SUBDIVISION WASTEWATER ASSESSMENT

27 Selby Road

Kettering

September 2025

Revised January 2026

Revised April 2026

GES

GEO-ENVIRONMENTAL

SOLUTIONS

Disclaimer: The author does not warrant the information contained in this document is free from errors or omissions. The author shall not in any way be liable for any loss, damage or injury suffered by the User consequent upon, or incidental to, the existence of errors in the information.

Document Set ID: 4783874
Version: 1, Version Date: 04/06/2026

Investigation Details

Client:	Steve Percival & Robyn Martin
Site Address:	27 Selby Road, Kettering
Date of Inspection:	02/09/2025
Proposed Works:	Subdivision
Investigation Method:	70mm hand auger
Inspected by:	JP Cumming

Site Details

Certificate of Title (CT):	141484/1
Title Area:	Approx. 9667m²
Planning Overlays:	Biodiversity Protection Area
	Bushfire-prone Areas
Slope & Aspect:	Approx. 15% NE facing slope
Vegetation:	Mixed flora

Background Information

Geology Map:	MRT 1:250 000
Geological Unit:	Jurassic dolerite
Climate:	Annual rainfall approx. 900mm
Water Connection:	Tank
Sewer Connection:	Unserviced-On-site required
Testing and Classification:	*AS1547:2012*

Document Set ID: 4783874
Version: 1, Version Date: 04/06/2026

Investigation

A number of test holes were completed to identify the distribution and variation of the soil materials at the site, the test hole locations are indicated on the site plan. See soil profile conditions presented below. Tests were conducted to assess the capacity of the materials for onsite wastewater disposal according to AS1547:2012. Test hole numbers correspond to lot numbers.

Wastewater Profile Summary

TH2 Depth (m)	TH3 Depth (m)	Horizon	Description
0.00 – 0.20	0.00 – 0.15	A1	Dark Brown **Clayey SAND (SC)**: slightly moist medium dense consistency, gradual boundary to
0.20 – 0.60	0.15 – 0.40	B2	Brown **Gravelly CLAY (CI)**: slightly moist firm consistency, gradual boundary to
0.60 – 0.70	0.40 – 0.60	BC	Yellow Brown **CLAYEY GRAVELS (GC)**: highly weathered dolerite gravels, refusal.

Site Notes

Soils on the site are developing from Jurassic dolerite. These soils have moderate capacity to accept onsite wastewater, with moderate permeability and good nutrient retention capacity.

Site Summary

The current proposal is for the subdivision of the existing title into 3 lots. Proposed Lots 2 and 3 will have areas of 2990m^2 and 2660m^2 respectively, while the balance Lot will have an area of 4450m^2. Site investigation found the soil profile to be predominantly clay over gravels grading to highly weathered bedrock. Consequently, wastewater infiltration is expected to be low to moderate, with a moderate to high CEC for nutrient absorption. The soils across the site area classified according to AS1547-2012 as **Category 5 – Light Clay**.

Nutrient Balance and Sustainable Wastewater Application

The soils across the entire site are developing from Jurassic dolerite with a high estimated Cation Exchange Capacity (CEC). Therefore, the soils have a good capacity to retain nutrients from applied wastewater.

Document Set ID: 4783874
Version: 1, Version Date: 04/06/2026

Hydrological Balance and Wastewater Disposal

The existing four-bedroom equivalent dwelling on the balance lot (proposed lot 1) is serviced by a package treatment system (AWTS) with a land application area comprised of subsurface irrigation (350m^2) which is located within proposed Lot 3. Therefore, the application area will need to be disconnected and decommissioned from use and a new wastewater disposal will be required within the proposed new boundaries of the balance lot. This report does not cover the design or certification of a new system on the balance lot. Modelling of wastewater application on the proposed lots was undertaken using the Trench program, long term weather average for Kettering, and the observed soil profile characteristics.

Assuming the construction of a three-bedroom dwelling with a typical domestic wastewater loading, the expected loading under AS1547-2012 is 600L/day. This is based on a tank water supply with an occupancy of 5 persons using 120L/person/day.

The proposed lots have been assessed using the design parameters applicable to a secondary treatment system (e.g., AWTS, Eljen GSF etc.) given that the soils across the site are not suitable for the installation of a primary treatment system. On **Category 5** soils a Design Irrigation Rate (DIR) of 3mm/day or a Design Loading Rate (DLR) of 10L/m^2/day would be applicable. The shallow depth of the soils on site suggests that the most suitable form of wastewater disposal would be via subsurface irrigation. Alternatively, where space is limited, a raised bed may be used for disposal via absorption. For proposed Lots 2 and 3, with a wastewater loading of 600L/day and a DIR of 3mm/day, an irrigation area of 200m^2 or absorption area of 60m^2 would be required on each lot.

The land application area is to be excluded from traffic or any future building works. For each lot a 100% reserve area should be set aside for future wastewater requirements where necessary, resulting in a minimum of 120m^2 plus area to account for setbacks required to be set aside for wastewater requirements on each lot. Wastewater disposal on all lots will take into account any drainage lines, water courses, and landslide hazard areas.

It is recommended the final decision of wastewater system approval rest with the permit authority at the time of site-specific design to ensure the most compatible environmental and economic outcomes. Therefore, it is not warranted to restrict the lot to a single wastewater system type at the subdivision approvals stage, as each dwelling will have individual nuances which may be more suited to any one of a range of designs allowable within AS1547-2012.

Document Set ID: 4783874
Version: 1, Version Date: 04/06/2026

To comply with E23.9 of the Kingborough Interim Planning Scheme 2015:

E23.9.1 Development Standards for New Lots

Acceptable Solutions	**Comment**
A1 A new lot must have an area no less than: 5,000 m^2.	Non-compliance

Performance Criteria	**P1** The area of a new lot must be adequate to accommodate a land application area of sufficient size to comply with the requirements of AS/NZ1547 for a dwelling containing a minimum of 3 bedrooms.
Comment	As demonstrated above and shown on the attached plan, there is sufficient area on each of the proposed lots to comply with the requirements of AS/NZ1547 for a three-bedroom dwelling. Application area design for Lots 2 and 3, including distribution detail and setbacks, will be addressed at the relevant approval stage.

Acceptable Solutions	**Comment**
A2 Subdivision is not prohibited by the relevant zone standards.	Complies

E23.9.2 Development Standards for New Boundaries

Acceptable Solutions	**Comment**
A1 A new boundary must have a separation distance from an existing land application area that complies with E.23.10.1 A3.	Complies

A number of indicative minimum setbacks applicable to the development have been modelled based on the use of secondary treatment and an average slope of 9° utilising the Trench program and with reference to E23 of the Kingborough Interim Planning Scheme 2015:

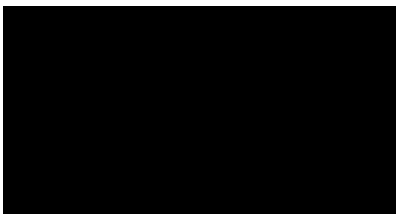
Upslope and level buildings:	2m
Downslope buildings:	4.25m
Upslope and level boundaries:	1.5m
Downslope boundary:	10.5m
Downslope surface water:	68m

The assessment concludes that the proposed lots would be sufficient to accommodate wastewater from future residential development and are consistent with E23.9.1 of the Kingborough Interim Planning Scheme 2015. The proposal is also consistent with the objective of E23.9.2, given that the only existing wastewater system within proximity to a new boundary is the system on proposed Lot 1 which is required to be removed as part of the subdivision. The proposed boundaries are not expected to have any impact on the wastewater systems on adjacent properties.

Document Set ID: 4783874
Version: 1, Version Date: 04/06/2026

Conclusions

The current subdivision proposal allows for sufficient space on the proposed lots to be created for the installation and successful operation of wastewater treatment systems, with adequate setbacks in regards to boundaries and sensitive features. The actual setbacks applied will require fine tuning at the special plumbing permit stage as access, parking, and building footprints are finalised in conjunction with wastewater disposal areas. Modelling at this planning stage does however suggest that sufficient room is available on the proposed lots to accommodate the required setbacks.



Dr John Paul Cumming B.Agr.Sc (hons) PhD CPSS GAICD

Director

Document Set ID: 4783874
Version: 1, Version Date: 04/06/2026

GES Pty Ltd

Land suitability and system sizing for on-site wastewater management

Trench 3.0 (Australian Institute of Environmental Health)

Assessment Report

Site assessment for on-site waste water disposal

Assessment for	Steve Percival & Robyn Martin	Assess. Date	16-Sep-25
		Ref. No.	
Assessed site(s)	27 Selby Road, Kettering	Site(s) inspected	1-Sep-25
Local authority	Kingborough	Assessed by	John Paul Cumming

This report summarises wastewater volumes, climatic inputs for the site, soil characteristics and sustem sizing and design issues. Site Capability and Environmental sensitivity issues are reported separately, where 'Alert' columns flag factors with high (A) or very high (AA) limitations which probably require special consideration for system design(s). Blank spaces on this page indicate data have not been entered into TRENCH.

Wastewater Characteristics

Wastewater volume (L/day) used for this assessment = 600 (using the 'No. of bedrooms in a dwelling' method)
Septic tank wastewater volume (L/day) = 200
Sullage volume (L/day) = 400
Total nitrogen (kg/year) generated by wastewater = 2.2
Total phosphorus (kg/year) generated by wastewater = 1.1

Climatic assumptions for site (Evapotranspiration calculated using the crop factor method)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean rainfall (mm)	54	56	63	76	72	81	82	95	87	85	75	73
Adopted rainfall (R, mm)	54	56	63	76	72	81	82	95	87	85	75	73
Retained rain (Rr, mm)	43	45	50	60	58	65	66	76	69	68	60	58
Max. daily temp. (deg. C)												
Evapotrans (ET, mm)	130	110	91	63	42	29	32	42	63	84	105	126
Evapotr. less rain (mm)	**87**	**65**	**41**	**3**	**-16**	**-35**	**-34**	**-34**	**-6**	**16**	**45**	**68**

Annual evapotranspiration less retained rain (mm) = 199

Soil characterisitics

Texture = Light CLAY Category = 5 Thick. (m) = 1
Adopted permeability (m/day) = 0.12 Adopted LTAR (L/sq m/day) = 3 Min depth (m) to water = 5

Proposed disposal and treatment methods

Proportion of wastewater to be retained on site:	All wastewater will be disposed of on the site
The preferred method of on-site primary treatment:	In a package treatment plant
The preferred method of on-site secondary treatment:	In-ground
The preferred type of in-ground secondary treatment:	None
The preferred type of above-ground secondary treatment:	None
Site modifications or specific designs:	Not needed

Suggested dimensions for on-site secondary treatment system

Total length (m) =	17
Width (m) =	12
Depth (m) =	0.4
Total disposal area (sq m) required =	200
comprising a Primary Area (sq m) of:	200
and a Secondary (backup) Area (sq m) of:	

Sufficient area is available on site

Comments

Modelling the proposed lots with a wastewater loading of 600L/day (typical three-bedroom dwelling) and a DIR of 3mm/day results in a minimum irrigation area of 200m^2.

Document Set ID: 4783874
Version: 1, Version Date: 04/06/2026

GES Pty Ltd

Land suitability and system sizing for on-site wastewater management

Trench 3.0 (Australian Institute of Environmental Health)

Site Capability Report

Site assessment for on-site waste water disposal

Assessment for	Steve Percival & Robyn Martin	Assess. Date	16-Sep-25
		Ref. No.	
Assessed site(s)	27 Selby Road, Kettering	Site(s) inspected	1-Sep-25
Local authority	Kingborough	Assessed by	John Paul Cumming

This report summarises data relating to the physical capability of the assessed site(s) to accept wastewater. Environmental sensitivity and system design issues are reported separately. The 'Alert' column flags factors with high (A) or very high (AA) site limitations which probably require special consideration in site acceptability or for system design(s). Blank spaces indicate data have not been entered into TRENCH.

Alert	Factor	Units	Value	Confid level	Limitation Trench	Limitation Amended	Remarks
	Expected design area	sq m	1,000	V. high	Moderate		
	Density of disposal systems	/sq km	20	Mod.	Moderate		
	Slope angle	degrees	9	High	Moderate		
	Slope form	Convex spreading		High	Very low		
	Surface drainage	Imperfect		High	Moderate		
	Flood potential	Site floods <1:100 yrs		High	Very low		
	Heavy rain events	Infrequent		High	Moderate		
	Aspect (Southern hemi.)	Faces NE or NW		V. high	Low		
	Frequency of strong winds	Common		High	Low		
	Wastewater volume	L/day	600	High	Moderate		
	SAR of septic tank effluent		1.0	High	Low		
	SAR of sullage		1.6	High	Low		
	Soil thickness	m	1.0	V. high	Low		
A	Depth to bedrock	m	1.0	V. high	High		
	Surface rock outcrop	%	0	V. high	Very low		
	Cobbles in soil	%	0	V. high	Very low		
	Soil pH		5.5	High	Low		
	Soil bulk density	gm/cub. cm	1.4	High	Very low		
	Soil dispersion	Emerson No.	8	V. high	Very low		
	Adopted permeability	m/day	0.12	Mod.	Very low		
	Long Term Accept. Rate	L/day/sq m	3	High	High	Moderate	Other factors lessen impact

Comments

Secondary treatment of wasterwater is required.

Document Set ID: 4783874
Version: 1, Version Date: 04/06/2026

GES Pty Ltd

Land suitability and system sizing for on-site wastewater management

Trench 3.0 (Australian Institute of Environmental Health)

Environmental Sensitivity Report

Site assessment for on-site waste water disposal

Assessment for	Steve Percival & Robyn Martin	Assess. Date	16-Sep-25
		Ref. No.	
Assessed site(s)	27 Selby Road, Kettering	Site(s) inspected	1-Sep-25
Local authority	Kingborough	Assessed by	John Paul Cumming

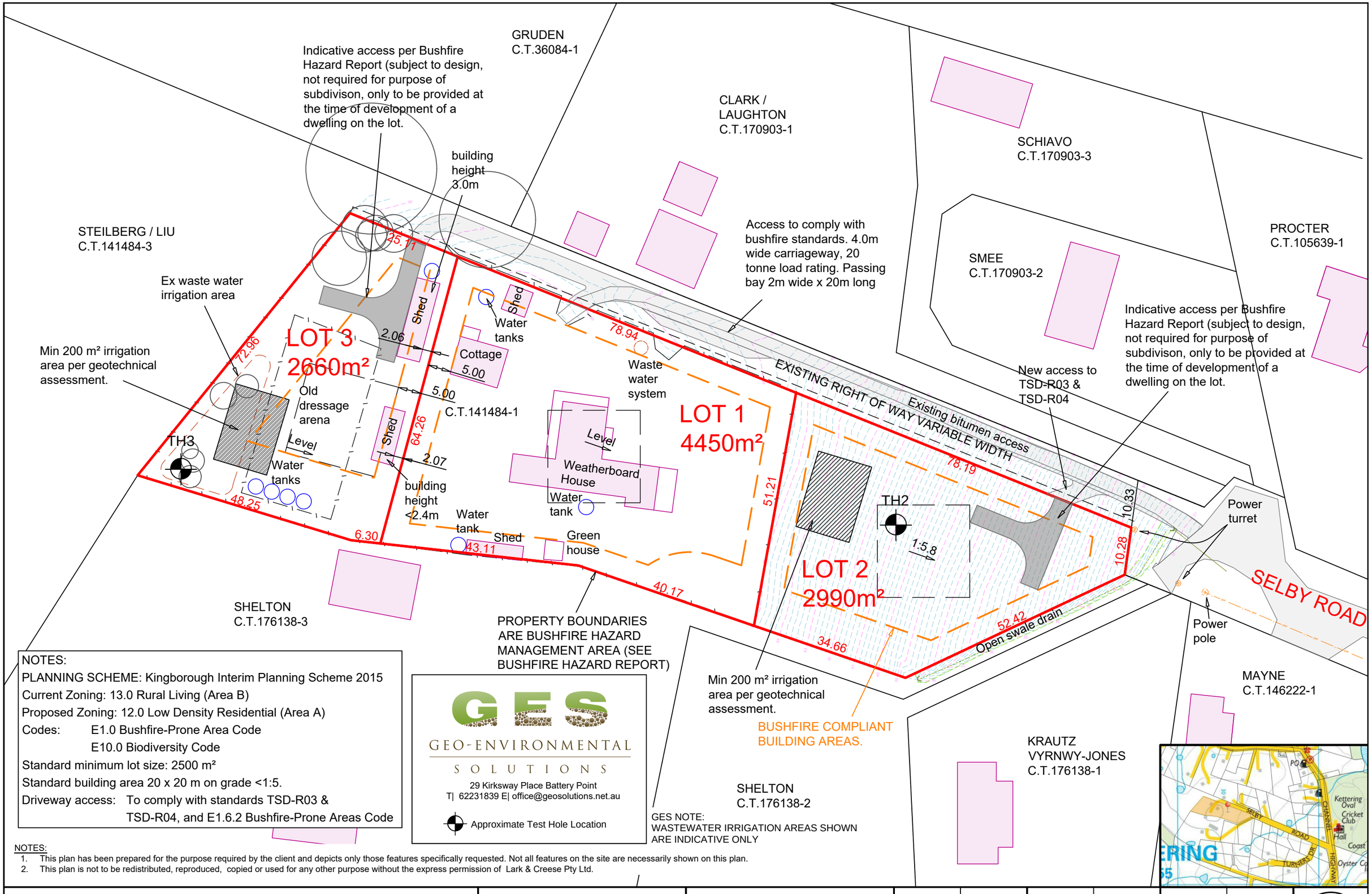
This report summarises data relating to the environmental sensitivity of the assessed site(s) in relation to applied wastewater. Physical capability and system design issues are reported separately. The 'Alert' column flags factors with high (A) or very high (AA) limitations which probably require special consideration in site acceptability or for system design(s). Blank spaces indicate data have not been entered into TRENCH.

Alert	Factor	Units	Value	Confid level	Limitation Trench	Limitation Amended	Remarks
	Cation exchange capacity	mmol/100g	90	High	Low		
	Phos. adsorp. capacity	kg/cub m	0.6	High	Moderate		
	Annual rainfall excess	mm	-199	High	Very low		
	Min. depth to water table	m	5	High	Very low		
	Annual nutrient load	kg	3.3	High	Very low		
	G'water environ. value	Agric non-sensit		V. high	Low		
	Min. separation dist. required	m	2	High	Very low		
	Risk to adjacent bores	Very low		V. high	Very low		
	Surf. water env. value	Agric sensit/dom drink		V. high	Moderate		
	Dist. to nearest surface water	m	70	V. high	High	Moderate	Other factors lessen impact
	Dist. to nearest other feature	m	10.5	V. high	High	Moderate	Other factors lessen impact
	Risk of slope instability	Very low		V. high	Very low		
	Distance to landslip	m	500	V. high	Very low	Moderate	

Comments

Use of secondary treatment will minimise the environmental risks associated with onsite wastewater disposal to an acceptably low level.

Document Set ID: 4783874
Version: 1, Version Date: 04/06/2026



NOTES:
PLANNING SCHEME: Kingborough Interim Planning Scheme 2015
Current Zoning: 13.0 Rural Living (Area B)
Proposed Zoning: 12.0 Low Density Residential (Area A)
Codes: E1.0 Bushfire-Prone Area Code
E10.0 Biodiversity Code
Standard minimum lot size: 2500 m²
Standard building area 20 x 20 m on grade <1:5.
Driveway access: To comply with standards TSD-R03 & TSD-R04, and E1.6.2 Bushfire-Prone Areas Code

GES
GEO-ENVIRONMENTAL SOLUTIONS
29 Kirksway Place Battery Point
T| 62231839 E| office@geosolutions.net.au

Approximate Test Hole Location

NOTES:
1. This plan has been prepared for the purpose required by the client and depicts only those features specifically requested. Not all features on the site are necessarily shown on this plan.
2. This plan is not to be redistributed, reproduced, copied or used for any other purpose without the express permission of Lark & Creese Pty Ltd.

LARK & CREESE Pty Ltd
Land & Engineering Surveyors
62 Channel Highway,Kingston
+61 (03) 6229 6563
info@larkandcreese.com.au
www.larkandcreese.com.au

DEVELOPMENT APPLICATION
- SUBDIVISION -

27 SELBY ROAD
KETTERING

S. PERCIVAL & R. MARTIN

TITLE	C.T.141484-1	PROJECT	30785	DATE	25/02/2026
PID	2527893	DRAWING	52302-05	DRAWN	GS
CONTOUR	-	SCALE	1:750@A3	CHECKED	NC

N
MGA2020
AHD

Document Set ID: 4783874
Version: 1, Version Date: 04/06/2026