance, a four-bedroom house with town water supply and standard water fixtures is expected to house five people, and so produce 900 L/day (180 L/person/day multiplied by 5).

Note that the organic loading rate must be considered as well as the hydraulic flow rate when designing onsite wastewater management systems. The organic loading rate does not change in response to the use of water saving fixtures.

It is recommended that the message about the importance of conservative household water use is incorporated into all communication and education programs related to onsite wastewater systems. Refer to Section 4.6 for further discussion.

Appendix 3: Meeting Ministerial Guidelines (2012) requirements for DWMPs

Table A3-1: Requirements for DWMPs as a basis for relaxation of density limits set out in Ministerial Guidelines for planning permit applications in open, portable water supply catchment areas.

[5] Includes reticulated town water supply, groundwater bores and/or stock and domestic waterway diversion licences (where connected to household use).

REQUIREMENTS	HOW THIS DWMP MEETS THE REQUIREMENTS
The DWMP must be prepared or reviewed in consultation with all relevant stakeholders including other local governments who share the water supply catchment, EPA Victoria and local water corporations.	Refer to Chapter 1.7 and 7 for stakeholder engagement and implementation plan. GMW are involved in the development and review of this plan. Council will continue to engage GMW in ensuring the agreed action plan is carried out and adapted where required.
The DWMP must comprise a strategy, including timelines and priorities to: ▪ Prevent discharge of wastewater beyond property boundaries and ▪ Prevent individual and cumulative impacts on groundwater and surface water beneficial uses.	Refer to Chapter 7 for strategy and timelines for implementation. The plan includes a compliance program and risk assessment that considers impacts to surface and ground water.
The DWMP must provide for:	
▪ The effective monitoring of the condition and management of onsite treatment systems, including but not limited to compliance by permit holders with permit conditions and the Code.	Refer to Chapter 4.2 and 4.3 for proposed database and program for existing onsite systems.
▪ The results of monitoring being provided to stakeholders as agreed by the relevant stakeholders.	Refer to 4.3 for program for existing onsite systems.
▪ Enforcement action where non-compliance is identified.	Refer to 4.3 for program for existing onsite systems.
▪ A process of review and updating (if necessary) of the DWMP every 5 years.	Refer to Chapter 7 for review of DWMP.
▪ Independent audit by an accredited auditor (water corporation approved) of implementation of the DWMP, including of monitoring and enforcement, every 3 years.	Refer to Chapter 7 for audit of DWMP.
▪ The results of audit being provided to stakeholders as soon as possible after the relevant assessment.	Refer to Chapter 7 for audit of DWMP.
▪ Councils are required to demonstrate that suitable resourcing for implementation, including monitoring, enforcement, review, and audit, is in place.	Refer to Chapter 7 for implementation plan.