



WESTERN VICTORIA

SOIL TESTING

**65 Minyip Road
Lara**

**Land Capability Assessment for
Vesta Designs**

Report 261161
July 2026

Land Capability Assessment

for

65 Minyip Road, Lara

(City of Greater Geelong)

for

Vesta Designs

Report 261161

31/07/2026

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DISCLAIMER

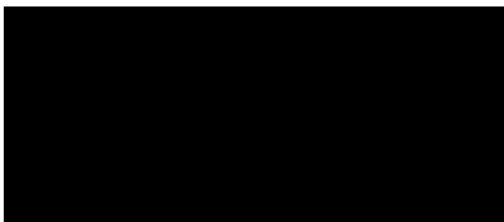
This investigation has been carried out in goodwill and under the instructions of Vesta Designs. The investigation was undertaken with the care and skill of competent personnel as defined within the Western Victoria Soil Testing (WVST) quality system. WVST has the appropriate insurances required to undertake such work, which are available upon request.

This document provides both site and soil information and a conceptual design of the proposed development. The document also recommends monitoring and management options for the type of system(s) being recommended. This report should not be seen as a guarantee for the relevant permit to be issued by local council, as the report provides recommendations only for the City of Greater Geelong to assess.

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

WVST's professional opinions contained in this document are subject to modification if additional information is obtained through further investigation, observation or analysis in accordance with future activities.

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



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REFERENCES IN THIS DOCUMENT

EPA Victoria *Guideline for onsite wastewater management (GOWM)*, May 2024
 EPA Victoria *Guideline for onsite wastewater effluent dispersal and recycling systems (EDRS)*, May 2024
 Joint Australian/New Zealand Standard AS1547 – 2012 *Onsite domestic wastewater management*, February 2012
 WaterNSW *Designing and installing on-site wastewater management systems (DWMS)*, February 2023

1 SUMMARY

Vesta Designs commissioned Western Victoria Soil Testing (WVST) to undertake a Land Capability Assessment (LCA) to assess the suitability and placement of a new wastewater treatment system at 65 Minyip Road, Lara. The property consists of a dual land parcel (1\PS543290) of approximately 2.04ha. The development intent is understood to involve the establishment of a 4-bedroom residence, a second 2-bedroom dwelling and an associated onsite wastewater treatment system.

With the allotment situated within a Rural Living Zone, the schedule to the overlay stipulates that all residential development should be connected to both reticulated water and sewerage, if available. In the absence of such a scheme, a 'Land Capability Assessment' (LCA) is required to indicate the soil's suitability and capability to both treat and retain all generated effluent within the allotment's boundaries.

This LCA will provide site and soil information as well as a schematic diagram showing the proposed building location and potential land application area for the disposal of suitably treated effluent at the site. The document will also recommend monitoring and management options for the type of wastewater system(s) being recommended.

The Land Capability Class Rating (LCCR) of the site was determined to be 5, primarily due to the risk of sodic/dispersive subsoils, the low permeability of the soil profile and, to a lesser extent, the risk of soil salinisation.

Given the constraints to the site identified by the LCCR, the following systems are recommended:

- A secondary wastewater treatment system connected to:
 - a drip irrigation dispersal system with a minimum land application area of 909m², or
 - a evapotranspiration bed system with a minimum basal application area of 240m², or
 - a wick trench & bed evapotranspiration system with a minimum bed length of 180 metres.

A minimum 20/30/10 effluent quality (BOD < 20mg/L, TSS < 30mg/L and E. Coli < 10cfu/100mg) should be maintained by the selected secondary treatment system. A manufacturer-accredited maintenance and service contract to ensure regular servicing of the system should be implemented.

Preparation of the receiving soil should be undertaken by deep ripping, shallow cultivation and/or the application of gypsum at 1kg/m² to the base of the trenches and beds.

The EPA provides a list of approved options for appropriate treatment systems, many of which can achieve the recommended level of performance. Details of the chosen system should be included on the Septic Tank Permit to Install application provide to the City of Greater Geelong. It remains the responsibility of the property owner/plumber to make the final system selection and forward the type of system selected to the City of Greater Geelong for approval prior to installation.

Regardless of the system selected, the disposal areas including the immediate surrounding area should be planted out with shallow rooted grasses and/or indigenous shrubs to help uptake the applied effluent via evaporation/transpiration techniques. While shallow diversion drains are required to redirect surface waters around all building & disposal localities, strict adherence to the maintenance and monitoring of the installed system is also an essential part of the ongoing treatment and disposal program.

2 PROPOSED DEVELOPMENT

Site Address:	65 Minyip Road, Lara
Allotment Size:	Single land parcel (1\PS543290) of approximately 2.04ha
Proposed development:	The construction of a new 4-bedroom residence, a second 2-bedroom dwelling, a shed and an associated onsite wastewater treatment system
Council:	City of Greater Geelong (Property No. 332316)
Zones and Overlays:	Rural Living Zone (RLZ) Environmental Significance Overlay – Schedule 4 (ESO4) Designated Bushfire Prone Area
Catchment Area:	The site is not within a proclaimed catchment area
Infrastructure:	Mains power is available
Water Supply:	Mains water is available
Sewer:	Reticulated sewerage is not available

3 LOCATION AND SITE FEATURES

The proposed development is the construction of a new 4-bedroom residence, a second 2-bedroom dwelling, a shed and an associated onsite wastewater treatment system. The shed is to have a toilet installed but no habitable rooms. The wastewater treatment systems is to service all the proposed structures.

A locality map within the planning documents is provided in the Appendices to show the location of the site. An aerial photograph has also been provided to show the area under investigation.

Situated within the Rural Living Zone, the property is relatively flat or with a very slight fall (<2%) towards the north. There is an existing residential building, shed and associated primary wastewater system located in the southwestern corner of the property contained within an area of about 0.15ha. The existing residence and wastewater treatment system are to be demolished as part of the site development while the new structures are to be located in the southeastern quadrant of the property, with no footprint overlap.

The remaining ~1.9ha of the property is currently vacant with good coverage of maintained grass (seeded pasture). There are some small trees along or near the southern, northern and eastern boundaries. ESO4 provides additional planning controls related to the conservation of remnant native vegetation within the Werribee Plains Hinterland, however WVST understands that no trees or other native vegetation will require removal as part of the project.

No farm dams were identified at or within 100 metres of the property and no waterways were identified within 300 metres of the property. A disused waterbore was identified at the site near the existing residence.

Climate:	On average, the Lara region experiences warm summers and mild winters, with moderate to strong winds all year round, tending to be from the west or south. The average rainfall may meet or exceed average evaporation for up to 2 months of the year, which normally coincides with June to July. The area has an average rainfall of approximately 455mm and an average evaporation of approx. 1,270mm (Avalon Airport - 87113).
Exposure:	The site exhibits good sun and wind exposure.
Vegetation:	The property is covered in maintained grass with small trees along the southern, northern and eastern boundaries.
Erosion:	There were no signs of erosion having occurred on site.
Groundwater:	During this investigation, 3 boreholes were drilled to depths of 1.4 to 1.7 metres with no groundwater seepage encountered. A Groundwater Report was obtained from the Victorian Department of Environment, Land, Water & Planning (DELWP) which indicated that the water level below ground level (BGL) is likely <5 metres in the proposed development area. Available information on the waterbore indicates it is screened for an aquifer interval of 9 to 13 metres below surface.
Bores:	A waterbore (likely bore ID 81410) was identified at the site during the investigation in the southeast quadrant of the property, near the existing residence. The condition of the borehead indicates this bore is disused. A review of known bores around the locality was conducted using the online mapping tool <i>Visualising Victoria's Groundwater</i>, which identified an additional waterbore (bore ID 81402) in the vicinity. While the VVG map shows this bore to be located centrally on the property, there was no indication of a bore in this area. A review of available information (including original location data) indicates that this bore is likely located near existing structures in a lot to the southeast of the property.
Dam:	No farm dams were identified at or within 100 metres of the property.
Drainage:	Currently, there is no formal drainage implemented upon the allotment. Stormwater in the area of the dispersal field is seen to runoff the site's surface following the natural slope.

4 SOIL INFORMATION

The local geology of the property was determined using the Victorian Government Department of Environment, Land, Water & Planning (DELWP) *Geovic* online mapping tool, which showed the likely formations of the site:

- **‘Neo’ New Volcanic Group** – Miocene to Holocene; extrusive igneous surface flows; basalt rock with surface and intercalated gravels, sands & clays.

The soil investigation was carried out on the 9th July 2026 to ascertain the soil’s suitability for onsite wastewater disposal practices. Two boreholes were drilled for the purposes of this report (BH1 & BH2). Due to wet surface conditions, the boreholes were conducted using a hand auger, with total borehole depths being between 1.4 to 1.7 metres

The boreholes indicated that the soil profile across the site is relatively uniform and adheres to the ‘Neo’ group basalt-derived sandy silty clays. Both boreholes terminated due to refusal of the hand auger to penetrate on very stiff clays or possibly underlying weathered rock.

No outcropping rock was noted across the proposed development area. No groundwater infiltration was observed in any borehole.

There were some minor variations across the boreholes with regards to colour and encountered depth profiles, therefore reference should be made to the borehole logs within the Appendices for a full description of subsurface conditions at each location.

A composite sample of the receiving soil taken from BH1 & BH2 for laboratory testing. The sample comprised of the expected receiving soil material from below the topsoil, with the results summarised in *Table 1 & Table 2* below. The laboratory reports with full results are available in the Appendices.

Soil property	BH1/BH2
Overall soil depth (mm)	1,400-1,700
Water table depth (mm)	>1,700
Plasticity (Liquid limit %) ¹	85
Plasticity Index (%) ¹	64
Shrinkage (%) ¹	19.0
Emerson Class	2
Salinity (dS/m)	2.667
pH	8.2

Table 1 – Summary of results on receiving soil, determined from the investigation.

These properties were determined using Australian Standard (AS) test methods.

¹ Plasticity and shrinkage is a characteristic of the clay fraction of the soil

Soil property	BH1/BH2
% Gravel	2
% Coarse Sand	7
% Medium Sand	3
% Fine Sand	18
% Silt	21
% Clay	49

Table 2 – Summary of soil fractions determined from the investigation.

These properties were determined using Australian Standard (AS) test methods.

From the soil fraction properties and material assessment during the investigation, the receiving soil profile underlying the topsoil at the site is deemed to be a **Soil Category 6 weakly structured medium clay** (GOWM / AS1547 – 2012).

Therefore, the following design loading rates and design irrigation rates (Table 3) are deemed to be applicable for the suitable disposal of effluent at the site onto the receiving Category 6 soils:

Application (disposal) method	DLR/DIR (mm/day)
Conventional trenches (primary treatment)	<i>Not recommended</i>
Conventional trenches (secondary treatment)	<i>Not recommended</i>
Evapotranspiration (ETA) beds and trenches (secondary only)	5
Drip irrigation (secondary treated only)	2
Low pressure effluent distribution (LPED) subsurface irrigation	<i>Not recommended</i>
Mounds	5

Table 3 – Design load rates (DLR) and design irrigation rates (DIR) for dispersal methods, from Table L1, Table M1 and Table N1 of AS1547 – 2012 for weakly structured Category 6 soils.

5 LAND CAPABILITY CLASS RATING (LCCR)

Land Features	Land Capability Class Rating					Individual Rating
	1	2	3	4	5	
General Characteristics						
Site drainage	Very slow	Slow	Moderate	Rapid	Very rapid	1
Runoff ¹	None	Low	Moderate	High	Very high	2
Flooding (years)	Never	–	<1 in 100	<1 in 30	<1 in 20	1
Proximity to watercourses	>100m	–	–	–	<100m	1
Slope ¹ (%)	0 – 2	2 – 8	8 – 12	12 – 20	>20	1
Landslip	No present or past failures	–	–	–	Present or past failures	1
Water table (m)	>5	5 – 2.5	2.5 – 2.0	2.0 – 1.5	<1.5	1-3
Rock outcrop ¹ (>200mm)	None	<10%	10 – 20%	20 – 50%	>50%	1
Erosion Potential ¹	None	Minor	Moderate	High	Severe	1
Exposure	High sun and wind	–	Moderate	Low sun and wind	–	1
Vegetation	Turf / pasture	–	Scattered trees	–	Dense forest, little understorey	1
Rainfall (mm/year)	<450	450 – 650	650 – 750	750 – 1000	>1000	2
Pan evaporation (mm/year)	>1500	1250 – 1500	1000 – 1250	–	<1000	2
Fill ¹	No fill	–	Fill present	–	–	1

Table 4 – Land capability class rating; general characteristics.

¹ Relevant to the site in the proposed dispersal areas.

Land Features	Land Capability Class Rating					Individual Rating
	1	2	3	4	5	
Soil Profile Characteristics						
Profile depth (m)	> 2.0	1.5 – 2.0	–	1.0 – 1.5	< 1.0	2
Soil structure ¹	High	Moderate	Weak	Massive	Single grain	3
Mottling	None	–	–	–	Extensive	1-3
Shrinkage ^{1,2} (%)	<4	4 – 12	12 – 20	>20	–	3
Emerson Class ^{1, 2}	4, 6, 8	5	7	2, 3	1	4
EC (dS/m) ¹	<0.3	0.3 – 0.8	0.8 – 2.0	2.0 – 4.0	>4.0	4
pH	6 – 8	–	4.5 – 6.0	–	<4.5 or >8.0	5
Sodic soil ³	Low	–	Moderate	–	High	3-5
Gravel Fraction ¹ (%)	<10	10 – 20	20 – 40	–	>40	1
				Overall Site Rating		5

Table 5 – Land capability class rating: receiving soil characteristics.

¹ Relevant to soil layer(s) at disposal location.

² Sand material with little to no clays has equivalent Emerson Class of 8 (no slaking, no swelling) and minimal shrinkage.

³ Sodic soil risk is determined through geological maps, soil structure, dispersion, Emerson Class, pH and EC data.

The Land Capability Class Rating (LCCR) of the site has been determined to be a 5, primarily due to the risk of sodic/dispersive subsoils, the low permeability of the soil profile and, to a lesser extent, the risk of soil salinisation.

The Emerson Class, EC and pH data, along with risk mapping of the receiving soil, indicates that dispersive or sodic sub-soil may be a risk at the site. From *Table K2 of AS1547 – 2012*, all land application systems are potentially useable with sodic/dispersive soils, though systems with a conservative application rate and/or that apply effluent within the topsoil (irrigation drip systems) may be preferred. Gypsum should be applied during construction to the receiving soil at a minimum rate of 1kg/m².

For low permeability soils (Category 5 or 6), *Table K2 of AS1547 – 2012* recommends the use of irrigation systems designed using a water balance analysis, or evapotranspiration absorption (ETA) beds with secondary treated effluent. The EPA GOWM and EDRS suggests that 'enhanced' evapotranspiration (wick & bed systems) may be preferred in these conditions. The Victorian EPA GOWM refers to *WaterNSW DWMS* for design guidelines when wick trench & bed systems are selected.

Where soil salinisation is a risk, *Table K2 of AS1547 – 2012* recommends any system that is above the watertable, where at least 0.6 metres of unsaturated soil is available below the base of the effluent field

installation. The investigation indicates that there is at least 1.4 metres of unsaturated soil profile in the proposed land application area (LAA).

In addition, *Table K2* recommends preparation of the receiving soil, potentially by deep ripping, the planting of 'vigorous' vegetation to encourage evapotranspiration and the placement of good permeability soil around trenches or beds.

6 ONSITE WASTEWATER DISPOSAL

This LCA has been prepared to accompany a permit application to the City of Greater Geelong in review of an onsite wastewater treatment system for a new 4-bedroom residence and a second 2-bedroom dwelling.

Given the constraints to the site identified by the LCCR, the following systems are recommended:

- A secondary wastewater treatment system connected to:
 - a drip irrigation dispersal system, *or*
 - a evapotranspiration bed system, *or*
 - a wick trench & bed evapotranspiration system

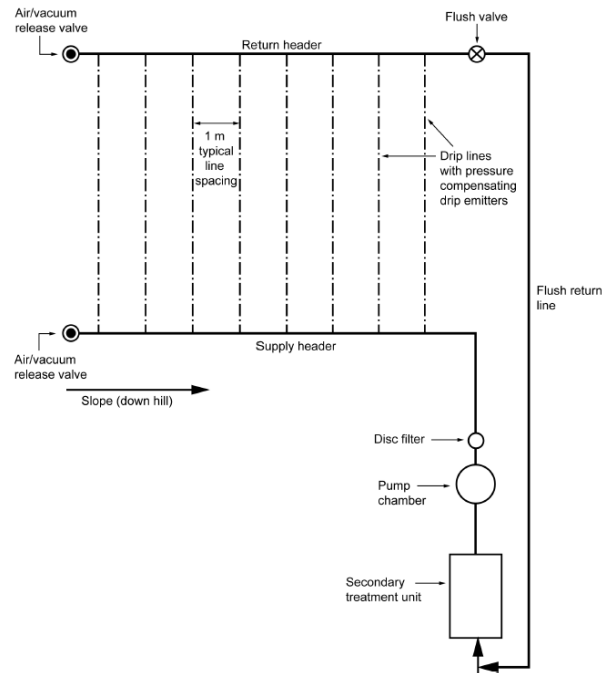
A minimum 20/30/10 effluent quality (BOD < 20mg/L, TSS < 30mg/L and E. Coli < 10cfu/100mg) should be maintained by the selected secondary treatment system. A manufacturer-accredited maintenance and service contract to ensure regular servicing of the system should be implemented.

Preparation of the receiving soil should be undertaken by deep ripping, shallow cultivation and/or the application of gypsum at 1kg/m² to the base of the trenches and beds.

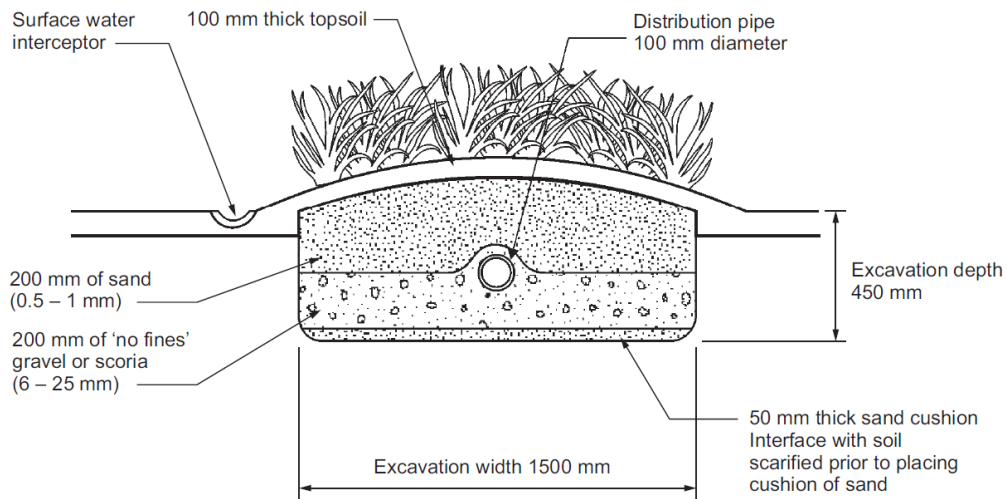
As per *M5 of AS1547 – 2012*, drip irrigation systems should be installed into in situ or imported good quality topsoil with a minimum depth of 250mm, with grass or other suitable vegetation at surface. Importation of topsoil to the area may be required.

As per *L6.1 of AS1547 – 2012* and *Section 10.8.1 of WaterNSW DWMS*, ETA systems should have horizontal bases to encourage even flow through the system, therefore should be installed on flat land. Where the land is not flat, terracing of the application field may be required. It is noted that the land between trenches does not need to be flat.

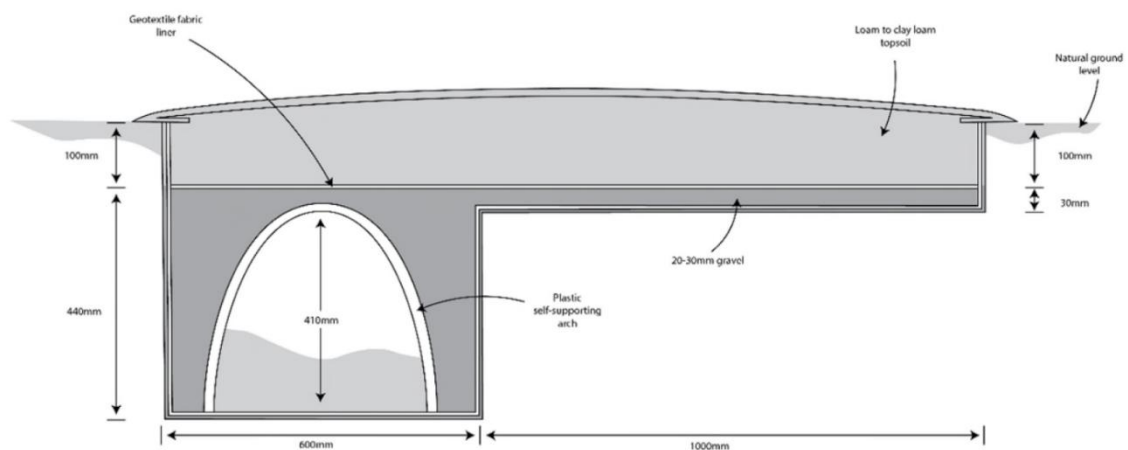
LPED lines can be used to dose the ETA beds.



Example drip irrigation system, from *Figure M1* of AS1547 – 2012.



Example evapotranspiration bed system, from *Figure L6* of AS1547 – 2012.



Example wick trench & bed system, from *DWMS Figure 10.13b*.

7 SIZING OF THE WASTEWATER SYSTEM

The design capacity of the treatment system should cater for the expected peak daily load of the proposed development. As per *EPA GOWM*, the daily load is estimated based on the number of occupants (potential occupancy) and how efficiently water is used within the development (based on water fixtures).

Subsequently, the daily wastewater volume generated has been determined using the 'Minimum Daily Wastewater Flow Rates & Organic Loading Rates' as listed within both *AS1547 – 2012* and *EPA GOWM*.

WVST has provided a system sizing as suited to a 4-bedroom residence and a second 2-bedroom dwelling which will be connected to mains water supplies. The potential wastewater volume generated has been based upon typical values of 150L/person/day and 60g BOD/person/day for a building fitted with full water reduction fixtures and fittings, with full water reduction being defined as minimum WELS rating of 3 stars for appliances and 4 stars for fixtures and fittings.

Following *EPA GOWM* and *AS1547 – 2012*, where the design occupancy is based on the number of bedrooms + 1 per residence (total design occupancy of 8 from 4 + 1 (main residence) and 2 + 1 (second dwelling)), the development is therefore envisaged to generate maximum hydraulic loading of **1,200L/day** and organic loadings of up to 480g BOD/day.

As per *AS1547 – 2012 Table J1*, the minimum operational capacity for an all-waste septic tank for a design occupancy of 8 is recommended as 4,000L.

It is noted that the selected wastewater system should also have appropriate capacity for testing wastewater flow and sufficient storage for build-up of solids before removal. Systems are also required to:

- Hold normal flow of domestic wastes for a range of population equivalents.
- Allow for normal peak flows
- Allow for short-term surge flows (for unusual or excess wastewater production)
- Allow for sludge and scum build up.

EPA GOWM provides a number of potential strategies to reduce wastewater generation, including but not limited to:

- Installation of WELS rated water efficient fittings (minimum 3 stars for appliances, and 4 stars for all fittings and fixtures)
- Consider not installing high water use fixtures such as spas and baths.
- Consider the installation of a dry composting toilet.

8 SIZING AND LOCATION OF THE DISPOSAL FIELDS

There are multiple methodologies available to determine the size of the disposal fields required for the wastewater treatment system. In line with the development intention for the site, WVST has used a water balance equation (from a spreadsheet provided by the Victorian Land Capability Assessment Framework) as the basis to determine the minimum area required for suitable disposal purposes using a drip irrigation system, verified using area calculations from *AS1547 – 2012*, and the conservative design calculations provided in *AS1547 – 2012* for the sizing of the ETA beds, and from *WaterNSW DWMS* for the wick trench & bed system.

WATER BALANCE : DRIP IRRIGATION

WVST also used a water balance equation (provided in the Appendices) to determine the required distribution area for the LAA, in accordance with the area's climate statistics. Available climate data from the *Bureau of Meteorology* (station Avalon Airport - 87113) shows that mean monthly rainfall for the region is likely to meet or exceed average evaporation about 2 months of the year (typically from June to July).

When using the water balance equation, the minimum disposal area required for zero winter storage (assuming a DIR of 2.0mm/day, as per *Table M1* of *AS1547 – 2012*) is **909m²**.

AS1547 – 2012 : DRIP IRRIGATION

The above disposal area was verified to ensure accordance with recommended design irrigation rates provided by *AS1547 – 2012* and *EPA GOWM*. Following *Section M* of *AS1547 – 2012*, the required dispersal areas for irrigation-type systems can be determined as:

$$A = \frac{Q}{DIR} \text{ rearranged to } DIR = \frac{Q}{A}$$

Where: A = dispersal area (m²)
 DIR = design irrigation rate (mm/day)
 Q = design daily flow rate (L/day) = 1,200L/day

For a drip irrigation system where the water balance has determined an application area of 909m²:

$$DIR = \frac{1,200}{909} = 1.3\text{mm/day}$$

From *AS1547 – 2012 Table M1* and *EPA GOWM Table 4-8*, a design irrigation rate (DIR) of up to 2.0mm/day for secondary treated effluent disposal in drip irrigation systems in weakly structured Category 5 soils can be used, therefore the above application meets this requirement.

AS1547 – 2012: EVAPOTRANSPIRATION BED SYSTEM

From *Table L1* of AS1547 – 2012, a design loading rate (DLR) of 5mm/day for Category 5 soils can be used for evapotranspiration bed systems. Following *Section L4.2* of AS1547 – 2012, the size of the ETA bed system can be determined by:

$$L = \frac{Q}{DLR \times W}$$

Where: L = total bed length required (m)

Q = design daily flow rate (L/day) = 1,200L/day

DLR = design loading rate (mm/day) = 5mm/day

W = total width of bed system (m) = 1.0m

$$L = \frac{1,200}{5 \times 1.0} = 240 \text{ metres}$$

A total bed length of 240 metres and a width of 1.0 metres provides a total basal area of **240m²**. Where the bed width is increased, the total bed length can be reduced, as long as the minimum total basal area of 240m² is maintained.

Following *Section L6.1.1* of AS1547 – 2012, the maximum bed length should be 20 metres, so a system of 12 x 1.0 metre beds nominally measuring 20.0 metres in length could be used.

For clay soils, as per *Table L2* of AS1547 – 2012, a side wall to side wall spacing of the same width of a minimum of 1 metre may be adopted for conventional ETA beds.

WaterNSW DWMS : WICK TRENCH AND BED SYSTEM

From *Table L1* of AS1547 – 2012, a design loading rate (DLR) of 5mm/day for Category 5 soils can be used for wick trench and beds systems. Following *Section 10.8* of *WaterNSW DWMS*, the size of the wick trench and bed system can be determined by:

$$L = \frac{Q}{DLR \times \frac{W}{F}}$$

Where: L = total trench length required (m)

Q = design daily flow rate (L/day) = 1,200L/day

DLR = design loading rate (mm/day) = 5mm/day

W = total width of trench & bed system (m) = 1.6m

F = design factor = 1.2

$$L = \frac{1200}{5 \times \frac{1.6}{1.2}} = 180 \text{ metres}$$

Following *Section L6.1.1* of AS1547 – 2012, the maximum trench length should be 20 metres, so a system of 9 wick trench & beds nominally measuring 20 metres in length could be used.

From the *WaterNSW DWMS*, a side wall to side wall spacing of a minimum of 2 metres should be adopted for wick trench & bed systems.

Based on these requirements, for a secondary treatment system:

- for an ETA bed system, a series of 12 x 20 metre long beds of 1.0 metre width and 1.0 metre spacing would require a nominal area of approximately 460m².
- for a wick & trench bed system, a series of 9 x 20 metre long beds of 1.6 metre width and 2.0 metre spacing would require a nominal area of approximately 608m².

For all ETA type systems, the land must be flat and the base of the trench must be horizontal. Minor terracing to create a series of level beds may be required. It is noted that the land is not required to be flat between the beds.

Beds should be installed at least 3 metres from trees and/or outside tree protection zones (where applicable).

LOCATION OF THE DISPOSAL FIELD

EPA GOWM provides a number of setback distances (buffers) for the disposal field to help reduce the risk of human contact, protect sensitive environmental areas and maintain public amenity.

For secondary treated sewerage systems, these can be summarised as:

- 300 metres upslope from dams, lake or reservoirs used as a source of potable water.
- 100 metres up-slope from waterways used as a source of potable water.
- 30 metres upslope from waterways or dams not used as a source for potable water.
- 7.5 metres from in-ground water tanks.
- 3 metres up-slope of a building and 1.5 metres down-slope of a building.
- 3 metres up-slope of an adjacent lot and 1.5 metres down-slope of an adjacent lot.
- 20 metres from groundwater bores.
- 1.5 metres from base of trench to seasonal high-water table.
- 0.6 metres depth to a hydraulic limiting layer (eg. bedrock).

For this site, these EPA setbacks are achievable.

While a detailed design of the system is beyond the scope of this report, the schematic diagrams provided in the Appendices show the available area for the wastewater disposal field, a potential drip irrigation system and an ETA bed system layout for the dispersal of secondary treated effluent at the site. The above setbacks should be adhered to during final positioning of the dispersal field.

9 MANAGEMENT AND MAINTENANCE PROTOCOLS

Maintenance and monitoring of the wastewater treatment system is to be carried out in accordance with the certificate of approval and City of Greater Geelong's permit conditions. In addition, for the long-term benefit of any wastewater treatment system there are a number of requirements for the owner to follow, namely:

- Minimise domestic water use.
- Minimise the use of non-biodegradable detergents.

- Use biodegradable soaps and low-phosphorus detergents.
- Minimise the use of high-sodium detergents or soaps.
- Restrict the use of germicides, ie. disinfectants.
- Minimise the discharge of fats, grease or chemicals into the system.
- Monitor quality of groundwater (if applicable).
- No sanitary or other hygiene products should be put in the system.
- Follow any other specific instructions provided by the manufacturers of the tank.

The following should also be considered for any disposal area at this site:

- Should be well exposed to the sun and wind.
- Alternate dispersal between different parts of the disposal field.
- Should contain plant vegetation requiring high nutrient plants - a list of potential plants for the disposal field is provided in the Appendices.
- A dense cover of appropriate evergreen species will be required to assist with water and nutrient uptake, particularly in the wet periods.
- Regularly harvest (mow) vegetation/grasses to maximize their uptake of water and nutrients.
- In dry times, to ensure the viability of the vegetation on and around the disposal field, it may be necessary to water them occasionally.
- Areas along the perimeter and below the disposal field should be vegetated with trees and shrubs.
- There should be restricted access to the disposal fields for vehicles, visitors, pets and children, noting that a fully fenced off area may be required in some cases.
- No permanent structures are to be erected over the reserve disposal area (where required).
- Ensure the area is level by filling depressions with good topsoil (not clay).
- While the disposal areas can be positioned to fit in with a landscape type design, it is easier to manage if they are all in one allocated area.

10 OTHER ON-GOING MANAGEMENT, MAINTENANCE AND REPORTING PROTOCOLS

It is the responsibility of the landowner to manage and maintain the complete domestic wastewater system, including the disposal fields. It is important that the owner compiles all services and actions conducted on the selected system and the disposal field and makes them readily available to the City of Greater Geelong, when requested.

If either the system or the disposal field fails, it is important that a qualified person, ie. plumber, be called out quickly to limit any damage. The City of Greater Geelong should also be contacted at the earliest possible convenience to assess any potential health issues that may have occurred due to the failure.

If or where no mains water is available, provisions should still be made at the planning stage to collect as much water from roof catchments via water tanks as possible. Furthermore, all proposed buildings should have their structure designed to maximise their water catchment potential and typically have water tanks with a volume that can sustain the dwelling for the summer months. It is recommended that a separate tank be considered for non-potable requirements such as fire prevention and watering purposes during drier times.

11 CONCLUSION

The Land Capability Class Rating (LCCR) of the site was determined to be a 5, primarily due to the risk of sodic/dispersive subsoils, the low permeability of the soil profile and, to a lesser extent, the risk of soil salinisation.

Given the constraints to the site identified by the LCCR, the following systems are recommended:

- A secondary wastewater treatment system connected to:
 - a drip irrigation dispersal system with a minimum land application area of 909m², or
 - a evapotranspiration bed system with a minimum basal application area of 240m², or
 - a wick trench & bed evapotranspiration system with a minimum bed length of 180 metres.

A minimum 20/30/10 effluent quality (BOD < 20mg/L, TSS < 30mg/L and E. Coli < 10cfu/100mg) should be maintained by the selected secondary treatment system. A manufacturer-accredited maintenance and service contract to ensure regular servicing of the system should be implemented.

Preparation of the receiving soil should be undertaken by deep ripping, shallow cultivation and/or the application of gypsum at 1kg/m² to the base of the trenches and beds.

As per *M5 of AS1547 – 2012*, drip irrigation systems should be installed into in situ or imported good quality topsoil with a minimum depth of 250mm, with grass or other suitable vegetation at surface. Importation of topsoil to the area may be required.

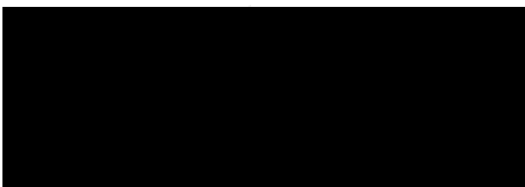
As per *L6.1 of AS1547 – 2012* and *Section 10.8.1 of WaterNSW DWMS*, ETA systems should have horizontal bases to encourage even flow through the system, therefore should be installed on flat land. Where the land is not flat, terracing of the application field may be required. It is noted that the land between trenches does not need to be flat.

LPED lines can be used to dose the ETA beds.

The EPA provides a list of approved options for appropriate treatment systems, many of which can achieve the recommended level of performance. Details of the chosen system should be included on the Septic Tank Permit to Install application provide to the City of Greater Geelong.

It remains the responsibility of the property owner/plumber to make the final selection of the treatment systems and forward this information to City of Greater Geelong for approval prior to installation.

Strict adherence to the maintenance and monitoring of the installed system is also an essential part of the ongoing wastewater treatment and disposal program.



DISTRIBUTION

Electronic copies

Vesta Designs (Architect) info@vestadesigns.com.au

This document was prepared for the sole use of the Vesta Designs and the regulatory agencies directly involved in this project. No third party should rely upon any of the information contained in this document without the prior consent of Western Victoria Soil Testing.



APPENDIX A – MAPS

PROPERTY REPORT



Energy,
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and Climate Action

Created at 31 July 2026 06:45 AM

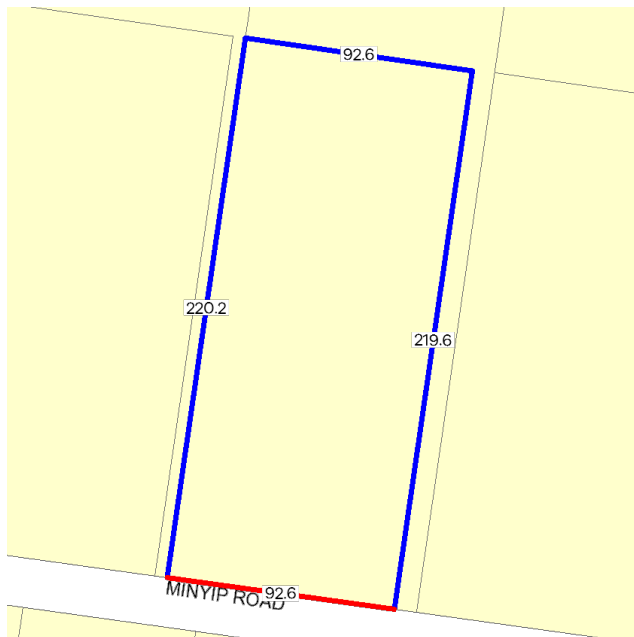
PROPERTY DETAILS

Address: **65 MINYIP ROAD LARA 3212**
 Lot and Plan Number: **Lot 1 PS543290**
 Standard Parcel Identifier (SPI): **1\PS543290**
 Local Government Area (Council): **GREATER GEELONG**
 Council Property Number: **332316**
 Directory Reference: **Melway 422 C10**

www.geelongaustralia.com.au

SITE DIMENSIONS

All dimensions and areas are approximate. They may not agree with those shown on a title or plan.



Area: 20365 sq. m (2.04 ha)

Perimeter: 625 m

For this property:

— Site boundaries

— Road frontages

Dimensions for individual parcels require a separate search, but dimensions for individual units are generally not available.

Calculating the area from the dimensions shown may give a different value to the area shown above

For more accurate dimensions get copy of plan at

[Title and Property Certificates](#)

UTILITIES

Rural Water Corporation: **Southern Rural Water**
 Urban Water Corporation: **Barwon Water**
 Melbourne Water: **Outside drainage boundary**
 Power Distributor: **POWERCOR**

STATE ELECTORATES

Legislative Council: **WESTERN VICTORIA**
 Legislative Assembly: **LARA**

PLANNING INFORMATION

Property Planning details have been removed from the Property Reports to avoid duplication with the Planning Property Reports from the Department of Transport and Planning which are the authoritative source for all Property Planning information.

The Planning Property Report for this property can found here - [Planning Property Report](#)

Planning Property Reports can be found via these two links

Vicplan <https://mapshare.vic.gov.au/vicplan/>

Property and parcel search <https://www.land.vic.gov.au/property-and-parcel-search>

PROPERTY REPORT



Energy,
Environment
and Climate Action

Area Map



PLANNING PROPERTY REPORT



Department
of Transport
and Planning

From www.planning.vic.gov.au at 31 July 2026 06:45 AM

PROPERTY DETAILS

Address: **65 MINYIP ROAD LARA 3212**
 Lot and Plan Number: **Lot 1 PS543290**
 Standard Parcel Identifier (SPI): **1\PS543290**
 Local Government Area (Council): **GREATER GEELONG**
 Council Property Number: **332316**
 Planning Scheme: **Greater Geelong**
 Directory Reference: **Melway 422 C10**

www.geelongaustralia.com.au

[Planning Scheme - Greater Geelong](#)

UTILITIES

Rural Water Corporation: **Southern Rural Water**
 Urban Water Corporation: **Barwon Water**
 Melbourne Water: **Outside drainage boundary**
 Power Distributor: **POWERCOR**

STATE ELECTORATES

Legislative Council: **WESTERN VICTORIA**
 Legislative Assembly: **LARA**
 Registered Aboriginal Party: **Wadawurrung Traditional Owners Aboriginal Corporation**
 Fire Authority: **Fire Rescue Victoria & Country Fire Authority**

[View location in VicPlan](#)

Planning Zones

[RURAL LIVING ZONE \(RLZ\)](#)

[SCHEDULE TO THE RURAL LIVING ZONE \(RLZ\)](#)



Note: labels for zones may appear outside the actual zone - please compare the labels with the legend.

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Notwithstanding this disclaimer, a vendor may rely on the information in this report for the purpose of a statement that land is in a bushfire prone area as required by section 32C (b) of the Sale of Land 1962 (Vic).

PLANNING PROPERTY REPORT



Department
of Transport
and Planning

Planning Overlays

[ENVIRONMENTAL SIGNIFICANCE OVERLAY \(ESO\)](#)

[ENVIRONMENTAL SIGNIFICANCE OVERLAY - SCHEDULE 4 \(ESO4\)](#)



Note: due to overlaps, some overlays may not be visible, and some colours may not match those in the legend

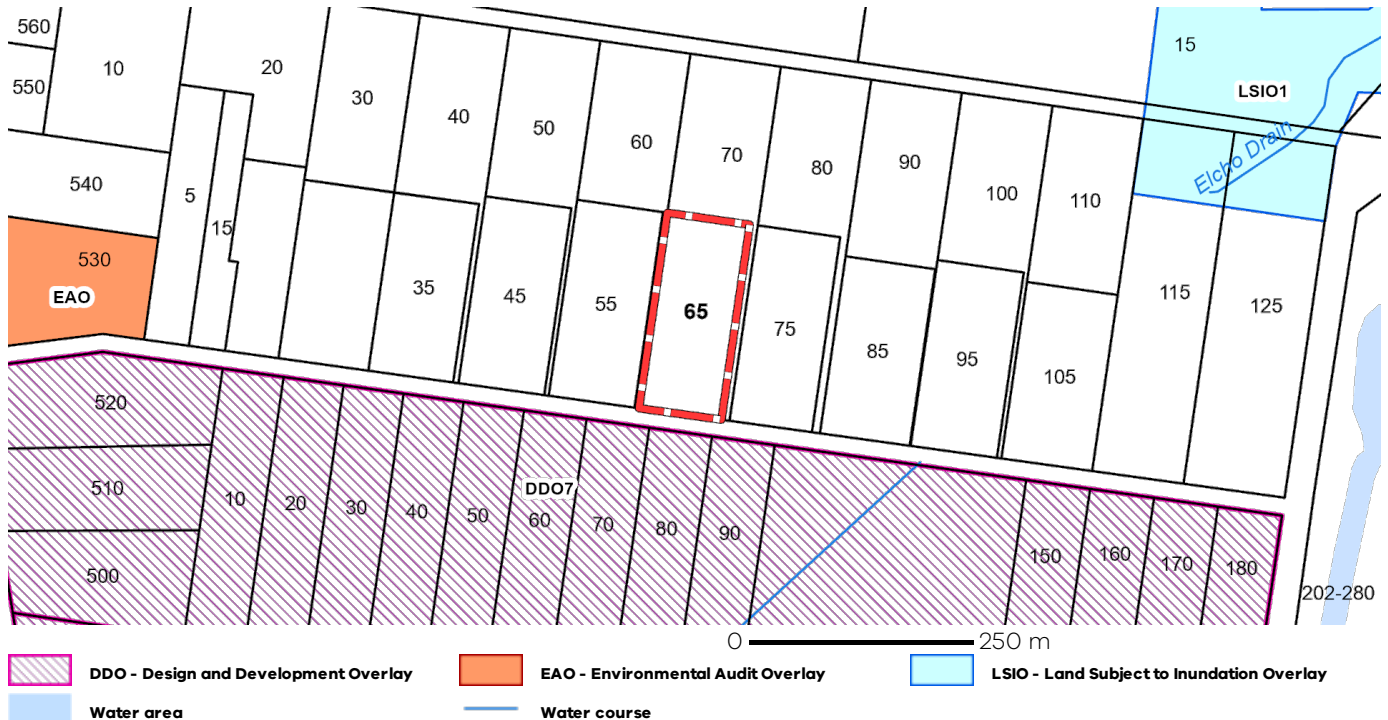
OTHER OVERLAYS

Other overlays in the vicinity not directly affecting this land

[DESIGN AND DEVELOPMENT OVERLAY \(DDO\)](#)

[ENVIRONMENTAL AUDIT OVERLAY \(EAO\)](#)

[LAND SUBJECT TO INUNDATION OVERLAY \(LSIO\)](#)



Note: due to overlaps, some overlays may not be visible, and some colours may not match those in the legend

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PLANNING PROPERTY REPORT

VICTORIA
State
GovernmentDepartment
of Transport
and Planning

Further Planning Information

Planning scheme data last updated on 30 July 2026.

A **planning scheme** sets out policies and requirements for the use, development and protection of land.

This report provides information about the zone and overlay provisions that apply to the selected land.

Information about the State and local policy, particular, general and operational provisions of the local planning scheme that may affect the use of this land can be obtained by contacting the local council

or by visiting <https://www.planning.vic.gov.au>

This report is NOT a **Planning Certificate** issued pursuant to Section 199 of the **Planning and Environment Act 1987**.

It does not include information about exhibited planning scheme amendments, or zonings that may affect the land.

To obtain a Planning Certificate go to Titles and Property Certificates at Landata - <https://www.landata.vic.gov.au>

For details of surrounding properties, use this service to get the Reports for properties of interest.

To view planning zones, overlay and heritage information in an interactive format visit <https://mapshare.vic.gov.au/vicplan/>

For other information about planning in Victoria visit <https://www.planning.vic.gov.au>

PLANNING PROPERTY REPORT



VICTORIA
State
Government

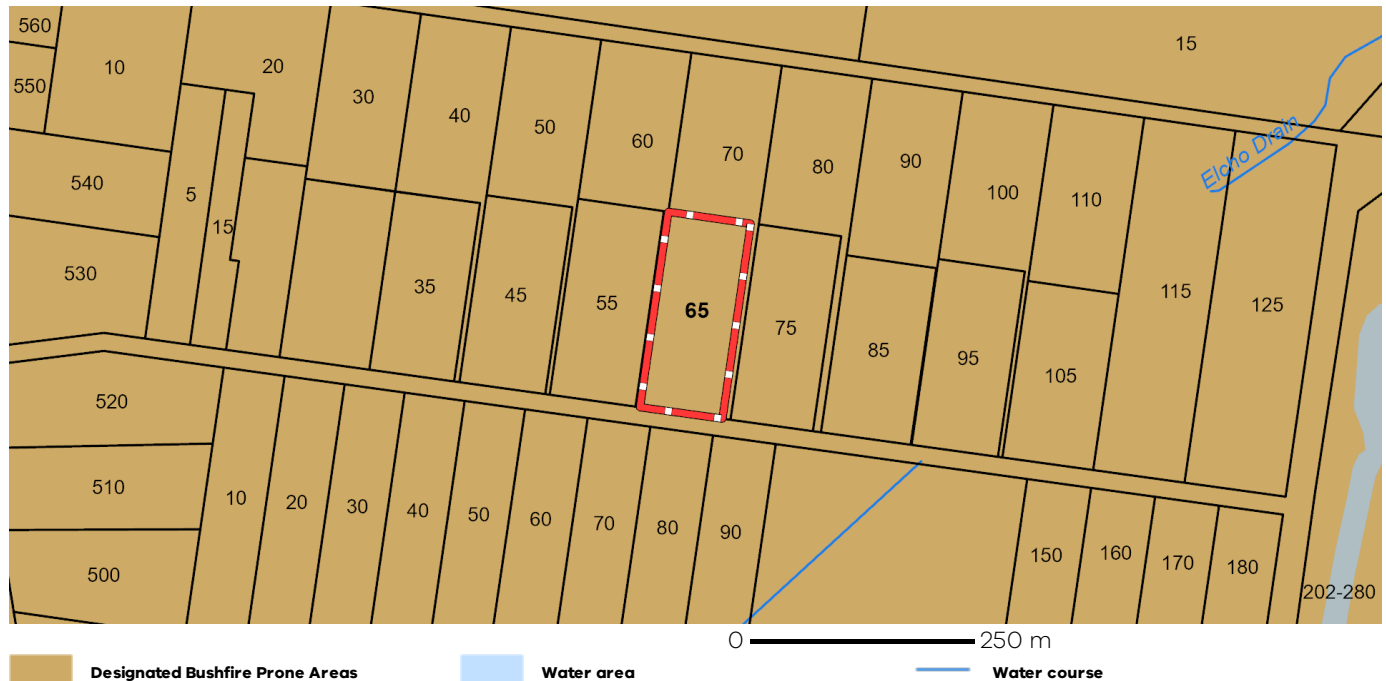
Department
of Transport
and Planning

Designated Bushfire Prone Areas

This property is in a designated bushfire prone area. Special bushfire construction requirements apply to the part of the property mapped as a designated bushfire prone area (BPA). Planning provisions may apply.

Where part of the property is mapped as BPA, if no part of the building envelope or footprint falls within the BPA area, the BPA construction requirements do not apply.

Note: the relevant building surveyor determines the need for compliance with the bushfire construction requirements.



Designated BPA are determined by the Minister for Planning following a detailed review process. The Building Regulations 2018, through adoption of the Building Code of Australia, apply bushfire protection standards for building works in designated BPA.

Designated BPA maps can be viewed on VicPlan at <https://mapshare.vic.gov.au/vicplan/> or at the relevant local council.

Create a BPA definition plan in [VicPlan](#) to measure the BPA.

Information for lot owners building in the BPA is available at <https://www.planning.vic.gov.au>.

Further information about the building control system and building in bushfire prone areas can be found on the Victorian Building Authority website <https://www.vba.vic.gov.au>. Copies of the Building Act and Building Regulations are available from <http://www.legislation.vic.gov.au>. For Planning Scheme Provisions in bushfire areas visit <https://www.planning.vic.gov.au>.

Native Vegetation

Native plants that are indigenous to Victoria and important for biodiversity might be present on this property. This could include trees, shrubs, herbs, grasses or aquatic plants. There are a range of regulations that may apply including need to obtain a planning permit under Clause 52.17 of the local planning scheme. For more information see [Native Vegetation \(Clause 52.17\)](#) with local variations in [Native Vegetation \(Clause 52.17\) Schedule](#)

To help identify native vegetation on this property and the application of Clause 52.17 please visit the Native Vegetation Regulations Map (NVR Map) <https://mapshare.vic.gov.au/nvr/> and [Native vegetation \(environment.vic.gov.au\)](http://nativevegetation.environment.vic.gov.au) or please contact your relevant council.

You can find out more about the natural values on your property through NatureKit [NatureKit \(environment.vic.gov.au\)](http://naturekit.environment.vic.gov.au)

Groundwater Resource Report

Groundwater catchment: West Port Phillip Bay

VICGRID94 Easting: 2444291 Northing: 2384703

Depth to water table: < 5m

Water table salinity (mg/L): 1001 - 3500

Groundwater layers (Aquifers and Aquitards)	Depth below surface (m)	Groundwater salinity (mg/L)
UTB Upper Tertiary / Quaternary Basalt basalt (fractured rock)	0 - 28	1001 - 3500
UMTD Lower Mid-Tertiary Aquitard clay, silt, siltstone (fractured rock), marl (fractured rock), minor sand	28 - 130	Unknown
LTA Lower Tertiary Aquifer sand, gravel, clay and silt, minor coal	130 - 192	3501 - 13000
BSE Mesozoic and Palaeozoic Bedrock (basement) sedimentary (fractured rock): Sandstone, siltstone, mudstone, shale. Igneous (fractured rock): includes volcanics, granites, granodiorites.	192 - 392	1001 - 3500

There are no GMUs at this location

For further information about this report contact:

Department of Environment, Land, Water & Planning

Email: ground.water@delwp.vic.gov.au
For further information on groundwater licensing in this area contact:

Southern Rural Water Corporation

Phone: 1300 139 510

Email: srw@srw.com.auWebsite: www.srw.com.au
Disclaimer

This publication may be of assistance to you but the State of Victoria and its employees do not guarantee that the publication is without flaw of any kind or is wholly appropriate for your particular purposes and therefore disclaims all liability for any error, loss or other consequence which may arise from you relying on any information in this publication.

Printed: 31 July 2026

Date Updated: 11 January 2019

How to read this report

Introduction

Groundwater is part of the water cycle. When rain or snow falls on land, some of it evaporates, some flows to streams and rivers, and some seeps into the soil. Some of the water in the soil is used by plants but some continues to move down through the soil and rock until all the pores and cracks are full of water. This is known as the water table and this water is called groundwater.

Groundwater is a finite resource that, like surface water, is allocated under the Water Act (1989). A Bore Construction Licence is required to drill for groundwater including for domestic and stock purposes. Taking and using groundwater for commercial or irrigation purposes requires an additional licence.

Purpose of this report

This report has been prepared to provide potential groundwater users with basic information about groundwater beneath their property. This includes the different geological layers, the depths of the layers and the salinity of groundwater in the layers. Information on the groundwater management units (GMU) and any associated caps on the volume that can be licensed (the PCV) are also provided.

Definitions and context

Term	Description
Groundwater Catchment	An identified area of the State within which groundwater resources are connected.
Easting / Northing	The VICGRID 94 coordinates of the spot that was selected on the interactive map.
Groundwater Salinity	Indicates the possible concentration of salts within the groundwater. The salt content indicates the possible uses of the water (see the Beneficial Use Table below). Fertilisers and other contaminants can also enter groundwater and affect its use. It is up to you to make sure that the groundwater you use is suitable for your purpose.
Aquifer	An aquifer is a layer of soil or rock which stores usable volumes of groundwater. Aquifers are generally limestones, gravels and sands, as well as some fractured rocks where the cracks in the rock are open and connected (some basalts, sandstones and limestones). How much water can be pumped from an aquifer depends on how much water is stored in pores and cracks, how well connected the pores and cracks are, and how thick the layer is. It is more likely that volumes of water for irrigation and urban water supply will come from gravels, sands, limestones and basalts that are at least 30 metres thick. Low volumes of water for domestic and stock use are likely from any aquifer greater than 10 metres thick. The advice above is a guide only, as the amount of water available can be highly variable. Actual pumping volumes can only be determined from drilling, appropriate construction and testing of a bore.
Aquitard	An aquitard is a layer of rock or soil that does not allow water to move through it easily, limiting its capacity to supply water. Aquitards are generally silts, clays and fractured rocks (where there are few cracks in the rock or the cracks are poorly connected).
Groundwater Management Unit (GMU)	A collective term for groundwater management areas (GMAs) and water supply protection areas (WSPAs). GMAs and WSPAs are defined areas and depths below the surface where rules for groundwater use may apply. WSPAs often have caps on groundwater use and plans describing how the resource is managed. GMAs usually have caps on groundwater use and may have local plans and rules. All other areas are managed directly through the Water Act (1989). Always check with your local Rural Water Corporation to be sure that the information on the GMU is correct for your specific location.
Permissible Consumptive Volume (PCV)	A cap that is set under the Water Act (1989) declaring the total volume of groundwater that may be taken from the area. Once the PCV is reached, no additional extraction can be licensed for use within the area unless traded from another groundwater licence holder.
Depth to Water Table	This is an indication of the depth at which groundwater might first be encountered when drilling a bore. The depth can vary from year to year, and from place to place and may vary significantly from that indicated in this report.

Beneficial Use Table

Salinity range (mg/L TDS)	Beneficial use as described by State Environment Protection Policy (Groundwaters of Victoria) s160							
	Potable water - preferred	Potable water - acceptable	Potable mineral water	Irrigation	Stock water	Industry	Ecosystem protection	Buildings and structures
<500	✓	✓	✓	✓	✓	✓	✓	✓
501-1000		✓	✓	✓	✓	✓	✓	✓
1001-3500			✓	✓	✓	✓	✓	✓
3501-13000					✓	✓	✓	✓
13001+						✓	✓	✓

Accessibility

If you would like to receive this publication in an alternate format, please telephone or email the DELWP Customer Service Centre 136 186, email customer.service@delwp.vic.gov.au, or via the National Relay Service on 133 677 www.relayservice.com.au.

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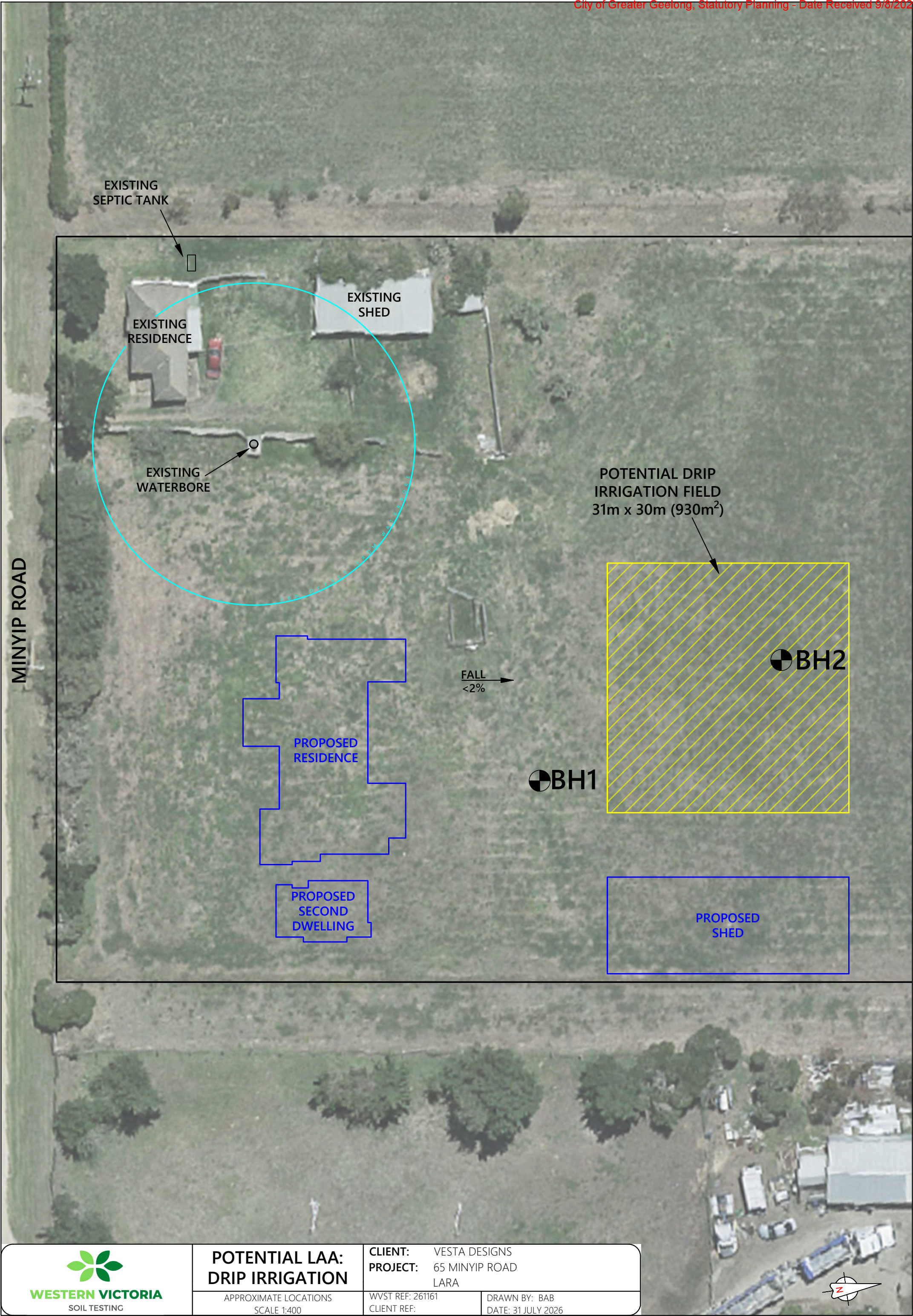
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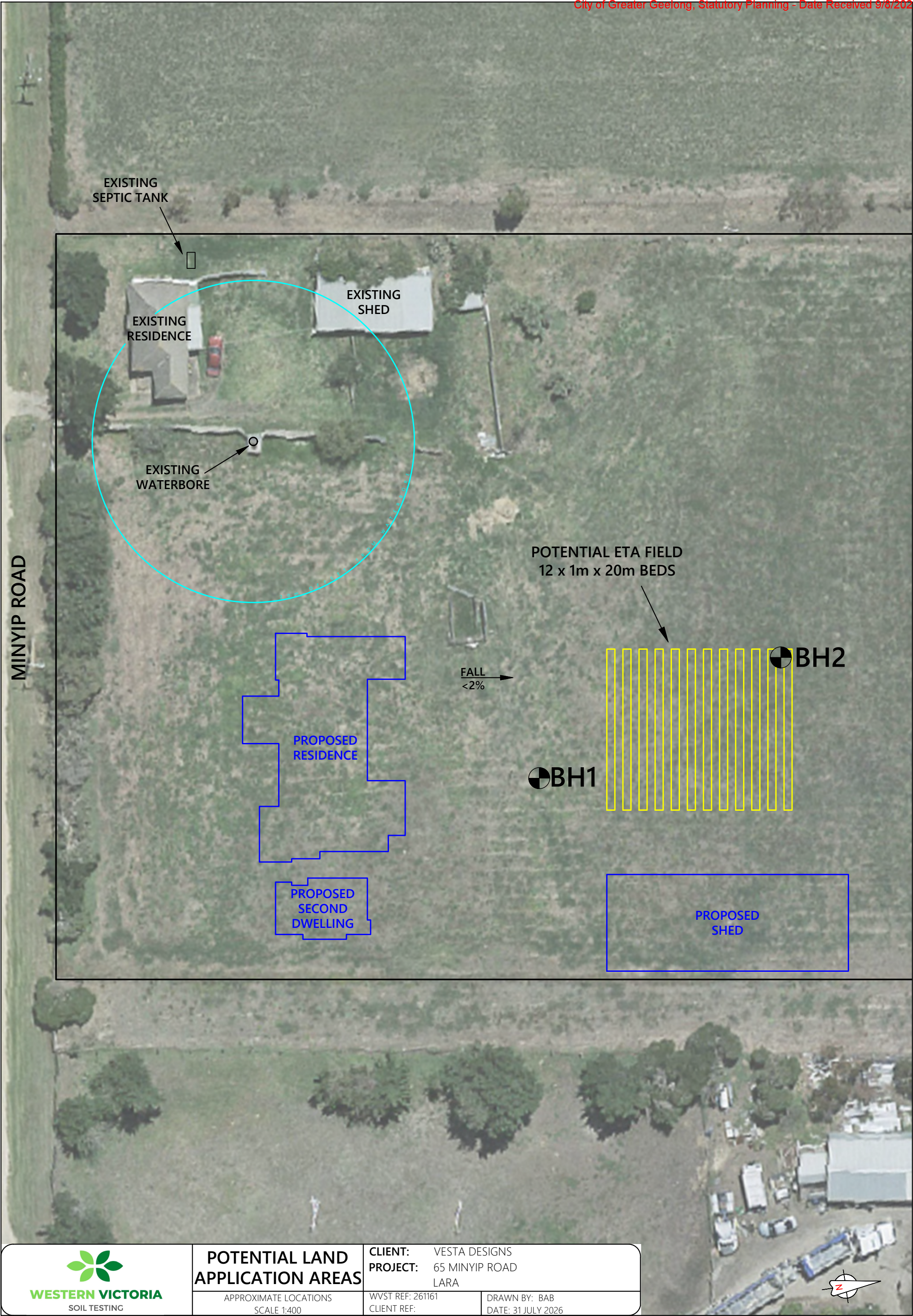
Printed: 31 July 2026

Date Updated: 11 January 2019



Environment,
Land, Water
and Planning





	POTENTIAL LAND APPLICATION AREAS		CLIENT: VESTA DESIGNS
			PROJECT: 65 MINYIP ROAD LARA
	APPROXIMATE LOCATIONS SCALE 1:400	WVST REF: 261161 CLIENT REF:	DRAWN BY: BAB DATE: 31 JULY 2026




WESTERN VICTORIA
SOIL TESTING

APPENDIX B – BOREHOLE LOGS

Client:	Vesta Designs		Date drilled:	9/07/2026
Project:	65 Minyip Road, Lara		Report number:	261161
Method:	Hand auger		Borehole log no:	1
Depth (mm)	Structure	Material Description		Testing
0 – 100	Topsoil	Clayey SILT, dark brown, firm, moist, some fine sand		
100 – 200	Soil profile	Sandy Silty CLAY, high plasticity, grey with occasional orange or brown mottles, stiff to very stiff, moist, fine sand		Sample BH1/BH2 0.1-1.3m
200 – 300				
300 – 400				
400 – 500				
500 – 600		Sandy Silty CLAY, high plasticity, brown, very stiff, moist, fine to medium sand, trace fine gravel		
600 – 700				
700 – 800		Silty CLAY, high plasticity, grey with orange or brown mottles, stiff, moist, some fine sand		
800 – 900				
900 – 1000				
1000 – 1100				
1100 – 1200				
1200 – 1300		Pale grey with occasional orange mottles from 1.0 metres		
1300 – 1400	Sandy Silty CLAY, high plasticity, pale grey with orange, brown or off-white mottles, very stiff, slightly moist, fine to medium sand Hand auger refusal @ 1.4 metres			

Client:	Vesta Designs		Date drilled:	9/07/2026
Project:	65 Minyip Road, Lara		Report number:	261161
Method:	Hand auger		Borehole log no:	2
Depth (mm)	Structure	Material Description		Testing
0 – 100	Topsoil	Clayey SILT, dark brown, firm, moist, some fine sand		
100 – 200	Soil profile	Sandy Silty CLAY, high plasticity, grey with occasional orange or brown mottles, stiff to very stiff, slightly moist to moist, fine sand		Sample BH1/BH2 0.1-1.5m
200 – 300				
300 – 400				
400 – 500				
500 – 600				
600 – 700				
700 – 800		Silty CLAY, high plasticity, grey with orange or brown mottles, stiff, slightly moist to moist, some fine sand		
800 – 900				
900 – 1000				
1000 – 1100				
1100 – 1200				
1200 – 1300				
1300 – 1400				
1400 – 1500				
1500 – 1600		Pale grey with occasional orange mottles from 1.5 metres		
1600 – 1700	Hand auger refusal @ 1.7 metres			



WESTERN VICTORIA
SOIL TESTING

APPENDIX C – SITE PHOTOGRAPHS



Site of proposed LAA at time of investigation, looking southeast.



Site of proposed LAA at time of investigation, looking southwest.



Site of proposed LAA at time of investigation, looking northwest.



Site of proposed LAA at time of investigation, looking northeast.



Top of primary septic tank at existing residence.



Borehead of disused waterbore.

APPENDIX D – NATA ACCREDITED TEST REPORTS





Protest CMT

ABN: 26602913673

www.protestcmt.com.au

Atterberg Limits Report

Client :	Western Victoria Soil Testing		Report Number :	SR/PTP/15902 - 3/1
Client Address :	Shed 5/16 Concept Drive, Delacombe, 3356, VIC		Report Date :	21/07/2026
Project Name :	WVST - Lara - 261161		Test Request :	WVST - Lara
Project Number :	PTP/15902		Page 1 of 1	
Location :	10 Hicks Street, Lara, VIC, 3212			
Test Methods :	AS1289.3.1.2, AS1289.3.2.1, AS1289.3.4.1, AS1289.3.3.1, AS1289.2.1.1			
Material Description :	Silty CLAY - Pale brown/orange Medium Plasticity			
Sample Number :	S/365933	Sampling Location :	Random	
Date(s) Tested :	09/07/2026 - 21/07/2026	Sampling Method :	As Received	
Material Source :	BH1/2 - As recieved	Time :	09:00	
For use as :	Geotechnical Investigation	Location 1 :	BH1/2	
Lot Number :	-	Location 2 :	As Recieved	
ATT Specification Number :	N/A	Location 3 :	-	
		Location 4 :	-	
History of Sample :	Oven Dried			
Method of Preparation :	Dry Sieved			
Linear Shrinkage & Defects :	Curling Occurred			
Mould Length (mm) :	251			
Atterberg Limits Test Results	Liquid Limit (%) :	Plastic Limit (%) :	Plasticity Index (%) :	Linear Shrinkage (%) :
Results :	85	21	64	19.0
Specifications :				
Remarks :	-			
 Note: The results contained in this report relate only to the item/s that were tested/sampled Accredited for Compliance with ISO/ IEC 17025 - Testing Protest CMT (Geelong) Accreditation Number - 19667 Base Laboratory Site Number - 10657 - Geelong Laboratory Base Laboratory Address - 78 Mornington Street, North Geelong, 3215, VIC		APPROVED SIGNATORY  Joshua Brunacci - Signatory		

Document Number : RF05

Date : 23/06/2026

REPORT OF DETERMINATION OF ELECTRICAL CONDUCTIVITY OF A SOIL

Conductivity (uS/cm) **2667**

Lab Number : PTP/15902 - J1	
Client : Western Victoria Soil Testing	Project: WVST - Lara 261161
Sampled By : Client, Tested as Received	Date Sampled : 9/07/2026
Sampling Method : Sampled by Client method not known. Results relate to testing performed only.	
Date Tested : 15/07/2026	Material : Silty CLAY - Pale brown/orange, medium plasticity
Sample Source / Identification : S/365933 BH1/BH2	
Date received : 9/07/2026	Water Type & temperature : Distilled, 19c

NOTES :

Solution Tested at Ratio : 30g and 75g water

Sample Moisture condition at testing : Natural



J. Brunacci
 Authorised Signatory :

21/07/2026
 Date :



Protest CMT

ABN: 26602913673

www.protestcmt.com.au

Emerson Class Report

Client :	Western Victoria Soil Testing			Report Number :	SR/PTP/15902 - 1/1	
Client Address :	Shed 5/16 Concept Drive, Delacombe, 3356, VIC			Report Date :	15/07/2026	
Project Name :	WVST - Lara - 261161			Test Request :	WVST - Lara	
Project Number :	PTP/15902			Page 1 of 1		
Location :	10 Hicks Street, Lara, VIC, 3212					
Test Methods :	AS1289.3.8.1					
Sample Number :	S/365933					
Date/s Tested :	09/07/2026 - 15/07/2026					
Material Source :	BH1/2 - As recieved					
For Use As :	Geotechnical Investigation					
Sampling Location :	Random					
Sampling Method :	As Received					
Time :	09:00					
Lot Number :	-					
Location 1 :	BH1/2					
Location 2 :	As Recieved					
Location 3 :	-					
Location 4 :	-					
Water Type :	Distilled					
Soil Description :	Silty CLAY - Pale brown/orange Medium Plasticity					
Emerson Specification Number :	N/A					
Specification Limits :	-					
Emerson Class Number :	2					
Remarks :						
		Note: The results contained in this report relate only to the item/s that were tested/sampled Accredited for Compliance with ISO/ IEC 17025 - Testing Protest CMT (Geelong) Accreditation Number - 19667 Base Laboratory Site Number - 10657 - Geelong Laboratory Base Laboratory Address - 78 Mornington Street, North Geelong, 3215, VIC			APPROVED SIGNATORY Joshua Brunacci - Signatory	

Document Number : RF6

Date : 24/03/2026

Material Test Report

Report Number: GEO94-34
Issue Number: 1
Date Issued: 20/07/2026
Client: PROTEST CMT GEELONG
 PO BOX 5298, NORTH GEELONG VIC 3215
Contact: Joshua Brunacci
Project Number: GEO94
Project Name: LAB TESTING
Project Location: VARIOUS
Work Request: 27810
Sample Number: 94-S59
Date Sampled: 09/07/2026
Dates Tested: 10/07/2026 - 15/07/2026
Sampling Method: Sampled by Client - Tested as Received
The results apply to the sample as received
Sample Location: WVST - Lara BH1/2
Lot No: Client Project No. PTP/15902
Sub Lot No: Sample No. S/365933
Material: CLAY/SILT, medium to high plasticity, pale brown/orange,
 with sand 28% fine to coarse grained, trace gravel 2%
Material Source: Insitu



C & T Geotechnical (South West)
 8 Freedman Street North Geelong Vic 3215

Phone: (03) 7000 4648

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Accredited for compliance with ISO/IEC 17025 - Testing



B. Elliott

Approved Signatory: Brent Elliott

Laboratory Manager

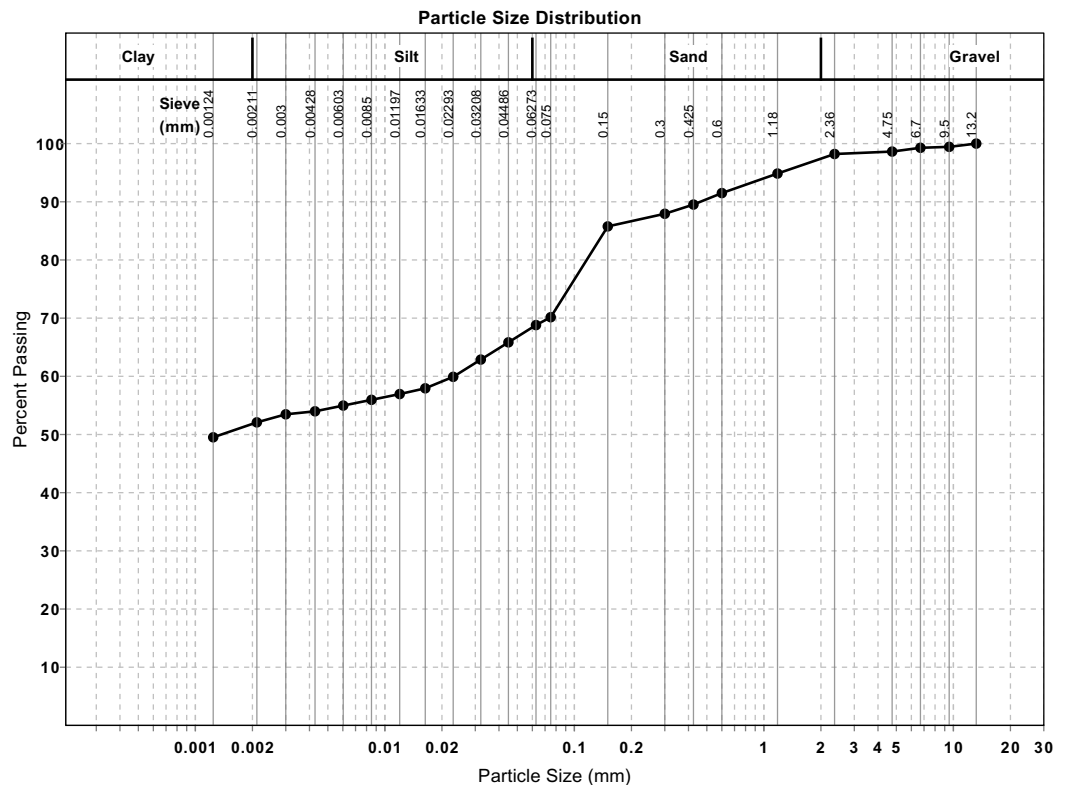
Laboratory Number: 20109

Particle Size Distribution (AS 1289 3.6.1)

Sieve	Passed %	Passing Limits
13.2 mm	100	
9.5 mm	99	
6.7 mm	99	
4.75 mm	99	
2.36 mm	98	
1.18 mm	95	
0.6 mm	91	
0.425 mm	90	
0.3 mm	88	
0.15 mm	86	
0.075 mm	70	

Fine Analysis Using a Hydrometer (AS 1289 3.6.3)

Particle Size (mm)	Passed %
0.063	68.8
0.045	65.8
0.032	62.9
0.023	59.9
0.016	57.9
0.012	56.9
0.008	56.0
0.006	55.0
0.004	54.0
0.003	53.5
0.002	52.1
0.001	49.5



Fine Analysis Using a Hydrometer (AS 1289 3.6.3)

Type of Hydrometer	g/l
Method of Preparation	Natural State
Method of Dispersion	Mechanical Device
Loss in Pretreatment	0
Soil Particle Density (t/m^3)	2.65
Total Gravel Content: 2%	
Total Sand Content: 28%	
Total Silt Content: 18%	
Total Clay Content: 52%	



Protest CMT
 ABN: 26602913673
www.protestcmt.com.au

pH of Soil Report - Electrometric Method

Client :	Western Victoria Soil Testing				Report Number :	SR/PTP/15902 - 4/1	
Client Address :	Shed 5/16 Concept Drive, Delacombe, 3356, VIC				Report Date :	21/07/2026	
Project Name :	WVST - Lara - 261161				Test Request :	WVST - Lara	
Project Number :	PTP/15902				Page 1 of 1		
Location :	10 Hicks Street, Lara, VIC, 3212						
Test Methods :	AS1289.4.3.1						
Sample Number :	S/365933						
Date/s Tested :	09/07/2026 - 21/07/2026						
Material Description :	Silty CLAY - Pale brown/orange Medium Plasticity						
Material Source :	BH1/2 - As recieved						
For Use As :	Geotechnical Investigation						
Sample Location :	Random						
Sampling Method :	As Received						
Time:	09:00						
Lot Number :	-						
Location 1 :	BH1/2						
Location 2 :	As Recieved						
Location 3 :	-						
Location 4 :	-						
pH of Distilled Water Before Use :	7.0						
Soil State :	In situ Natural State						
Temperature (°C) :	19						
pH of Soil :	8.2						
Remarks :	-						
 Note: The results contained in this report relate only to the item/s that were tested/sampled Accredited for Compliance with ISO/ IEC 17025 -Testing Protest CMT (Geelong) Accreditation Number - 19667 Base Laboratory Site Number - 10657 - Geelong Laboratory Base Laboratory Address - 78 Mornington Street, North Geelong, 3215, VIC				APPROVED SIGNATORY  Joshua Brunacci - Signatory			

Document Number : RF51

Date : 26/03/2026

APPENDIX E – WATER BALANCE & TRENCH SIZING

Victorian Land Capability Assessment Framework

Please read the attached notes before using this spreadsheet																	
Irrigation area sizing using Nominated Area Water Balance & Storage Calculations																	
Site Address:	65 Minyip Road, Lara																
Date:	31/07/2026				Assessor:	Western Victoria Soil Testing											
INPUT DATA																	
Design Wastewater Flow	Q	1,200	L/day	Based on maximum potential occupancy and derived from Table 4 in the EPA Code of Practice (2016)													
Design Irrigation Rate	DIR	2.0	mm/day	Based on soil texture class/permeability and derived from Table 9 in the EPA Code of Practice (2016)													
Nominated Land Application Area	L	909	m ²	1													
Crop Factor	C	0.4 - 0.7	unitless	Estimates evapotranspiration as a fraction of pan evaporation; varies with season and crop type ²													
Rainfall Runoff Factor	RF	1.0	unitless	Proportion of rainfall that remains onsite and infiltrates, allowing for any runoff													
Mean Monthly Rainfall Data	Avalon Airport - 87113			BoM Station and number													
Mean Monthly Pan Evaporation Data	BoM climate data			Evaporation data extracted from http://www.bom.gov.au/jsp/ncc/climate_averages/evaporation/index.jsp													
Parameter	Symbol	Formula	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	
Days in month	D		days	31	28	31	30	31	30	31	31	30	31	30	31	365	
Rainfall	R		mm/month	34.3	31.0	26.5	39.4	36.4	38.5	35.7	40.8	42.8	48.5	52.2	30.0	456	
Evaporation	E		mm/month	186	160	129	85	55	40	45	63	81	115	140	167	1267	
Crop Factor	C		unitless	0.70	0.70	0.70	0.60	0.50	0.45	0.40	0.45	0.55	0.65	0.70	0.70		
OUTPUTS																	
Evapotranspiration	ET	ExC	mm/month	130	112	90	51	28	18	18	28	45	75	98	117	810.1815	
Percolation	B	DIRxD	mm/month	62.0	56	62.0	60.0	62.0	60.0	62.0	62.0	60.0	62.0	60.0	62.0	730.0	
Outputs		ET+B	mm/month	192.0	167.888	152.2	111.0	89.7	78.1	80.1	90.2	104.5	137.1	158.3	179.0	1540.2	
INPUTS																	
Retained Rainfall	RR	RxRF	mm/month	34.3	31	26.5	39.4	36.4	38.5	35.7	40.8	42.8	48.5	52.2	30	456.1	
Applied Effluent	W	(QxD)/L	mm/month	40.9	37.0	40.9	39.6	40.9	39.6	40.9	40.9	39.6	40.9	39.6	40.9	481.8	
Inputs		RR+W	mm/month	75.2	68.0	67.4	79.0	77.3	78.1	76.6	81.7	82.4	89.4	91.8	70.9	937.9	
STORAGE CALCULATION																	
Storage remaining from previous month			mm/month	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Storage for the month	S	(RR+W)-(ET+B)	mm/month	-116.8	-99.9	-84.8	-32.0	-12.4	0.0	-3.5	-8.5	-22.1	-47.6	-66.5	-108.0		
Cumulative Storage	M		mm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Maximum Storage for Nominated Area	N		mm	0.00													
	V	NxL	L	0													
LAND AREA REQUIRED FOR ZERO STORAGE				m ²	236	245	296	503	698	908	838	753	583	420	339	250	
MINIMUM AREA REQUIRED FOR ZERO STORAGE:					909.0 m ²												
CELLS																	
Please enter data in blue cells XX Red cells are automatically populated by the spreadsheet XX Data in yellow cells is calculated by the spreadsheet, DO NOT ALTER THESE CELLS																	
NOTES																	
¹ This value should be the largest of the following: land application area required based on the most limiting nutrient balance or minimum area required for zero storage																	
² Values selected are suitable for pasture grass in Victoria																	

-151.4 -128.8 -102.4 -45.6 -19.1 -1.8 -9.6 -21.9 -38.2 -67.0 -88.2 -137.1

Victorian Land Capability Assessment Framework

Trench & Bed Sizing

FORMULA FOR TRENCH AND BED SIZING

L = Q/DLR x W

From AS/NZS 1547:2012

Where:

Units

L = Trench or bed length

m

Total trench or bed length required

Q = Design Wastewater Flow

L/day

Based on maximum potential occupancy and derived from Table 4 in the EPA Code of Practice (2013)

DLR = Design Loading Rate

mm/day

Based on soil texture class/permeability and derived from Table 9 in the EPA Code of Practice (2013)

W = Trench or bed width

m

As selected by designer/installer

INPUT DATA

Design Wastewater Flow	Q	1200	L/day	Based on maximum potential occupancy and derived from Table 4 in the EPA Code of Practice (2013)
Design Loading Rate	DLR	5.0	mm/day	Based on soil texture class/permeability and derived from Table 9 in the EPA Code of Practice (2013)
Trench basal area required	B	240.0	m ²	
Selected trench or bed width	W	1.0	m	As selected by designer/installer

OUTPUT

Required trench or bed length	L	240.0	m
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CELLS

	Please enter data in blue cells
XX	Red cells are automatically populated by the spreadsheet
XX	Data in yellow cells is calculated by the spreadsheet, DO NOT ALTER THESE CELLS

APPENDIX F – POTENTIAL PLANTS FOR THE DISPOSAL FIELD

Distribution pipes of effluent systems are not generally subject to root blockage if constructed as recommended by the Code of Practice. The following list, although not exhaustive, is included as a guide to species that have been found from industry experience to be satisfactory.

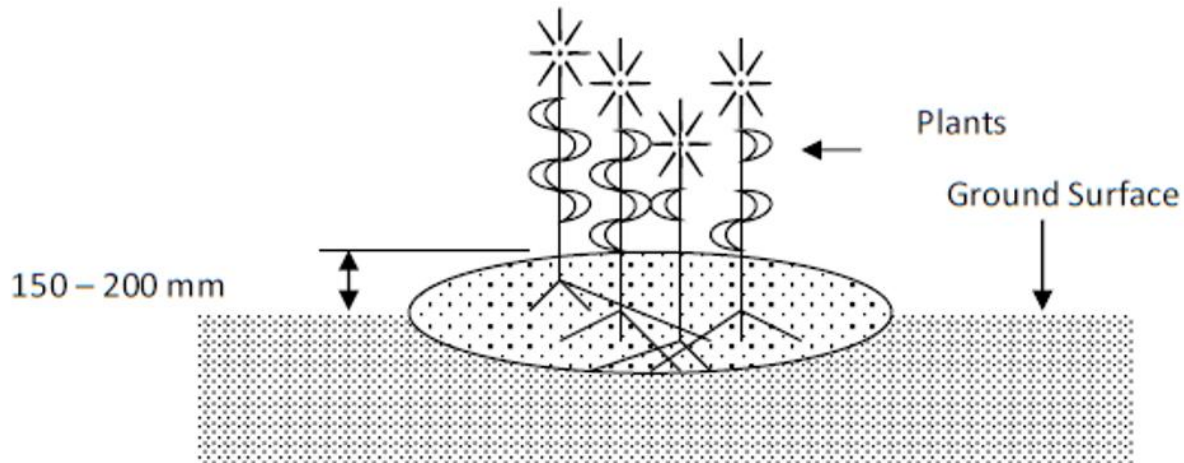
Botanical names	Common names
<i>Phragmites australis</i>	Common Reed
<i>Canna x generalis</i>	Canna Lily
	Calla Lily
	Ginger Lily
<i>Acacia howittii</i>	Sticky Wattle
<i>Callistemon citrinus</i>	Crimson Bottlebrush
<i>Callistemon macropunctatus</i>	Scarlet Bottlebrush
<i>Leptospermum lanigerum</i>	Wooley Tea-tree
<i>Melaleuca decussata</i>	Cross Honey Myrtle
<i>Melaleuca ericifolia</i>	Swamp Paperbark
<i>Melaleuca halmaturorum</i>	Salt Paperbark
<i>Tamarix juniperina</i>	Flowering Tamarisk
<i>Eleocharis acuta</i>	Cannas
	Common Spike-rush
	Buffalo/Kikuyu
	Geranium
	Hydrangeas
	Tall Wheat Grass
	Strawberry Clover
	White Clover
	Perennial Rye
	Bougainvillea

Note: Care should be taken when locating trees to ensure they do not shade the system unless they draw from it.

Contact your local garden nursery for water tolerant plants or refer to gardening books such as:

- *Grow What Where*, The Australian Plant Study Group, Viking O'Neill (Penguin Books, 1990)
- *Gardening with Australian Plants*, Roger Eliot (Lothian Publishing, 1990)

Planting in damp conditions



Tree planting near disposal fields and drains

Bushes, shrubs and trees should generally not be permitted to grow directly over absorption trenches or sand filters to minimise problems should the systems need to be dug up for maintenance. Where trees are near drainage lines, difficulties with roots entering the drains can be anticipated. Plants listed below should not be planted near drains (within 8 metres) due to the risk of pipe blockage.

Botanical names

Eucalyptus camaldulensis
Eucalyptus citiododra
Fraxinus raywoodi
Eucalyptus cladocalyx
Plananus (all species)
Populus nigra, etc.
Salix babylonica, etc.

Common names

River Red Gum
 Lemon-scented Gum
 Claret Ash
 Sugar Gum
 Plane Trees
 Poplar
 Weeping Willow

The following plants are generally satisfactory for planting up to within 2 metres of any drain or drainage area.

Botanical names

Acacia lonifolia
Callistemon viminalis
Callistemon lilacinus
Eucalyptus preissiana
Viminaria juncea

Common names

Sallow Wattle
 Weeping Bottlebrush
 Lilac Bottlebrush
 Bell-fruit Mallee
 Native Broom