CITY OF GREATER BENDIGO

# Domestic Wastewater Management Strategy

2014-15

CITY OF GREATER BENDIGO

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## List of Acronyms

| | |
|---|---|
| **COGB** | City of Greater Bendigo |
| **DWMP** | Domestic Wastewater Management Plan |
| **DWMS** | Domestic Wastewater Management Strategy |
| **EHO** | Environmental Health Officer |
| **EPA** | Environment Protection Authority |
| **ESO** | Environmental Significance Overlay |
| **EVH & LL** | Environmental Health and Local Laws |
| **GIS** | Geospatial Information System |
| **GPS** | Global Positioning System |
| **LCA** | Land Capability Assessment |
| **LCM&AT** | Land Capability Mapping and Assessment Tool |
| **LPED** | Low Pressure Effluent Distribution (a type of onsite wastewater disposal system) |
| **MAV** | Municipal Association of Victoria |
| **OWMS** | Onsite Wastewater Management System |
| **PIC** | Plumbing Industry Commission |
| **PTP** | Packaged Treatment Plant (generally a secondary treatment system) |
| **SEPP** | State Environment Protection Policy |
| **SMO** | Salinity Management Overlay |
| **STED** | Septic Tank Effluent Drainage (a type of hybrid sewer system) |
| **SWSC** | Special Water Supply Catchment |
| **VPO** | Vegetation Protection Overlay |

## Purpose and Scope

This strategy is a guide to the City of Greater Bendigo and its partners in improving onsite wastewater management across the Greater Bendigo municipality. This strategy has been developed with the vision of protecting our drinking water, our community, and our environments from wastewater pollution. Drinking water and sewerage provision is beyond the scope of this strategy, and is a matter for management by the relevant water corporation. Instead, the focus remains on domestic wastewater management systems designed for daily wastewater flows of 5000 litres or less.

The strategy identifies a number of actions for the City of Greater Bendigo to undertake in improving wastewater management. Some of the actions involve the partnership of other stakeholders, particularly in developing minimum standards for the industry, yet most actions are the responsibility of the Environmental Health Department, Statutory Planning, and the Strategic Planning Unit .

Most actions presented in the strategy fall within three major focus points for achieving the overall goal:

- Reducing the negative impacts of offsite discharge is fundamental to improving wastewater management.
- Keeping a watchful eye on areas that could present significant issues if their standards deteriorate is important to prevent widespread and irreversible damage.
- Mapping, monitoring, promoting higher standards, and applying and sharing new knowledge is the key to managing existing and future onsite wastewater systems in Greater Bendigo.

The City of Greater Bendigo has dedicated the necessary budgetary assignments to support the permanent EFT Domestic Wastewater Planner position in implementation of the strategy, proposed monitoring activities, any necessary enforcement, review and audit of the strategy.

# Executive Summary – Domestic Wastewater Management Strategy

Managing wastewater on the land is a method employed by more than 10,000 households in Greater Bendigo. Where reticulated sewerage services are not available to a household, an onsite wastewater management system such as a septic tank provides an opportunity to dispose of domestic wastewater on the land. Unlike a reticulated sewerage system, once wastewater is generated it is directed through a treatment tank, and then applied to the land where it is returned to the natural water cycle. This method for wastewater management can be very effective if it is designed and operated correctly, yet if wastewater is mismanaged, it can have detrimental effects on the surrounding environment and present a risk to human health.

State environment policy requires that local governments develop plans for managing domestic wastewater to protect environmental assets. Town sewer planning is managed by water authorities in their sewer and water plans, so the focus for local governments is planning for onsite wastewater management systems. The City of Greater Bendigo first produced a Domestic Wastewater Management Plan in 2006, yet time, experience and changes in trends resulted in the need to review the plan.

Following a review of the original Greater Bendigo Domestic Wastewater Management Plan in 2013, a new Domestic Wastewater Management Strategy has been produced. The strategy is developed with the knowledge gained from experience, growth and deeper research in Greater Bendigo since the inception of the initial plan. New priorities are listed as:

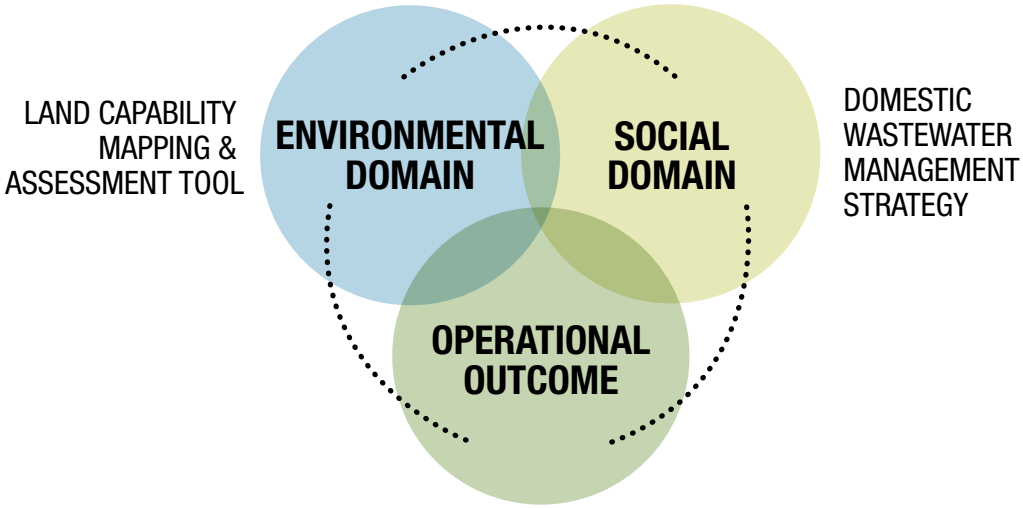
1. Manage and control new and existing developments and installations effectively with the best knowledge available to limit their impact in the future.
2. Reduce the impact of existing blackwater offsite discharges.
3. Reduce the impact of greywater offsite discharges.
4. Fill knowledge gaps on existing wastewater management systems by mapping and recording their construction, function, environment, and environmental receptors in a comprehensive, useful and methodical manner. Collate this information and use it to support responsible and informed decisions.
5. Maintain an ongoing process of implementation and evaluation of the domestic wastewater management strategy.

These priorities reflect the new attitude applied to domestic wastewater management in Greater Bendigo with this strategy. The strategy sheds a light on wastewater management by exploring planning for growth, areas for improvement, areas for careful management, and better practice for better outcomes. Now, with a stronger focus on socially determined wastewater outcomes, and an approach of flexibility, sustainability and interminability, the strategy is presented to guide action in improving wastewater management in Greater Bendigo into the future.

## Positioning the Domestic Wastewater Management Strategy

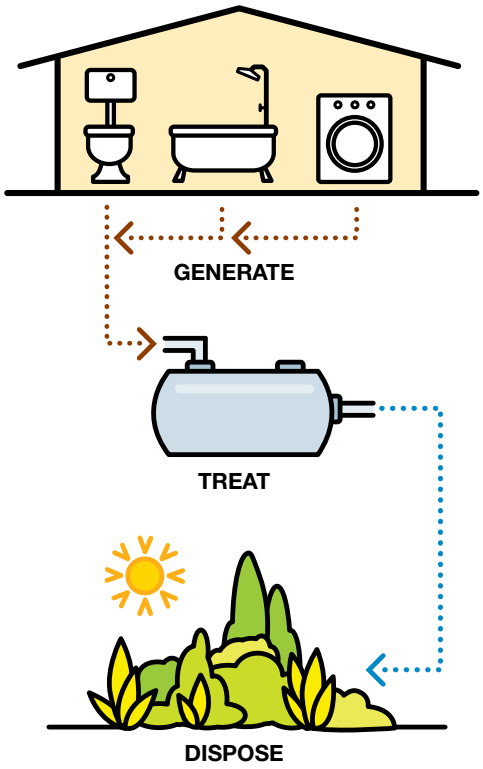
There are two major fields of influence that determine onsite wastewater management outcomes. In the social domain we see behaviour, knowledge, management of onsite wastewater management systems, as well as the perception of impact, tolerance and value. The social domain is overarching and has direct influence on a number of elements in the environmental domain. The environmental domain encapsulates the physical elements of operation; the influences from the surrounding environment that create variance in operational efficiency and effectiveness. These include things like soil, construction, treatment standards, rainfall, slope and vegetation.

The Domestic Wastewater Management Strategy functions within the social domain while the Land Capability Mapping and Assessment Tool (LCM&AT) operates with a stronger focus in the environmental domain. With combined implementation, it is intended that they collaboratively bring about a more positive operational outcome for wastewater management in Greater Bendigo.



# An Introduction to Onsite Wastewater Management

Onsite wastewater management provides an opportunity to dispose of domestic wastewater in circumstances where a reticulated centralized sewerage system is not available. Onsite wastewater management remains the only wastewater disposal option available to many domestic properties in Greater Bendigo. This form of wastewater management involves the retention of wastewater within the property boundaries, rather than disposal via reticulated pipe networks to a treatment facility. Commonly, onsite wastewater management involves a three phase process of generation, treatment, and disposal[1, 2].




Once wastewater is drained from sanitary fixtures, it will be collected and detained for treatment. The most common manner for doing this is via a settlement tank, where detention allows separation of contaminants in the water that is driven by their differing densities. From this primary treatment phase, the clarified liquid known as effluent is released and most commonly introduced into the soil. Disposal via the soil allows for chemical interactions to occur that further improve the quality of the water, while soil conduction, evaporation, and transpiration by vegetation provide a pathway for return of this water back into natural water cycles[3, 4].

More intensive treatment of wastewater can also be integrated into the treatment phase. Recent times have seen the increased popularity of higher treatment systems[5]. These systems generally operate by means of forced aeration of wastewater that facilitates further microbial activity and assists in the processing of contaminants in the wastewater before its release into the disposal environment[6, 7].

When operated and maintained correctly, onsite wastewater management systems can act as a valuable resource. Water resources can be recovered for reuse in maintaining gardens and reducing the pressures on drinking water and centralized sewerage systems. However, domestic wastewater contains materials that require careful management to prevent harm to surrounding environments and human health. Microbes[2, 8-12], nutrients[2, 3], and other chemical compounds[2] can all have a negative impact if they are released incorrectly. Waterways and water bodies are particularly sensitive environmental receptors as they often form natural points for water collection, and they support delicate ecosystems[4, 7, 13-16]. Degradation of ecosystems, contamination of valuable resources and spread of illness are all potential outcomes from poor onsite wastewater management[7-9, 13, 14, 17].

In order to prevent adverse outcomes such as these, specific treatment and disposal standards are required. This is guided in Victoria by legislation, policies and guidelines, as well as national standards. Local governments are charged with the responsibility as an approval authority for the installation, alteration and use of onsite wastewater management systems within their municipality[18]. See Appendix A City of Greater Bendigo Permit Flow. Furthermore, local governments are required to plan for the management of these onsite wastewater management systems to ensure their negative impact on the environment and health are minimized[19]. Further details are provided in Chapter 1 Statutory Obligations and Policy Analysis.

# Roles and Responsibilities in Onsite Wastewater Management

**City of Greater Bendigo (Local Government)**

- Administering permits for installation and alteration of onsite wastewater management systems
- Administering planning permits
- Approving the use of onsite wastewater management systems in accordance with relevant codes and requirements
- Investigating and managing risks to public health
- Regulating the maintenance of onsite wastewater management systems in accordance with relevant permits and legislation
- Developing and implementing Domestic Wastewater Management Plans
- Strategic planning for growth and development across municipality

**Property Owners / Residents**

- Obtaining the necessary permits and approvals to install, alter and use onsite wastewater management systems
- Ensuring their onsite wastewater management system is suitably operated and maintained in accordance with relevant permits

**Coliban Water (Urban Water Corporation)**

- Planning, providing and maintaining reticulated sewerage infrastructure
- Referral authority for planning permit applications (where prescribed)
- Planning, providing and maintaining reticulated potable water supply infrastructure
- Providing and maintaining some rural channel water supply systems
- Operating and protecting some water storages

**Goulburn Murray Water (Rural Water Corporation)**

- Providing and maintaining irrigation storages and channel water supply systems
- Regulation on use and protection of groundwater
- Protection of waterways and land in special water supply catchments
- Operating and protecting some water storages

**North Central Catchment Management Authority**

- Production and implementation of catchment strategies
- Management of river health, groundwater, salinity and floodplains

**Environment Protection Authority**

- Maintenance of the Environment Protection Act, subordinate legislation and wastewater guidance publications
- Certification of onsite wastewater treatment systems for use in Victoria
- Administering approvals for onsite wastewater management systems exceeding domestic flow rates (>5000L per day)
- Referral authority for planning permit applications (where prescribed)

**Department of Environment, Land, Water & Planning**

- Management of natural resources
- Development of guidelines and publications relevant to Victorian natural resources
- Referral authority for planning permit applications (where prescribed)

**Plumbing Industry Commission (Victorian Building Authority)**

- Responsible for licencing all plumbers and drainers across Victoria
- Regulating the installation of plumbing works in accordance with Victorian Plumbing Regulations

**Wastewater Treatment System Manufacturers/ Importers / Suppliers**

- Responsible for product meeting certification requirements of Australian Standards
- Responsible for product to maintain a current EPA Certificate of Approval
- Producing and distributing specific information on the installation and use of their product
- Training and certifying service agents / technicians in the maintenance of their products

**Onsite Wastewater Management System Installers, Plumbers and Drainers**

- Responsible for meeting all permit requirements, regulations and codes when installing onsite wastewater management systems
- Responsible for issuing a PIC Compliance Certificate for all relevant plumbing works

**Land Capability Assessors**

- Providing independent expert advice on the suitability of a site for onsite wastewater management

**Planning, Building and Development Consultants**

- Ensuring all applications for planning permits and onsite wastewater management systems meet the requirements of all relevant codes and regulations

**Planning, Building and Development Private Regulators**

- Ensuring suitable assessment to ensure that all permit applications meet the requirements of all relevant codes and regulations
- Ensuring all relevant permit pertaining to onsite wastewater management have been obtained

**Service Agents / Technicians**

- Responsible for obtaining training and certification from manufacturer before servicing Wastewater Treatment Systems
- Ensuring all components of wastewater treatment systems operate in accordance with all codes and certificates of approval, and meet relevant treatment standards
- Providing detailed reports on servicing activities to system owners and the relevant local government

# Chapter 1: Statutory Obligations and Policy Analysis

**Introduction**

**Legislation and Policies**

**State Environment Protection Policy – Waters of Victoria**

On-site Domestic Wastewater Management
Preventing Discharge Beyond Property Boundaries
Preventing Impacts on Groundwater Beneficial Uses
Assessment of Compliance with Permit Conditions
Identification of Priorities and Preferred Options

**Planning Permit Applications in Open, Potable Water Supply Catchment Areas – November 2012**

Effluent Disposal and Septic Tank System Maintenance
Effective Monitoring of Condition and Management of Onsite Treatment Systems
Enforcement Action
Independent Auditing and Quinquennial Review
Resourcing the Implementation of the Strategy

**Guidelines for Environmental Management – Onsite Wastewater Management Publication 891 (as updated)**

Domestic Wastewater Management Plans

## Statutory Obligations and Policy Analysis Introduction

This chapter discusses the requirements of this strategy that span from Victorian policy and legislation. Three policies are analysed in detail due to their explicit reference to Domestic Wastewater Management Plans, and their influence on the structure and composition of this strategy. Relevant wastewater legislation and guidance documents are also listed in this chapter as a means of describing their role and requirements for domestic wastewater management.

## Legislation and Policies

Policies, standards and guidelines with specific reference to onsite wastewater management.

**Environment Protection Act (1970)**

- Sets requirements for obtaining a permit before installing or altering an onsite wastewater management system
- Requires that onsite wastewater management systems be maintained in accordance with permits
- Defines domestic wastewater as wastewater flows not exceeding 5000 litres per day
- Empowers the SEPP WOV

**State Environment Protection Policy – Waters of Victoria**

- Requires that local governments develop a DWMP where relevant (further details provided in this chapter)
- Prohibits discharge of wastewater beyond property boundaries
- Requires that onsite wastewater management systems do not negatively impact beneficial uses of surface and ground waters
- Empowers Code of Practice for Onsite Wastewater Management, as well as other EPA publications and bulletins

**Guidelines for Environmental Management – Code of Practice for Onsite Wastewater Management (Publication 891 as updated)**

- Provides specific guidance for onsite wastewater management system selection, approval, management and maintenance
- Provides guidance for site assessment and design for domestic onsite wastewater management

**Code of Practice for Small Wastewater Treatment Plants**

- Provides guidance on the design, approval, management and maintenance of treatment components of onsite wastewater management systems servicing up to 500 persons

**Australian Standards**

AS/NZS1547 (as updated) – Detailed guidance in onsite wastewater management

AS/NZS 1546.1,2,3,4 (as updated) – Detailed guidance on construction of treatment systems

AS/NZS 3500.2 (as updated) – Detailed guidance on sanitary drainage

(AS/NZS 4130, AS/NZS 1319 and AS/NZS 2439 are also referenced by guidelines yet are not specific to onsite wastewater management)

**EPA Guidelines – Land Capability Assessment for Onsite Domestic Wastewater Management (Publication 746 as updated)**

- Provides guidance on the production and structure of a land capability assessment for onsite wastewater management
- Identifies site constraints for onsite wastewater management

**Policies with general relevance to onsite wastewater management.**

**Public Health and Wellbeing Act (2008)**

- Provides an enforcement tool to local governments for addressing matters that present a risk to public health

**Water Act (Under Review)**

- Empowers water authorities to undertake their services and functions
- Provides an enforcement tool for water authorities to require upgrade or repair of onsite wastewater management systems
- Provides an enforcement tool for water authorities to require connection of a property to reticulated sewerage

**Catchment and Land Protection Act (1994)**

- Empowers Catchment Management Authorities and defines their powers and functions
- Provides for the declaration of Special Water Supply Catchment areas
- Requires that land owners take reasonable steps to protect water resources and avoid soil disturbance, weed growth and pests.

**Local Government Act (1989)**

- Empowers local governments to undertake their services and functions
- Empowers local governments to produce and enforce local laws (by-laws)

**Planning and Environment Act (1987)**

- Defines responsible authorities for issuing planning permits
- Establishes the requirement to obtain a planning permit
- Empowers municipal planning schemes and Victorian planning provisions
- Requires the referral of planning permit applications to relevant referral bodies

State Environment Protection Policy – Waters of Victoria

## On-site Domestic Wastewater Management

The State Environment Protection Policy – Waters of Victoria (SEPP) is a key document in the protection of Victorian waters. The policy sets a number of requirements for maintaining water quality throughout the State and lists responsibilities for a selection of key organizations. The requirement for a municipal council to produce and implement a Domestic Wastewater Management Plan spans from Clause 32 of the policy; further details of what this should include are provided in the policy. The following chapters will act to interpret and address these requirements in order to actively acknowledge, specify and plan to meet these requirements, while maintaining transparency and rationale.

State Environment Protection Policy – Waters of Victoria

## Preventing Discharge Beyond Property Boundaries

The requirement for maintaining wastewater within property boundaries is not listed exclusively in the SEPP. This requirement is now actively included in the Code of Practice – Onsite Wastewater Management 891 (as updated), and is also reflected in the standard onsite wastewater permits now issued by the City. In order to prevent discharge of wastewater beyond property boundaries, a collection of elements must first be explored and defined.

Offsite discharge can occur in a number of ways and can be categorized into two major categories. Either active, where part or all wastewater is intentionally directed offsite for disposal, or passive, where wastewater is disposed onsite but shed in part or in full by means of gravity, introduction to groundwater, or mixing with precipitation or surface waters but not by means of intended design. While all wastewater will eventually leave the site as part of the water cycle, water of wastewater quality should not be permitted to leave the property boundaries.

It must be noted that while the SEPP requires containment of wastewater within property boundaries, stricter controls are imposed by the Code of Practice – Onsite Wastewater Management 891 (as updated), and by the City's permits. Here, explicit reference is made to containment on a 'lot' or 'allotment' as opposed to a 'property'. This indicates that effluent of wastewater quality must be contained within an allotment as defined by a title, regardless of whether adjoining allotments bare ownership by the same person or body. These stricter controls reflected in the City's permits arise as a means of preventing future offsite discharge. It means that should adjoining allotments be excised by sale, wastewater will remain contained within the allotment boundaries. While this protects newly developed properties from discharging wastewater beyond property boundaries, this has not always been the case.

There was a time where active offsite discharge was a legitimate method for wastewater disposal. This is clearly expressed in historic wastewater Codes of Practice[20]. Hence, the municipality of Greater Bendigo retains a number of wastewater management systems that were permitted to discharge wastewater offsite and continue to do so. This presents complexities for two particular reasons. The first is that by issuing a permit for offsite discharge without a sunset clause, if that system continues to discharge wastewater offsite in accordance with the permits issued, it leaves little scope to enforce improvements. Secondly, if a property has been permitted to discharge wastewater offsite, it is frequently a smaller lot with insufficient space for onsite wastewater disposal, or has been developed to a point where there is no longer space for onsite wastewater disposal.

Active offsite discharge is seen across the municipality with examples shown in Strathfieldsaye, Heathcote, Goornong, Raywood, Sebastian, Ascot, Sailors Gully and Junortoun. The type of active offsite discharge also varies throughout these areas, some exhibiting partial offsite discharge of greywater, while others actively discharge all-waste wastewater offsite. Further detail is provided in specific locality chapters.

While all water that is produced at a domestic property will eventually leave the site and return to the water cycle, water of wastewater quality is not permitted to leave the property. Contaminants and constituents of the wastewater must first be removed before the water can leave the site. There is no standard available that defines wastewater quality for these purposes. Grey and black waters are likely to contain a number of contaminants that have a potential to impact on human health, ecological health of receiving environments, and amenity. These may be a direct result of each discharge partially treated or a cumulative result of discharge over time. In order to prevent new offsite discharges of wastewater, and limit the impact of existing offsite discharges, there are a collection of actions listed throughout this strategy.

**Recommendations:**

- Continue to implement requirements with planning permit applications for subdivision and boundary realignment to ensure that existing onsite wastewater management systems and their discharge are maintained within new allotment boundaries as defined by a plan of subdivision, and meet setback requirements for boundaries as listed within the Code of Practice - Onsite Wastewater Management (as updated).
- Continue to assess planning applications to ensure wastewater can be managed suitably and sustainably for any new developments or subdivisions.
- Ensure detailed assessment of each site is undertaken, in accompaniment of guidance from the LCM&AT, for each Application to Install / Alter an onsite wastewater management system to identify features that may lead to expedited discharge of wastewater offsite or to areas of environmental significance.

Each area of known offsite discharge shall receive detailed analysis later in this document. Locality specific solutions are required given the diversity seen between these areas.

State Environment Protection Policy – Waters of Victoria

# Prevent Impacts on Groundwater Beneficial Uses

Beneficial uses of groundwater in the Greater Bendigo municipality are not as numerous as other areas of the State, but there remain wide areas where potable mineral water is noted as a beneficial use, and selections to the East and the West where groundwater is acceptable for potable use. Protection of these beneficial uses is greatly important and requires particularly close attention and careful management, especially as the popularity of alternative water sources continues to increase.

Protection of groundwater requires careful and measured assessment of the circumstances. The role of soil as an instrument for treatment, detention and assimilation of wastewater is a key element in protecting groundwater from contamination and a deep understanding of its properties can provide guidance on suitable methods and locations for disposal[2, 12, 21]. The movement of wastewater through soil can be greatly influenced by a number of factors that relate to its chemical composition, physical construction, and external elements such as evapotranspiration pathways. The presence of moisture in the soil is also greatly influential[7, 21]. While unsaturated, wastewater will move through the soil by means of capillary action, drawn into void spaces where it is held by charge. This unsaturated hydraulic conductivity differs greatly from saturated conditions where the capillaries are filled and the water is subject to movement through all pore spaces under the influence of gravity[21]. Time, distance of travel, and surface area provide greater opportunity for renovation of wastewater to higher standards by the soil. Chemical reactions, particularly those that are biologically facilitated, occur here and remove many harmful constituents of wastewater.

Hence, ensuring conditions are never subject to deep saturation with wastewater, and ensuring suitable separation from groundwater will act to reduce the risk of groundwater contamination. There are a number of complexities that can alter the pathways of introduction into groundwater. Their depth and site specificity extend beyond the scope of this strategic document but should form part of a site and soil investigation where protection of groundwater is pertinent.

## Groundwater Protection

**Action 1**
Add groundwater mapping into GIS mapping systems to allow easy identification and investigation into groundwater when assessing applications for installation of an onsite wastewater management system.

**Action 2**
Undertake a review of City of Greater Bendigo disposal system design requirements to ensure they support suitable wastewater disposal pathways.

- Ensure suitable information is requested to inform permit application assessment where officer deems insufficient evidence for the protection of groundwater is available.

State Environment Protection Policy – Waters of Victoria

# Assessment of Compliance with Permit Conditions

Please refer to ***Planning Permit Applications in Open, Potable Water Supply Catchment Areas – November 2012 – Effective Monitoring of Condition and Management of Onsite Treatment Systems and Enforcement Action*** later in this chapter for more details on assessment of compliance with permit conditions.

State Environment Protection Policy – Waters of Victoria

## Identification of Priorities and Preferred Options

One of the foremost intentions of this strategy is to identify priority areas for remediation of failing onsite wastewater systems, and areas for protection from impacts of future onsite wastewater management systems. Priorities and priority levels are detailed throughout the strategy. However, as a means of maintaining transparency in decision making and rationale, this section will declare the methods employed to establish priorities and preferred options formulated for this strategy.

Acknowledgement of findings of the Auditor General's Report , 'Protecting our environment and community from failing septic tanks (2006)' is also greatly important. Here it was found that the application of un-uniformed risk assessment models resulted in differing classification of risk and priorities between organizations. Consequently, recommendation 5 of section 3 of the report suggests an agreed set of risk criteria to assess backlog consistently be developed. Unfortunately, no specific criteria has been developed and implemented to support the determination of wastewater priorities at this time.This Domestic Wastewater Management Strategy has employed the following elements to determine risk:

- Application of land capability data
- Qualitative characterization of receiving environment
- Qualitative characterization of the risk perceived by the community and industry professionals
- Mixed methods review of records
- Comparison with relevant guidelines, standards and policies

It is important to note that the risk is not characterized quantitatively in this strategy. Hence, numbers are not assigned to weight risk and provide an end figure. The reason that a qualitative risk assessment has been employed in this strategy is because insufficient data exist to support the assignment of numerical weighting to risk. Determination of dose and exposure ratings for all constituents of onsite wastewater exceeds the scope of this strategy. This strategic document aims to present data with minimal interpretation and abstraction. The imposition of arbitrary figures to illustrate risk is neither necessary, nor appropriate and the intricate complexities of the social realm of onsite wastewater management are likely to be lost or distorted. Further details are provided on the risk assessment approach later in this document.

The localities presented within this strategy are the priorities determined from information currently available to the City of Greater Bendigo. Wastewater issues are likely to exist outside of these identified areas, however, the extent of their potential to impact public health, environment and amenity have not presented as critical with the current available information. An ongoing process of application and review must adopt an element of ongoing monitoring of circumstances outside of the defined priority areas to ensure wastewater matters across Greater Bendigo are managed suitably and effectively. This is particularly pertinent as newer development areas see greater development and use, and are exposed to the test of time.

The core of priorities that guide this strategy can be summarized into the following points:

1. Manage and control new and existing developments and installations effectively and with the best knowledge available to limit their impact in the future.
2. Reduce the impact of existing blackwater offsite discharges.
3. Reduce the impact of greywater offsite discharges.
4. Fill knowledge gaps on existing wastewater management systems by mapping and recording their construction, function, environment, and environmental receptors in a comprehensive, useful and methodical manner. Collate this information and use it to support responsible and informed decisions.
5. Maintain an ongoing process of implementation and evaluation of the Domestic Wastewater Management Strategy.

Planning Permit Applications in Open, Potable Water Supply Catchment Areas – November 2012

## Effluent Disposal and Septic Tank System Maintenance

The guidelines for Planning Permit Applications in Open, Potable Water Supply Catchment Areas have become a particularly influential document in the management of wastewater in potable water supply catchments. The municipality of Greater Bendigo has only one area that is declared a special potable water supply catchment. The declared catchment area spans the South Eastern sector of the municipality and encapsulates much of the landscape that is expected to supply Lake Eppalock. Townships such as Heathcote, Derrinal, Mia Mia, Redesdale, and Eppalock fall at least partly within the declared catchment area.

Application of these guidelines sees a requirement for a maximum development density of one dwelling per 40 hectares within the declared catchment area. However, this requirement can be relaxed where water corporations and local government are satisfied that the development will not present an unreasonable risk to catchment water quality. Risk is considered from both an individual and a cumulative perspective. The following sections of this chapter provide detail on the elements that assist in determining the suitability of relieving the density guidelines. These requirements include and expand on those listed within the SEPP. It is not intended that this document act as the device to relieve development in catchment areas from assessment in line with the guidelines. Instead, it is intended that this strategy act to pave the way for evidence gathering and knowledge development to assist the City and referral authorities in making informed decisions about developments and potential impacts on catchment water quality protection.

Planning Permit Applications in Open, Potable Water Supply Catchment Areas – November 2012

## Effective Monitoring of Condition and Management of Onsite Treatment Systems

The guidelines for special water supply catchments particularly promote monitoring of onsite wastewater management systems to ensure their condition and management is adequate. This is a point that water authorities have also highlighted as an important element of managing wastewater, particularly in potable water supply catchment areas. To date, the City of Greater Bendigo has employed a reactive approach to wastewater management, responding to permit applications and complaints. Large gaps in knowledge of the function and condition of thousands of onsite wastewater management systems have grown over time. It is proposed that a monitoring and mapping program be adopted to support comprehensive record keeping and inform priorities for assistance and upgrade of wastewater management systems across Greater Bendigo.

In order for monitoring to be effective and relevant, the method of monitoring must comprise appropriate investigative elements[22]. Three key points present here.

1. The first is that onsite wastewater management systems, while often very effective methods for improving the quality of wastewater at a site, still do not treat and remove all potentially harmful wastewater constituents[8, 10, 23, 24].
2. Secondly, the role of soil in the treatment and polishing of wastewater is fundamental to successful onsite wastewater management in most instances[1, 2, 25-29].
3. Thirdly, while an onsite wastewater management system may be operated in accordance with best practice, a number of environmental factors have a key bearing on whether contamination of a water body occurs or not[8, 30, 31].

With reflection on these three points, it is essential that visual surface monitoring of onsite wastewater management systems is executed in conjunction with other testing methods that provide a means of triangulation. The

most effective way to determine whether contamination of a water body is occurring, and is a result of domestic wastewater discharge, is by testing the water body for contamination indicators[32-34].

While hypotheses can be formed by inspecting the onsite wastewater systems in the area, in many cases it can only be confirmed by direct testing of the receiving environment at suitable intervals with an ongoing basis. Other sources of contamination can act to confound determination of the source and only with specific testing methods may these be distinguished[32, 34]. Information gathered onsite can allow development of catchment effluent models and assist with determination of risk presented by sites and localities[35]. Further details on preparing for mapping and monitoring are provided in the Better Practice for Better Outcomes chapter of this document.

**Planning Permit Applications in Open, Potable Water Supply Catchment Areas – November 2012**

## Enforcement Action

The guidelines for planning permits in PWSCs makes specific note that non-compliances identified in monitoring programs should be met with enforcement action. Little detail is provided of the enforcement action that might be implemented in such instances and hence, the City of Greater Bendigo enforcement policies that currently stand shall be adopted by this strategy in order to maintain consistency and alignment.

Enforcement action is a more forceful approach to achieving positive wastewater management outcomes and should only be employed when other compliance pathways have been exhausted. A collaborative approach to assisting system owners and householders in achieving better wastewater management outcomes is an essential first step to managing wastewater in Greater Bendigo. Such an approach recognises the social determinants that underlie wastewater issues and offers tailored corrective measures be applied where the issues are stemming from, providing an opportunity to address them collaboratively and sustainably[36].

Current wastewater management legislation presents limited opportunities for enforcement, with a stronger focus on new installations and maintaining the system in accordance with permit conditions. Not all onsite wastewater management systems in the Greater Bendigo municipality have a permit available given their age and the amalgamation of councils. Also, many older permits make reference to historic requirements that are significantly less specific and more lenient than current onsite wastewater management requirements and can lead to complexities in achieving positive wastewater management outcomes. This has led to some local governments relying on alternative legislation not specific to onsite wastewater management for achieving improvements in wastewater matters[5, 37]. While enforcement remains a last resort, it must be supported by coherent legislation that fits purpose. Support for adjustment to legislation to make for a clearer and more appropriate enforcement pathway should be a point for advocacy with the implementation of this strategy.

Operation of an onsite wastewater management system in accordance with relevant permits to install and approvals for use is a key focus of compliance in this strategy, yet limiting the potential for systems to have negative impacts on human health, natural environments, and surrounding environments remains the core impetus for pursuing compliance. Further details of compliance and enforcement elements of this strategy are provided in the Better Practice for Better Outcomes chapter.

### Recommendations:

#### Enforcement Action

- Continue to lobby for legislation change that allows clearer application of wastewater requirements to promote better wastewater outcomes.
- Encourage homeowners to rectify failing onsite wastewater management systems to ensure their impact is limited as best as possible.
- Ensure a collaborative and supportive approach is adopted in the monitoring and upgrade of onsite wastewater management systems between homeowners and the City of Greater Bendigo. A defined approach to determining failure and requiring upgrade must be established. (see schedule)

# Independent Auditing and Quinquennial Review

Frequent review of the Domestic Wastewater Management Strategy is essential to ensuring that it remains contemporary and reflects achievements, as well as shifting trends encountered in the wastewater management field. The PWSC guidelines require a review of the strategy once every five years. While this is presented as a minimum review period, it is intended that the strategy remain within a cyclic process of review and implementation. By employing such a method, it is intended that the strategy remain fluid in nature and provide the flexibility required to attend to the ever changing wastewater management landscape. A number of significant milestones are noted to occur within the short to mid term of implementation and provide an opportunity for a scheduled in-house review to ensure the strategy is aligned with the needs of Greater Bendigo.

Independent review of the Domestic Wastewater Management Strategy is also required by the PWSC Guidelines to ensure that actions and resources are aligned and are being suitably met. Establishment of an independent auditor will be made once the domestic wastewater management strategy has commenced implementation. This process is expected to provide a level of transparency and accountability to ensure the Domestic Wastewater Management Strategy remains a viable and sustainable plan for action.

## Action and Recommendation

### Audit and Review

**Action 3**
Appoint a suitable auditor to undertake an independent review of implementation of the strategy once sufficient time has passed to commence implementation and provide adequate data to inform the audit.

- Maintain a cyclic approach of implement and review throughout the implementation of the strategy.
- Appoint an accredited auditor with relevant approvals to undertake an audit of the strategy every 3 years.
- Supply a copy of the audit report to relevant stakeholders.

**Planning Permit Applications in Open, Potable Water Supply Catchment Areas – November 2012**

# Resourcing the Implementation of the Strategy

The City of Greater Bendigo has dedicated the necessary budgetary assignments to support the permanent EFT Domestic Wastewater Planner position in implementation of the strategy, proposed monitoring activities, any necessary enforcement, review and audit of the strategy.

It is intended that this Domestic Wastewater Management Strategy continue to be implemented to support development and growth into the future of the City of Greater Bendigo.

**Guidelines for Environmental Management – Code of Practice – Onsite Wastewater Management Pub 891(as updated)**

## Domestic Wastewater Management Plans

The Code of Practice – Onsite Wastewater Management is a publication of the Environment Protection Authority and acts as the key guidance document for onsite wastewater management regulation in Victoria. The document is an essential reference point for local government officers assessing applications to install and alter onsite wastewater management systems and prescribes requirements such as buffer distances and directions for sizing of disposal systems[38]. There is little reference in this document to Domestic Wastewater Management Plans other than identifying their role in wastewater management considerations for planning permit applications. Recognising wastewater requirements at the stage of application for a planning permit is a vital step to ensuring land is not rendered undevelopable, constrained by limitations on development potential, or approved for unsafe or unsustainable development. This strategy identifies the importance of the planning stage for wastewater management and provides further analysis in the ***Better Practice for Better Outcomes*** chapter.

# Chapter 2: Integrated Principles and Philosophies



## Integrated Principles and Philosophies

### Introduction

This chapter has been compiled in order to guide the interpretation and application of this strategy by the City, and its partners. The inclusion of these principles and philosophies is intended to inform the City's approach to considering domestic wastewater management issues, both on the individual scale and on the broader cumulative scale. It is also intended that this chapter provide some explanation of the structure and inclusions of elements of this strategy. Details of the risk approach applied in the development of the strategy are also provided in this chapter.

## Avoiding the Bookshelf Master Plan

This Domestic Wastewater Management Strategy is not intended as a device to plug gaps on the bookshelf of statutory plans. This strategy is intended to be used as a flexible and ongoing strategic handbook to managing onsite wastewater at the frontline. Only by implementation and review of the strategy can there be improvement in standards of onsite wastewater management in Greater Bendigo. This plan is not finite and is intended to adopt the flexibility required to meet the evolving needs of our municipality.

*' We should be very suspicious of master plans that will, supposedly, bring us to our goal in 10 or 20 years. In an era of unprecedented change, it is very difficult, if not impossible, to be able to forecast what the world will be like… So instead of trying to develop a master plan for attaining a Healthy City that will in all probability join all the other master plans on the bookshelf, we need a process of 'goal –(vision) directed [working] through'*

**Hancock, T. (1992). 'The healthy city: Utopias and realities.' *Healthy Cities*. J. Ashton (ed.). Buckingham: Open University Press: 22-9[39]**

## The Precautionary Principle

Integration of the Precautionary Principle as a guiding principle for this strategy is a matter that requires particular consideration. Clear definition is greatly important to ensure the guiding principle is included and managed correctly. While the principle has been previously defined at the First International Conference on Protection of the North Sea (1984), the principle has been cited in a number of documents since[40]. Here, there are significantly varying views on the method of application of the guiding principle to wastewater management situations.

The Precautionary Principle will be ascribed to this document with reference to the Australian Intergovernmental Agreement on the Environment (May, 1992)[41] definition:

> *Where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the Precautionary Principle, public and private decisions should be guided by:*
>
> *i) Careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment;*
>
> *and*
>
> *ii) An assessment of the risk-weighted consequences of various options*

This principle has not been included as a guise to avoid scientific investigation by imposing conservative regulations indefinitely. There are two essential components to the precautionary principle: the interim controls imposed as an immediate protection measure, and the scientific investigation to find the correct management solutions.

## A Risk Based Approach

It is apparent that numerous risk assessment models have been applied to Domestic Wastewater Management Plans across the State of Victoria. With reference to the findings of the Auditor General's Report, 'Protecting our environment and community from failing septic tanks (2006)', the application of unfounded quantitative risk weighting leads to an un-uniformed assignment of risk to wastewater scenarios between municipalities. While development of an evidence based risk assessment framework remains incomplete for use in Victoria, reflection on methods of investigation lead to the approaches to risk assessment used in this strategy. Here, it is recognised that insufficient evidence is currently available to assign weighting to risk factors and as such, a qualitative investigation of risk will be presented with findings presented in a form true to the method of investigation.

Determination of locations included in this strategy has been based on a qualitative risk assessment. The hazard identification and characterisation process is summarised below.

1. Areas with high densities of onsite wastewater management systems were identified through use of GIS mapping software.
2. Identification of problem areas known to experienced local officers were identified. Review of records for confirmation of designs, complaints, and previous investigations and studies was undertaken.
3. A general, visual investigation of each area and water quality testing relevant to discharge types was completed.
4. The number of dwellings, characterisation of discharge type and equivocal volume of discharge was analysed and considered.
5. Investigation of LCM&AT data relevant to the area employing EPA Publication 746.1 Risk Matrix Table as a general framework for analysis was completed.
6. Determination of proximity to watercourses and waterbodies was undertaken with use of GIS mapping software.
7. Summation of values of risk matrix values against proximity to waterbodies and discharge character provided a means of trite validation in support of the priority levels initially assigned to the relevant locations based on officer knowledge.

## Risk Model for Referral, Assessment and Inspection Regime in Special Water Supply Catchment

At the request of Goulburn Murray Water, a set of risk analysis tools developed for determination of contamination risk to special water supply catchments are also referenced in this Domestic Wastewater Management Strategy. The risk analysis tools are derived from the work of White, Williams and Edis and have been developed as a means of assigning a risk value through the use of an algorithm. The algorithm comprises a number of input variables associated with spatial relationships, site and soil features, and current operational standards in general areas. The tools can be used to determine risk at the sub-catchment scale, or at an individual property scale. In other areas, these risk ratings have been used to direct monitoring programs, the level of detail required in applications for development, and the referral procedures for applications to referral authorities. Further investigation into the feasibility and rigour of the risk analysis tools for use in conjunction with current assessment practices and applied in Greater Bendigo should be undertaken.

**Action 4:**

Investigate the feasibility, rigour and value of applying the risk analysis tools developed by White, Williams and Edis to assessment of proposals for unsewered development in the special water supply catchment.

Report to be produced within 6 months of adoption DWPO

The City of Greater Bendigo must reserve the courage to take the time to trial approaches, seeking evidence of efficacy, before making a commitment to adoption and implementation.

## The New Public Health

Wastewater management holds a strong relationship with human health. Hence, due recognition should be provided to founded public health principles to promote healthy outcomes and sustainable strategies. The New Public Health steps away from clinical models of health, identifying a broader spectrum of health promotion approaches that address the underlying social determinants of health[42, 43]. Guidance for applying a New Public Health approach can be found in the Ottawa Charter, a product of the Declaration of Alma Ata[42-44]. The Ottawa Charter holds five key actions for health promotion denoted below:

**Build Healthy Public Policy** – Application of policies, whether health care-sectoral or not, can act as a significant social determinant of health. The intention of building healthy public policy is to make the healthy choice, the easiest choice and ensure that policies do not have a negative impact on public health.

**Create Supportive Environments** – Protection of our built, living and natural environments is essential to ensure they are conducive to a healthy lifestyle.

**Strengthen Community Action** – Community participation in determining needs and decision making processes allows key issues in a community to be identified and addressed. This also aids sustainability of programs within communities once funding is disbursed.

**Develop Personal Skills** – Education, training and resources empower people to take control of their own lifestyle and make informed decisions about their health.

**Reorient Health Services (Public Services)** – Shifting focus away from clinical models of health care toward a more holistic approach to health and due recognition of social determinants is essential to preventing poor health statuses. [42]

Health promotion principles hold a strong focus on psycho-socio-cultural elements that lead to states of health. This approach has also been identified to apply to the determination of the functional status of onsite wastewater management systems. Hence, failure of onsite wastewater management systems can be frequently linked back to underlying social determinants[36]. The application of the Ottawa Charter has been applied with acknowledgement of this and is not only implemented to attend to health matters, but also to capture and progress the functional status of onsite wastewater management systems.

## Evidence Based Practice

Where possible, formulation of this Domestic Wastewater Management Strategy has been informed by evidence. In instances where suitable evidence was not available, reliance on codes, standards and best practice models have been used as a means of promoting safe and sustainable onsite wastewater management. Rigorous application of academic research methods during the development of this strategy are intended to provide trustworthy and reliable data with reflection of the corresponding methodology. While these processes have been integrated into this strategy's development, interpretation and application of this data is expected to receive some colouration by the experiences of the policy developer, and the political landscape in which this strategy exists. The application of an evidence based approach should continue throughout the implementation of this strategy.

# Principles of Ecologically Sustainable Development

It is intended that this strategy promote ecologically sustainable development within the Greater Bendigo municipality. The nature of onsite wastewater management systems means that their ill management can result in ecological degradation [3, 4, 7, 13-16]. The following principles of ESD have received careful consideration throughout the development of this strategy and the action areas designated therein.

"**Integration Principle** - Decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations (the 'integration principle').

**Principle of Inter-generational Equity** – The present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations (the 'intergenerational principle').

**Biodiversity Principle** - The conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making (the 'biodiversity principle').

**Valuation Principle** - Improved valuation, pricing and incentive mechanisms should be promoted (the 'valuation principle')." [45]

## Whole of Water Cycle Approach

Whole of water cycle approaches to water capture and use is also supported by this strategy where it can be achieved safely and sustainably. Domestic wastewater is a useful resource when managed suitably. It can be used to provide a water source and a nutrient source to household gardens. Use of wastewater in this way is also a means of reducing demands on drinking water supplies. By designing and operating onsite wastewater management systems well, the beneficial uses of domestic wastewater can be better realised. Also, by containing wastewater within the property boundaries and relying on evaporation and plant transpiration to return the water back to the water cycle, it can prevent the degradation of the beneficial uses of other water bodies.

Care must be had to ensure that energy consumption in the treatment process is suitably offset by the benefit of the reuse it supports. Treating wastewater to A class reclaimed water standards or potable water quality is pointless if legislation does not facilitate this level of reuse/recycling in the decentralised domestic setting.

## City of Greater Bendigo - Council Plan 2013–2017

The Council Plan is one of the most important documents the Council produces. It takes advice from the community about their priorities and expectations and provides information back to the community about the major direction the Councillors have chosen to take in the next four years. The following themes are drawn from the Council Plan and are used to guide the development of this Domestic Wastewater Management Strategy.

**Theme 1: Planning for Growth** – During this term Council has made a strong commitment to significant planning work to develop detailed and long term plans around integrated transport and future residential needs. This enables Greater Bendigo to plan for the future and present compelling arguments to the State and Federal Governments for funding to deliver on the plans, especially major infrastructure items. The completion of a number of major projects, identified in previous planning work, is also a high priority. These strategies ensure Greater Bendigo adapts to the needs of a growing and increasingly diverse population smoothly and positively.

**Theme 2: Liveability** – When people in Bendigo describe it as being very liveable, they use phrases such as, it is easy to get around, it is safe, it is affordable, and there is good access to health and education, and services for people who need help. There are choices in activities, education, housing and entertainment. And people still say 'Hello' in the street. These are important features of the community to strengthen as Greater Bendigo grows and changes.

**Theme 3: Productivity** – Productivity is about encouraging innovation and diversity in education, commerce and industry. It is about responding to new economic opportunities, including making sure our local workforce is appropriately skilled. It involves creating the opportunity for all people to be actively employed. It is establishing the environment for investment, and making sure the infrastructure is in place to support economic activity.

**Theme 4: Sustainability** – Sustainability means making good use of all our resources, so that the decisions made today do not limit the choices of future generations. Many people think of sustainability as the ongoing viability of natural systems (air, water, energy, biodiversity) in a balanced relationship with human life. In the context of this Council Plan, built and natural assets and finances must also be managed in a way that is viable into the future. A changing climate threatens our future prosperity, environment and development. Without strong action globally, and at home, the projected impacts and costs of the changing weather patterns are significant. Action includes reducing the consumption of resources, especially carbon fuels, reducing waste and generating and celebrating new industries which create positive outcomes.

**Theme 5: Good Governance and Decision Making** – Good governance is the leadership shown by the Council, to assure the community that there is transparent and well-informed decision making for the long term, sound management of resources, diverse and effective engagement with community members, and the flexibility to plan for and manage emerging issues, as well as respond to immediate problems.

**City of Greater Bendigo. (2013). Council Plan 2013-2017 [46]**

# Chapter 3: Research and Development Methods



## Research and Development Methods

### Introduction

During the development of this strategy, research was undertaken on a number of physical and social elements pertaining to wastewater management in Greater Bendigo. This included interviews with stakeholders, community questionnaires, scientific investigation of receiving environments, reviews of records and local studies, and review and expansion of land capability data. A mixed method approach was adopted by the inquiry, and findings were applied by informing the development of priority areas and approaches to wastewater management detailed in this strategy.

### Methods and Methodology

This study employed a mixed-method approach to inquiry. Mixed-method studies integrate elements of qualitative approaches and quantitative approaches to inquiry. This method was selected in order to investigate the diversity of research questions in a means that provides rigorous and methodologically aligned methods of investigation. The application of a mixed method approach acted as a means of complementary 'conversations' that provide greater breadth to the knowledge being attained [47], and provided a means of triangulation, an opportunity to derive viable and useable data, a means of painting a comprehensive portrait of the broad societal and environmental contexts, and determining the manner in which they interact and align [47, 48].

## Participants and Data Collection

The inquiry can be separated into two phases of investigation. The first is the People and the Professionals (Predominantly Qualitative Components), and the second is the Receiving Environments and the Operational Perspective (Predominantly Quantitative Components). The combination of community and expert assessment provides a greater opportunity to achieve accurate baseline data (International Councils for Local Environmental Initiatives 1996, cited in Baum 2008)[49].

**Elements of Inquiry included:**

- Chemical, Physical and Biological Testing of Waters in Receiving Environments
- Interviews with Professionals and Representatives of Stakeholder Organisations
- Testing and Classification of Sites and Soils in Accordance with elements of AS1547
- Content Analysis of Treatment Plant Service Reports
- Mail-outs and Online Questionnaires for Community Members

## Data Analysis and Findings

The findings from the qualitative investigation were thematically analyzed and are presented below in broad themes [50]. Application of these findings can be found throughout this document and have informed its formation and presentation.

**Theme 1: Financial Landscape**

**Theme 2: Neighbourhood Character**

**Theme 3: Resource Capitalisation**

### The Findings

Many people value their septic system. It is a useful resource that supports the maintenance of neighbourhood character. They are a cheap and effective method for wastewater management that offer an opportunity to avoid regular ongoing costs and generally a reduced experience of bureaucratic imposition in their use.

Neighbours are a common information resource on wastewater management and offer a pathway for strengthening community action and developing personal skills in working toward better onsite wastewater management in Greater Bendigo.

While septic systems are widely seen as a useful resource, the release of wastewater into sensitive environmental receptors is viewed as disappointing by some, and unacceptable by others. Failing septics and their odour are endured by some residents while properties across the road are connected to reticulated town sewer.

The financial landscape appears to instil an attitude toward access to reticulated town sewer. The cost of sewer connection is a prohibitive barrier for many residents and this seems to have resulted in many residents accepting that they must remain reliant on septic systems, whether they are operational or not. Financial hardship is shaping a situation of inequitable access to essential public health infrastructure. This appears to be further influenced by a lack of understanding of service roles and responsibilities, particularly regarding government agencies, and a lack of awareness and engagement of social support organisations.

From this, we take an approach that most areas surveyed are content with septic systems servicing their neighbourhood; however, they must be operated in a manner that limits environmental degradation, public exposure, and negative impacts on neighbours.

# Chapter 4: Planning for Growth

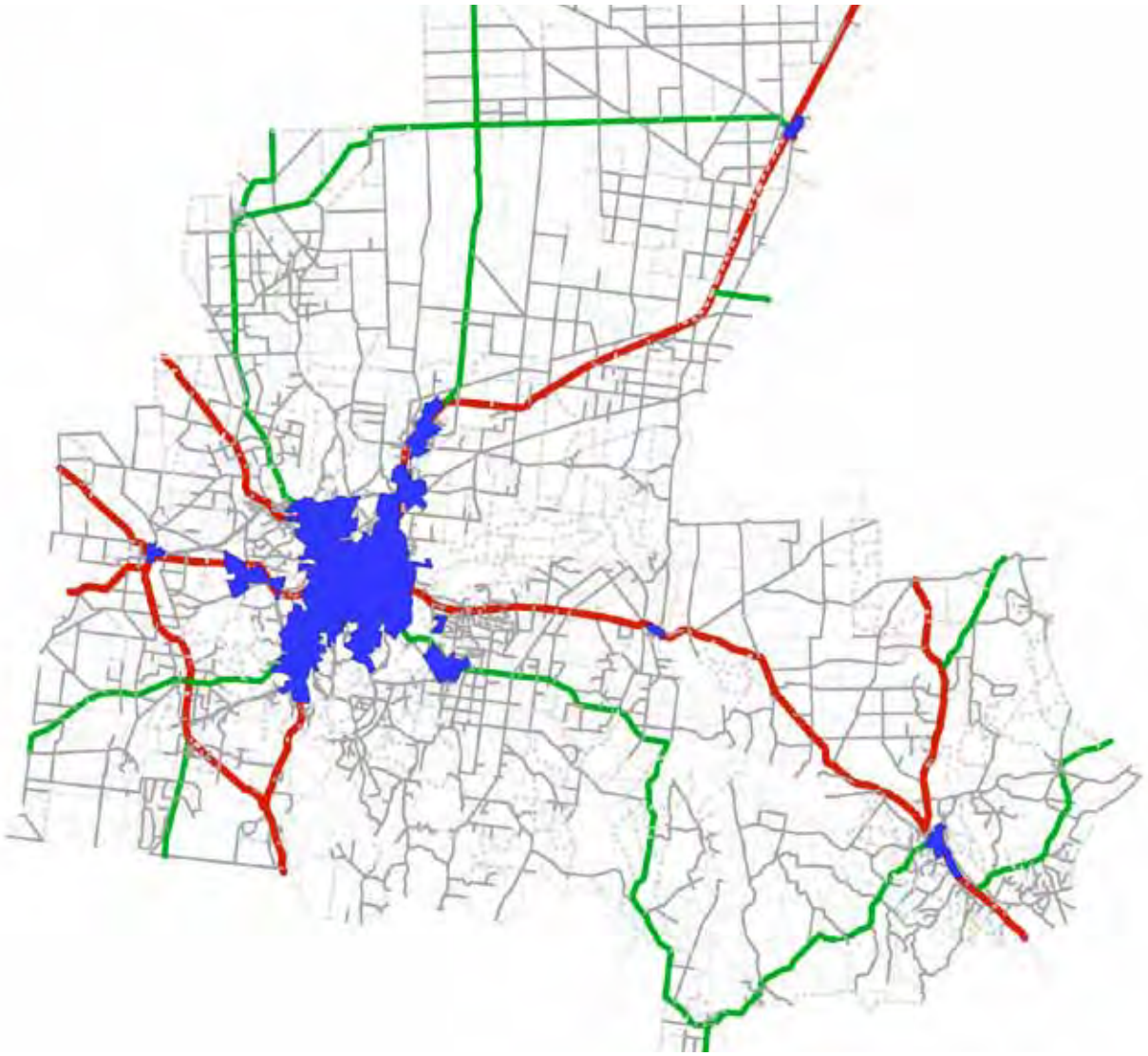


## Planning for Growth

## Introduction

This chapter highlights the role and importance of reticulated sewerage systems in supporting intensive residential development. The City of Greater Bendigo is currently experiencing considerable population growth and this is predicted to continue into the future. New development areas have been declared to support the resulting residential development yet their connection to reticulated sewerage remains pivotal to their suitability and sustainability.

This chapter also acts to identify the importance of wastewater planning when considering alternative development areas and highlights growth constraints experienced by some unsewered townships in the Greater Bendigo municipality.



## Supporting Growth with Responsible Wastewater Management

Coliban Water remains the authority for overseeing sewer provision, and providing key elements of infrastructure where prescribed by legislation[56]. However, the City of Greater Bendigo hold a key responsibility here in ensuring that suitable planning, communication, and foresight is maintained throughout phases of planning and development to promote the most beneficial and healthy wastewater management outcomes. Provision of reticulated sewerage to the new development areas holds many benefits:

- Sewer is necessary for achieving the intended density yields.
- It supports multi-format housing types.
- Sewer promotes ongoing sustainability of these sites by not relying on the land to accept, treat and retain wastewater.
- Centralised reticulated sewer comprises professionally maintained infrastructure and facilities.
- Sewer reduces the risk of exposure for the community to wastewater.
- Sewer can reduce maintenance burdens for householders.
- Sewer negates the potential for acute and cumulative impacts to span from onsite wastewater management systems. [57]

There are four new development areas currently nominated by the City of Greater Bendigo. These areas have been identified as suitable to support focused residential development to accommodate the anticipated growth of the City. Their development is supported by changes to the Planning Scheme to foster and encourage residential development. In order for this development to be safe and sustainable in managing wastewater, and to achieve the development density programmed for these areas, reticulated sewerage is required. The four development areas include:

- Huntly

- Strathfieldsaye

- Maiden Gully North

- Jackass Flat

Further development will also be seen in Marong, while Heathcote is to receive further investigation for opportunities for growth.

## Alternative Development Areas

While the Greater Bendigo municipality spans a significant area, much of the residential development has been confined to the Bendigo city and outlying townships. Focus for consolidating and retaining growth within the urban growth boundaries is important to ensure farming land and natural assets are not lost, while ensuring the land already developed and the associated services and infrastructure are used to their potential. Further residential growth beyond the urban growth boundary does occasionally see advocacy. These areas can present a collection of challenges for onsite wastewater management due to their geology. South Western regions see soils originating from granitic parent material. The landforms differ greatly from other areas of Greater Bendigo and present large elevations with significant slopes, rocky outcrops are common, while there is strong erosion potential, and numerous drainage depressions. The soil profiles in this area also commonly lead to saturation of soil in depressions during wetter months due to the difference in hydraulic conductivity between horizons. This can be easily identified by the rapid growth of *juncus acutus* (spiny rush) in these areas[58].

This contrasts areas seen to the North where the land presents very gentle slope and commonly sees inundation and water logging in low-lying areas, particularly in the vicinity of watercourses. The landscape in this area is predominantly composed of sedimentary and alluvial material.

These constraints for onsite wastewater management are not solely precluding low density or rural residential development in these areas but can have great influence on the viable densities of development and in some circumstances they define specialised design requirements for effective onsite wastewater management.

### Recommendation:

**Alternative Development Areas**

- Where support is considered for residential growth in unsewered areas, detailed investigation into the capability of the land for onsite wastewater management must be undertaken to ensure the City of Greater Bendigo can make a clear and informed decision.

## Growth of Unsewered Townships

Greater Bendigo, alike many other municipalities across Victoria, is home to a number of unsewered townships. Many of the allotments in these townships are small and constrictive for onsite wastewater disposal. A chronology of trends can be seen of various wastewater disposal designs utilised by developed allotments; offsite discharge of greywater and partially treated blackwater being common methods. With the evolution of wastewater guidance and legislation, these options are no longer available. Wastewater is now required to be maintained within the boundaries of the allotment where it was generated, unless the property is connected to a reticulated sewerage system or cluster system. This has resulted in many smaller township allotments being constrained for development.

Furthermore, more specific and conservative requirements have been implemented for design and siting requirements for traditional wastewater disposal methods. New technologies offers some opportunities to land owners by reducing the amount of land required to facilitate operation, yet they have not provided a solution that is solely sufficient to support development of these allotments in ways that are favourable and meeting modern living expectations.

Concern has been voiced by members of some small townships about their capacity for growth in the absence of a solution to these wastewater management constraints. Investigation into alternative options for wastewater management in unsewered townships should be undertaken with suitable guidance from the Greater Bendigo Residential Development Strategy.

While wastewater management is an important consideation, it must be noted that it is only one element in the determination of growth potential for townships

### Action 5:

- Undertake an investigation into innovative wastewater solutions for small townships in Greater Bendigo.

## Development within the Special Water Supply Catchment

A key aim of this strategy is to protect Bendigo's drinking water supply catchment from contamination by domestic wastewater. Detailed studies of the area have contributed to the declaration of Lake Eppalock and surrounds as a Special Water Supply Catchment. The catchment extends considerable distance to the South of the lake and includes townships such as Heathcote, Redesdale and Mia Mia. The catchment primarily comprises land zoned for farming, conservation and recreation while there are also some areas zoned as township, low density and rural residential areas, and general residential areas are seen in the centre of Heathcote.

Heathcote general residential areas are partly serviced by a reticulated sewerage scheme. Further extension of the sewerage system has been included in the Coliban Water Plan 2013-2018 [67]. Some areas of low density residential and rural living zone around Heathcote will remain unserviced by reticulated sewer due to density and need and will require special consideration when proposed for new development.  Redesdale, Mia Mia and Derrinal are all solely reliant on onsite wastewater management systems.

There are a collection of landform elements in the catchment that require specific consideration and planning to ensure wastewater is managed safely and sustainably, and is not contributing to contamination of the lake. There are several tributaries to the lake that traverse the catchment area. Larger rivers such as the Campaspe and Coliban Rivers are the most prominent of these. The major tributaries travel through the landscape of the catchment area that differs greatly from the expansive plains of the Northern sector of the municipality. Higher relief, a higher presence of basalt derived soils, and widely spaced major water courses with numerous tributaries and drainage depressions characterise the catchment area [58].

In order to protect the special water supply from contamination by domestic wastewater, the following Schedule has been developed to guide the City of Greater Bendigo when assessing applications for installation of an onsite wastewater management system, construction of a dwelling in unsewered areas, and subdivisions in unsewered areas in the special water supply catchment.

## Schedule A – Development in a Special Water Supply Catchment

In order to install an onsite wastewater management system in a declared special water supply catchment, the following criteria must be satisfied and all relevant threats be suitably mitigated:

All new applications for subdivision, consolidation or residential development in an Environmental Significance Overlay 3 must:

- Comply with the Code of Practice – Onsite Wastewater Management 891 (as updated), unless circumstances prescribe a need to make variation or exemption to achieve a best practice or better catchment protection outcome with consent of the approving officer.
- Make application to the City , and be issued with a permit under S53M of the Environment Protection Act before installing a domestic onsite wastewater management system.
- Demonstrate compliance of the proposal with the Environment Protection Act, SEPP Waters of Victoria, and the City's policies (or capacity for compliance if development does not form part of the application).
- Be accompanied by a Land Capability Assessment that:
    - Meets the satisfaction of the City's assessing officers,
    - Meets the satisfaction of the OWMS installation approval authority
    - Identifies and mitigates risk of adverse impacts on surface and groundwaters to the satisfaction of the OWMS installation approval authority
    - Is developed in accordance with appropriate Environment Protection Authority guidance materials (and/or as otherwise agreed with the City)
- Demonstrate that wastewater will be contained within the allotment boundaries.
- Not be designed to discharge wastewater to the surface of the ground.
- Be accompanied by suitable and detailed irrigation or disposal system design (where application is for construction or use of a dwelling)

This will form part of any new application for a planning permit for subdivision, consolidation or residential development in a declared special water supply catchment. The above information will be required for Environmental Health and Local Laws to determine whether onsite wastewater management is safe and suitable and provide advice to the Statutory Planning Department.

## Referral Authorities

The City of Greater Bendigo is not the only authority that is responsible for ensuring unsewered developments do not pose a significant contamination threat to the special water catchment. In consultation with the relevant referral authorities, it has been determined that additional risk analysis and information may be required to support applications for development in the special water supply catchment. It is proposed that any additional requirements be determined in consultation with the relevant referral authorities that may be necessary to accompany those listed in Schedule A. It is intended that this will allow applicants to prepare all necessary documentation before making application for unsewered development in the special water supply catchment.

### Action 6:

Consult the relevant referral authorities prescribed under Section 55 of the Planning and Environment Act 1987 to determine any additional requirements for assessing planning permits in the special water supply catchment with relevance to domestic onsite wastewater management.

# Chapter 5: Areas for Improvement



## Areas for Improvement

## Introduction

This chapter identifies areas within the Greater Bendigo municipality that require improvement in the way they manage domestic wastewater. The areas identified are known to the City for presenting difficulties in onsite wastewater management due to constraints of the landscape, historic or inadequate system design, widespread system failure and a history of complaints. All of these areas host wastewater systems designed to discharge offsite, particularly to drains and waterways. However, while they share a common theme of wastewater issues, there is some variation in the circumstances presented by each area. These variations can be observed in the summaries for each location.

A qualitative risk assessment has been applied to determine the priority given to each of these areas. The risk assessment is described in Chapter 1, while individual details informing the risk assessment are included with each locality. Also included for each locality is a visual representation of the landscape elements that can have particular influences on onsite wastewater management. These have been adapted from information in the City's Land Capability Mapping and Assessment Tool, developed on a collection of land capability studies in the Greater Bendigo municipality.

Actions and recommendations are provided in this chapter to guide the City of Greater Bendigo and its partners in improvement of wastewater management for these areas. Priorities have been applied as a means of focussing limited resources in addressing issues most effectively.


| **GENERAL CHARACTERISTICS** (Rises, Very Gentle Slope) | | | **COMMON SOIL CHARACTERISTICS** | | | **MANAGEMENT ANALYSIS** | | |
|---|---|---|---|---|---|---|---|---|
| Site Drainage / Runoff | Moderately Well Drained | 3 | Structure | Moderate | 2 | Character of Discharge | Offsite Discharge Grey only (Mobile) | 4 |
| Flood | Some drainage issues experienced after high rainfall | 3 | Profile Depth | 700mm | 5 | Volume of Discharge | 16+ houses | 5 |
| Slope % | 2% common | 2 | Sodicity | 9% | 4 | Potential for Site Return | Low | 5 |
| Landslip | X | 1 | Permeability | 6b 0.04m/d | 5 | Proximity to Water Course | Drain | 1 |
| Seasonal Water Table | >1.5 | 4 | Gravel | 75% | 5 | Proximity to Water Course | Stream | 1 |
| Rainfall | 513.1 mm/yr | 2 | Emerson AC | E2 | 4 | Proximity to Water Course | River | 1 |
| ET pot | 1600mm/yr | 1 | Salinity | <0.30ds/m | 1 | Proximity to FSL SWSC | N/A | 0 |

Analysis adapted from EPA Publication 746.1 and the work of White, Williams and Edis Information has been extracted from the City of Greater Bendigo Land Capability Mapping and Assessment Tool. This table is informative only and must not be used for assessment of land capability or development planning.

## Goornong Township Priority Level: 1

### For Inclusion in Mapping and Monitoring Program
### An Overview

Goornong is a moderate sized township on the Midland Highway, North of Bendigo city. The township is solely reliant on onsite wastewater management systems, many of which are greater than 25 years old and varying in design[59]. There are a number of small lots within the core of the township area that accommodate generally 2-4 bedroom residences[59]. The landscape in this area is predominantly very flat and during times of high precipitation, the area can be subject to some ponding and slow drainage. Goornong hosts a collection of complex wastewater management issues that span from historic designs, ageing systems, limited available space, highly developed lots, subjectivity to inundation, and limited success of roadside drainage[60].

At the time of initial development of the township of Goornong, it was common place to dispose of greywater directly to kerbside gutters. Kerbside drainage in the Goornong township presents as open earth drains in many areas, and these are frequently overwhelmed with stormwater after rain events. Some concrete kerbside drains can also be seen in the residential areas toward the Northern segment of the township. These drains are also frequently flooded, leaving stagnant water exposed until it drains or evaporates away. While this drainage infrastructure functions poorly for the township, the issue is confounded by mixing of effluent with the stormwater. This has led to a history of complaints of offensive odours emanating from the drains within the township. Exposure of residents to wastewater in the open drains also remains a concern for health protection.

## The Landscape

Goornong's water supply is predominantly sourced from the Campaspe River that traverses the landscape approximately 3.5 kilometres to the East. Protection of this asset is greatly important to ensure suitable drinking water quality for the town. Goornong naturally slopes very gently toward the North where the township boundary is curbed by Bendigo Creek, a tributary of the Loddon River. The Goornong area is included within the Land Capability Mapping and Assessment Tool and shows little variation across the general area. The area is noted to consist of sedimentary soils of the Ordovician period with very gentle slope, and the surrounds of the township are detailed as alluvial plains[61]. Hence, the area shows little variation in elevation and agricultural use dominates land surrounding the township.

## Goornong - Wastewater Essentials

### Context

- A high level of grey water discharge to stormwater drains.
- A high level of residential development of small lots in high density clusters leaves little room for onsite wastewater management / remediation.
- Low lying area subject to some inundation in times of high rainfall.
- Some properties are suspected of discharging partially treated blackwater to stormwater drains.

### Issues

- Increased potential for human contact with threat of disease communication.
- Pooling of wastewater in open roadside drains resulting in offensive odours.
- Mixing of wastewater and stormwater allowing movement of contaminants to Northern extent of town and potentially into Bendigo Creek environs.
- Development limitation resulting in restrictions on developments imposed and some lots remaining undevelopable.

### Receiving Environments

- Open earth kerbside drains
- Concrete kerbside drains
- Railway reserve
- Potentially Bendigo Creek environs during large watershed events

### Priority Rationale

- High intensity wastewater issue
- High implicit volumes of uncontrolled wastewater
- Widespread potential to impact on residents

## Action:

### Areas for Improvement – Goornong

**Action 7**
Develop a committee populated with members of the Goornong community and representatives of stakeholder organisations to determine suitable solutions to the issues, seek funding and implement remedial actions.


| GENERAL CHARACTERISTICS | | | COMMON SOIL CHARACTERISTICS | | | MANAGEMENT ANALYSIS | | |
|---|---|---|---|---|---|---|---|---|
| Site Drainage / Runoff | Moderately Well Drained | 3 | Structure | Moderate | 2 | Character of Discharge | Offsite Discharge Grey only (Mobile) | 4 |
| Flood | | 1 | Profile Depth | 800mm | 5 | Volume of Discharge | 10-15 houses | 4 |
| Slope % | 2% common | 2 | Sodicity | 0% | 1 | Potential for Site Return | Mod | 3 |
| Landslip | X | 1 | Permeability | 6b 0.04m/d | 5 | Proximity to Water Course | Drain | 1 |
| Seasonal Water Table | >2m | 3 | Gravel | 2.9% | 1 | Proximity to Water Course | Stream | 1 |
| Rainfall | 513.1 mm/yr | 2 | Emerson AC | E1 | 5 | Proximity to Water Course | River | 1 |
| ET pot | 1600mm/yr | 1 | Salinity | 0.53-1.26ds/m | 3 | Proximity to FSL SWSC | N/A | 0 |

Analysis adapted from EPA Publication 746.1 and the work of White, Williams and Edis Information has been extracted from the City of Greater Bendigo Land Capability Mapping and Assessment Tool. This table is informative only and must not be used for assessment of land capability or development planning.

# Raywood Township Priority Level: 2

## For Inclusion in Mapping and Monitoring Program An Overview

Raywood is a moderate sized township North of Bendigo City. Home to a school, police station, churches and some local businesses, the area holds a close community feel. Raywood has a history built on gold and agriculture. Many houses in the core of the township show hints to the age of the township. Raywood is solely reliant on onsite wastewater management systems for wastewater disposal. While many of the outer lying properties have considerable space for disposing of wastewater, some houses in the core of the township dispose of blackwater onsite, but discharge greywater to kerbside gutters. This issue is particularly notable in the Inglewood Street area. The greywater discharged mixes with stormwater and moves slowly through the open street drains and flows toward the recreation reserve in the North West. Here, the greywater has the opportunity to enter the storage dam that is used to irrigate the oval.

## The Landscape

Raywood presents only very gentle inclines across the landscape like much of the Northern segment of the municipality. The soil is composed of Ordovician sediments in the township while the East and West are bordered by alluvial plains that accommodate water courses, namely Myers Creek and Ellysian Flat Creek. The Raywood area presents higher rates of evapotranspiration than other parts of Bendigo[62], and with most households producing low volumes of wastewater, most disposal systems appear to recover well during dryer months even though they are undersized according to modern requirements.

In-situ cast septic tanks with various trench designs are common across the Raywood township and older properties[63]. Water use may also vary slightly with the construction of a more reliable reticulated water supply pipe in 2012/13. Ongoing monitoring of the influence of the new water supply should be maintained to ensure any fluctuations are not in excess of the capacity of existing onsite wastewater management systems.

## Raywood - Wastewater Essentials

### Context

- Some grey water discharge to stormwater drains along Inglewood Street.
- A high level of residential development on small lots leaving little room for onsite wastewater management / remediation.
- Accumulation of greywater in stormwater drains with slow drainage.
- Greywater draining from kerbside gutters to recreation reserve area and dam.
- Numerous small lots remain undeveloped in the township partially due to the limitations for wastewater disposal.

### Issues

- Increased potential for human contact with threat of disease communication.
- Pooling of wastewater in open roadside drains resulting in offensive odours.
- Mixing of wastewater and stormwater allowing movement of contaminants toward the recreation reserve dam
- Development limitation resulting in restrictions on developments imposed and some lots remaining undevelopable.

### Receiving Environments

- Brick lined kerbside drains
- Concrete kerbside drains
- Recreation reserve area and irrigation dam

### Priority Rationale

- Low volume of uncontrolled greywater
- Receiving environment of greywater is known and reasonably contained
- Issue slowly decreasing with the redirection of some split systems to onsite disposal

## Actions and Recommendations:

### Areas for Improvement – Raywood

### Action 8

Investigate extent of properties discharging greywater offsite to inform decision making and any funding assistance bids.

### Action 9

Investigate funding sources for better management of greywater.

- Maintain detailed mapping and records of all onsite wastewater management systems in the area.
- Closely monitor applications to install and alter septic tank systems in the Raywood area and, where possible, require current discharge requirements be met as part of any permits issued to do so.


| GENERAL CHARACTERISTICS | | | COMMON SOIL CHARACTERISTICS | | | MANAGEMENT ANALYSIS | | |
|---|---|---|---|---|---|---|---|---|
| Site Drainage / Runoff | Imperfectly | 2 | Structure | Moderate | 2 | Character of Discharge | Offsite Discharge BW/Combination (Mobile) | 4 |
| Flood | 1:100 on some properties | 3 | Profile Depth | 1300mm | 4 | Volume of Discharge | 10-15 houses | 4 |
| Slope % | 12% common | 2 | Sodicity | 20% | 5 | Potential for Site Return | Mod | 3 |
| Landslip | X | 1 | Permeability | 6b 0.04m/d | 5 | Proximity to Water Course | Drain | 1 |
| Seasonal Water Table | >1.5m | 4 | Gravel | 20% | 3 | Proximity to Water Course | Stream | 3 |
| Rainfall | 513.1 mm/yr | 2 | Emerson AC | E1 | 5 | Proximity to Water Course | River | 1 |
| ET pot | 1600mm/yr | 1 | Salinity | <0.30ds/m | 3 | Proximity to FSL SWSC | N/A | 0 |

Analysis adapted from EPA Publication 746.1 and the work of White, Williams and Edis Information has been extracted from the City of Greater Bendigo Land Capability Mapping and Assessment Tool. This table is informative only and must not be used for assessment of land capability or development planning.

# Unsewered Strathfieldsaye Priority Level: 1

## For Inclusion in Mapping and Monitoring Program
## An Overview

Strathfieldsaye is located to the South East of Bendigo city, nestled between bushland to the North West, and agricultural land to the South and the East. The township had a population of 3804 in 2006 yet this is projected to grow to 10,512 by 2030. This increase of 6,708 people, while it remains estimation, indicates that the demands placed on Strathfieldsaye are likely to increase considerably. Careful, specific and equitable consideration of this growth on wastewater management considerations will be required to navigate the growth in a sustainable and accommodating way.

The Western and Central sectors of Strathfieldsaye are now serviced by reticulated centralised sewer. These areas still contain small pockets where onsite wastewater management systems are used.

However, the Residential 1 Zoned areas to the North East and the New Development Areas are not currently serviced with reticulated centralised sewer. These areas are still serviced by onsite wastewater management systems, where developed. Many of these systems are conventional septic tanks that dispose to various trench designs. Other systems on smaller lots developed in the late 1970's and early 1980's are widely reliant on sand filter systems that discharge wastewater to storm water drains, and ultimately to one of the two major watercourses that navigate Strathfieldsaye.

## The Landscape

The landscape of Strathfieldsaye is a complex environment for onsite wastewater management. The Strathfieldsaye township is not included in the Land Capability Mapping and Assessment Tool. Visual assessment of the area establishes that the area consists primarily of meta sedimentary soils. Some exposed sedimentary rock is apparent in the North East and scattered pebbles are also visible. Gentle inclines can be seen across the township, with convergence to the central sector and major water courses. Alluvial plains hem the major water courses with shallow groundwater apparent toward the central South and South Western sectors of Strathfieldsaye. The presence of shallow groundwater has left a legacy of high salt concentrations in these areas that predominantly surround the surface water bodies. A Salinity Management Overlay has been applied to some of these saline areas[64].

The hydraulic conductivity of much of the area is expected to show a nature of that similar to much of the surrounding area. The alluvial plains that flank the two major watercourses could be expected to have a slightly elevated hydraulic conductivity in general. Gentle crests in the North Eastern and South Eastern areas are expected to have a limited depth of soil. This presents further complexity for wastewater disposal via absorption trench in some instances, the most common design for existing onsite wastewater management systems in these areas.

An Environmental Significance Overlay 2 and a Salinity Management Overlay highlight the areas of notable groundwater activity; primarily recharge and discharge [64]. Groundwater in this area is generally mapped for very limited beneficial use [65]. A number of dams are present on select properties in areas of lower density residential development. Some of the unsewered segments of Strathfieldsaye are captured by a Vegetation Protection Overlay that can also limit disposal options for onsite wastewater management systems.

## Unsewered Strathfieldsaye – Wastewater Essentials

### Context

- Two clusters of properties designed to discharge partially treated blackwater to collection drains and to creeks.
- High level of development on these lots does not provide sufficient space to sustainably manage wastewater onsite.
- Open concrete drains traverse some private properties collecting wastewater for disposal to Sheepwash Creek. These drains are occasionally overwhelmed and wastewater spills onto these properties requiring clean up.
- Other development clusters to the North West are reliant on ageing onsite wastewater management systems with highly developed lots and little space for expansion, repair or replacement.

### Issues

- Potential for human contact with wastewater with threat of disease communication.
- Movement and overflow of wastewater onto private properties resulting in odour and offensive materials being deposited.
- Discharge of wastewater from properties directed into Sheepwash Creek and Emu Creek presenting a threat to water quality and ecological health.

### Receiving Environments

- Sheepwash Creek
- Emu Creek
- Open concrete collection drains (some traversing residential properties)
- Kerbside gutters

### Priority Rationale

- Direct discharge of partially treated wastewater to notable water courses
- Direction of partially treated wastewater through open drains on private property increasing risk of human contact

## Actions and Recommendation:

Areas for Improvement – Unsewered Strathfieldsaye

### Action 10

Commence investigation into the feasibility of connection of properties discharging wastewater offsite to reticulated centralised sewer.

- Maintain detailed mapping and records of all onsite wastewater management systems in the area.

# Heathcote & Argyle Priority Level:1

## For Inclusion in Mapping and Monitoring Program
## An Overview

Heathcote and Argyle are programmed for sewer extension. Provisions have been made with inclusion of this backlog extension into the Coliban Water 'Water Plan 2013 – 2018'. With reflection on resources available to the DWMP review, no further intensive investigation has been made into this area at this time. This will occur in collaboration with Coliban Water with the implementation of the backlog sewer extension scheme. Once determined, areas that fall outside the sewer extension area will be investigated in detail and their management detailed within this strategy where necessary.

**Priority Rationale:**

- Previously identified as high priority area in DWMP 2006 due to widespread offsite discharge in a declared open potable water supply catchment area.

**Actions:**

Heathcote and Argyle

**Action 11**

Support Coliban Water in preparing, planning and communication of sewerage extension works planned for Heathcote and Argyle.

**Action 12**

Include and investigate sections of Heathcote and Argyle that are not serviced by the proposed sewer extension and include any relevant wastewater matters in this strategy.


| GENERAL CHARACTERISTICS | | | COMMON SOIL CHARACTERISTICS | | | MANAGEMENT ANALYSIS | | |
|---|---|---|---|---|---|---|---|---|
| Site Drainage / Runoff | Moderately Well Drained | 3 | Structure | Moderate | 2 | Character of Discharge | Offsite Discharge Grey only (Mobile) | 4 |
| Flood | 1:100 mapped in proximity of properties in question | 3 | Profile Depth | 500-700mm | 5 | Volume of Discharge | 1-5 houses | 2 |
| Slope % | 5% common | 2 | Sodicity | 19% | 5 | Potential for Site Return | High | 1 |
| Landslip | X | 1 | Permeability | 6b 0.04m/d | 5 | Proximity to Water Course | Drain | 1 |
| Seasonal Water Table | >1.5m | 4 | Gravel | 75% | 5 | Proximity to Water Course | Stream | 2 |
| Rainfall | 513.1 mm/yr | 2 | Emerson AC | E2 | 4 | Proximity to Water Course | River | 1 |
| ET pot | 1600mm/yr | 3 | Salinity | <0.30ds/m | 1 | Proximity to FSL SWSC | N/A | 0 |

Analysis adapted from EPA Publication 746.1 and the work of White, Williams and Edis Information has been extracted from the City of Greater Bendigo Land Capability Mapping and Assessment Tool. This table is informative only and must not be used for assessment of land capability or development planning.

# Ascot Priority Level: 3

## For Inclusion in Mapping and Monitoring Program An Overview

Ascot accommodates a number of unsewered properties. Many of these properties are sizeable, providing space for householders to afford a semi-rural lifestyle. While there are many large properties, there remain a cluster of properties in the area that saw development at a time of limited wastewater requirements. As a consequence, some of the smaller properties have been designed to discharge greywater to an open earth drain. Poor drainage of this greywater is augmented by increased vegetation growth and aggregation of silt in the drains.

## The Landscape

The developed areas of Ascot present a relatively flat landscape composed of sedimentary and alluvial soils. A collection of small water courses traverse the area, yet the most prominent water course remains the Bendigo Creek to the West. The Ascot area is subject to more significant surface water movement than many other areas of Bendigo. This highlights the importance for robust onsite wastewater management system design, and the retention of wastewater onsite. While the potential for pollution from other activities in the area are likely to outweigh the impact of active greywater offsite discharge, due regard should still be made for reducing this pollution source where possible. While the properties known to discharge greywater offsite are smaller in comparison to other properties in the area, preliminary investigation identifies that they still generally exhibit sufficient space for onsite disposal.

## Ascot - Wastewater Essentials

**Context**

- A cluster of houses have been designed to dispose of greywater to an open earth drain.
- The proximity of Ascot to significant water courses, and the frequency and volume of stormwater flows through the area provide a pathway for contamination.

**Issues**

- Greywater pooling in open earth drains have been identified to smell at times.
- Greywater, if permitted to enter water courses in the area may contribute to ecological degradation.

**Receiving Environments**

- A collection of small proximal watercourses and depressions
- Potentially Bendigo Creek
- Potentially Back Creek
- Open earth drain

**Priority Rationale**

- Small implicit volume of uncontrolled wastewater
- Low intensity wastewater issue
- Limited impacts on public spaces

**Proposed Actions**

- Where possible, promote redirection of wastewater to be disposed and retained onsite.
- Promote robust onsite wastewater management system design when applications to alter or install are made.
- Maintain detailed mapping and records of all onsite wastewater management systems in the area.

## Recommendations:

Areas for Improvement – Ascot

- Where possible, promote redirection of wastewater to be disposed and retained onsite.
- Promote robust onsite wastewater management system design when applications to alter or install are made.
- Maintain detailed mapping and records of all onsite wastewater management systems in the area.

# Markovich Lane (A Learning Experience)

## An Overview

Markovich Lane and the McIvor Highway Service Road in Junortoun was identified as a high risk area due to existing onsite wastewater management systems in the DWMP 2006. This area commenced development in the late 1970's through to the mid 1990's. While the area is relatively small, there is a high density of residences that are reliant on onsite wastewater management systems on properties that span down to approximately 560m$^2$. Further contributing to the issues in this area is the number of wastewater management systems that have been designed to dispose of wastewater offsite.

Here, wastewater is directed to a kerbside drain that drains to an open spoon drain on the opposite side of the McIvor Highway. A collection of complaints have been received by the City of Greater Bendigo regarding odour, and the rapid growth of reeds in the drain has resulted in concern about road safety for traffic entering the McIvor Highway from local properties. Larger properties in this area discharge wastewater within the property boundaries; however this is with limited success in some instances.

## Knowledge Gained

The Markovich Lane area highlights the difficulties faced with offsite discharge of wastewater and the impacts experienced by the residents. It is a prime example of the need for well-considered planning for the future of residential developments, particularly with their need for ongoing wastewater disposal and it also demonstrates that temporary wastewater disposal measures can be required to far exceed their design life due to budgetary constraints, and competing demands on available resources.

The sewerage extension programme has identified a need for strengthening relationships with water corporations to ensure valuable, clear, and consistent communication between organisations and the community. This is greatly important to keep everyone informed and up to date with the progress. There is also great significance invested in the depth and detail of system audits undertaken by City officers to ensure Coliban Water is provided with comprehensive and constructive information about the situation to assist them in developing priorities, strategizing properties for inclusion, and determining the benefits of reticulated sewerage provision to these areas.

# Chapter 6: Areas for Careful Management



## Areas for Careful Management

## Introduction

This chapter identifies areas within the Greater Bendigo municipality that require careful management to ensure that they continue to manage wastewater suitably and effectively. The areas identified are clusters of residential development that have a high potential for release of large quantities of wastewater offsite, or release of wastewater to very sensitive receiving environments. Hence, a particular focus is on areas within special water supply catchments, and areas with high densities of wastewater systems designed to discharge to the surface of the ground.

The risk assessment approach adopted in Chapter 5 has also been applied in this chapter for determining areas for inclusion, and the priority level assigned to them. A particular focus of this chapter is managing existing developments, but also future development in the area. The intention is not to retard development, but to ensure it is appropriate and wastewater can be managed sustainably onsite.

Actions and recommendations are provided in this chapter to guide the City of Greater Bendigo and its partners in carefully managing wastewater in these areas.

## Junortoun
## Priority Level: 2

### For Inclusion in Mapping and Monitoring Program
### An Overview

Junortoun is largely a new development centre that has seen a collection of residential subdivisions in more recent times. Low Density Residential lots span the area while only a segment to the West of the suburb is serviced with reticulated town sewer. The landscape in Junortoun reflects much of this Eastern sector of the Greater Bendigo municipality with a significant presence of sedimentary soils. Native vegetation is a distinctive element of this area, and in many parts of Junortoun it is protected by means of a Vegetation Protection Overlay[64]. The majority of properties in Junortoun are serviced by higher treatment systems that dispose of waste via irrigation to the surface of the ground. While these systems produce higher treated wastewater and allow more effective water reuse, they must be serviced regularly to do so safely. Failure to treat wastewater to a suitable standard results in an increased risk of human and environmental exposure to harmful wastewater contaminants[6]. Hence, careful management of these systems to ensure their effective treatment is vital in sustaining safe and suitable wastewater management in Junortoun into the future.

### The Landscape

Junortoun's landscape supports low density residential use with its gentle undulations and presence of native vegetation. Minimum lot sizes prescribed by the planning scheme are 4000m² and most properties are found to be reflective of this. Homebush Creek runs parallel to the McIvor Highway through the core of Junortoun, affronting many residential properties. Native vegetation is very dense in the Western sector of the suburb, and is particularly notable in areas such as Floreate Drive, Botany Drive, Heritage Court, Strathfieldsaye Road, and extending South toward Strathfieldsaye. The presence of this native vegetation appears to have prevented harvesting of fragments of siltstone and meta-morphised rock from the ground surface for use in roads and construction as has happened in many other areas like this in Greater Bendigo.

The majority of Junortoun is included in the LCM&AT and is identified primarily as Ordovician sediments while alluvial soils can be observed in areas surrounding Homebush Creek [61].


| GENERAL CHARACTERISTICS (Low hills, Gentle Slope) | | | COMMON SOIL CHARACTERISTICS | | | MANAGEMENT ANALYSIS | | |
|---|---|---|---|---|---|---|---|---|
| Site Drainage / Runoff | Imperfect | 2 | Structure | Weak | 3 | Character of Discharge | Surface Irrigation/ OD Subsurface | 3 |
| Flood | 1:100 mapped on some properties | 3 | Profile Depth | 1300-1500mm | 2 | Volume of Discharge | 16+ houses | 5 |
| Slope % | 7% common | 2 | Sodicity | 22% | 5 | Potential for Site Return | High | 5 |
| Landslip | X | 1 | Permeability | 6b 0.04m/d | 5 | Proximity to Water Course | Drain | 1 |
| Seasonal Water Table | >1.5m | 4 | Gravel | 20% | 3 | Proximity to Water Course | Stream | 2 |
| Rainfall | 513.1 mm/yr | 2 | Emerson AC | E1 | 5 | Proximity to Water Course | River | 1 |
| ET pot | 1600mm/yr | 3 | Salinity | <0.30ds/m | 1 | Proximity to FSL SWSC | N/A | 0 |

Analysis adapted from EPA Publication 746.1 and the work of White, Williams and Edis Information has been extracted from the City of Greater Bendigo Land Capability Mapping and Assessment Tool. This table is informative only and must not be used for assessment of land capability or development planning.

## Junortoun - Wastewater Essentials

### Context

- A high density of higher treatment systems in residential developments
- Many onsite wastewater management systems rely on surface irrigation for wastewater disposal and require regular and competent servicing to meet safe water quality standards
- A widespread presence of dense native vegetation is found in the Western sector of the suburb that is protected by planning controls

### Issues

- If inadequately serviced and maintained, higher treatment systems may not treat wastewater to the safe standards that are required
- Surface irrigation increases potential for human contact and movement of wastewater offsite during high precipitation which could promote disease communication and environmental degradation if treatment standards are not met
- Containment of effluent disposal areas within the building envelope due to protected vegetation may result in a higher risk of human exposure to effluent

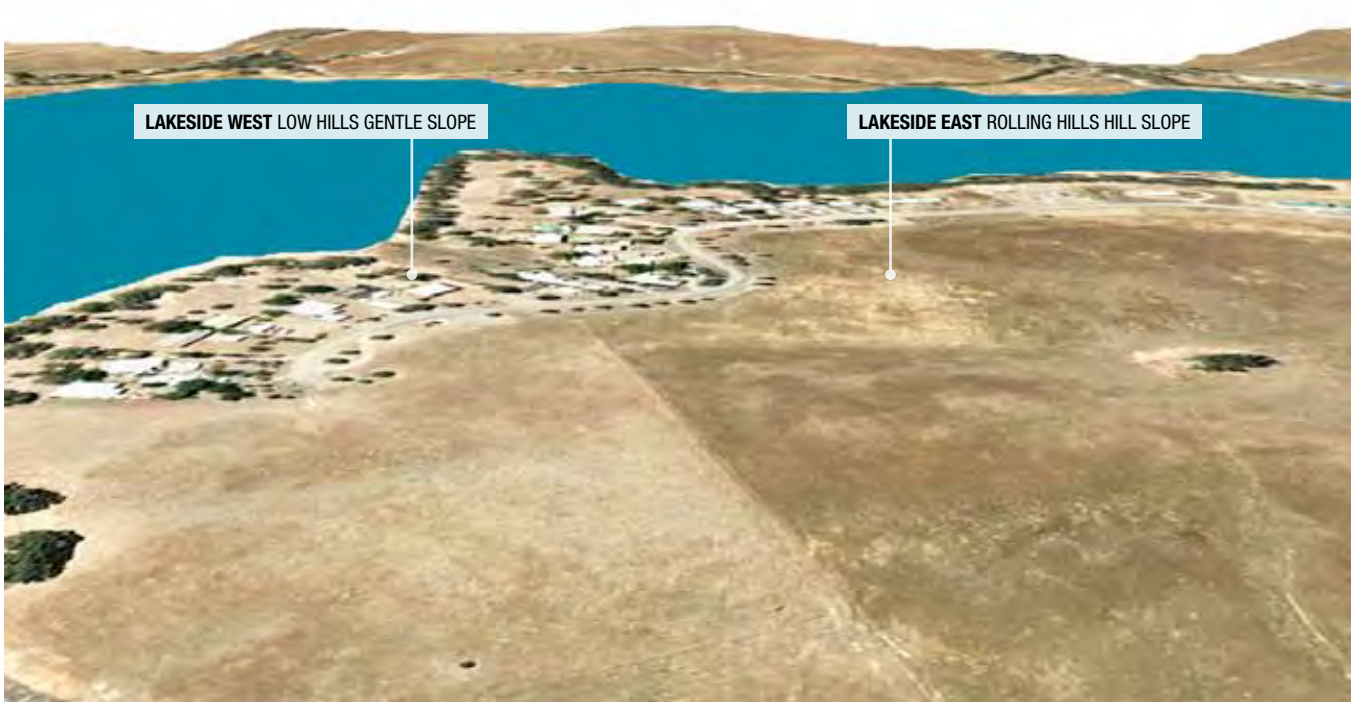
### Priority Rationale

- High volume of wastewater to be managed in the area
- Low density development
- High density of systems designed to discharge wastewater to the surface of the ground

## Recommendations

Areas for Careful Management – Junortoun

- Promote routine servicing should be completed by competent and suitably qualified persons.
- Maintain detailed mapping and records of all onsite wastewater management systems in the area.
- Ensure suitable consideration of effluent disposal locations is determined during the subdivision or planning permit process to promote safe disposal with minimal vegetation disturbance.




| **GENERAL CHARACTERISTICS** (Lakeside East) | | | **COMMON SOIL CHARACTERISTICS** | | | **MANAGEMENT ANALYSIS** | | |
|---|---|---|---|---|---|---|---|---|
| Site Drainage / Runoff | Well drained | 3 | Structure | Moderate | 2 | Character of Discharge | Surface Irrigation/ OD Subsurface | 3 |
| Flood | Anecdotal evidence of FSL exceeded | 3 | Profile Depth | 1300mm | 2 | Volume of Discharge | 1-5 houses | 2 |
| Slope % | 11% representative of site | 2 | Sodicity | 9% | 4 | Potential for Site Return | High | 1 |
| Landslip | X | 1 | Permeability | 6a 0.06m/d | 5 | Proximity to Water Course | Drain | 1 |
| Seasonal Water Table | >1.3m | 5 | Gravel | 28% | 5 | Proximity to Water Course | Stream | 1 |
| Rainfall | 572.3 mm/yr | 2 | Emerson AC | Low | 2 | Proximity to Water Course | River | 1 |
| ET pot | 1400mm/yr | 2 | Salinity | <0.30ds/m | 1 | Proximity to FSL SWSC | | 3 |

| **GENERAL CHARACTERISTICS** (Lakeside West) | | | **COMMON SOIL CHARACTERISTICS** | | | **MANAGEMENT ANALYSIS** | | |
|---|---|---|---|---|---|---|---|---|
| Site Drainage / Runoff | Imperfect | 2 | Structure | Weak | 3 | Character of Discharge | Discharge Subsurface | 2 |
| Flood | Anecdotal evidence of FSL exceeded | 3 | Profile Depth | 1300-1500mm | 2 | Volume of Discharge | | 1 |
| Slope % | 7% common | 2 | Sodicity | 22% | 5 | Potential for Site Return | High | 1 |
| Landslip | X | 1 | Permeability | 6b 0.04m/d | 5 | Proximity to Water Course | Drain | 1 |
| Seasonal Water Table | >1.5m | 4 | Gravel | 20% | 3 | Proximity to Water Course | Stream | 1 |
| Rainfall | 572.3 mm/yr | 2 | Emerson AC | E1 | 5 | Proximity to Water Course | River | 1 |
| ET pot | 1400mm/yr | 2 | Salinity | <0.30ds/m | 1 | Proximity to FSL SWSC | | 3 |

Analysis adapted from EPA Publication 746.1 and the work of White, Williams and Edis Information has been extracted from the City of Greater Bendigo Land Capability Mapping and Assessment Tool. This table is informative only and must not be used for assessment of land capability or development planning.

# Lakeside Boulevard - Derrinal (PWSC) Priority Level: 1

## For Inclusion in Mapping and Monitoring Program
## An Overview

Lakeside Boulevard accommodates 25 residential lots on the shores of Lake Eppalock. As the lake is the key potable water supply catchment for Greater Bendigo, development of these lots has seen scrutiny and concern for the protection of water quality. The 25 lots are now all developed with dwellings located on each, all of which rely on onsite wastewater management systems for wastewater disposal. None of the onsite wastewater management systems meet the required 300m buffer distance from the full supply level of the lake as required by the current Code of Practice – Onsite Wastewater Management. Wastewater is predominantly managed by conventional septic tanks with absorption trenches, yet there remain a cluster of properties on the Eastern extent that rely on packaged treatment plants or dry composting systems.

While it is not the only residential development in close proximity to Lake Eppalock, Lakeside Boulevard presents the highest density of residential lots reliant on decentralized domestic wastewater management systems.

Calculations based on saturated seepage rates measured in the area suggest that a significant space of time required for effluent to reach the lake via the soil. This is not the situation for all systems in the area however, due to some discharging wastewater to the surface of the ground. Surface discharge presents a much faster pathway for carriage of contaminants to the lake during periods of high precipitation and is a matter for further investigation.

## The Landscape

The landscape surrounding Lakeside Boulevard presents some interesting origins that differ from much of the Greater Bendigo municipality. Glacial sediments of the Permian period are noted in the area while Ordovician sediments are also present[61]. Much of the area has been cleared of native vegetation apart from the waterfront. Hence, grasses cover much of the wastewater disposal areas. The land generally slopes toward the waterfront from the developed strip, ranging from very gentle to gentle.

## Lakeside Boulevard - Wastewater Essentials

**Context**

- A cluster of 25 dwellings in close proximity to Greater Bendigo's key drinking water supply catchment
- The location and condition of these OWMSs are generally unknown
- Some OWMSs are higher treatment systems that dispose of wastewater to the surface of the ground.

**Issues**

- Increased risk of contamination of drinking water supply with wastewater due to proximity to the water body

**Priority Rationale**

- Close proximity to potable water body meaning that may result in contamination should systems fail

## Action and Recommendations:

- Areas for Careful Management – Lakeside Boulevard Derrinal
- Promote routine servicing should be completed by competent and suitably qualified persons.
- Maintain detailed mapping and records of all onsite wastewater management systems in the area.
- Investigate funding sources for an upgrade subsidy scheme to assist homeowners in achieving best practice wastewater management.

**Action 13**

Undertake routine inspections of the onsite wastewater management systems to ensure their compliance with permit conditions and minimise their potential for contamination of the potable water supply catchment.


## MIA MIA

| **GENERAL CHARACTERISTICS** PLAIN | | | **COMMON SOIL CHARACTERISTICS** | | | **MANAGEMENT ANALYSIS** | | |
|---|---|---|---|---|---|---|---|---|
| Site Drainage / Runoff | Poorly | 2 | Structure | Moderate | 2 | Character of Discharge | Discharge Subsurface | 2 |
| Flood | | 1 | Profile Depth | >2000mm | 1 | Volume of Discharge | | 1 |
| Slope % | 2% common | 2 | Sodicity | 0% | 1 | Potential for Site Return | High | 1 |
| Landslip | X | 1 | Permeability | 5 0.07m/d | 3 | Proximity to Water Course | Drain | 1 |
| Seasonal Water Table | >3m | 2 | Gravel | 7% | 1 | Proximity to Water Course | Stream | 1 |
| Rainfall | 572.3 mm/yr | 2 | Emerson AC | Low | 2 | Proximity to Water Course | River | 1 |
| ET pot | 1400mm/yr | 2 | Salinity | <0.30ds/m | 1 | Proximity to FSL SWSC | | 3 |

| **GENERAL CHARACTERISTICS** CREST | | | **COMMON SOIL CHARACTERISTICS** | | | **MANAGEMENT ANALYSIS** | | |
|---|---|---|---|---|---|---|---|---|
| Site Drainage / Runoff | Rapid | | Structure | Moderate | | Character of Discharge | Discharge Subsurface | 2 |
| Flood | | 1 | Profile Depth | 100-700mm | 5 | Volume of Discharge | 1-5 houses | 2 |
| Slope % | 20% common (10%-40% range) | 5 | Sodicity | 0% | 1 | Potential for Site Return | | 1 |
| Landslip | High susceptibility to soil erosion | 5 | Permeability | 6b 0.04m/d | | Proximity to Water Course | Drain | 1 |
| Seasonal Water Table | 3m | 2 | Gravel | 4-6% | 1 | Proximity to Water Course | Stream | 2 |
| Rainfall | 572.3 mm/yr | | Emerson AC | Low | 2 | Proximity to Water Course | River | 1 |
| ET pot | 1400mm/yr | 2 | Salinity | <0.30ds/m | 1 | Proximity to FSL SWSC | | 3 |

Analysis adapted from EPA Publication 746.1 and the work of White, Williams and Edis Information has been extracted from the City of Greater Bendigo Land Capability Mapping and Assessment Tool. This table is informative only and must not be used for assessment of land capability or development planning.


## REDESDALE

| GENERAL CHARACTERISTICS PLAIN | | | COMMON SOIL CHARACTERISTICS | | | MANAGEMENT ANALYSIS | | |
|---|---|---|---|---|---|---|---|---|
| Site Drainage / Runoff | Poorly | 2 | Structure | Moderate | 2 | Character of Discharge | Discharge Subsurface | 2 |
| Flood | | 1 | Profile Depth | >2000mm | 1 | Volume of Discharge | | 1 |
| Slope % | 2% common | 2 | Sodicity | 0% | 1 | Potential for Site Return | High | 1 |
| Landslip | X | 1 | Permeability | 5 0.07m/d | 3 | Proximity to Water Course | Drain | 1 |
| Seasonal Water Table | >3m | 2 | Gravel | 7% | 1 | Proximity to Water Course | Stream | 1 |
| Rainfall | 572.3 mm/yr | 2 | Emerson AC | Low | 2 | Proximity to Water Course | River | 1 |
| ET pot | 1400mm/yr | 2 | Salinity | <0.30ds/m | 1 | Proximity to FSL SWSC | | 3 |

| GENERAL CHARACTERISTICS CREST | | | COMMON SOIL CHARACTERISTICS | | | MANAGEMENT ANALYSIS | | |
|---|---|---|---|---|---|---|---|---|
| Site Drainage / Runoff | Rapid | | Structure | Moderate | | Character of Discharge | Surface Irrigation/ OD Subsurface | 3 |
| Flood | | 1 | Profile Depth | 100-700mm | 5 | Volume of Discharge | 1-5 houses | 2 |
| Slope % | 20% common (10%-40% range) | 5 | Sodicity | 0% | 1 | Potential for Site Return | | 1 |
| Landslip | High susceptibility to soil erosion | 5 | Permeability | 6b 0.04m/d | | Proximity to Water Course | Drain | 1 |
| Seasonal Water Table | 3m | 2 | Gravel | 4-6% | 1 | Proximity to Water Course | Stream | 1 |
| Rainfall | 572.3 mm/yr | 2 | Emerson AC | Low | 2 | Proximity to Water Course | River | 3 |
| ET pot | 1400mm/yr | 2 | Salinity | <0.30ds/m | 1 | Proximity to FSL SWSC | | 3 |

Analysis adapted from EPA Publication 746.1 and the work of White, Williams and Edis Information has been extracted from the City of Greater Bendigo Land Capability Mapping and Assessment Tool. This table is informative only and must not be used for assessment of land capability or development planning.

# Mia Mia and Redesdale Priority Level: 2

## For Inclusion in Mapping and Monitoring Program
## An Overview

Mia Mia and Redesdale are small townships located within the special water supply catchment to the South of Lake Eppalock. While currently presenting modest residential development, the township zoning of the area offers some development potential with regard to the Victorian Planning Provisions alone. There remain many undeveloped small allotments within the township areas, most of which extend below two thousand square metres in area. This lot size, accompanied by other guidance and wastewater requirements may be a significant factor in the limited development rates in the area seen to date.

## The Landscape

Redesdale presents a cluster of dwellings in close proximity to the Campaspe River. There is a notable presence of rocky outcrop and stony surface deposits in these areas. Evidence can also be seen of a shallow water table in some low-lying, sandy areas flanking the Campaspe River. A clear transition is seen from the Basaltic plains in the Southern sector, passing over a gentle crest and sloping down to an open drainage depression accommodating the Campaspe River. Some dwellings are distributed along the waning mid-slope of the terrain; while a cluster of small vacant allotments are also distributed along the slope. While Redesdale presents basaltic plains, sedimentary soils and granitic materials, deposition of stones, and a major tributary of Lake Eppalock, Mia Mia is a gateway to steep low hills composed of Ordovician sediments spanning further North. Soils are generally shallow, only presenting suitable depth for subsoil wastewater disposal in lower slopes and flats. Accordingly, a study of the Land in the Campaspe River catchment has identified these two townships to fall within separate land systems yet they both present many similar constraints for onsite wastewater management.

### Redesdale

Redesdale presents a landscape of high variance. Plains are bordered by considerable depressions. Basaltic plains littered with stony depositions at the surface can be seen in the area. A volcanic history, along with sedimentary material and granitic derivations can be observed within the township area. While a collection of dwellings are located toward the South on the plains, a number of dwellings dot the slope down toward the Campaspe River.

### Mia Mia

Mia Mia also presents sections of moderate slopes developed with dwellings. Plains can be seen to the South while the Centre of the township is crossed by a creek and its associated alluvial deposits. Stony deposits are also common in part of this area and rolling hills can be seen surrounding the township. Many dwellings in Mia Mia are smaller in size and are reliant on tanks as a sole water source.

## Mia Mia & Redesdale – Wastewater Essentials

### Context

- A number of small lots currently undeveloped remain within these townships
- A high variance across the landscape with large depressions, steep slopes, shallow soil, wide deposits of rock, and complex soils and landforms present constraints for onsite wastewater management
- A collection of ageing onsite wastewater management systems with limited records currently service houses in the area
- These townships fall within the declared catchment area with water courses and depressions in close proximity to many township allotments

### Issues

- Increased risk of contamination of drinking water supply with wastewater due to proximity to the water body
- Potential for ecological degradation of watercourses in close proximity

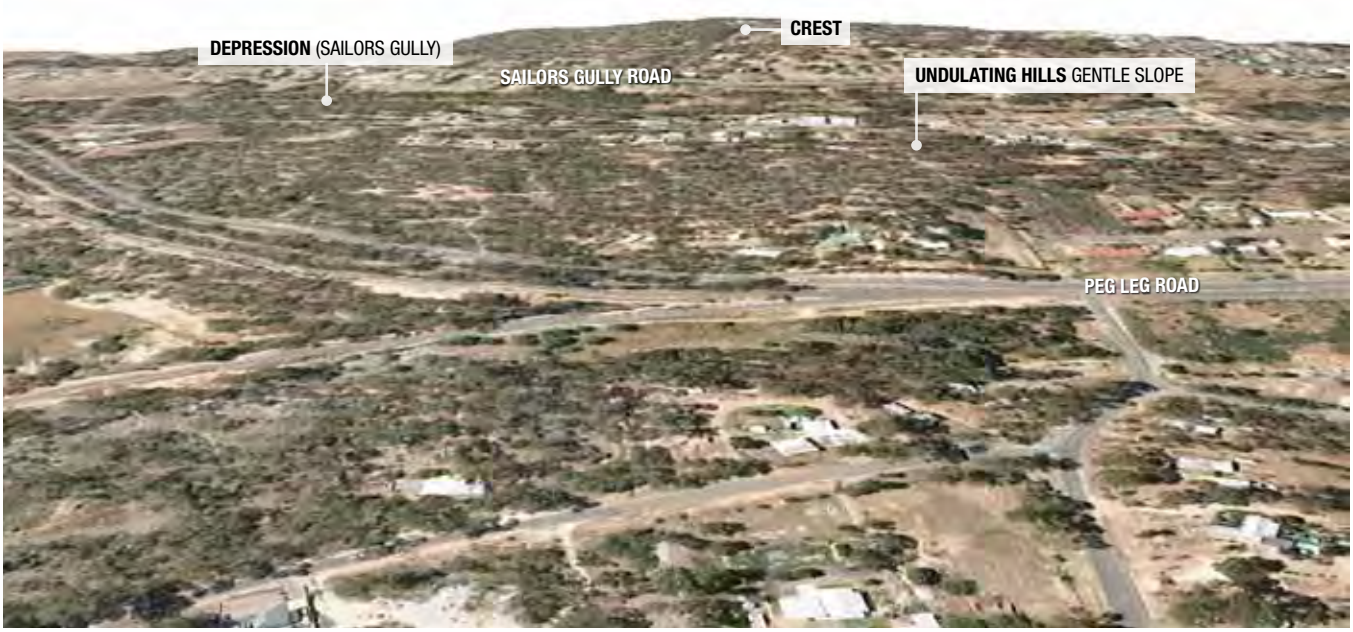
### Priority Rationale

- Close proximity to key tributary water courses of a potable water body potentially resulting in contamination should failure occur
- Complex landscape for onsite wastewater management in some segments

## Recommendations:

Areas for Careful Management – Mia Mia and Redesdale

- Promote routine servicing should be completed by competent and suitably qualified persons.
- Maintain detailed mapping and records of all onsite wastewater management systems in the area
- Where applications for alteration or upgrade to individual onsite wastewater management systems are made, ensure the systems are carefully evaluated in their effectiveness and their suitability to the site.




| GENERAL CHARACTERISTICS | | | COMMON SOIL CHARACTERISTICS | | | MANAGEMENT ANALYSIS | | |
|---|---|---|---|---|---|---|---|---|
| Site Drainage / Runoff | Well drained | 4 | Structure | Moderate | 2 | Character of Discharge | Offsite Discharge Grey only (Mobile) | 4 |
| Flood | | 1 | Profile Depth | 800mm | 5 | Volume of Discharge | 1-5 houses | 2 |
| Slope % | 5% common | 2 | Sodicity | 0% | 1 | Potential for Site Return | High | 1 |
| Landslip | X | 1 | Permeability | 6b 0.04m/d | 5 | Proximity to Water Course | Drain | 2 |
| Seasonal Water Table | >5m | 3 | Gravel | 7% | 1 | Proximity to Water Course | Stream | 1 |
| Rainfall | 513.1 mm/yr | 2 | Emerson AC | E1 | 5 | Proximity to Water Course | River | 1 |
| ET pot | 1600mm/yr | 1 | Salinity | 0.53-1.26ds/m | 3 | Proximity to FSL SWSC | N/A | 0 |

Analysis adapted from EPA Publication 746.1 and the work of White, Williams and Edis Information has been extracted from the City of Greater Bendigo Land Capability Mapping and Assessment Tool. This table is informative only and must not be used for assessment of land capability or development planning.

## Sailors Gully & Eaglehawk Priority Level: 3

### For Inclusion in Mapping and Monitoring Program
### An Overview

Sailors Gully is the gateway to the North West from Eaglehawk. It shows a strong history of gold mining with a collection of mine spoil heaps projecting from behind the clusters of ironbark. Sailors Gully itself is a shallow gully that carries water from time to time. The area is surrounded by undulating rises while Sailors Gully and Peg Leg Gully compose the lowest points. Onsite wastewater management systems in this area are generally ageing along with a cluster of small properties to the North, some of which discharge greywater offsite.

The most common onsite wastewater management systems in the area are conventional septic tanks with various trench configurations. Some of the newer properties make use of package treatment plants for wastewater management, commonly disposing to surface drippers. Split systems can also be seen in the area, particularly servicing smaller properties with limited available space for onsite disposal.

## The Landscape

The area is generally comprised of Ordovician sediments with exposed faces of siltstone apparent in areas. A widely vegetated area, the Sailors Gully locality gives a neighbourhood feel of semi-rural country roads. Residents have noted this neighbourhood character as a valued element of the area, while onsite wastewater management contributes also to this appearance and lifestyle. Much of the Sailors Gully area is not included in the LCM&AT mapping, yet the landscape presents some limitations for onsite wastewater management. Vegetation, shallow soils, and some older and smaller lots in areas can present complexities for managing wastewater onsite. Much of this area is now developed and hence the focus shifts for onsite wastewater management to managing and maintaining existing infrastructure and systems.

## Sailors Gully & Eaglehawk – Wastewater Essentials

### Context

- Widely developed area with ageing onsite wastewater management systems
- Some offsite discharge of greywater by historic design.
- Site constraints in the area identify that some existing onsite wastewater management systems are not ideally suited to the site of installation
- Sewer is in close proximity yet development in the area is unlikely to grow due to interfaces with dense native vegetation and developed larger lots.
- Residents indicate that while sewer connection is the ideal option for the area, they are widely content with their existing onsite wastewater management system

### Issues

- Discharge of greywater offsite can lead to offensive odours
- Introduction of greywater can lead to ecological degradation in receiving environments

### Priority Rationale

- Implicit volume of uncontrolled wastewater is relatively small
- Most records of wastewater issues in the area have been localised to the particular property and those immediately surrounding it

## Action and Recommendations:

Areas for Careful Management – Sailors Gully and Eaglehawk

- Promote routine servicing should be completed by competent and suitably qualified persons.
- Maintain detailed mapping and records of all onsite wastewater management systems in the area
- Where applications for alteration or upgrade to individual onsite wastewater management systems are made, ensure the systems are carefully evaluated in their effectiveness and suitability to the site.
- If evidence becomes available to support the need for wide-spread sewer extension, undertake re-evaluation of the circumstances, advocate and provide support for sewer extension.

### Action 14

Continue to monitor receiving environments, conditions and the opinions of the residents regarding onsite wastewater management in the area.

# Goornong Water Supply (Campaspe River) Priority Level: 2

## An Overview

The Campaspe River is a very large water course that stretches from its origins near Lerderberg in the South, through to the Murray River. The Campaspe forms a significant landmark and acts as the Eastern border for the Northern section of the municipality. A key tributary to Lake Eppalock, the river is protected to the South as a potable water supply. Yet, as it ventures North the river's status as a declared potable water supply ceases. The Campaspe River acts as the main water supply for Goornong's reticulated water system. Protection of this watercourse from contamination is hence a priority.

## The Landscape

Much of the land surrounding the Campaspe River is zoned for Farming use or as Rural Living zone. The distribution of dwellings does not reflect the densities seen in residential areas. However, consideration must still be made to ensure that water quality is maintained and contribution of contamination from onsite wastewater management systems is minimised. The landscape that surrounds the Campaspe River presents numerous variations along its path due to differing parent materials. Plains are the predominant landform pattern in the area, particularly as the river progresses North.

## Goornong Water Supply – Wastewater Essentials

**Context**

- Goornong extracts water from the Campaspe River to support the town drinking water supply.
- Dwellings on properties that flank the Campaspe River are predominantly reliant on onsite wastewater management systems to dispose of wastewater.

**Issues**

- Should onsite wastewater management systems fail, there is potential for water quality to be reduced.
- If introduction of wastewater occurs, it increases the potential for disease transmission and detriment to the River's ecology.

**Priority Rationale**

- Most of the catchment area for this segment of the Campaspe River is developed in extremely low density and are already conducive to achieving a 100m setback in most cases.

## Recommendation:

Areas for Careful Management – Goornong Water Supply Campaspe River

- Where possible, assessing officers should ensure new onsite wastewater management systems are installed 100m from the Campaspe River in accordance with guidance provided in the Code of Practice – Onsite Wastewater Management (as updated)

# Chapter 7: Better Practice for Better Outcomes



## Better Practice for Better Outcomes

### Introduction

As a regulator and approval authority, the City of Greater Bendigo holds particular responsibilities to ensure permits are issued only for suitable wastewater management proposals. Further to this, however, comes a number of opportunities to improve onsite wastewater management across the municipality. These opportunities arise through developing minimum standards and expectations for submissions and mandatory reporting to the City, filling gaps in records and knowledge of existing onsite wastewater management systems, supporting flexibility and freedom where it is possible and appropriate, and applying learning from the past to manage new developments.

Actions and recommendations are provided in this chapter to guide the City of Greater Bendigo and its partners in improving standards and practice in onsite wastewater management.

# Considering Wastewater with Planning Permit Applications

## Referrals to Environmental Health and Local Laws

Wastewater management considerations form an important element of statutory town planning. An inability to manage wastewater adequately could render a site undevelopable. While prescribed instances exist under the Planning and Environment Act for referral of planning permit applications to referral bodies, Environmental Health and Local Laws are not listed as a statutory referral body. The referral of proposed developments, subdivisions and consolidations of land to Environmental Health and Local Laws is greatly important to ensure land outside of a sewered area is adequate to support proposed or future development and use. Numerous limitations can impede the safe management of wastewater via an onsite wastewater management system. Blanket application of minimum lot sizes has been proven by time and experience that they are not a failsafe and only form part of the wider picture when determining the viability of a site to sustain safe wastewater management.

## Action and Recommendation:

Considering Wastewater with Planning Applications – Referrals to EVH

- All applications for a planning permit to develop or use land for a dwelling or structure where wastewater will be generated, subdivide land, or consolidate land, outside of an area serviced by a viable sewer connection point, should be referred to Environmental Health and Local Laws for comment.

**Action 15**

Make amendment to the Greater Bendigo Planning Scheme to reference this Domestic Wastewater Management Strategy.

## Vegetation Protection and Wastewater Management

A particular element of crossover between wastewater management and statutory town planning involves the consideration of sites presenting a Vegetation Protection Overlay. A collection of recent subdivisions have yielded lots covered by dense native vegetation. While a building envelope has been designated during the subdivision phase, a viable location for wastewater management has been overlooked. As the properties are developed, it has been realised that further vegetation removal is required as insufficient space remains for wastewater disposal within the building envelope. Through designation of a specific wastewater disposal location, the backtracking and application for further planning permits can be circumvented and as specific determination of the details of development are produced, simple adjustments to accommodate wastewater disposal areas can be made.

## Recommendation:

Vegetation Protection and Wastewater Management

- Require that applications for a planning permit to develop and use land for a dwelling or structure where wastewater will be generated, or subdivide land for residential use on land subject to a Vegetation Protection Overlay, should designate a flexible wastewater disposal envelope.

### Preventing Unnecessary Encumbrance

The Planning and Environment Act offers a number of pathways to ensure conditions of development are applied to the subject land. One particular option, known as a Section 173 Agreement, has been requested by Environmental Health and Local Laws to be imposed on developments with particular regard to wastewater matters on occasion. A Section 173 Agreement remains on the subject land until such time that it is removed by relevant legal proceedings. Time and experience has now identified that the Section 173 Agreement should be applied sparingly due to the fast evolution of wastewater management conventions. While current best practice measures may provide an opportunity to manage wastewater in the most suitable manner available, subjection of the land to these requirements on an ongoing basis is a matter that requires careful and measured consideration.

### Recommendation:

Preventing Unnecessary Encumbrance

- Application of a Section 173 Agreement should not be requested by Environmental Health and Local Laws unless the circumstances presented are such that no other method for enabling safe and sustainable onsite wastewater management can be utilised.

## Determining Safe and Sustainable Disposal Methods (Sewer Availability)

The provision of reticulated centralised sewer is the first preference for wastewater management at any property in the City of Greater Bendigo. Connection to a reticulated sewerage system relieves property owners of maintenance and management burdens associated with onsite wastewater management systems. Stricter management protocols and higher treatment are also achievable through this method. It is, however, duly noted that provision of reticulated sewerage to many properties within the Greater Bendigo municipality is unfeasible and unrealistic. The management of reticulated sewer systems within the municipality is the responsibility of Coliban Water. Nonetheless, the City of Greater Bendigo plays a very important role in supporting Coliban Water with the planning and sustainability of these sewerage systems and in determining when properties should be connected.

There are particular instances where the City of Greater Bendigo holds responsibility in ensuring the safest and most suitable wastewater disposal method is determined. These include:

- In the development (before endorsement) of precinct and township structure plans.
- When assessing applications to subdivide land.
- When assessing applications to develop or use land for a dwelling or structure producing wastewater.
- When assessing applications to install an onsite wastewater management system.

This determination must be made in consultation with Coliban Water to ensure that adequate provisions and limits of the proposal meets the availability and capacity of sewer infrastructure.

Decisions may be influenced by the following factors:

- Zoning of the land.
- Overlays, schedules and local policies.
- The likelihood of further development in the area.
- The proximity to sewer.
- The proximity of the land to elements of environmental significance or sensitive resources.
- The viability of the site for sustaining an onsite wastewater management system in a safe and suitable condition.

- The extent of the proposed development.
- The ongoing sustainability of the proposal.
- The capacity of the available infrastructure.
- The alignment with growth patterns and development directions in the general area.
- The viability and availability of a suitable sewerage connection point.
- Density of development in the general area.

Two major pathways for investigating safe and suitable wastewater disposal methods are presented for the City of Greater Bendigo. The first is by statutory referral to water corporations pursuant to Section 55 of the Planning and Environment Act. The second is via voluntary referral in instances such as development of strategic plans, assessment of onsite wastewater management applications, and planning permit applications not triggering referral requirements. Determination of voluntary referral is a matter for assessing officers of City of Greater Bendigo to establish upon assessment. Where matters are referred internally to Environmental Health and Local Laws, consideration of the matter will be provided and recommendation for further referral be suggested or undertaken where appropriate.

### Action and Recommendation:

Determining Safe and Sustainable Disposal Methods Sewer Availability

- Where an assessing officer at the City of Greater Bendigo identifies that a development or proposal may be viably achieved through reticulated sewerage connection, referral of the matter to Coliban Water should be made.
- Before it is determined that a property may avoid connection to a reticulated centralised sewer, it must be proven that connection to sewer is not viable and that the site can sustain onsite wastewater management on a permanent, ongoing basis (regardless of whether it is a temporary measure while waiting for sewer extension).

**Action 16**

Develop a policy in consultation with relevant water corporations to establish a definition for when sewer is 'reasonably available' and when an engineering report should be requested to support a development application.

Residential development planning by the City of Greater Bendigo has adopted the position that provision and extension of conventional residential scale development will only occur where reticulated sewerage is made available. Planning for Bendigo's conventional residential growth is not being provided for where it is reliant on onsite wastewater treatment.

## Minimum Standards for Land Capability Assessment

Land capability assessments form critical reports that guide decisions and conditions made by the City of Greater Bendigo regarding onsite wastewater management. Detailed land capability assessments are occasionally required to provide additional information to support development proposals, particularly where onsite wastewater management is subject to constraining environmental features, or present a threat to elements of environmental significance. Hence, the accuracy of a land capability assessment is highly important.

Land capability assessments are often undertaken by local consultants with a background in environmental science, geotechnical disciplines, engineering, environmental health, or soil science. No formal training requirements and no licencing schemes currently exist in Victoria to undertake land capability assessments. As a consequence, the City of Greater Bendigo receives varying standards of land capability reports with regard to their depth, trustworthiness, and admonition.

Where further information in the form of a land capability assessment is required to support an application, the applicant is required to source a consultant and pay for the assessment to be undertaken. If the land capability assessment fails to meet a suitable standard and fails to provide adequate information to the City of Greater Bendigo, or other referral authority, the process can result in costly and time consuming revisions and amendments to the report. In order to prevent this from occurring, it is proposed that minimum standards for land capability assessment in the City of Greater Bendigo be formulated. Here, the impetus is focussed on ensuring assessments are identifying all relevant elements of the site and surrounds, the advice provided within the report is conservative and appropriate, and the methods for assessment are based on best practice models.

Two key documents are currently available in Victoria to help guide land capability assessment for onsite wastewater management. The Victorian Land Capability Assessment Framework and EPA Publication 746 both provide clear guidance for basic elements of land capability assessment, however, more regional specific guidance is required to ensure suitable reports are provided to the City of Greater Bendigo and undue risk is not presented to the community by inappropriate or unsafe development.

### Action:

Minimum Standards for Land Capability Assessment

**Action 17**

Form a committee composed of land capability assessors, referral authorities, members of neighbouring local governments and relevant delegates of the City of Greater Bendigo to determine minimum standards for land capability assessment in the Greater Bendigo region.

## Minimum Standards for Service Reports

A mandate of many higher onsite treatment systems is that they be serviced by a suitably competent service agent at prescribed intervals. Service reports must be submitted to the City of Greater Bendigo as a record of completion and to support record keeping on the system's condition. The format of these service reports vary between service agents, as well as their depth of detail. Commonly known in the industry as a 'tick and flick', these reports can be very limited in providing details on the condition of the system and the works undertaken. Furthermore, there is a divide in the industry whether service agents are responsible for maintaining irrigation systems commonly associated with these systems. By implementing minimum servicing standards, it is intended that higher servicing standards and more comprehensive records of system function can be maintained across the Greater Bendigo area.

### Action and Recommendation:

Minimum Standards for Service Reports

**Action 18**

Form a committee composed of service agents, neighbouring local governments and relevant delegates of the City of Greater Bendigo to develop minimum standards for servicing and reporting on higher treatment systems in the Greater Bendigo area.

- Explore avenues where the mandatory routine servicing and reporting process can be used to support the mapping and monitoring program proposed as part of this strategy.

## Service Contract Termination Notifications

The management of servicing of higher treatment systems in the Greater Bendigo municipality is a large task that widely relies on the self-directed compliance of property owners with onsite wastewater permit conditions. Most property owners ensure their higher treatment system is regularly serviced by a qualified service agent, however, if a servicing contract is cancelled, the City is not directly notified. Variances in the frequency of servicing occurs between system types which further complicates the matter of following up servicing of higher treatment systems. Here, as a means of simplicity, a standard notification form for all service agents could provide a notification pathway. This form would allow service agents to notify the City of Greater Bendigo if a servicing contract is cancelled. This often occurs at the time of a property sale with new owners being unaware of the mandatory service requirements. By ensuring that the City of Greater Bendigo is notified of the contract cancellation, it allows for the property owners to be contacted with educational material advising of the servicing requirements of their higher treatment system with greater immediacy.

### Action:

Service Contract Termination Notification

**Action 19**

Develop a standard form available for voluntary use by service agents to notify the City of Greater Bendigo when servicing contracts are terminated to promote that the system continues to be suitably serviced.

## Maintaining High Regulatory Standards

### Open Trench Inspections

Ensuring onsite wastewater management systems are installed correctly and in accordance with guidelines, requirements and permit conditions is essential to provide them the best opportunity to manage wastewater effectively. As an approval authority for onsite wastewater management system installation, the City of Greater Bendigo remains the key body in ensuring all installations are completed satisfactorily before approving use of the system within the municipality. To date, the regulatory procedure commonly entailed the following elements:

- Desktop assessment of application to install onsite wastewater management system against LCM&AT, Land Capability Assessment (if required), and any other relevant information.
- Initial site inspection to validate findings of the desktop assessment.
- If suitable, issue a Permit to Install an Onsite Wastewater Management System
- (An opportunity for an open trench inspection occurs here)
- Receive final paperwork including PIC Compliance Certificate and ‘as installed’ plan
- Final inspection onsite to confirm compliance with Permit to Install
- Issue of Approval to Use the Onsite Wastewater Management System

While the final inspection offers an opportunity to identify non-conformances with permit conditions, the depth of the inspection is greatly limited as the system is generally covered over. The system may have been installed two years previous to the final inspection and can lead to costly repair work or alteration if it is identified that permit conditions have not been met. It is proposed that the City of Greater Bendigo adopt an additional site inspection in the sequence of approval. An inspection undertaken during the installation of the onsite wastewater management system, commonly known as an ‘open trench inspection’

in the industry will allow for the identification of issues before works are finalised. While an open trench inspection is an additional demand on immediate resources, such an inspection allows the City of Greater Bendigo to provide a more comprehensive and competent service as an approval authority. The open trench inspection will not be mandatory for all work undertaken, however a percentage of works undertaken in Greater Bendigo will be inspected to promote a higher standard across the board.

### Action:

Maintaining High Regulatory Standards Open Trench Inspections

**Action 20**

Implement an open trench inspection program that focusses on undertaking inspections on a percentage of systems at the installation stage.

### Promoting Officer Competency

In order for inspections and desktop assessments to work effectively, assessing officer knowledge is essential. It is proposed that a standard training package be developed for all new Environmental Health Officers accepting employment with the City of Greater Bendigo. The training package shall focus on specific local wastewater elements, system design, the development and application of the LCM&AT, site assessment, general land capability assessment, and policies, procedures and legislation pertaining to wastewater management.

### Action:

Promoting Officer Competency

**Action 21**

Produce and implement a new officer training package for the City of Greater Bendigo that provides relevant new employees with fundamental local wastewater knowledge.

## Promoting Healthy Choice

Frequently, City of Greater Bendigo Environmental Health and Local Laws are contacted by proponents wishing to develop land, commonly for use as a dwelling. General advice can be provided over the phone or counter with reference to the LCM&AT. Particular site conditions can influence the type of onsite wastewater management system suitable for use on a lot. Site constraints can include shallow soil depth to a limiting layer (rock, groundwater, etc.), low permeability of soil, slope of the land, proximity to environmentally significant features, established vegetation, and available space for installation. While some of these site constraints cannot be avoided on occasions, there are often instances where promotion of healthy choice can be made for future land owners at the subdivision stage.

Generally, the easiest manner for overcoming such site constraints is through the use of more complex wastewater treatment technologies. Here, flexibility is provided in more disposal design options and a smaller system footprint. However, along with a more complex treatment system frequently come reliance on more parts with limited lifespans, higher maintenance requirements, and often higher reliance on professional service agents. Environmental Health and Local Laws regularly receive feedback that such systems do not suitably align with the lifestyle of some residents required to install them at their property due to the level of maintenance, the servicing costs, and the tolerance of the system to particular household wastewater contaminants.

In some instances, this cannot be overcome and the land can only be developed with the use of higher treatment technologies. However, careful consideration at the subdivision stage can sometimes prevent higher treatment requirements being imposed on future owners of the allotments. Here, the choice is restored for the land owner to make healthy choices that suit their lifestyle. Some land owners will choose higher treatment technologies to support garden beds and land scaping designs, but before doing so, they have the opportunity to assess their capacity for meeting the higher maintenance and monitoring requirements.

It is hence proposed that this thought process be implemented into the assessment process for new subdivisions in unsewered areas upon referral to Environmental Health and Local Laws. Any Land Capability Assessment developed for a residential subdivision must provide evidence that each lot can manage wastewater onsite safely and sustainably through the use of a primary treatment onsite wastewater management system and associated approved disposal methods as well as by a secondary treatment system and associated disposal methods. There will be instances where this cannot be achieved. Here it will be required that any Land Capability Assessment produced to support the subdivision provide extensive rationale for why the subdivision should proceed with reliance on higher treatment systems alone. The intention is not to restrict development, instead it is intended to act to empower future property owners to make healthy choices that suit their lifestyle.

### Recommendation:

Promoting Healthy Choice

- Require that all applications for subdivision in unsewered areas be supported by wastewater management proposals that do not limit the development unnecessarily to reliance on higher treatment systems only, when it can be achieved by other methods.

## Reserve Areas

One of the most significant problems faced with failing onsite wastewater management systems in the Greater Bendigo municipality is a lack of available space for growth or upgrade. Development on these established lots has expended all available space to expand or move the failed wastewater system. A reserve area in this instance is a means of reserving space for future expansion or replacement where required; a failsafe.

The idea of a reserve area is not new. Reserve areas are a requirement for trench and LPED systems prescribed in the Code of Practice – Onsite Wastewater Management 891, however this has only been actively enforced in particularly sensitive circumstances by the City.

A reflection on previous standards for determining minimum disposal system size shows a general trend of expansion, with many older systems now being considered undersized by current sizing guides. Although a reserve area is a requirement for trench and LPED systems as prescribed by the Code, irrigation systems are not required by the Code to have a reserve area. The rationale behind this being that research has shown that irrigation failure is rarely a result of exhaustion of the application area. Regardless of whether this is the case, it still fails to provide space for future house extension or expansion of the field if wastewater generation at the property exceeds the system design.

It is proposed that a reserve field be a requirement for all new onsite wastewater management system installations. By requiring this failsafe, greater longevity can be promoted at each site for safe and sustainable onsite wastewater management. It is noted that not all new residential developments will be able to designate sufficient area for a reserve field. In these instances, management programs may need to be developed to designate an appropriate course of action should failure or expansions occur.

Any land capability assessment for a new residential subdivision or lot development must designate suitable reserve areas.

### Actions

Reserve Areas

**Action 22**

Make adjustment to internal policy to require that suitable reserve areas be demonstrated at the time of subdivision

**Action 23**

Make adjustment to internal policy to require that a suitable reserve area is designated at the time of application for a permit to install an onsite wastewater management system

# Creating Supportive Environments for Best Practice

## A Supportive Approach

This strategy is formed on the principles of health promotion with acknowledgement of the social model of health and of onsite wastewater management system function. In reflection on this, the approaches to bringing about better wastewater management outcomes centres on socially focussed actions. This strategy is a guide for assisting the community of Greater Bendigo to manage wastewater safely and sustainably through healthy public policy, strengthening community action, developing personal skills, creating supportive environments, and reorienting public services. Hence, a collaborative and supportive approach to improving onsite wastewater management conditions is the necessary approach, while enforcement and regulatory activities are reserved for a last resort for resolving wastewater matters. See the City of Greater Bendigo Compliance Policy (as updated) for the approach to be applied to monitoring and improvement associated with onsite domestic wastewater in Greater Bendigo.

## Recommendation:

Creating Supportive Environments for Best Practice A Supportive Approach

- Apply a supportive approach to wastewater regulation in accordance with the City of Greater Bendigo Compliance Policy (as updated).

## Preparedness for Funding Initiatives

Funding for onsite wastewater management initiatives is made available on occasion. Their frequency is not linear and is hard to pre-empt given their influences. However, while funding is not regularly available, preparedness for its availability provides the City of Greater Bendigo the opportunity to make a prioritised, rationed and formulated basis for application. Development of priorities, collation of evidence and investigation of potential solutions should be documented where possible across Greater Bendigo to ensure that once funding is made available, an articulate submission can be made.

## Recommendation:

Preparedness for Funding Initiatives

- Ensure that data gathered throughout implementation of the Domestic Wastewater Management Strategy is detailed and documented for clear translation into a funding application. Identification of priorities, evidence of issues, and proposed solutions should be included in this documentation.

## Defining Failure

Upon review of onsite wastewater management literature, it is apparent that a variety of definitions of failure exist[36]. In order to satisfy a pragmatic approach, a definition of failure has been developed to support the application of this strategy. See Schedule B for details of the adopted definition of failure for this strategy. The definition has been developed with consideration of the intentions of onsite wastewater management legislation and guidelines to operate in accordance with the intended capabilities of its approval, limit the risk presented to the surrounding environment and the health of the public. Treatment standards are only a factor for consideration where the quality of the effluent is directly influencing these elements. Protection of surface and groundwaters, beneficial uses of environmental resources, maintaining amenity standards for upholding quality of life and neighbourhood values, and containment of effluent in the intended disposal area contribute to the formation of the outcome priorities.

### Schedule B

An onsite wastewater management system is defined as failing if it functions in a in a mode that the:

- Onsite wastewater management system is in a condition or state of operation that requires general maintenance work to treat and/or dispose wastewater as intended or prescribed by the permit or other relevant requirements – Minor failure (eg. may include small damaged structural items, minor component failure or damage, not serviced in accordance with permit or requirements, requiring replacement of minor commodities / consumable components etc.)
- Treatment of wastewater by the onsite wastewater management system is inadequate or incompatible with the disposal method or the permit or other relevant requirements – Moderate failure (eg. residual disinfectant concentrations not within prescribed relevant range for surface discharges etc.)
- Disposal method is not operating in accordance with the permit or other relevant requirements where a permit is not available – Moderate failure (eg. irrigation system retrofitted with sprinklers that emit aerosols etc.)
- Wastewater disposal area is inadequate or exhausted and unable to accept, contain or treat wastewater in accordance with the permit or other relevant requirements where a permit is not available. – Major failure (eg. wastewater disposal area unable to accept wastewater without replacement of soil and disposal system components etc.)
- Wastewater is discharged offsite or in a manner that promotes human contact in contravention of a permit or other relevant requirements – Major failure (eg. system adulterated to discharge blackwater to a stormwater drain etc.)
- Onsite wastewater management system is deemed to present an unreasonable risk to public health or the surrounding environment by an officer of Environmental Health & Local Laws. – Major Failure

The determined level of failure will influence the priority and timeframes required for any repairs in conjunction with the City of Greater Bendigo Enforcement Policy.

## Building Capacity for Climatic Reflex

Climate change is a matter that deserves particular consideration in wastewater management. Currently, the specific consequences of climate change are unclear; however preparedness and flexibility are keys to managing a changing climate. More extreme weather events are expected to span from climate change and these may alter the functioning and efficiency of onsite wastewater management systems with their current designs in Greater Bendigo. Higher rainfall events and adjusted evapotranspiration rates may impair or enhance the disposal efficiency of these systems. Vegetation components of onsite wastewater management systems may also be influenced by climate change[68]. While the extent and course of change remains indefinite, the need to diligently monitor the situation remains essential. This will provide the opportunity to adjust accordingly and promote innovative measures attuned to the trends observed.

Limiting the contribution from onsite wastewater management systems to climate change should also remain a subject for consideration in Greater Bendigo. Where possible, treatment of wastewater through simple and natural processes that rely on low energy inputs, reduced product miles, downgrading of by-products of wastewater processing, and making safe and beneficial use of end products should be encouraged. This is, however, a choice for consumers to make with consideration of their lifestyle and the constraints of their property. City of Greater Bendigo holds a role in demonstrating effective, efficient and environmentally responsible onsite wastewater management at facilities across the Greater Bendigo municipality.

### Recommendation:

Building Capacity for Climatic Reflex

- Ongoing monitoring of the condition and effectiveness of onsite wastewater management systems should be undertaken to ensure that local design requirements remain reflexive and robust to operate efficiently and safely in a changing climate.

## Mapping, Monitoring and Education for Safe and Sustainable Environments

This element of the Domestic Wastewater Management Strategy is a fundamental cornerstone. Through mapping, monitoring and maintaining records of onsite wastewater management systems and their capabilities and upkeep, evidence based practice can be supported. To date, the City of Greater Bendigo has not followed up on onsite wastewater management systems after they have been approved for use. Only a lodged complaint triggers the City of Greater Bendigo to investigate and pursue the function of the onsite wastewater management system. This has led to circumstances where risks are presented because of the unknown. Informed decisions cannot be made on catchment protection, lobbying for funding to support upgrade, and managing areas presenting high risk without evidence of the functionality of systems.

It is proposed that a mapping, monitoring and record updating program be commenced. This program would involve the investigation and mapping of onsite wastewater management systems to identify the GPS location of their components, their design and size, and their capabilities for treating wastewater and retaining it onsite. Through collection of this data it is possible to identify areas of high risk and it allows for immediate access to system data for these properties. This data forms the basis for making informed decisions about wastewater management across Greater Bendigo and provides an opportunity to satisfy the relaxation of catchment guidelines where appropriate.

Receipt and analysis of service reports is also vitally important to ensure their upkeep and to validate their safety. Failure to maintain higher treatment systems can lead to the discharge of poorly treated wastewater in areas with high potential for human contact, or for release into sensitive environmental receptors.

A key element of the mapping and monitoring program is to identify the functionality of onsite wastewater management systems in higher risk areas. A checklist, along with relevant permit conditions will be used to assess onsite wastewater management systems and assist officers in determining the functionality of these systems. The level of functionality determined by the assessment will prescribe the priority of any required repairs or upgrades and will be considered in conjunction with the City of Greater Bendigo Enforcement Policy where applicable. A pragmatic approach will be applied to the program to ensure that where an existing system is operating effectively but does not comply with current standards or the Code of Practice, then the system will be monitored; however, unless a failure occurs the owner will not be required to repair, upgrade or replace the system.

The mapping and monitoring program will commence in areas identified as priority 1 in this strategy and follow onto areas of lower order priority as resources permit. Further details on risk and priority assignment can be found in *Chapter 2 Integrated Principles and Philosophies.*

### Actions and Recommendations:

Mapping, Monitoring and Education for Safe and Sustainable Environments

**Action 24**

Commence an onsite wastewater system mapping and monitoring program to map the GPS coordinates, the functionality, and the system design for integration into a centralised database. Initial focus is to be maintained in areas with higher densities of onsite wastewater management systems. (Priority schedules will dictate order of investigation.)

**Action 25**

Trial a householder education scheme in conjunction with the mapping and monitoring program to promote wider understanding of onsite wastewater management systems and empower householders to make informed decisions about management and maintenance of their onsite wastewater management system.

**Action 26**

Undertake specialised testing of receiving environments to develop detailed knowledge of the impacts experienced and their influences.

Use data gathered from the mapping and monitoring program to provide specific and relevant reminders for property owners on scheduled maintenance activities to assist householders in managing their system effectively.

- Provide a summary of monitoring results to relevant stakeholders annually.

## Service Report Database

Routine servicing is essential for most of the higher treatment systems installed in Greater Bendigo. Generally, the servicing intervals occur once every three months, yet the frequency differs between systems and their designs. It is greatly important to ensure higher treatment systems are serviced regularly because they are often composed of many moving components, and they have consumable components as well. Checking sludge accumulation, adjusting aeration rates and checking the function of electronic components are all key measures to ensuring the higher treatment system meets the required water quality standards to protect the receiving environment and human health. It is a legal requirement that routine servicing be undertaken by a suitably experienced person, and that a report be submitted to local government.

To date, the City of Greater Bendigo has struggled to manage the number of reports that are submitted to effectively monitor them and follow up any outstanding issues. There is a need for an electronic database to maximise efficiency in managing the reports, linking them to other corresponding records for those individual systems, and ensuring that any critical issues are followed up promptly.

## Action:

Service Report Database

**Action 27**

Develop a centralised service report database that allows for the lodgement and tracking of higher treatment systems to ensure their regular servicing is carried out and their functionality is maintained.

# Chapter 8: Land Capability Mapping and Assessment Tool



## The LCM&AT

### Role of the Instrument

The Land Capability Mapping and Assessment Tool is a reference document for this strategy and is a vital tool for the City of Greater Bendigo when assessing applications to install and alter onsite wastewater management systems. The LCM&AT was initially developed in 2006 by RMCG in conjunction with Van Der Graaf and Associates and consists of land capability data relevant to onsite wastewater management. Previous land capability studies of the Greater Bendigo area acted as a source of baseline data that has been interpreted for onsite wastewater management purposes. Here the data has been integrated into the City of Greater Bendigo GIS software and provides officers with immediate access to detailed land capability data. Along with the land capability mapping, the LCM&AT holds other important wastewater design and decision guidance.

The LCM&AT continues to provide the City of Greater Bendigo with an opportunity to undertake desktop assessments to support field assessments for onsite wastewater suitability. It affords the City an opportunity to relax the requirement for all wastewater applications to be accompanied by a land capability assessment.

### Interpretation of the Document

While the LCM&AT remains an invaluable tool to the City of Greater Bendigo, its accurate and competent interpretation is essential for it to provide value. Broad-scale land capability assessment must always be confirmed by comprehensive site inspections to ensure its accuracy. Time and exposure to human activities can also alter the circumstances presented at sites and without contemporary site investigation, these issues can proceed unattended. Hence, there remains a strong reliance on knowledge of the assessing officer. To ensure all new officers are equipped with the necessary knowledge and interpretive skills required for effective use of the LCM&AT, it is proposed that a comprehensive training manual be produced and provided for all new officers.

### Action:

**Action 28**

Develop a comprehensive training package for new assessing officers at the City of Greater Bendigo to provide detailed knowledge and interpretive skills for effective use of the LCM&AT

## Maintaining a LCM&AT Approach

The Land Capability Mapping and Assessment Tool approach has been adopted into practice by the City of Greater Bendigo, yet it differs from approaches of some other local governments in Victoria. Land capability risk ranking by a 'traffic light system' is a method employed by some local governments in their DWMP development[35]. While this approach offers these local governments with an opportunity to make prompt and procedurally driven decisions, this approach does not align with the needs of the City of Greater Bendigo. This is mostly because we are in an era of unprecedented change, and the traffic light approach applies blanket clauses to issues that can vary significantly given the specific circumstances. This is seen to present potential for property value loss and unnecessary encumbrance on development in some instances. Instead, by taking the more open approach of interpreting the LCM&AT data with consideration of the specific circumstances, the City of Greater Bendigo can make more informed and suitable decisions regarding onsite wastewater management and require specifically aimed management strategies. It is, however, greatly important to recognize that this method relies heavily on the skills and knowledge of authorized officers. Comprehensive and specific training is essential to support authorized officers in employing the LCM&AT approach to onsite wastewater management.

## Inclusions & Modifications to the LCM&AT

The test of time and application has identified some elements of the LCM&AT may require review to ensure their accuracy and relevance to contemporary onsite wastewater management.

### Action:

Inclusions and Modifications to the LCM&AT

**Action 29**

Undertake a review of the LCM&AT, as required, to ensure its relevance with contemporary onsite wastewater management requirements and needs of the Greater Bendigo municipality.

# Chapter 9: Summation of Actions and Recommendations

**The core of priorities that guide this strategy are summarized into the following points:**

1. Manage and control new and existing developments and installations effectively and with the best knowledge available to limit their impact in the future.
2. Reduce the impact of existing blackwater offsite discharges.
3. Reduce the impact of existing greywater offsite discharges.
4. Fill knowledge gaps on existing wastewater management systems by mapping and recording their construction, function, environment, and environmental receptors in a comprehensive, useful and methodical manner. Collate this information and use it to support responsible and informed decisions.
5. Maintain an ongoing process of implementation and evaluation of the Domestic Wastewater Management Strategy.

A summation of the actions discussed in the strategy are provided in the below table.

| Reference | Actions and Recommendations | Commencement & Completion | Assignment |
|---|---|---|---|
| **Preventing Offsite Discharge** | - Continue to implement requirements with planning permit applications for subdivision and boundary realignment to ensure that existing onsite wastewater management systems and their discharge are maintained within new allotment boundaries as defined by a plan of subdivision, and meet setback requirements for boundaries as listed within the Code of Practice – Onsite Wastewater Management (as updated).<br><br>- Continue to assess planning applications to ensure wastewater can be managed suitably and sustainably for any new developments or subdivisions.<br><br>- Ensure detailed assessment of each site is undertaken, in accompaniment of guidance from the LCM&A Tool, for each Application to Install / Alter an onsite wastewater management system to identify features that may lead to expedited discharge of wastewater offsite or to areas of environmental significance. | | |
| **Groundwater Protection** | **Action 1** Add groundwater mapping into GIS mapping systems to allow easy identification and investigation into groundwater when assessing applications for installation of an onsite wastewater management system. | Completed within 2 years of adoption | DWPO in collaboration with City of Greater Bendigo GIS Departme |
| | **Action 2** Undertake a review of City of Greater Bendigo disposal system design requirements to ensure they support suitable wastewater disposal pathways. | Completed within 2 years of adoption | DWPO |
| | Ensure suitable information is requested to inform permit application assessment where officer deems insufficient evidence for the protection of groundwater is available. | | |

| Reference | Actions and Recommendations | Commencement & Completion | Assignment |
|---|---|---|---|
| **Enforcement Action** | - Continue to lobby for legislation change that allows clearer application of wastewater requirements to promote better wastewater outcomes.<br>- Encourage homeowners to rectify failing onsite wastewater management systems to ensure their impact is limited as best as possible.<br>- Ensure a collaborative and supportive approach is adopted in the monitoring and upgrade of onsite wastewater management systems between homeowners and the City of Greater Bendigo. A defined approach to determining failure and requiring upgrade must be established. (see schedule) | | |
| **Audit and Review** | **Action 3** Appoint a suitable auditor to undertake an independent review of implementation of the strategy once sufficient time has passed to commence implementation and provide adequate data to inform the audit. | Auditor appointed within 3 years of adoption | Manager EVH&LL |
| | Maintain a cyclic approach of implement and review throughout the implementation of the strategy.<br>- Appoint an accredited auditor with relevant approvals to undertake an audit of the strategy every 3 years.<br>- Supply a copy of the audit report to relevant stakeholders. | | |
| **A Risk Based Approach** | **Action 4** Investigate the feasibility, rigour and value of applying the risk analysis tools developed by White, Williams and Edis to assessment of proposals for unsewered development in the special water supply catchment. | Report to be produced within 6 months of adoption | DWPO |
| **New Development Areas** | - Ensure any persons and corporations are aware of the need to provide sewer to these areas if developed and promote their engagement with Coliban Water, particularly in planning and scoping phases.<br>- Ensure all strategic documents, adjusted overlays and zones, projected timeframes, and projected lot yields are directed to Coliban Water for comment as they change to confirm adequate infrastructure and financial capacity is available to support reticulated sewer provision to new development. | | |

| Reference | Actions and Recommendations | Commencement & Completion | Assignment |
|---|---|---|---|
| **Alternative Development Areas** | - Where support is considered for residential growth in unsewered areas, detailed investigation into the capability of the land for onsite wastewater management must be undertaken to ensure the City of Greater Bendigo can make a clear and informed decision. | | |
| **Growth of Unsewered Townships** | **Action 5** Undertake an investigation into innovative wastewater solutions for small townships in Greater Bendigo. | Report to be produced within 3 years of adoption | DWPO |
| **Development in SWSC** | **Action 6** Consult the relevant referral authorities prescribed under Section 55 of the Planning and Environment Act 1987 to determine any additional requirements for assessing planning permits in the special water supply catchment with relevance to domestic onsite wastewater management. | Within 6 months of adoption | DWPO / CoGB Statutory Planning |
| **Areas for Improvement – Goornong** | **Action 7** Develop a committee populated with members of the Goornong community and representatives of stakeholder organisations to determine suitable solutions to the issues, seek funding and implement remedial actions. | Meet within 2 years of adoption | DWPO |
| **Areas for Improvement – Raywood** | **Action 8** Investigate extent of properties discharging greywater offsite to inform decision making and any funding assistance bids. | Completed within 4 years of adoption | DWPO |
| | **Action 9** Investigate funding sources for better management of greywater. | Completed within 4 years of adoption | DWPO |
| | - Maintain detailed mapping and records of all onsite wastewater management systems in the area.<br>- Closely monitor applications to install and alter septic tank systems in the Raywood area and, where possible, require current discharge requirements be met as part of any permits issued to do so. | | |

| Reference | Actions and Recommendations | Commencement & Completion | Assignment |
|---|---|---|---|
| **Areas for Improvement – Unsewered Strathfieldsaye** | **Action 10** Commence investigation into the feasibility of connection of properties discharging wastewater offsite to reticulated centralised sewer. | Commence investigation within 3 years of adoption | DWPO |
| | Maintain detailed mapping and records of all onsite wastewater management systems in the area. | | |
| **Heathcote and Argyle** | **Action 11** Support Coliban Water in preparing, planning and communication of sewerage extension works planned for Heathcote and Argyle. | Current and Ongoing | EVH&LL |
| | **Action 12** Include and investigate sections of Heathcote and Argyle that are not serviced by the proposed sewer extension and include any relevant wastewater matters in this strategy. | Within 3 years of adoption | DWPO |
| **Areas for Improvement – Ascot** | - Where possible, promote redirection of wastewater to be disposed and retained onsite.<br>- Promote robust onsite wastewater management system design when applications to alter or install are made.<br>- Maintain detailed mapping and records of all onsite wastewater management systems in the area. | | |
| **Areas for Careful Management – Junortoun** | - Promote routine servicing should be completed by competent and suitably qualified persons.<br>- Maintain detailed mapping and records of all onsite wastewater management systems in the area.<br>- Ensure suitable consideration of effluent disposal locations is determined during the subdivision or planning permit process to promote safe disposal with minimal vegetation disturbance. | | |

| Reference | Actions and Recommendations | Commencement & Completion | Assignment |
|---|---|---|---|
| **Areas for Careful Management – Lakeside Boulevard Derrinal** | - Promote routine servicing should be completed by competent and suitably qualified persons.<br>- Maintain detailed mapping and records of all onsite wastewater management systems in the area.<br>- Investigate funding sources for an upgrade subsidy scheme to assist homeowners in achieving best practice wastewater management. | | |
| | **Action 13** Undertake routine inspections of the onsite wastewater management systems to ensure their compliance with permit conditions and minimise their potential for contamination of the potable water supply catchment. | To be completed annually | DWPO / EVH&LL |
| **Areas for Careful Management – Mia Mia and Redesdale** | - Promote routine servicing should be completed by competent and suitably qualified persons.<br>- Maintain detailed mapping and records of all onsite wastewater management systems in the area<br>- Where applications for alteration or upgrade to individual onsite wastewater management systems are made, ensure the systems are carefully evaluated in their effectiveness and their suitability to the site. | | |
| **Areas for Careful Management – Sailors Gully and Eaglehawk** | - Promote routine servicing should be completed by competent and suitably qualified persons.<br>- Maintain detailed mapping and records of all onsite wastewater management systems in the area<br>- Where applications for alteration or upgrade to individual onsite wastewater management systems are made, ensure the systems are carefully evaluated in their effectiveness and suitability to the site.<br>- If evidence becomes available to support the need for wide-spread sewer extension, undertake re-evaluation of the circumstances, advocate and provide support for sewer extension. | | |
| | **Action 14** Continue to monitor receiving environments, conditions and the opinions of the residents regarding onsite wastewater management in the area. | Ongoing with key monitoring activity once every 3 years | DWPO |

| Reference | Actions and Recommendations | Commencement & Completion | Assignment |
|---|---|---|---|
| **Areas for Careful Management – Goornong Water Supply Campaspe River** | - Where possible, assessing officers should ensure new onsite wastewater management systems are installed 100m from the Campaspe River in accordance with guidance provided in the Code of Practice – Onsite Wastewater Management (as updated) | | |
| **Considering Wastewater with Planning Applications – Referrals to EVH** | - All applications for a planning permit to develop or use land for a dwelling or structure where wastewater will be generated, subdivide land, or consolidate land, outside of an area serviced by a viable sewer connection point, should be referred to Environmental Health and Local Laws for comment. | | |
| | **Action 15** Make amendment to the Greater Bendigo Planning Scheme to reference this Domestic Wastewater Management Strategy. | Completion within 18 months of adoption | CoGB Planning Amendments / DWPO |
| **Vegetation Protection and Wastewater Management** | - Require that applications for a planning permit to develop and use land for a dwelling or structure where wastewater will be generated, or subdivide land for residential use on land subject to a Vegetation Protection Overlay, should designate a flexible wastewater disposal envelope. | | |
| **Preventing Unnecessary Encumbrance** | - Application of a Section 173 Agreement should not be requested by Environmental Health and Local Laws unless the circumstances presented are such that no other method for enabling safe and sustainable onsite wastewater management can be utilised. | | |

| Reference | | Commencement & Completion | Assignment |
|---|---|---|---|
| **Determining Safe and Sustainable Disposal Methods Sewer Availability** | - Where an assessing officer at the City of Greater Bendigo identifies that a development or proposal may be viably achieved through reticulated sewerage connection, referral of the matter to Coliban Water should be made.<br>- Before it is determined that a property may avoid connection to a reticulated centralised sewer, it must be proven that connection to sewer is not viable and that the site can sustain onsite wastewater management on a permanent, ongoing basis (regardless of whether it is a temporary measure while waiting for sewer extension). | | |
| | **Action 16** Develop a policy in consultation with relevant water corporations to establish a definition for when sewer is 'reasonably available' and when an engineering report should be requested to support a development application. | To be completed within 18 months of adoption | DWPO / EVH&LL |
| **Minimum Standards for Land Capability Assessment** | **Action 17** Form a committee composed of land capability assessors, referral authorities, members of neighbouring local governments and relevant delegates of the City of Greater Bendigo to determine minimum standards for land capability assessment in the Greater Bendigo region. | Committee to be formed within 1 year of adoption. Minimum standards within 18 months | DWPO |
| **Minimum Standards for Service Reports** | **Action 18** Form a committee composed of service agents, neighbouring local governments and relevant delegates of the City of Greater Bendigo to develop minimum standards for servicing and reporting on higher treatment systems in the Greater Bendigo area. | Committee to be formed within 1 year of adoption. Minimum standards within 18 months | DWPO |
| | - Explore avenues where the mandatory routine servicing and reporting process can be used to support the mapping and monitoring program proposed as part of this strategy. | | |

| Reference | Actions and Recommendations | Commencement & Completion | Assignment |
|---|---|---|---|
| **Service Contract Termination Notification** | **Action 19** Develop a standard form available for voluntary use by service agents to notify the City of Greater Bendigo when servicing contracts are terminated to promote that the system continues to be suitably serviced. | Form developed within 6 months of adoption | DWPO |
| **Maintaining High Regulatory Standards Open Trench Inspections** | **Action 20** Implement an open trench inspection program that focusses on undertaking inspections on a percentage of systems at the installation stage. | Upon adoption | EVH&LL |
| **Promoting Officer Competency** | **Action 21** Produce and implement a new officer training package for the City of Greater Bendigo that provides relevant new employees with fundamental local wastewater knowledge. | Within 2 years of adoption | DWPO / EVH&LL |
| **Promoting Healthy Choice** | - Require that all applications for subdivision in unsewered areas be supported by wastewater management proposals that do not limit the development unnecessarily to reliance on higher treatment systems only, when it can be achieved by other methods. | | |
| **Reserve Areas** | **Action 22** Make adjustment to internal policy to require that suitable reserve areas be demonstrated at the time of subdivision | Within 3 months of completion of planning scheme amendment | DWPO / CoGB Statutory Planning |
| | **Action 23** Make adjustment to internal policy to require that a suitable reserve area is designated at the time of application for a permit to install an onsite wastewater management system | Within 3 months of completion of planning scheme amendment | DWPO / CoGB Statutory Planning |
| **Creating Supportive Environments for Best Practice A Supportive Approach** | - Apply a supportive approach to wastewater regulation in accordance with the City of Greater Bendigo Compliance Policy (as updated). | | |

| Reference | Actions and Recommendations | Commencement & Completion | Assignment |
|---|---|---|---|
| **Preparedness for Funding Initiatives** | - Ensure that data gathered throughout implementation of the Domestic Wastewater Management Strategy is detailed and documented for clear translation into a funding application. Identification of priorities, evidence of issues, and proposed solutions should be included in this documentation. | | |
| **Building Capacity for Climatic Reflex** | - Ongoing monitoring of the condition and effectiveness of onsite wastewater management systems should be undertaken to ensure that local design requirements remain reflexive and robust to operate efficiently and safely in a changing climate. | | |
| **Mapping, Monitoring and Education for Safe and Sustainable Environments** | **Action 24** Commence an onsite wastewater system mapping and monitoring program to map the GPS coordinates, the functionality, and the system design for integration into a centralised database. Initial focus is to be maintained in areas with higher densities of onsite wastewater management systems. (Priority schedules will dictate order of investigation.) | To be completed once every 3 years | DWPO / EVH&LL |
| | **Action 25** Trial a householder education scheme in conjunction with the mapping and monitoring program to promote wider understanding of onsite wastewater management systems and empower householders to make informed decisions about management and maintenance of their onsite wastewater management system | To commence within 6 months of adoption | DWPO |
| | **Action 26** Undertake specialised testing of receiving environments to develop detailed knowledge of the impacts experienced and their influences | Ongoing. Testing projects to be determined annually | DWPO / EVH&LL |
| | - Use data gathered from the mapping and monitoring program to provide specific and relevant reminders for property owners on scheduled maintenance activities to assist householders in managing their system effectively.<br>- Provide a summary of monitoring results to relevant stakeholders annually. | | |

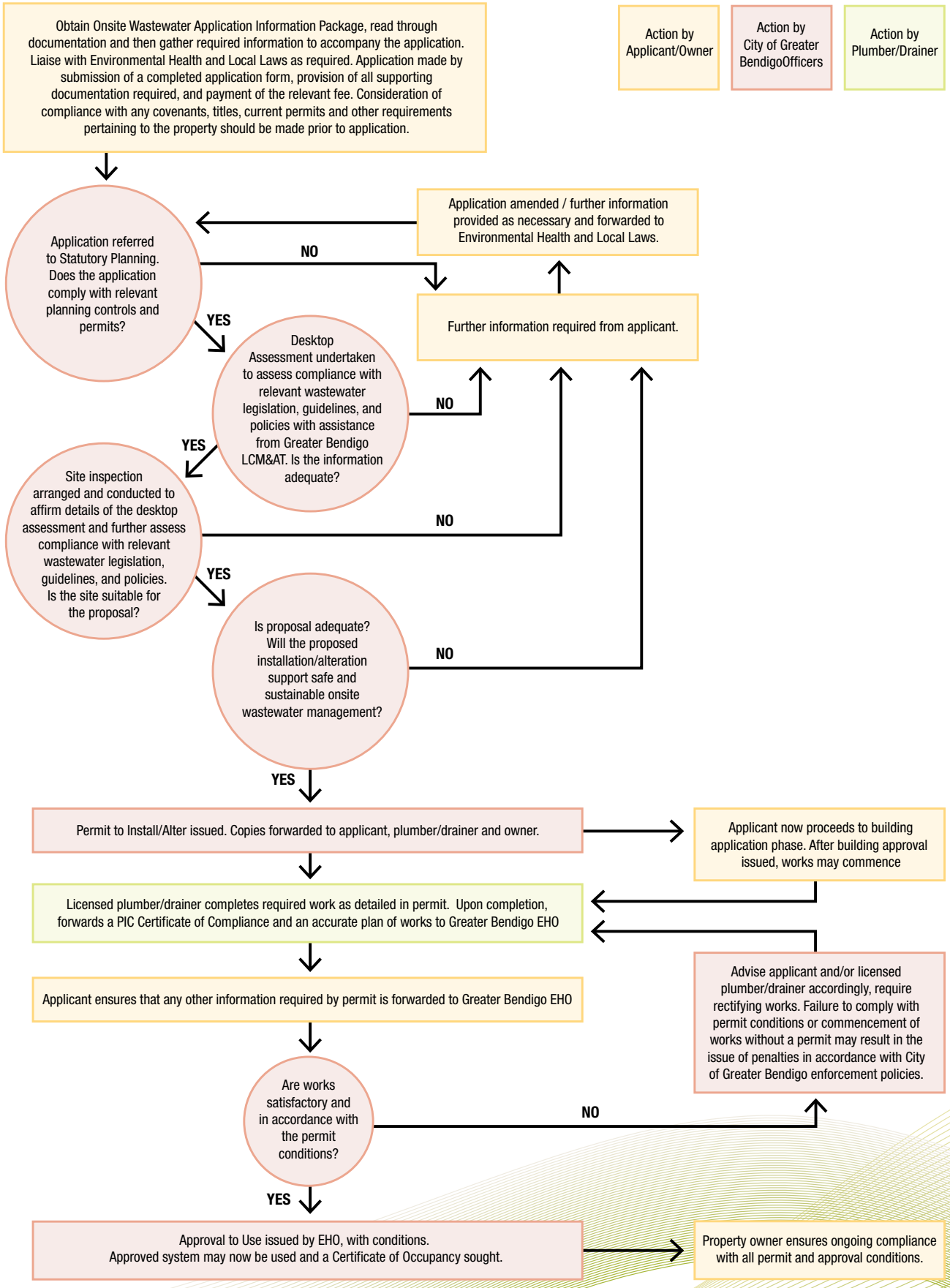
| Reference | Actions and Recommendations | Commencement & Completion | Assignment |
|---|---|---|---|
| **Service Report Database** | **Action 27** Develop a centralised service report database that allows for the lodgement and tracking of higher treatment systems to ensure their regular servicing is carried out and their functionality is maintained. | To be developed within 1 year of adoption | DWPO / CoGB Information Management |
| **The LCM&AT Interpretation of the Document** | **Action 28** Develop a comprehensive training package for new assessing officers at the City of Greater Bendigo to provide detailed knowledge and interpretive skills for effective use of the LCM&AT | Within 2 years of adoption | DWPO / EVH&LL |
| **Inclusions and Modifications to the LCM&AT** | **Action 29** Undertake a review of the LCM&AT, as required, to ensure its relevance with contemporary onsite wastewater management requirements and needs of the Greater Bendigo municipality. | Once every five years or as deemed necessary by EVH&LL | DWPO |

# Appendices

**Appendix A –**
**City of Greater Bendigo –**
**Wastewater Permit Flow**

**Appendix B –**
**Questionnaires and Summarised**
**Quantitative Results**

## Appendix A – City of Greater Bendigo – Wastewater Permit Flow



Project Bulletin

# Domestic Wastewater Management Plan Review 2013

**October 2013**

The Greater Bendigo Domestic Wastewater Management Plan (DWMP) is currently under review. It is a statutory requirement for the City of Greater Bendigo to produce a DWMP. The Plan intends to define a direction for managing septic systems in a safe and sustainable way across Greater Bendigo, and must consider specific elements including protecting surface and ground water, appropriately containing wastewater and protecting the community's health. Town sewer planning is managed by water authorities in their sewer and water plans, so the Plan primarily considers septic systems.

This bulletin has come to you because the new DWMP may affect the way you manage wastewater at your property. While there are some aspects of the Plan that must be included, other elements remain open for your input to promote better wastewater management for all.

Above: *Greywater discharging into stormwater drains can result in algal growths, odours and unhealthy environments in some areas.*

## *Why plan for wastewater?*

Septic systems provide an opportunity to manage domestic wastewater in areas not serviced by a reticulated town sewer. When designed and operated correctly, septic systems can effectively manage household wastewater. If they are poorly designed or constructed, subjected to stressors from their environment or poorly matched to the lifestyle of householders, septic systems can present as a source of pollution and disease.

Through careful planning, wastewater issues can be identified and addressed. State Government funding and resources can be used to support community initiatives that prevent problems occurring with septic systems in new and existing developments.

Project Bulletin

## *We'd like to hear your thoughts*

The Plan has a number of statutory responsibilities to fulfil and these must be included in the Plan.

**To meet our statutory responsibilities the City must:**

- Monitor the condition and management of septic systems.
- Ensure septic systems comply with permit conditions.
- Prevent groundwater and surface water contamination.
- Prevent wastewater being discharged beyond property boundaries.
- Ensure adequate resources are available to implement the Plan.
- Ensure all legal responsibilities are fulfilled by the City and our community.

The Plan must meet some targets but there is great scope in the DWMP to capture other wastewater matters and promote better wastewater outcomes in Greater Bendigo.

**Areas where the City would appreciate your input:**

- Determine areas with wastewater issues in Greater Bendigo.
- Determine how these wastewater issues impact you, your family and community.
- Your experiences of having a septic system servicing your property.
- Your experiences of living in a neighbourhood reliant on septic systems.
- Your views on the sustainability of septic systems in your area.
- Your interest in extending a reticulated sewer into your area (if possible).
- Your willingness to contribute to upgrading septic systems or a new sewer connection.
- What works well for wastewater management in your area?
- How can wastewater management be improved in your area?

## *How can your voice be heard?*

There is a selection of ways you can provide your thoughts on the DWMP review.

- Complete the questionnaire (attached) and return via the reply paid envelope
- Complete the questionnaire online at www.bendigo.vic.gov.au/wastewater
- Request a telephone interview with the Wastewater Planner, please phone (03) 5434 6333
- An informal interview during the doorknocking engagement period (selected areas, see website for details)
- In writing to: Environmental Health Unit, City of Greater Bendigo, PO Box 733, BENDIGO VIC 3552 or by email to health@bendigo.vic.gov.au

***All comments must be received by November 15, 2013. This will allow time for your comments to be considered in the drafting of the DWMP.***

Questionnaire

# Domestic Wastewater Management Plan Review 2013

## Community Questionnaire

**October 2013**

1. Please state your suburb _____

2. Does your property have a septic system? (Please tick) Yes ☐ Unsure ☐ No ☐

### *Section 1 (of 3) – Your experiences*

Do you agree or disagree with the following statements?

*(Please tick the box that best describes your thoughts)*

| | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
|---|---|---|---|---|---|
| 3. My septic system is a burden on me and my family. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 4. Septic systems in my neighbourhood are not satisfactorily maintained. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 5. My septic system works correctly. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 6. My septic system is safe for me and my family. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 7. My septic system fits in comfortably with my lifestyle and my property. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 8. Wastewater management could be improved in my neighbourhood. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 9. My family and I should not be exposed to wastewater from other properties. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 10. I understand how my septic system works. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 11. I know where all of the components of my septic system are located. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 12. Access to a town sewer connection is a better option for my property than a septic system. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 13. Septic systems in my neighbourhood affect my enjoyment of my property and surrounds. | ☐ | ☐ | ☐ | ☐ | ☐ |

## *Section 2 (of 3) – Your priorities*

How important is the following in the new Greater Bendigo Domestic Wastewater Management Plan?

*(Please tick the box that best describes your preference)*

| | | High | Moderate | Low |
|---|---|---|---|---|
| 14. | Develop and implement policies that promote the safe and healthy operation of septic systems. | ☐ | ☐ | ☐ |
| 15. | Promote a higher standard of routine servicing for higher treatment systems by service agents. | ☐ | ☐ | ☐ |
| 16. | Promote a higher standard of site assessment to ensure new septic installations are safe and sustainable. | ☐ | ☐ | ☐ |
| 17. | Protect my neighbourhood from offensive odours from septic systems. | ☐ | ☐ | ☐ |
| 18. | Protect my neighbourhood from wastewater pooling in curbside gutters. | ☐ | ☐ | ☐ |
| 19. | Protect my family from exposure to potentially harmful wastewater from septic systems. | ☐ | ☐ | ☐ |
| 20. | Ensure Greater Bendigo is prepared for climate change with septic system design. | ☐ | ☐ | ☐ |
| 21. | Ensure, where possible, properties have a town sewer connection. | ☐ | ☐ | ☐ |
| 22. | Provide advice to householders on managing and maintaining septic systems in safe and sustainable conditions. | ☐ | ☐ | ☐ |
| 23. | Encourage residents to upgrade systems that currently dispose of wastewater above the ground via drippers. | ☐ | ☐ | ☐ |
| 24. | Ensure all systems are maintained to a high standard to prevent impacts on the environment, public health and amenity. | ☐ | ☐ | ☐ |
| 25. | Investigate funding sources to assist with upgrades in areas where there are high numbers of septic systems that discharge offsite. | ☐ | ☐ | ☐ |

## *Section 3 (of 3) – Your thoughts*

Please take a moment to write down your thoughts.

26. If a sewer connection could be made to my property, I would be prepared to contribute…

*(Please tick the box that best describes the amount you would be willing to contribute)*

| $0 | $250 | $500 | $1000 | $1500 | $2000 | $2500 | $3000 | $4000 | >$5000 |
|---|---|---|---|---|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

27. Do you have any comments or anything further to add about the Domestic Wastewater Management Plan? *(please comment below)*

**Summarised results from quantitative elements from the community questionnaire.**

| Please state your suburb **Greater Bendigo Total** | SA / H | A/M | N/L | D | SD |
|---|---|---|---|---|---|
| Does your property have a septic system | *Values provided below as %* | | | | |
| My septic is a burden on me and my family | 6 | 9 | 11 | 24 | 50 |
| Septic systems in my neighbourhood are not satisfactorily maintained | 9 | 9 | 22 | 30 | 31 |
| My septic system works correctly | 47 | 40 | 5 | 3 | 4 |
| My septic system is safe for me and my family | 46 | 41 | 5 | 3 | 5 |
| My septic system fits in comfortably with my lifestyle and my property | 45 | 32 | 10 | 8 | 6 |
| Wastewater management could be improved in my neighbourhood | 20 | 27 | 34 | 0 | 19 |
| My family and I should not be exposed to wastewater from other properties | 44 | 43 | 9 | 2 | 1 |
| I understand how my septic system works | 44 | 45 | 4 | 2 | 4 |
| I know where all of the components of my septic system are located | 49 | 39 | 3 | 6 | 4 |
| Access to a town sewer connection is a better option for my property than a septic system | 24 | 12 | 15 | 19 | 30 |
| Septic systems in my neighbourhood affect my enjoyment of my property and surrounds | 10 | 6 | 13 | 35 | 35 |
| Develop and implement policies that promote the safe and healthy operation of septic systems | 43 | 40 | 17 | | |
| Promote a higher standard of routine servicing for higher treatment systems by service agents | 22 | 46 | 32 | | |
| Promote a higher standard of site assessment to ensure new septic installations are safe and sustainable | 36 | 49 | 15 | | |
| Protect my neighbourhood from offensive odours from septic systems | 50 | 29 | 21 | | |
| Protect my neighbourhood from wastewater pooling in curbside gutters | 60 | 26 | 14 | | |
| Protect my family from exposure to potentially harmful wastewater from septic systems | 61 | 23 | 16 | | |
| Ensure Greater Bendigo is prepared for climate change with septic system design | 41 | 30 | 29 | | |
| Ensure, where possible, properties have a town sewer connection | 39 | 25 | 36 | | |
| Provide advice to householders on managing and maintaining septic systems in safe and sustainable conditions | 44 | 39 | 17 | | |
| Encourage residents to upgrade systems that currently dispose of wastewater above the ground via drippers | 24 | 34 | 43 | | |
| Ensure all systems are maintained to a high standard to prevent impacts on the environment, public health and amenity | 43 | 45 | 12 | | |
| Investigate funding sources to assist with upgrades in areas where there are high numbers of septic systems that discharge offsite | 49 | 35 | 16 | | |

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## Glossary

**Absorption Trench** – A soakage trench or dispersion line associated with the disposal of wastewater commonly from primary onsite wastewater management systems.

Active Offsite Discharge – Release of wastewater beyond the boundaries of the allotment where it was generated by intentional design of the onsite wastewater management system. eg. discharge of greywater to a kerbside drain via a diversion pipe.

Alluvial Soils – Soils that have aggregated as a result of water movement. Commonly floodplains are composed of alluvial soils.

Blackwater- Wastewater that contains faeces.

Basaltic Soils – Soils that have resulted from the weathering of volcanic rock. Often a strong red colour due to high iron oxide content.

Catchment – An area from which water drains to a reservoir or basin.

Catchment Effluent Modelling – A detailed geo-mathematical representation of a catchment that provides an opportunity to test water movement scenarios and provide likely portrayals of outcomes.

Content Analysis – Detailed analysis of the occurrence of words, phrases or themes in a document or series of documents, records or articles.

Conventional Septic System – A system comprising a settlement tank enclosing an anaerobic environment where primary treatment of wastewater occurs. Effluent from the tank is commonly conveyed by gravity to trench systems for disposal.

Decentralised Wastewater Management System - An onsite wastewater management system that is not connected to a centralised sewerage system.

Domestic Wastewater – Wastewater usually generated in the household setting. Also defined as wastewater flows of less than 5000 litres per day from a non-industrial setting.

Duplex Soil – A soil profile that exhibits a distinct change in texture between horizons.

Ecosystem – A complex arrangement of interrelationships held between animals, plants and microbes, their surrounding environs, and energy and nutrition sources.

Effluent – A liquid leaving a container or vessel.

Environment – The surrounds of a person or object that can include the natural, social, built, political or psychosocial settings.

Evapotranspiration – The transfer of water from the soil to the atmosphere by means of evaporation and transpiration by plants.

Granitic Soils – Soils that have resulted from the weathering of granite.

Greywater- Wastewater from sources in the domestic setting that does not contain faeces.

Groundwater – all underground water contained in the void spaces within and between the rocks and soil, generally excluding water travelling between the ground surface and the water table (Oxford Dictionary of Earth Sciences). Commonly, it is made with particular reference to water contained within phreatic zones but soil moisture resulting from funicular or capillation can also be termed groundwater of sorts. For the purposes of this document funicular and capillary groundwater is not considered groundwater.

Higher treatment system – A system designed to treat wastewater to a standard higher than primary treatment.

Hydraulic Conductivity – This can be defined loosely as the ability of a rock, sediment or soil to permit fluids to flow through it. More precisely, the hydraulic conductivity is the volume flow rate of water through a porous media under the influence of a hydraulic gradient of unity, at a specified temperature. It is measured in units of m/second or m/day generally and varies somewhat with the temperature as warmer water is less viscous than colder water.

In-situ Cast Septic Tank – An historic design of settlement tank that is constructed on site often by mortar and bricks, or concrete.

Land Capability – The capacity or innate ability of a site to sustainably accommodate an activity or object. For the purposes of this strategy, the proficiency of a selection of land to safely and sustainably accept, treat and assimilate wastewater.

Land Capability Assessment – An assessment of the capabilities of a site to accept, treat and assimilate wastewater in a safe and sustainable manner.

Microbes – Microscopic organisms and small macroscopic organisms including bacteria, viruses, protozoa, and helminths.

Nutrients – Organic and inorganic molecules that contain carbon, nitrogen, phosphorus, magnesium, calcium or potassium.

Offsite Discharge – Release of wastewater to a location exceeding the boundaries of the allotment upon which it was generated.

Onsite Wastewater Management System – Septic tank systems including primary and higher treatment systems.

Overlays and Zones – Conventions of the planning scheme used to categorize land determined suitable for particular purposes or vulnerable to stressors.

Packaged Treatment Plant – A type of onsite wastewater management system designed for treatment of wastewater to a secondary standard or better. Commonly, these systems rely on forced aeration of wastewater to facilitate aerobic microbiological digestion of organic materials.

**Passive Offsite Discharge** – Release of wastewater beyond the boundaries of the allotment where it was generated by consequence of environmental conditions and not by intended design of the onsite wastewater management system. eg. Runoff facilitated by wastewater mixing with rainwater.

Potable – Water of a quality acceptable for human consumption; drinking water.

Primary Treatment – Wastewater treatment where gross solids are removed and some biological digestion occurs in anaerobic conditions.

Qualitative – Generally consists of determination of multiple realities, interpretations , values and social phenomena through natural inquiry.

Quantitative – Generally consists of numerical measurement with control of variables in search of a singular truth.

Reticulated Centralised Sewerage – A sewerage system that drains wastewater from properties to a centralised point for processing, treatment and recovery.

Sand Filter System – An onsite wastewater management system with an aeration phase facilitated by percolation of wastewater through a sand filled vessel.

Saturation – A state whereby all pores of a soil are filled with water.

Secondary Treatment – Wastewater treatment that involves primary treatment followed by removal of suspended solids and reduction in organic contaminants facilitated by aerobic biological digestion.

Sedimentary Parent Material – Rocks that have formed from mud, sand and other materials that have settled, generally underwater. Many Central Victorian sedimentary materials span from historic marine settlement.

Sedimentary Soils – Soils that originate from sedimentary parent material. Often pale yellow, pale red, or grey soils that have a limited ability to accept wastewater.

Septic systems – Onsite wastewater management systems.

Sewage – Waste matter transported within a sewerage system. Any waste containing human excreta or domestic wastewater.

Sewerage – The pipe system that drains wastewater from properties. Commonly associated with centralised systems.

Sludge – Settled materials in an onsite wastewater management system generally composed of biosolids but includes any additional settled material.

Social Determinant – An underlying factor in the social domain that contributes or influences an outcome.

Soil Horizon – A layer of soil that is generally parallel to the surface of the ground. A horizon has different morphological traits to other layers below and/or above it.

Soil Profile – A vertical section of a soil from the surface through to underlying parent material or a preselected depth.

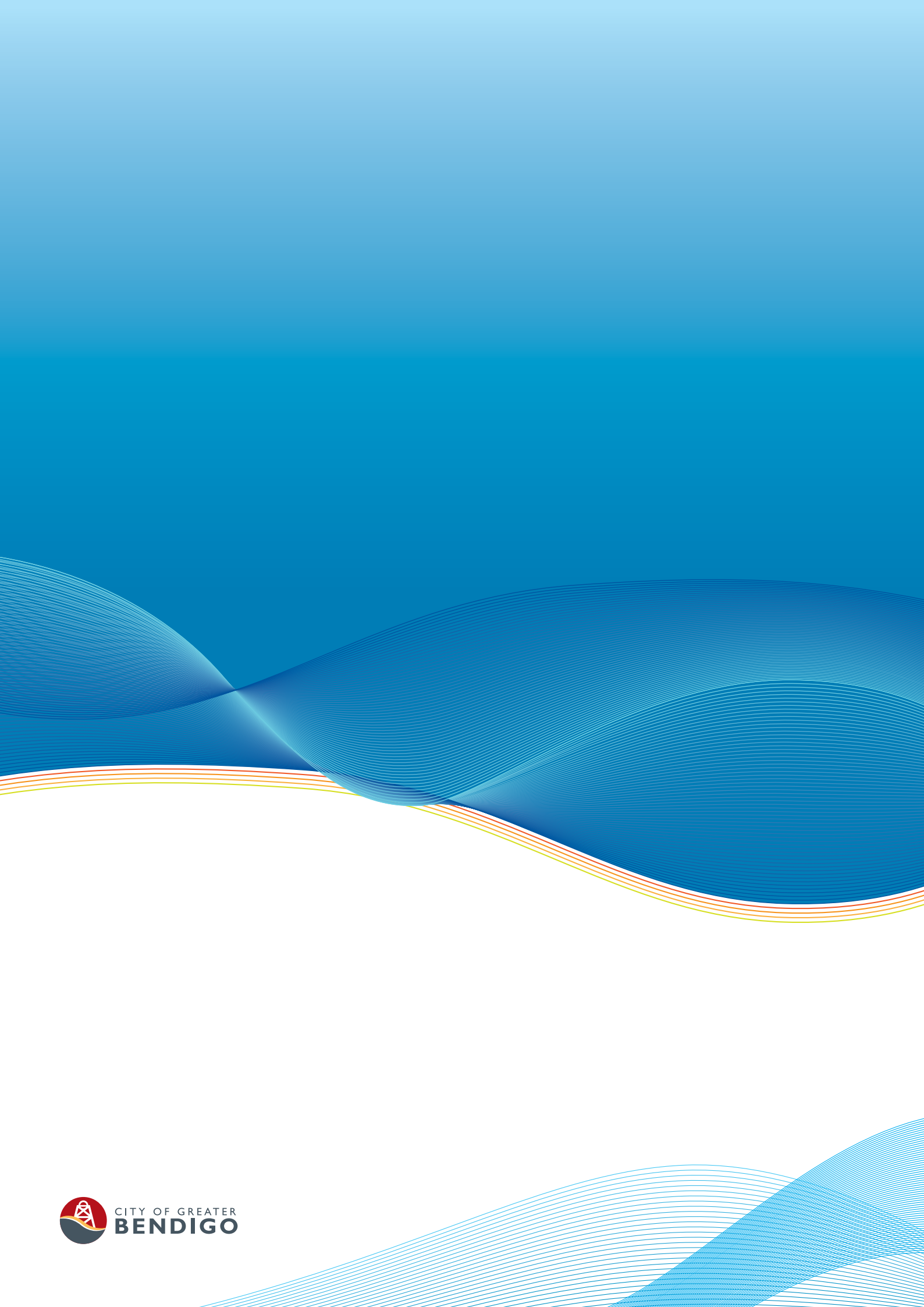
Split System – An onsite wastewater management system that actively separates the drainage, treatment and disposal of greywater from blackwater.

Sustainability – Of an ability to be sustained. This can be seen particularly from an ecological standpoint, or a program delivery perspective.

Wastewater – Water of a quality that has been degraded by a use or activity.

Wastewater Renovation – The treatment of wastewater to a higher quality, commonly by soil by means of biologically facilitated chemical interactions. This process can also be termed polishing in some instances.

Water Cycle – The natural cyclic pathway of water comprising various phases and states of being.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