Land Capability Assessment

For On-Site Wastewater Management

3 Nortons Lane,

Wantirna South, Victoria

E3633.1 AA

20 August 2025

Septic Systems Australia

GroundScience

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PROJECT DETAILS

Project Reference	E3633.1	Rev	AA
Project Title	3 Nortons Lane		
Project Location	Wantirna South	State	VIC
Date	20 August 2025		

CLIENT DETAILS

Prepared for (Client)	Septic Systems Australia		
Client Contact	Chris Plenderleith		
Client Address	191 Colchester Rd Kilsyth 3137	State	VIC

DISTRIBUTION

Original Held by	Ground Science Pty Ltd
One (1) Electronic Copy	Septic Systems Australia

This document presents the results of the Land Capability Assessment conducted for the above project and is detailed for the sole use of the intended recipient. Should you have any questions related to this report please do not hesitate to contact the undersigned.

PREPARED BY:

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REVIEWED BY:

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ASSESSMENT SUMMARY

Proposed Development	163 - pupil and staff (School)	
Design Hydraulic Flow Rate	20L/person/day	
Wastewater Loading Rate	2,350L/day (Flow Balanced)	
Limiting Soil Layer	Light Clay: Category 5a	
Major Site Constraints	• Sensitive Site Use • Shallow Soil Depth	
Minimum Treatment Requirement	Secondary Treatment	
Suitable Application Methods	Subsurface Irrigation	Absorption Beds
Minimum LAA Size	1,189m^2	196m^2

The above summary table must be read in the full context the following report.

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1. INTRODUCTION

Ground Science Pty Ltd (Ground Science) has prepared this report to present the findings of a Land Capability Assessment (LCA) undertaken for the proposed school development at 3 Nortons Lane, Wantirna South, Victoria (herein referred to as 'the site').

Ground Science was engaged by Septic Systems Australia (herein referred to as 'the Client') to conduct the LCA in general accordance with Ground Science email dated 1 July 2025. All Ground Science personnel involved in the preparation of this LCA are suitably qualified and experienced. Should Council require verification, curricula vitae and relevant insurances can be made available.

2. BACKGROUND

Ground Science understands that the Client proposes to develop a school at the site in Wantirna South. The site covers approximately 1.46ha of Public Park and Recreation Zone land which is currently occupied by a dwelling. According to drawings by MSM & Associated Pty Ltd (2025), a new school building will be created in stage 1 toward the northeast corner of the site, along with three (3) playground area and a soccer field. In stage 2, a new building including staff office, admin facility and a library will be created at the current dwelling location. The existing swimming pool will remain. The site will cater for up to 163 staff members and students.

As no reticulated sewer exists, an assessment is required to ensure wastewater generated from the development can be suitably managed onsite as part of planning approvals.

3. OBJECTIVES

The general objectives of the LCA are to:

- Gather geographical and social information relevant to the site;
- Determine high risk and sensitive areas within the allotment and identify relevant site conditions;
- Assess the capability of the site to sustainably manage wastewater within the allotment boundaries; and
- Formulate a sustainable management plan (if possible).

4. REGULATORY GUIDELINES

This assessment was performed in general accordance with the State Environment Protection Policy (SEPP), 2018 – *Waters*. The SEPP requires onsite domestic wastewater to be managed to prevent the transport of nutrients, pathogens and other pollutants to surface waters and to prevent any impacts on groundwater beneficial uses. To enable this, guidance has been sought from the following standards and documents:

- EPA Publication *Guideline for Onsite Wastewater Management* (GOWM) (2024);
- EPA Publication *Guideline for Onsite Wastewater Effluent Dispersal and Recycling Systems* (EDRS Guidelines) (2024)
- Municipal Association of Victoria *Victorian Land Capability Assessment Framework* (2014);
- AS/NZS: 1547:2012 *On-site Domestic Wastewater Management.*

In accordance with EPA GOWM (2024) the assessment should follow the conservative and 'best practice' LCA report procedures for carrying out land and soil assessments and hydrological calculations for designing land application areas. The framework for LCA aims to direct the assessor to consider both quantitative and qualitative methodologies and identify constraints presented by the site and soil characteristics.

5. SITE DETAILS

The information presented in Table 1 describes the site. A site locality plan is also provided in Figure 1.

Table 1: Summary of Site Details

Site Address	3 NORTONS LANE, WANTIRNA SOUTH 3152 VIC
Lot and Plan Number	Lot 1 TP201559
Council area	Knox
Surface area	1.46ha
Domestic water supply	Twon Water Supply
Availability of sewer	Currently none. Main sewer should be available by stage 2
Planning zone	Public Park and Recreation Zone (PPRZ)
Planning overlays	-

5.1 PROPOSED DEVELOPMENT

The site is proposed to be developed with a new school building (stage 1) toward the northeast corner of the site, along with three (3) playground area and a soccer field. A new building including staff office, admin facility and a library will be created at the current dwelling location (stage 2). The existing swimming pool will be demolished. The site will cater for up to 163 staff members and students.

Concept layout plans are presented Appendix A.

6. DESKTOP STUDY

6.1 SPECIAL WATER SUPPLY CATCHMENT

A review of the Victorian Government Land and Water Management online resources, GeoVic, identified the site existing outside all Declared Water Supply Catchments, Water Supply Protection Areas and Water Management Areas.

6.2 GEOLOGY

Review of Visualising Victorian Groundwater (VVG) database describes the local geology as siltstone and sandstone of the Silurian period.

6.3 TOPOGRAPHY

Information gathered from the Department of Environmental, Land, Water and Planning (DELWP) Land and Survey Spatial Information (LASSI) database shows the site lying at approximately 80m Australian Height Datum (AHD). According to local contours, the western half of the site appears to be on a crest, with a general southeast slope of approximately 5%.

6.4 CLIMATE

Representative climate data from the Bureau of Meteorology (BOM) is used to perform water balancing calculations and provide insight into the sites climatic condition. The climate station closest to the site with suitable rainfall data is the Glen Waverley (Golf Course) Climate Station, which reports a mean annual rainfall figure of 835mm/year.

Monthly evaporation data has been taken from Scoresby Research Institute Climate Station, which is considered the closest station to record representative pan evaporation. A representative annual pan evaporation of up to of 1,197mm/year was reported, which exceeds the annual rainfall.

6.5 HYDROGEOLOGY

The Visualising Victoria's Groundwater (VVG) website maintains a database of registered groundwater bores across Victoria. A search of the groundwater database does not identify any registered bores within 500m of the site. Based on available information and site conditions, groundwater is expected to be encountered between 20-50 metres below ground level (mbgl) on most of the site, and between 10-20mbgl along the southeast boundary.

6.6 SURFACE WATER

A review of the DEPI Victorian Water Resources online mapping database and aerial imagery identified Dandenong Creek running 250m southwest of the site and a dam existing 330m southeast of the site boundary.

6.7 FLOOD POTENTIAL

The development area is expected to be outside all flood ways and areas subject to inundation.

7. SITE INSPECTION

Ground Science personnel conducted a site inspection and soil assessment on 14 August 2025. Observations are detailed below, and site photographs are presented in Appendix B.

Table 2: Site Observations

Observation	3 Nortons Lane, Wantirna South, VIC
Setting	Predominantly farmland, with an area of bushland to the west.
Infrastructure	Existing infrastructure included a dwelling a shed and a tennis court. All infrastructure was in the western half of the site.
Surface water	No surface water was observed on site with the exception of the swimming pool along the northwest side of the dwelling which is believed to be decommissioned. Additionally an open stormwater drain was observed along Nortons lane.
Slope / Landform	The development area appears to be on a crest with elevation marginally dropping to the east and west. Slopes did not exceed approximately 5%.
Rock outcrops	Not observed
Coverage/exposure	The site exhibited healthy surface vegetation coverage. Trees were prevalent across the western half of the site. Much of the eastern half was cleared, with the exceptions of along the southern boundary. All pine trees are going to be removed prior site development. As such minimal shading and little wind exposure will be present within the development area. This is not expected to limit exposure across the proposed LAA area.
Existing Wastewater System	The existing septic system was observed south of the dwelling. No information regarding the effluent area was reported or observed on site.

7.1 SETBACK DISTANCES

Setback distances dependent on effluent type are to be observed for all sensitive features as specified in Table 4-10 of EPA GOWM. Relevant setback distances are outlined in Table 3, with a complete table provided in Appendix C.

Table 3: Applicable Setback Distances

Landscape feature or structure	Setback Distance (m)	
	Primary treated effluent	Secondary treated effluent
Wastewater field up-slope of building or adjacent Lot	6	3
Wastewater field down-slope of building or adjacent Lot	3	1.5

7.2 AREA AVAILABLE FOR LAND APPLICATION

The land application area (LAA) is the area into which treated effluent is applied via the chosen land application method. The site is expected to have sufficient area available for effluent application.

A reserve area is a duplicate land area of equal size to the designated LAA which should be used if the original LAA fails, is inadequate or needs to be rested. It is noted that a reserve area can be reduced or removed at Council's discretion if it is satisfied there is a low risk of negative impact on the environment and human health.

8. SOIL ASSESSMENT

A soil assessment conducted across the site included three (3) boreholes, targeting potential land application areas, shown in Figure 2. A maximum depth of 1.1mbgl was achieved. The soil conditions observed during the field program are summarised in Table 4 and further detailed in bore logs presented in Appendix D.

Table 4: Soil Profile

Soil Lithology	Depth (mbgl)	Description
Silty CLAY	0.0 – 0.05 to 0.1	Soft, dark brown Silty CLAY of low plasticity with sand, w<PL.
Gravelly to Clayey SILT	0.05 to 0.1 – 0.4 to 0.5	Very stiff, grey Gravelly to Clayey SILT of low plasticity, trace sand, w<PL.
Silty CLAY	0.4 to 0.5 – 0.6 to 1.1	Stiff to hard, brown Silty CLAY of medium plasticity with orange mottling, with gravel, trace sand, w<PL.

8.1 LIMITING SOIL UNIT

The limiting soil unit was identified as a silty clay, which must be considered for the long-term absorption of effluent. The soil displays the properties of a light clay when manipulated into a moist bolus, with consideration of its plasticity, sand and clay content in line with McDonald (1990).

8.2 SOIL PERMEABILITY

Soil permeability is the rate which soil transmits water and air. EPA GOWM outlines two procedures for estimating soil permeability; in-situ constant head permeability testing or indicative rates based on key soil properties (such as texture, structure, depth, colour and mottling). The indicative permeability rates detailed in EPA GOWM for a light clay are <0.06-0.5m/d (soil categories: 5a-5c).

The *Talsma Constant Head Soil Permeability Measurement* as outlined in AS/NZS 1547:2012 was used to measure in-situ the permeability of the limiting soil layer at BH03. The permeability rate was calculated at 0.4504m/day, indicative of a **strongly structured light clay (soil category 5a)**. Soil permeability results are presented in Appendix E.

8.3 SOIL PROPERTIES

Samples of discrete soil layers were collected at selected borehole locations for subsequent laboratory analysis of pH, electrical conductivity (EC) and stability. The soil pH and EC of 1:5 soil/water suspensions were measured using a hand-held meter, with modified Emerson Aggregate tests undertaken for a preliminary assessment of stability.

Table 5: Soil Analysis Summary

Sample no.	Soil Unit	Depth (m)	pH	EC (dS/m)	EAC
BH01-0.2	Growing medium	0.2	4.6	0.29	Slaking
BH01-0.5	Limiting unit	0.5	4.8	0.875	Slaking
BH02-0.2	Growing medium	0.2	3.9	2.19	Slaking
BH02-0.5	Limiting unit	0.5	4.3	0.78	Slaking
BH03-0.2	Growing medium	0.2	4.0	0.72	Slaking
BH03-0.5	Limiting unit	0.5	4.3	1.46	Slaking

Sample analysis reported acidic values all over the development area. One highly saline value was recorded within the growing medium, with most values between non-saline to moderately saline within the growing units. These may influence some vegetation growth, and salt tolerant plants are recommended for these areas.

Soil amelioration is recommended as outlined in Section 10.8.

9. RISK ASSESSMENT

Based on the site and soil characteristics, a risk assessment has been undertaken to consider typical constraints affecting the onsite management of wastewater. Major and moderate constrains are discussed in Table 6:

Table 6: Site Constraints & Mitigation Measures

Characteristic	Description	Level of constraint	Mitigation measure / comments
Sensitive site use	Access of the effluent area by pupil and staff from the school	Major	• Adopt secondary treatment to reduce required setbacks
Shallow soil depth	Borehole refusal from 1.1mbgl	Major	• Adopt shallow application method
Indicative permeability	Category 5a soils identified	Moderate	• Prepare receiving soil by deep ripping • Treat with gypsum • Utilisation application methods reliant on evapotranspiration
Emerson aggregate class	Slaking soils identified	Moderate	• Treat LAA with gypsum as described in Section 10.8
Slightly Acidic Soils	pH < 6.0	Moderate	• Treat LAA with agricultural lime as described in Section 10.8

The mitigation measures listed above must be implemented to reduce any potential impact on human health and the environment.

10. MANAGEMENT PROGRAM

10.1 WASTEWATER LOADING

The hydraulic loading of treated effluent is contributed to by numerous factors including occupancy, number of bedrooms and the type of water saving fixtures. EPA guidelines indicate that the hydraulic loading can be calculated by potential occupancy and the applicable design hydraulic flow rates.

In accordance with EPA GOWM (2024) the typical wastewater flow allowance pupil and staff in school of 20L/person/day is considered appropriate for the proposed development. An anticipated hydraulic loading for the 163-person capacity venue of 3,260L five (5) days a week will be considered. An associated organic loading of 3,260g BOD/person/day must also be considered.

Due to expected intermittent nature of hydraulic loading throughout the week, flow balancing was undertaken to demonstrate a suitable adjusted loading for the even distribution of effluent across the week. As such, a daily hydraulic loading of 2,350L (16,450L distributed over 7-days) will be considered for water balance calculations. This figure is considered suitable provided a minimum system capacity of 6,900L is provided.

The flow balance calculations are presented in Appendix G.

10.2 WASTEWATER MANAGEMENT SYSTEM

Untreated domestic wastewater typically has values of 200-300mg/L biochemical oxygen demand (BOD5) and 200-300mg/L total suspended solids (TSS). Primary treated effluent ranges from 100-140mg/L BOD and 20-55mg/L TSS with an outlet filter, while indicative target effluent quality for secondary treatment systems are <20mg/L BOD5, < 30mg/L TSS and <10cfu/100mL E. Coli.

A range of treatment system options are available for typical domestic wastewater management. Secondary treatment is recommended due to the sensitivity of the site use. Possible secondary treatment options include aerated wastewater treatment systems (AWTS), a combination of a primary treatment with sand/media filters and reed beds, or alternative treatments (vermiculture or composting) with secondary clarification of residual effluent.

Further information regarding treatment systems is presented in Appendix F.

10.3 LAND APPLICATION

A range of possible land application systems have been considered, such as absorption trenches/beds, evapotranspiration/absorption (ETA) beds and trenches, Wick Trench and Bed Systems, mound systems and sub-surface irrigation. AS1547:2012 outlines factors affecting the construction and operation of common land application systems with consideration of site features, sub-surface soil conditions and identified constraints.

Sub-surface irrigation is considered the most suitable effluent application method due to the sensitive use within the development area. Absorption beds are also considered a suitable effluent application method due to the favourable permeability of the soils within the development area.

Further details of land application systems are presented in Appendix F.

10.4 APPLICATION AREA SIZING

Application area sizing has been undertaken to calculate the minimum area for sub-surface irrigation and absorption beds. The water balance considers climate data and is designed so that the LAA is based upon a depth of saturated soil that meets the upper limits of acceptance. The parameters and results of the water balance and calculations are outlined in Table 7 and further detailed in in Appendix H.

Table 7: System Specifications

Treatment system	Application system	Daily wastewater flow (L/day)	Design irrigation/loading rate (mm/day)	Trench/Bed length (m)	Minimum LAA (m^2)	Reserve area (m^2)
Secondary treatment	Sub-surface irrigation	2,350	3.0	-	1,189	-
	Absorption Beds		12	196[1,2]	196[1,2]	196[1,2]

1. Based on 1m wide bed
2. Plus spacing between beds/trenches

10.5 NUTRIENT BALANCE

A nutrient balance was undertaken to determine the minimum size for assimilation of nitrogen by soil processes for subsurface irrigation systems. The nitrogen balance is based upon the MAV (2014) method and assumes a nitrogen concentration in secondary effluent of 25mg/L. A copy of the nutrient balance is presented in Appendix I.

Without considering further expected denitrification below the root zone, the nutrient balance requires a minimum of approximately 780m^2. This area is covered by the recommended minimum LAA for subsurface irrigation.

No nutrient balance was undertaken for phosphorus as soil with high clay content will be capable of utilising the anticipated phosphorus loading through biological processes prior to vertical or lateral migration.

10.6 DESIGNATED AREA

The LAA should be constructed in a designated area to enhance evapotranspiration and must not be used for purposes that compromise the effectiveness of the system (including access for maintenance) or have seepage beyond the designated area.

The recommended LAA location is presented in Figure 2, although the final LAA alignment may be modified, provided the minimum size and setback distances are met.

10.7 RESERVE AREA

In accordance with EPA Guidelines, a reserve area of equal size to the LAA must be maintained in the event of failure or overloading. Though the reserve area can be reduced or removed at Council's discretion if it is satisfied there is a low risk of negative impact on the environment and human health.

However, a reserve area is not required for sub-surface irrigation systems where the size of the system has been calculated and designed using the recommended irrigation rates.

10.8 SOIL AMELIORATION

The base of the LAA should be subject to ripping / cultivation to a depth of 150mm and treated with Gypsum at a dosage rate of 0.5kg/m^2 and agricultural lime at a dosage rate of 0.5kg/m^2 prior to construction to improve soil permeability. This renovation method should also act to raise the pH and manage further dispersion of soils caused by salt loading from the treated effluent.

Gypsum must be applied to the LAA surface every 4 years as a form of ongoing soil renovation.

10.9 CONSTRUCTION, OPERATION AND MAINTENANCE

Salt tolerant vegetation should be utilised across the LAA due to the moderate saline soil.

All works should be carried out in accordance with the Council permit and relevant Australian Standards to ensure effective long-term operation of the treatment and land application systems.

To ensure the land application area functions adequately, avoid vehicle and livestock access to the effluent area to prevent compaction and damage to the irrigation line. Divert roof drainage away from any effluent dispersal area.

Further detail regarding specific system requirements and general recommendations are presented in Appendix J.

11. DISCUSSION AND CONCLUSIONS

This LCA has been conducted for the onsite management of wastewater to be generated by the development of a school at 3 Nortons Lane, Wantirna South, Victoria. A school with sports facilities for up to 163 students and staff members is proposed to be developed at the site.

The desktop study and site investigation indicated shallow soil depth to rock at the site as the primary constraint associated with domestic wastewater management.

We consider the secondary treatment of wastewater and effluent disposal via sub-surface irrigation as the most suitable option for onsite wastewater management. The cumulative risk to human health and the environment will be low based on implementation of the following recommendations and conditions:

- Wastewater to be treated to secondary effluent standard;
- The treatment system must provide a minimum 24-hour day retention time, with 3-day retention ideal;
- Design, construction, operation and maintenance of the treatment system must be carried out in accordance with the relevant Australian Standard and Council requirements;
- Land application system must be installed by a suitably licensed contractor based on the minimum LAA outline in Table 7, with application lines installed parallel to the sites contours;
- Soils within the LAA should be treated with gypsum and agricultural lime and subject to shallow ripping to improve soil absorption;
- Following construction, vegetation should be maintained around the LAA to promote evapotranspiration and reduce erosion; and
- Low phosphorus and low sodium (liquid) detergents should be used to improve effluent quality.

Ground Science notes that the final system selection and placement should be detailed in a septic permit application to be submitted to Council.

12. LIMITATIONS

Ground Science has prepared this document in accordance with Ground Science email dated 1 July 2025.

The advice given in this report is based on the assumption that the test results are representative of the overall soil conditions. However, it should be noted that actual conditions in some parts of the site might differ from those found. If further sampling reveals soil conditions significantly different from those shown in our findings, Ground Science must be consulted.

It is recognised that the passage of time affects the information and assessment provided in this document. Ground Science's assessment is based on information that existed at the time of the preparation of this document. It is understood that the services provided allowed Ground Science to form no more than an opinion of the actual site conditions observed and cannot be used to assess the effects of any subsequent changes in the quality of the site, or its surroundings, or any laws or regulations.

Where data has been supplied by the client or a third party, it is assumed that the information is correct unless otherwise stated. No responsibility is accepted by Ground Science for incomplete or inaccurate data supplied by others.

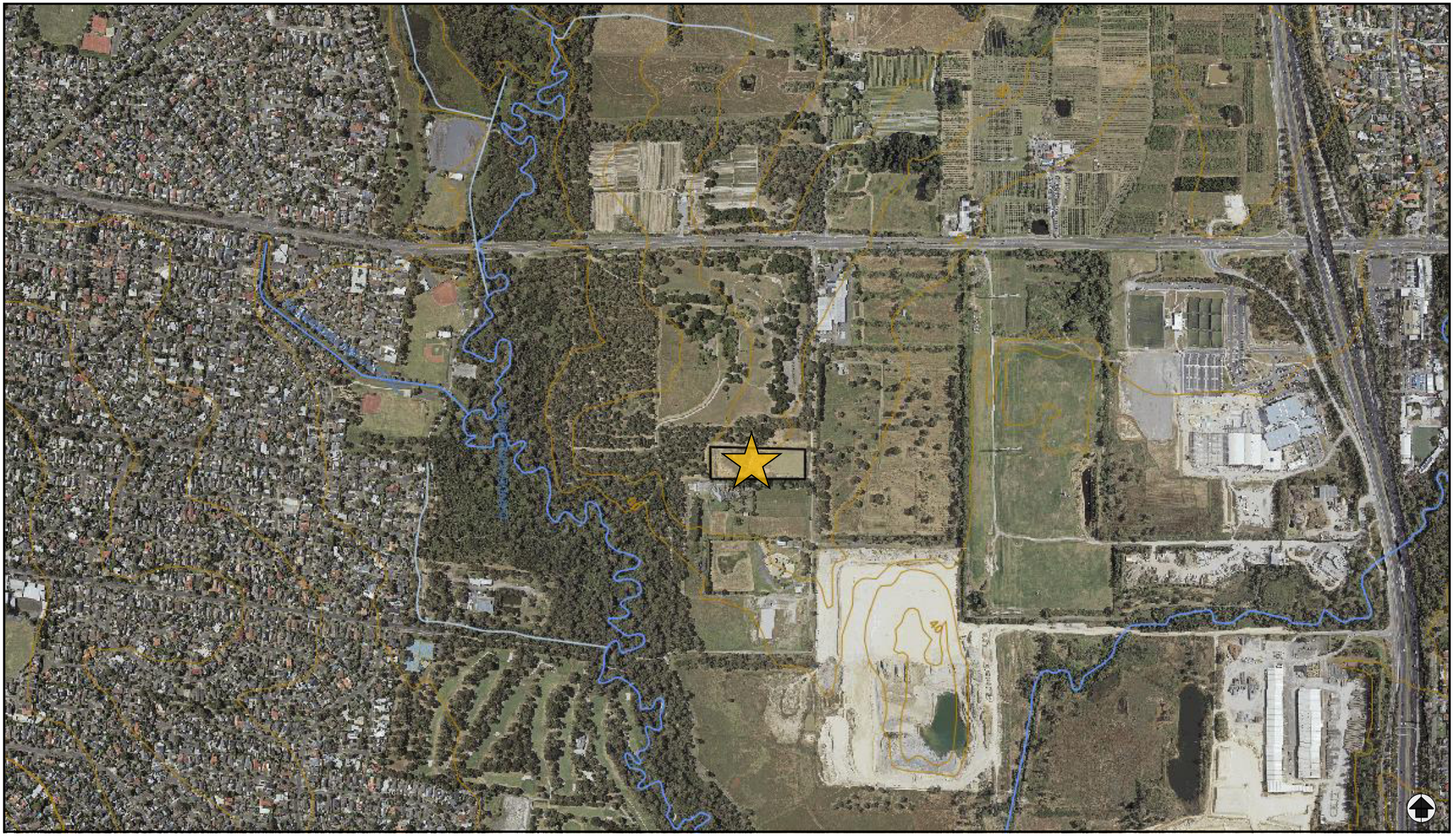
Any drawings or figures presented in this report should be considered only as pictorial evidence of our work. Therefore, unless otherwise stated, any dimensions should not be used for accurate calculations or dimensioning.

It is noted that the Knox City Council may include provisions of this LCA as conditions on the planning permit for the site.

13. REFERENCES

- Bureau of Meteorology *http://www.bom.gov.au*
- Department of Primary Industries *http://www.dpi.vic.gov.au*
- EPA Publication *Guideline for Onsite Wastewater Management* (GOWM) (2024)
- EPA Publication *Guideline for Onsite Wastewater Effluent Dispersal and Recycling Systems* (EDRS Guidelines) (2024)
- Municipal Association of Victoria, Department of Environment and Sustainability and EPA Victoria *Victorian Land Capability Assessment Framework* (2014)
- Nearmap Imagery *http://nearmap.com* (2019)
- Standards Australia / Standards New Zealand *AS/NZS: 1547:2012 On-site Domestic-wastewater Management* (2012)
- State Environment Protection Policy *(Waters of Victoria)* (2003)
- Victorian Water resources *http://www.dse.vic.gov.au/waterdata/*
- Visualising Victoria's Groundwater http://www.vvg.org.au/

FIGURES



Rev		Drawn	Date	Checked	Scale
0	FIGURE 1: SITE LOCALITY	MP	19/08/25	JO	NTS

Legend

- SITE BOUNDARY
- COUNTOURS (10m)
- WATERCOURSE
- DEVELOPMENT AREA

LAND CAPABILITY ASSESSMENT
3 NORTONS LANE
WANTIRNA SOUTH, VIC

Prepared For: Septic Systems Australia

Job No: E3633.1

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Rev		Drawn	Date	Checked	Scale
0	FIGURE 2: SYSTEM DETAILS	MP	19/08/25	JO	NTS

Legend

- Proposed Dwelling Location
- Potential Effluent Envelope
- Surface water Buffer Zone (30m)
- Approx. Borehole Location

LAND CAPABILITY ASSESSMENT
3 NORTONS LANE
WANTIRNA SOUTH, VIC

Prepared For: Septic Systems Australia

Job No: E3633.1

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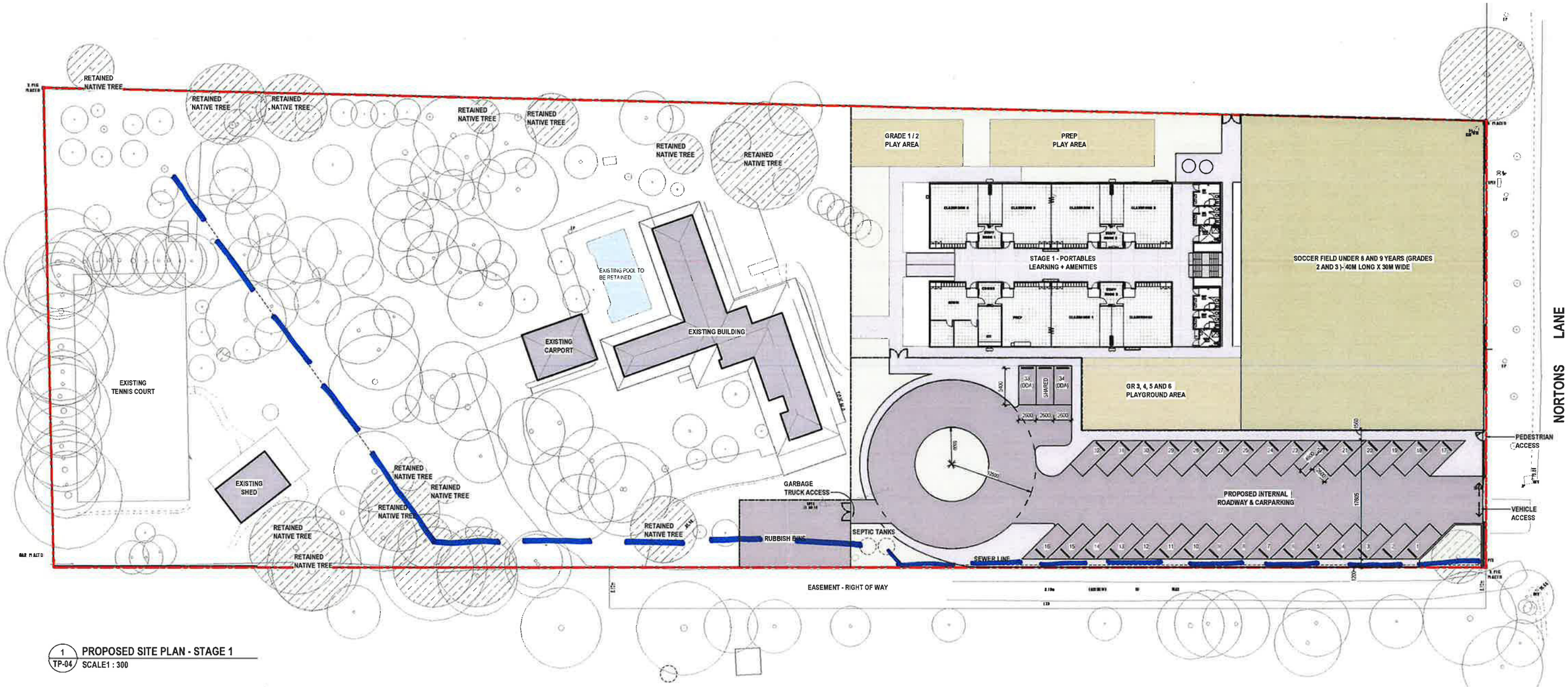
APPENDIX A

CONCEPT LAYOUT



1 TP-04 **PROPOSED SITE PLAN - STAGE 1**
SCALE1 : 300

LANDSCAPE PLAN LEGEND:

- BITUMEN PAVING
- CONCRETE DRIVEWAY
- PAVEMENT PATHWAYS
- LAWN
- GARDEN BEDS
- GRANITIC SAND / COMPACTED TOPPINGS
- EXISTING BUILDINGS/ STRUCTURES TO BE RETAINED
- EXISTING BUILDINGS/ STRUCTURES TO BE DEMOLISHED
- PROPOSED BUILDINGS
- EXISTING TREE TO BE RETAINED
- EXISTING TREE TO BE REMOVED
- PROPOSED TREE
- PROPOSED SHRUB (MEDIUM)
- PROPOSED SHRUB (SMALL)
- PROPOSED GROUND COVER
- TPZ / SRZ — TREE PROTECTION AREA AS PER ARBORIST REPORT; STRUCTURAL ROOT ZONE (SRZ); TREE PROTECTION ZONE (TPZ)

BINS	BINS AREA OR ENCLOSURE
CL	CLOTHESLINE
A/C	AIRCONDITIONING UNIT
P.O.S	PRIVATE OPEN SPACE
S.P.O.S	SECLUDED PRIVATE OPEN SPACE
HW	HABITABLE WINDOW
EX	EXISTING

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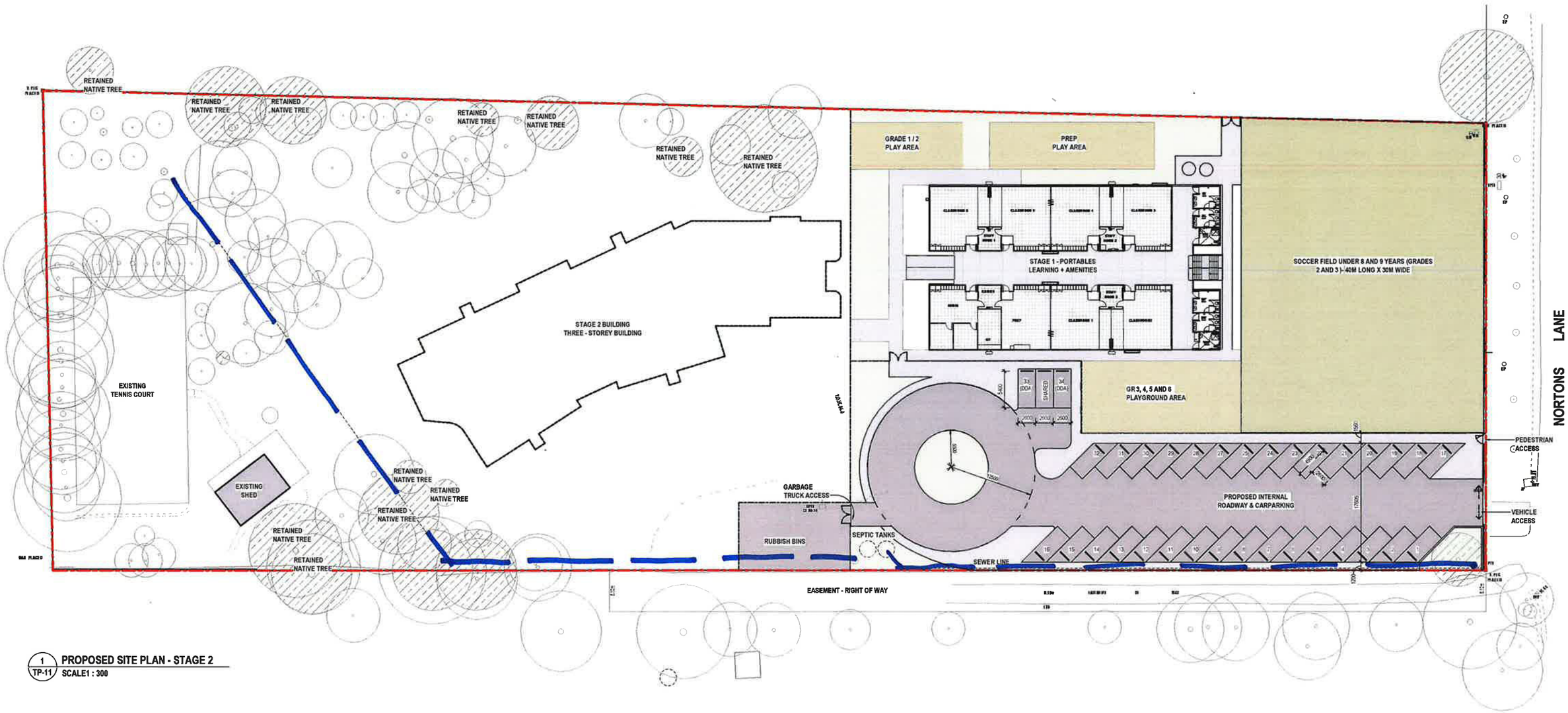
ASCENSION COLLEGE

3 NORTONS LANE, WANTIRNA SOUTH

QIBLA

PROPOSED SITE PLAN - STAGE 1
NOT TO SCALE

1566 - TP-04



1 TP-11 **PROPOSED SITE PLAN - STAGE 2**
SCALE1 : 300

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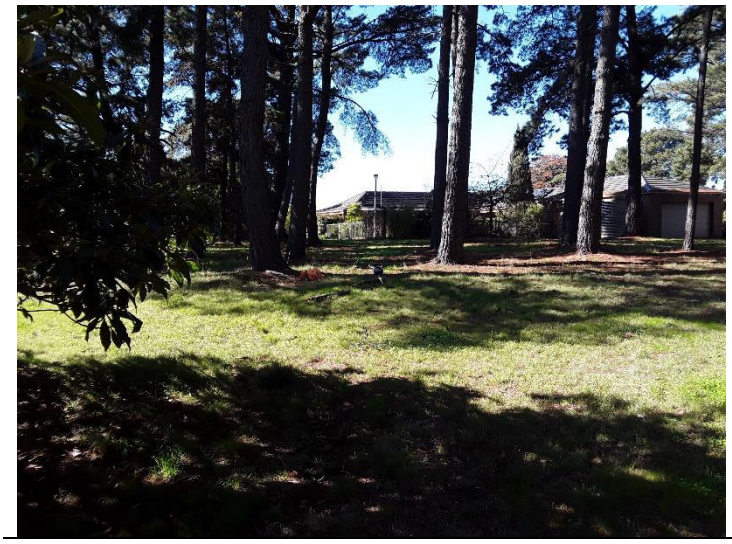
PROPOSED SITE PLAN - STAGE 2
NOT TO SCALE

1566 - TP-11

APPENDIX B

SITE PHOTOGRAPHS

Proposed LAA location / Site Conditions – facing northwest



Proposed LAA location / Site Conditions – facing east

In-ground swimming pool – east of development area

Soil profile – BH01

Soil profile – BH02

APPENDIX C

SETBACK DISTANCES

Landscape Feature/Structure	Setback (m)		
	Primary effluent	Secondary effluent	Advance secondary effluent
Building			
Wastewater field upslope of building	6	3	3
Wastewater field down slope of building	3	1.5	1.5
Allotment boundary			
Wastewater field upslope of adjacent lot	6	3	1
Wastewater field down slope of adjacent lot	3	1.5	0.5
Services			
Water supply pipe	3	1.5	1.5
Potable supply channel (wastewater field upslope)	300	150	150
Potable supply channel (wastewater down slope)	20	10	10
Gas supply pipe	3	1.5	1.5
Underground water tank	15	7.5	3
Closed stormwater drain	6	3	2
Open stormwater drain	50	30	10
Recreational areas			
In-ground swimming pool	6	3	2
Children's grassed playground	6	3	2
Surface waters (upslope from)			
Dam, Lake, reservoir (potable water supply / within special water supply catchment)	300	300	150
Waterways (potable water supply / within special water supply catchment)	100	100	50
Dam, lake, reservoir, waterways, wetlands, ocean beach (continuous or ephemeral, non-potable, outside all special water supply catchment)	60	30	30
Drainage lines	40	20	20
Cutting / escarpment (wastewater field upslope)	15	15	15
Groundwater bore			
Category 1 to 2a soils	NA	50	20
Category 2b to 6 soils	20	20	20
Water table			
Depth to highest seasonal water table	1.5	1.5	1.5
Depth to hydraulically limiting layer (bedrock)	1.5	0.6	0.6

APPENDIX D

BOREHOLE LOGS

Ground Science

13 Brock Street, Thomastown VIC 3074

Phone: (03) 9464 4617

Geotechnical Log - Borehole

BH01

UTM	: 55H	**Drill Rig**	: Hand Auger	**Job Number**	: E3633.1
Easting (m)	: 341522.40	**Driller Supplier**	: Ground Science	**Client**	: Septic Systems Australia
Northing (m)	: 5805796.16	**Logged By**	: Maude Plamandon	**Project**	: Wantirna South
Ground Elevation	: 83.44 (m)	**Reviewed By**	:	**Location**	: 3 Nortons Ln, Wantirna South VIC 3152, Australia
Total Depth	: 0.6 m BGL	**Date**	: 14/08/2025	**Loc Comment**	:

Drilling Method	Water	Depth (m)	Graphic Log	Soil Origin	Classification Code	Material Description	Moisture	Consistency	Samples	Testing
Hand Auger		0.05		Topsoil	CL	Silty CLAY, low plasticity, dark brown, with fine to medium grained sand.	w < PL	S		
				Natural	ML	Gravelly to Clayey SILT, low plasticity, grey, trace fine grained sand.	w < PL	VSt	BH01 - 0.2	
		0.4		Natural	CI	Silty CLAY, medium plasticity, brown mottled orange, trace fine to medium grained sand.	w < PL	St	BH01 - 0.5	
						BH01 Terminated at 0.6 m				

METHOD

EX	Excavator bucket
R	Ripper
HA	Hand auger
PT	Push tube
SON	Sonic drilling
AH	Air hammer
PS	Percussion sampler
AS	Short spiral auger
AD/V	Solid flight auger:V-Bit
AD/T	Solid flight auger:TC-Bit
HFA	Hollow flight auger
WB	Washbore drilling
RR	Rock roller

PENETRATION

VE	Very Easy(No Resistance)
E	Easy
F	Firm
H	Hard
VH	Very Hard(Refusal)

WATER

- Water Level on Date
- Water inflow
- Water outflow

FIELD TESTS

SPT	- Standard Penetration Test
PP	- Hand/Pocket Penetrometer
DCP	- Dynamic Cone Penetrometer
PSP	- Perth Sand Penetrometer
MC	- Moisture Content
PBT	- Plate Bearing Test
IMP	- Borehole Impression Test
PID	- Photo Ionisation Detector
VS	- Vane Shear; P=Peak, R=residual (unconnected kPa)

SAMPLES

B	- Bulk disturbed sample
D	- Disturbed sample
ES	- Environmental sample
U	- Thin wall tube "undisturbed"

MOISTURE

D	- Dry
M	- Moist
W	- Wet
PL	- plastic limit
LL	- liquid limit
W	- Moisture content

SOIL CONSISTENCY

VS	- Very soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very stiff
H	- Hard

RELATIVE DENSITY

VL	- Very loose
L	- Loose
MD	- Medium dense
D	- Dense
VD	- Very dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

Ground Science

Ground Science
13 Brock Street, Thomastown VIC 3074
Phone: (03) 9464 4617

Geotechnical Log - Borehole

BH02

UTM	: 55H	**Drill Rig**	: Hand Auger	**Job Number**	: E3633.1
Easting (m)	: 341522.40	**Driller Supplier**	: Ground Science	**Client**	: Septic Systems Australia
Northing (m)	: 5805796.16	**Logged By**	: Maude Plamandon	**Project**	: Wantirna South
Ground Elevation	: 83.44 (m)	**Reviewed By**	:	**Location**	: 3 Nortons Ln, Wantirna South VIC 3152, Australia
Total Depth	: 1.1 m BGL	**Date**	: 14/08/2025	**Loc Comment**	:

Drilling Method	Water	Depth (m)	Graphic Log	Soil Origin	Classification Code	Material Description	Moisture	Consistency	Samples	Testing
Hand Auger		0.1		Topsoil	CL	Silty CLAY, low plasticity, dark brown, with fine to medium grained sand.	w < PL	S		
				Natural	ML	Gravelly to Clayey SILT, low plasticity, grey, trace fine grained sand.	w < PL	VSt	BH02 - 0.2	
		0.5							BH02 - 0.5	
		1		Natural	Cl	Silty CLAY, medium plasticity, brown mottled orange, trace fine to medium grained sand.	w < PL	VSt - H		
						BH02 Refusal at 1.1 m (refusal on bedrock)				

METHOD

EX	Excavator bucket
R	Ripper
HA	Hand auger
PT	Push tube
SON	Sonic drilling
AH	Air hammer
PS	Percussion sampler
AS	Short spiral auger
AD/V	Solid flight auger:V-Bit
AD/T	Solid flight auger:TC-Bit
HFA	Hollow flight auger
WB	Washbore drilling
RR	Rock roller

PENETRATION

VE	Very Easy(No Resistance)
E	Easy
F	Firm
H	Hard
VH	Very Hard(Refusal)

WATER

- Water Level on Date
- Water inflow
- Water outflow

FIELD TESTS

SPT	- Standard Penetration Test
PP	- Hand/Pocket Penetrometer
DCP	- Dynamic Cone Penetrometer
PSP	- Perth Sand Penetrometer
MC	- Moisture Content
PBT	- Plate Bearing Test
IMP	- Borehole Impression Test
PID	- Photo Ionisation Detector
VS	- Vane Shear; P=Peak, R=residual (unconnected kPa)

SAMPLES

B	- Bulk disturbed sample
D	- Disturbed sample
ES	- Environmental sample
U	- Thin wall tube "undisturbed"

MOISTURE

D	- Dry
M	- Moist
W	- Wet
PL	- plastic limit
LL	- liquid limit
W	- Moisture content

SOIL CONSISTENCY

VS	- Very soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very stiff
H	- Hard

RELATIVE DENSITY

VL	- Very loose
L	- Loose
MD	- Medium dense
D	- Dense
VD	- Very dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

Ground Science

Ground Science
13 Brock Street, Thomastown VIC 3074
Phone: (03) 9464 4617

Geotechnical Log - Borehole

BH03

UTM	: 55H	**Drill Rig**	: Hand Auger	**Job Number**	: E3633.1
Easting (m)	: 341503.48	**Driller Supplier**	: Ground Science	**Client**	: Septic Systems Australia
Northing (m)	: 5805814.05	**Logged By**	: Maude Plamandon	**Project**	: Wantirna South
Ground Elevation	: 83.44 (m)	**Reviewed By**	:	**Location**	: 3 Nortons Ln, Wantirna South VIC 3152, Australia
Total Depth	: 0.6 m BGL	**Date**	: 14/08/2025	**Loc Comment**	:

Drilling Method	Water	Depth (m)	Graphic Log	Soil Origin	Classification Code	Material Description	Moisture	Consistency	Samples: Es	Testing
Hand Auger		0.1		Topsoil	CL	Silty CLAY, low plasticity, dark brown, with fine to medium grained sand.	w < PL	S		
				Natural	ML	Gravelly to Clayey SILT, low plasticity, grey, trace fine grained sand.	w < PL	VSt	BH03 - 0.2	
		0.5		Natural	CI	Silty CLAY, medium plasticity, brown mottled orange, trace fine to medium grained sand, with fine to medium sized gravel.	w < PL	St	BH03 - 0.5	
						BH03 Terminated at 0.6 m				

METHOD

EX	Excavator bucket
R	Ripper
HA	Hand auger
PT	Push tube
SON	Sonic drilling
AH	Air hammer
PS	Percussion sampler
AS	Short spiral auger
AD/V	Solid flight auger:V-Bit
AD/T	Solid flight auger:TC-Bit
HFA	Hollow flight auger
WB	Washbore drilling
RR	Rock roller

PENETRATION

VE	Very Easy(No Resistance)
E	Easy
F	Firm
H	Hard
VH	Very Hard(Refusal)

WATER

- Water Level on Date
- Water inflow
- Water outflow

FIELD TESTS

SPT	- Standard Penetration Test
PP	- Hand/Pocket Penetrometer
DCP	- Dynamic Cone Penetrometer
PSP	- Perth Sand Penetrometer
MC	- Moisture Content
PBT	- Plate Bearing Test
IMP	- Borehole Impression Test
PID	- Photo Ionisation Detector
VS	- Vane Shear; P=Peak, R=residual (unconnected kPa)

SAMPLES

B	- Bulk disturbed sample
D	- Disturbed sample
ES	- Environmental sample
U	- Thin wall tube "undisturbed"

MOISTURE

D	- Dry
M	- Moist
W	- Wet
PL	- plastic limit
LL	- liquid limit
W	- Moisture content

SOIL CONSISTENCY

VS	- Very soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very stiff
H	- Hard

RELATIVE DENSITY

VL	- Very loose
L	- Loose
MD	- Medium dense
D	- Dense
VD	- Very dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

Ground Science

APPENDIX E

PERMEABILITY TESTING

PERMEABILITY TEST REPORT

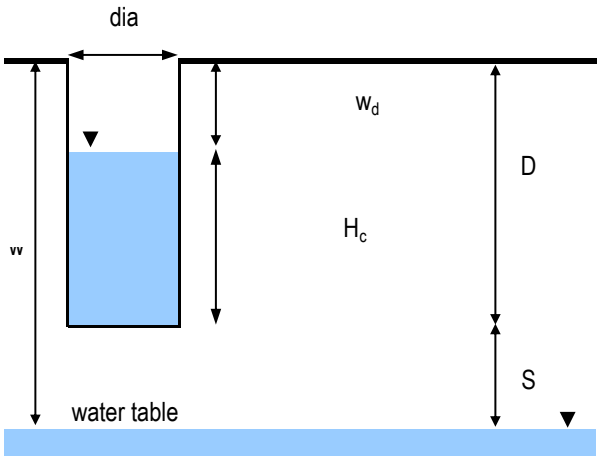
GS ENV 014 V2

Client :	**Septic Systems Australia**	Job Number :	**E3633.1**
Project :	**3 Nortons Lane**	Test Date :	**14-Aug-25**
Location :	**Wantirna South**	Tested By :	**MP**

Job ref / borehole ref: **BH01**

Test Method : AS /NZS 1547:2012

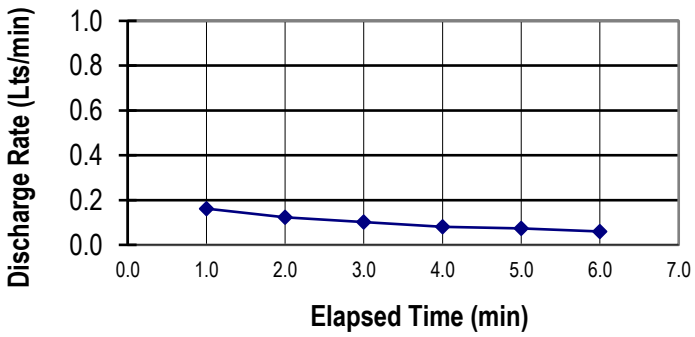
Applies where S > 2H_c



Test Fluid :	Potable water	
Hole Radius, R :	0.06	m
Hole Depth, D :	0.60	m
Depth to Water, w_d:	0.40	m
Constant Head, H_c :	0.20	m
Depth to Water Table, w (if known) :	NE	m

Reading No.	Elapsed Time t (mins)	Time Interval dt (mins)	Water Added per dt (litres)	Discharge Rate (litres/min)
1	0:00:15	0.25	0.087	0.34676
2	0:01:00	0.75	0.121	0.16182
3	0:02:00	1.00	0.123	0.12329
4	0:03:00	1.00	0.101	0.10114
5	0:04:00	1.00	0.081	0.08091
6	0:05:00	1.00	0.073	0.07320
7	0:06:00	1.00	0.060	0.05972

Discharge Rate versus Time



Discharge Rate Q = **0.1000** litres/min

Hydraulic Conductivity, K = $\frac{Q\{\sinh^{-1}(H_c/R) - 1\}}{2\pi H_c^2}$

=	**6.1E-06**	**m/sec**
=	**0.5266**	**m/day**

Site conditions

soil moisture condition :	dry
vegetation cover at test site:	trees
slope:	negligble
surface cracks:	not observed
water logging:	none

Notes : 1) Test material consists of: 0.0-0.6m: CLAY

PERMEABILITY TEST REPORT

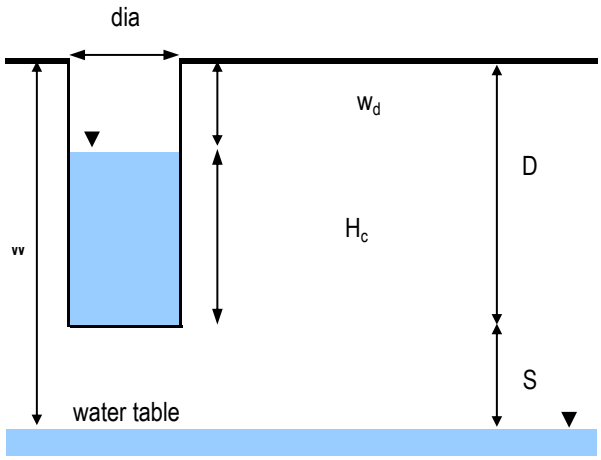
GS ENV 014 V2

Client :	**Septic Systems Australia**	Job Number :	**E3633.1**
Project :	**3 Nortons Lane**	Test Date :	**14-Aug-25**
Location :	**Wantirna South**	Tested By :	**MP**

Job ref / borehole ref: **BH03**

Test Method : AS /NZS 1547:2012

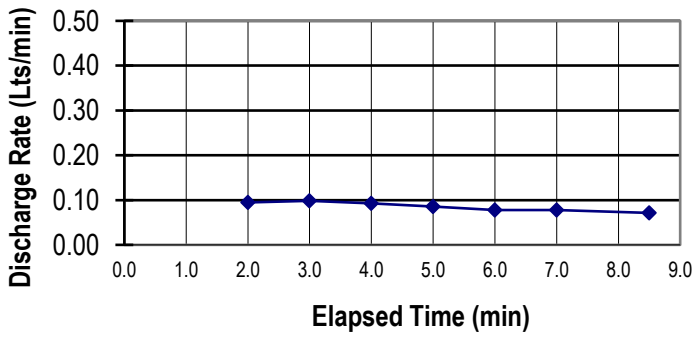
Applies where S > 2H_c



Test Fluid :	Potable water	
Hole Radius, R :	0.06	m
Hole Depth, D :	0.60	m
Depth to Water, w_d:	0.40	m
Constant Head, H_c :	0.20	m
Depth to Water Table, w (if known) :	NE	m

Reading No.	Elapsed Time t (mins)	Time Interval dt (mins)	Water Added per dt (litres)	Discharge Rate (litres/min)
1	0:00:30	0.50	0.088	0.17531
2	0:02:00	1.50	0.143	0.09504
3	0:03:00	1.00	0.098	0.09825
4	0:04:00	1.00	0.092	0.09247
5	0:05:00	1.00	0.086	0.08573
6	0:06:00	1.00	0.078	0.07802
7	0:07:00	1.00	0.078	0.07802
8	0:08:30	1.50	0.107	0.07128

Discharge Rate versus Time



Discharge Rate Q = **0.0855** litres/min

Site conditions

soil moisture condition :	dry
vegetation cover at test site:	trees
slope:	negligble
surface cracks:	not observed
water logging:	none

Hydraulic Conductivity, K = $\frac{Q\{\mathrm{Sinh}^{-1}(H_c/R) - 1\}}{2\pi H_c^2}$

=	**5.2E-06**	**m/sec**
=	**0.4504**	**m/day**

Notes : 1) Test material consists of: 0.0-0.6m: CLAY

APPENDIX F

TREATMENT AND APPLICATION SYSTEMS

TREATMENT SYSTEMS

Primary Treatment System – Septic Tank

Septic tanks provide preliminary treatment of wastewater by allowing solids to settle out of solution and oils/fats to float to the top, forming a scum layer. Anaerobic bacterial digestion of the settled solids produces sludge, which accumulates in the bottom of the tank. Primary treated effluent flows from the septic tank to a secondary system for further treatment or land application.

Aerated Wastewater Treatment System (AWTS)

AWTS are pre-fabricated treatment systems designed to treat wastewater to secondary effluent standard through the following processes:

- Settling of solids and flotation of scum in an anaerobic primary chamber;
- Oxidation and consumption of organic matter through aerobic biological processes;
- Clarification – secondary settling of solids; and
- Disinfection prior to disposal (in some systems).

Good maintenance of an AWTS (e.g. removal of sludge) is essential to ensure a consistently high level of performance, with quarterly service by an approved maintenance contractor required.

Biological Filters

Biological filters such as wet composting systems are comprised of different filter media which utilise worms and bacteria to breakdown and consume solid residuals and liquid organics within a wastewater load under aerobic conditions. Compost is removed from the humus layer and the residual wastewater that collects at the base of the tank is either pumped or flows by gravity to a land application area. Residual effluent from wet composting systems is generally representative of primary treated effluent only and further treatment may be required to ensure secondary effluent quality.

Sand Filters

Sand filters provide advanced secondary treatment to water that has already undergone primary treatment in a septic tank or similar device. They contain approximately 600mm depth of filter media (usually medium to coarse sand, but other media can be incorporated) within a lined excavation containing an underdrain system. Selection of the filter media is critical, and a carefully designed distribution network is necessary. A dosing well and pump is normally used to allow periodic dosing. Depending on the desired level of treatment, sand filters can be single-pass or may incorporate partial recirculation.

Reed Beds

Reed beds are typically a constructed aquatic system using macrophytes (plants) to provide an oxygen source and uptake nutrients and include Rhizopod Systems. Reed beds provide secondary treatment for BOD, TN, TSS and faecal coliforms for wastewater which has already undergone primary treatment in a septic tank or similar device. A reed bed is typically a 0.5m deep polyethylene tub/planter box approximately 8m long that contains various grades of granular fill media and suitable vegetation. An effluent outlet pump is stored in a dosing sump which is then pumped to the LAA. Reed beds are typically low maintenance and relatively inexpensive.

LAND APPLICATION METHODS

Land application	Description	Limitations & Suitability
Absorption trenches	Trenches are the most common type of land application system and are generally used on lots which are reasonably flat and where water soaks into the soil readily in all weather conditions. Commonly, distribution pipes, self-supporting arch trenching or box trenching are laid in trenches filled with aggregate/rock. Effluent then soaks into the surrounding soil.	• Relies on soil absorption • Limitations for use within Category 6 soils
ETA beds	ETA beds are shallower and wider forms of traditional absorption trenches. Because ETA systems have smaller sidewall area compared with absorption trenches, the absorption provided by sidewall loading is reduced. ETA systems maximise effluent disposal/reuse through evapotranspiration.	• Utilises soil absorption and evapotranspiration • Not suitable in high rainfall areas • Requires secondary treatment for use within Category 6 soils
Sub-surface irrigation	Sub-surface drip irrigation requires secondary treated effluent dosing lines buried in the topsoil at shallow depth. Irrigation systems operate by both soil absorption and evapotranspiration from plants/trees.	• Primarily utilises evapotranspiration • Requires secondary treatment
Mound system	A mound system permits the absorption area to be sited in a location where the natural water table or impermeable rock approaches the ground surface. The mound is filled with medium-grade sand to provide suitable filtering before intercepting the natural soils. A pump/siphon dosing system distributes effluent uniformly through a bed of aggregate at the top of the mound.	• Suitable for shallow rock or shallow groundwater / inundation conditions • Not suitable on steep slopes • Limitations regarding construction experience • Requires imported material

APPENDIX G

FLOW BALANCE CALCULATIONS

Activity	Occurrence	Weekly Loading (L)			
Pupil and staff	5x a week	3260			
				Deisgn hydraulic load (Q)	2350

Peak loads

	Week 1							Week 2							Week 3							Week 4						
	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Monday	Tuesday	Wednesda	Thursday	Friday	Saturday	Sunday	Monday	Tuesday	Wednesda	Thursday	Friday	Saturday	Sunday	Monday	Tuesday	Wednesda	Thursday	Friday	Saturday
Loading	**0**	**3260**	**3260**	**3260**	**3260**	**3260**	**0**	**0**	**3260**	**3260**	**3260**	**3260**	**3260**	**0**	**0**	**3260**	**3260**	**3260**	**3260**	**3260**	**0**	**0**	**3260**	**3260**	**3260**	**3260**	**3260**	**0**
Residual	-2350	0	910	1820	2730	3640	1290	0	910	1820	2730	3640	4550	2200	0	910	1820	2730	3640	4550	2200	0	910	1820	2730	3640	4550	2200

	Week 5							Week 6							Week 7							Week 8						
	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Monday	Tuesday	Wednesda	Thursday	Friday	Saturday	Sunday	Monday	Tuesday	Wednesda	Thursday	Friday	Saturday	Sunday	Monday	Tuesday	Wednesda	Thursday	Friday	Saturday
Loading	**0**	**3260**	**3260**	**3260**	**3260**	**3260**	**0**	**0**	**3260**	**3260**	**3260**	**3260**	**3260**	**0**	**0**	**3260**	**3260**	**3260**	**3260**	**3260**	**0**	**0**	**3260**	**3260**	**3260**	**3260**	**3260**	**0**
Residual	0	910	1820	2730	3640	4550	2200	0	910	1820	2730	3640	4550	2200	0	910	1820	2730	3640	4550	2200	0	910	1820	2730	3640	4550	2200

APPENDIX H

APPLICATION AREA SIZING CALCULATIONS

WATER BALANCE & LAND APPLICATION AREA

CLIENT:	Septic Systems Australia	**JOB NUMBER:**	E3633.1
PROJECT:	3 Nortons Lane	**DATE:**	15/08/2025
LOCATION:	Wantirna South	**ASSESSOR:**	MP

INPUT DATA

Design Hydraulic Loading	Q	2350	L/day	Based on anticipated hydraulic loading derived from Table 4 in the EPA GOWM (2024)
Design Irrigation Rate	DIR	3.0	mm/day	Based on soil texture class/permeability and derived from Table 9 in the EPA GOWM (2024)
Crop Factor	C	0.6-0.8	unitless	Estimates evapotranspiration as a fraction of pan evaporation; varies with season and crop type 2
Retained Rainfall	RF	0.75	unitless	Proportion of rainfall that remains onsite and infiltrates LAA
Mean Monthly Rainfall Data	Glen Waverley (Golf Course)			BoM Station
Mean Daily Pan Evaporation Data	Scoresby Research Institute			BoM Station

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**
Monthly Rainfall	R		mm/month	57.2	52.8	52	74.2	71.8	72.1	69.8	73.7	74.8	79.9	80.6	75.5	**834.4**
Monthly Evaporation	E		mm/month	173.6	154	124	81	52.7	39	43.4	58.9	78	105.4	132	155	**1197.0**
Crop Factor	C		unitless	0.8	0.8	0.7	0.7	0.6	0.6	0.6	0.6	0.7	0.8	0.8	0.8	
OUTPUTS																
Monthly Evapotranspiration	ET	ExC	mm/month	138.88	123.2	86.8	56.7	31.62	23.4	26.04	35.34	54.6	84.32	105.6	124	**890.5**
Percolation	B	DIRxD	mm/month	93	84	93	90	93	90	93	93	90	93	90	93	**1095.0**
Outputs		ET+B	mm/month	231.88	207.2	179.8	146.7	124.62	113.4	119.04	128.34	144.6	177.32	195.6	217	**1985.5**
INPUTS																
Retained Rainfall	RR	RxRF	mm/month	42.9	39.6	39	55.65	53.85	54.075	52.35	55.275	56.1	59.925	60.45	56.625	**625.8**
Applied Effluent	W	(QxD)/L	mm/month	61.269975	55.340622	61.26997477	59.293524	61.269975	59.293524	61.269975	61.269975	59.293524	61.269975	59.293524	61.269975	**721.4**
Inputs		RR+W	mm/month	104.16997	94.940622	100.2699748	114.94352	115.11997	113.36852	113.61997	116.54497	115.39352	121.19497	119.74352	117.89497	**1347.2**
STORAGE CALCULATION																
Storage for the month	S	(RR+W)-(ET+B)	mm/month	-127.71	-112.2594	-79.53002523	-31.75648	-9.500025	-0.031476	-5.420025	-11.79503	-29.20648	-56.12503	-75.85648	-99.10503	
Cumulative Storage	M		mm	0	0	0	0	0	0	0	0	0	0	0	0	
Monthly Land Area Required for Zero Storage			m²	385.49053	392.60143	517.4005682	774.29984	1029.391	1188.3692	1092.3677	997.05741	796.61017	620.55454	521.64262	454.24786	

Minimum LAA Required for Zero Storage	m²	**1189**

Water Balance prepared in accordance with Municipal Association of Victoria Victorian Land Capability Assessment Framework (2014)

TRENCH & BED SIZING

CLIENT:	Septic Systems Australia	**JOB NUMBER:**	E3633.1
PROJECT:	3 Nortons Lane	**DATE:**	20/08/2025
LOCATION:	Wantirna South	**ASSESSOR:**	MP

INPUT DATA

Design Hydraulic Loading	Q	2350	L/day	Based on anticipated hydraulic loading derived from Table 4 in the EPA GOWM (2024)
Design Loading Rate	DLR	12.0	mm/day	Based on soil texture class/permeability and derived from Table 9 in the EPA GOWM (2024)
Trench/Bed Width	W	1.0	m	Based on relevant tables from AS/NZS 1547:2012

SIZING CALCULATION

Parameter	Symbol	Formula	Units	Result
Trench/Bed Length	L	Q/DLR x W	m	**195.8333333**
Trench/Bed Basal Area Required	B	L x W	m²	**195.8333333**

Water Balance prepared in accordance with Municipal Association of Victoria Victorian Land Capability Assessment Framework (2014)

APPENDIX I

NUTRIENT BALANCE CALCULATIONS

NUTRIENT BALANCE

CLIENT:	Septic Systems Australia	**JOB NUMBER:**	E3633.1
PROJECT:	3 Nortons Lane	**DATE:**	15/08/2025
LOCATION:	Wantirna South	**ASSESSOR:**	MP

INPUT DATA

Wastewater Loading			**Nutrient Crop Uptake**					
Hydraulic Load	L/day	2350	Crop Uptake	220	kg/ha/yr.	equating to	60.27	mg/m²/day
Effluent N Concentration	mg/L	25						
Percentage Nitrogen Loss (Geary & Gardener, 1996)	Decimal	0.2						
Daily Nitrogen Load	mg/day	58750						
Annual Nitrogen Load	kg/year	21.44						
Total Nitrogen Loss To Soil	kg/year	4.29						
Remaining Nitrogen Load	kg/year	17.16						

NITROGEN BALANCE BASED ON ANNUAL CROP UPTAKE RATES

Minimum Land Application Area required for Nitrogen Uptake	m²	**780**
Nominated LAA Size	m²	**1189**
Minimum Buffer Required for Excess Nutrient	m²	0

Nutrient Balance prepared in accordance with Municipal Association of Victoria Victorian Land Capability Assessment Framework (2014)

APPENDIX J

SYSTEM CONSTRUCTION, OPERATION AND MAINTENANCE

CONSTRUCTION METHODS

Any wastewater system should be installed in compliance with the manufacturer's recommendations, AS/NZS 3500.2:2003 *Plumbing and Drainage* and Council requirements. An EPA Certificate of Approval is no longer required to certify that the installation has been performed in accordance with relevant requirements, however a Council inspection will be undertaken to confirm compliance.

The following excavation techniques shall be observed to minimise the risk of damage to the soil:

- Plan to excavate only when the weather is fine;
- Avoid excavation when the soil has a moisture content above the plastic limit;
- All trenching used to install pipes/lines must be backfilled adequately to prevent preferential flow; and
- Irrigation lines must be installed parallel to the contour of the site slope.

OWNERS RESPONSIBILITIES

Owners and occupiers must ensure the onsite wastewater management system is operated, maintained and monitored in accordance with the Council permit and EPA requirements. If a person other than the property owner will be using the system, the property owner must ensure the person is aware of any responsibilities they have in relation to the system, especially the mandatory requirement for ongoing regular servicing. A person who fails to comply with the permit conditions could be subject to Council enforcement action and penalties under sections 53MA and/or 53N of the Act. Property owners may need to review their public liability insurance policy to ensure the onsite wastewater management system is included.

Treatment System:

A suitably qualified maintenance contractor should perform maintenance procedures including but not limited to:

- Checking the structural integrity of the tank/s and lid/s;
- Checking the condition and operation of the, float switches and other components, and replacing or repairing any faulty parts;
- Ensuring adequate air delivery and timing of aeration;
- Ensuring correct operation of sludge return systems and skimmers;
- Checking biomass accumulation on the media (fixed growth systems) or settleability using Imhoff Cone (suspended growth systems);
- Assessing liquid characteristics such as colour, odour, pH, clarity and dissolved oxygen, to measure treatment performance or making adjustments as required to improve effluent quality; and
- Testing of effluent biochemical oxygen demand and suspended solids by a NATA registered laboratory in accordance with the time period set out in the system's EPA Certificate of Approval.

Land Application System:

- Regularly maintain growing vegetation within the LAA to maximise uptake of water and nutrients;
- Regularly harvest (mow) vegetation within the LAA and remove this to maximise uptake of water and nutrients;
- Monitor and maintain the system as per the manufacturer's recommendations, including flushing of lines;
- Regularly clean in-line filters;
- Do not erect any structures over the LAA;
- Minimise vehicle access to the LAA, to prevent compaction;
- Ensure that a minimum of two warning signs complying with AS 1319 and AS 1547 regarding the use of recycled water is posted within the irrigation area; and
- Divert storm water away from the land application area as much as practicable.

Water Conservation and Improving Wastewater Quality

Good water conservation is an important aspect in the overall management of onsite systems. It is important to the ongoing performance of both the treatment and land application systems that they are not overloaded hydraulically, or by particular chemical constituents contained in wastewater.

AAA rated plumbing is recommended for all water fixtures. Using the following water saving devices, the property's water consumption can be reduced substantially:

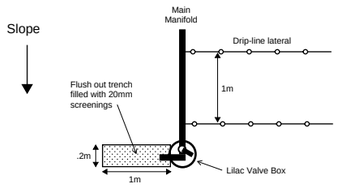
- AAA rated shower heads to limit flow to 6L/minute;
- AAA rated dishwasher, using not more than 18L/wash; and
- AAA rated washing machine, front loading, limiting water use to 22L/dry kg of clothes or less;
- dual flush 6/3L pan and cistern; and
- AAA rated taps, limiting flow to less than 9L/minute.

Organic matter, oils and fats can enter the waste stream from various sources. These pollutants can be reduced by avoiding disposal of food wastes, oils and fats down the sink. Compost food and other organic wastes where possible and place oils and fats in sealed containers for disposal with the Council waste collection system. Never install "Insinkerator" style garbage disposal units. A grease trap should be installed to capture any grease and oils that make their way into the waste stream.

Bleaches, disinfectants and other cleaning compounds can harm wastewater treatment systems, such as septic tanks, because they kill bacteria that colonies the treatment system and help treat wastewater. Use these products sparingly and always check that they are safe for septic systems.

Avoid placing oil, paint, petrol, acids, degreasers, photography chemicals, cosmetics, lotions, pesticides and herbicides in the wastewater system. Even small amounts of these products can harm the performance of the onsite effluent management system.

Flush Point Diagram:



80mm Irrigation Filter

Electrical Conduit

1.0 m

Flush Point

Air Valve

IRRIGATION AREA IS NON-TRAFFICABLE

1,200 sq m

LAA to be cleared of non-native trees prior to irrigation installation

Sewer Drain

2.4 m

1,200m2 - Subsurface irrigation: TO BE ZONED

- Individual Irrigation Field sizes subject to installers design
- Waste-Flow Drip-line Irrigation Pipe
- Installed on contour @ 1 metre spacings 150mm below ground
- Air Valve installed on highest point inside lilac valve box
- Flush Point installed on lowest point inside valve box

Ground works/ amelioration - AS PER LCA REPORT

WWTP Treatment Train
- 1 X 10,000L Balance Tank
- 1 X 5,000L AWTS

WWTP tanks position is subject to change up to 3m from marked location to accommodate sewer/services connection

Please note: Drawings provided by SSA are non-engineering drawing and are for reference purposes only. SSA drawings are a visual representation of the LCA and should be used as a guide only. SSA makes no warranties, either express or implied, regarding the accuracy or completeness of these drawings.

SEPTIC SYSTEMS AUSTRALIA

Project: COMMERCIAL SEPTIC INSTALLATION - ASCENSION COLLEGE		
Site Address: 3 NORTONS LANE, WANTIRNA SOUTH, VIC	Client: MSM ARCHITECTS	Date: 28 August 2025
	Version: 1.0	Drawn: CP
Drawing Name: Septic Site Plan	Job No: 7542	Drawing No: 001