SUBDIVISION WASTEWATER ASSESSMENT

22 Ferry Road

Kettering

May 2025

GES

GEO-ENVIRONMENTAL

SOLUTIONS

Investigation Details

Client:	Resul Kucukakyuz
Site Address:	22 Ferry Road, Kettering
Date of Inspection:	07/05/2025
Proposed Works:	Subdivision
Investigation Method:	Geoprobe 540UD - Direct Push
Inspected by:	C. Cooper

Site Details

Certificate of Title (CT):	60358/17
Title Area:	Approx. 7645m²
Planning Overlays:	Biodiversity Protection Area
Slope & Aspect:	Approx. 18% N 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*

Investigation

A representative of bore hole was completed to identify the distribution and variation of the soil materials at the site, the bore hole location is 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.

Wastewater Profile Summary

Test hole Depth (m)	Horizon	Description
0.00 – 0.10	FILL	Brown **Silty SAND (SM)**: slightly moist dense consistency, clear boundary to
0.10 – 0.40		Red Grey **Gravelly CLAY (GC)**: high plasticity, moist stiff consistency, clear boundary to
0.40 – 0.70	B2	Grey **Sandy CLAY (CH)**: high plasticity, slightly moist stiff consistency, visible boundary to
0.70 – 1.0	BC	Light Grey **Clayey SAND**: slightly moist medium dense consistency, with gravels, auger refusal on weathered gravels.

Site Notes

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

Site Summary

The current proposal is for the subdivision of the existing title (CT: 60358/17, approx. 7645m^2) into 3 lots. Proposed Lots 1 and 2 will have areas of 2547m^2 and 2514m^2 respectively, while the balance Lot will have an area of 2621m^2. Site investigation found the soil profile on both lots to be a sandy clay over weathered gravels. 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 developed from Jurassic dolerite with a high estimated Cation Exchange Capacity (CEC). Therefore, the soils have a good capacity to retain nutrients from applied wastewater.

Hydrological Balance and Wastewater Disposal

The existing five-bedroom dwelling on the balance lot is serviced by a primary treatment system that is located upslope, within proposed Lot 2. Therefore, this system will need to be disconnected and decommissioned from use and a new system 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., package treatment system such as Econocycle, Envirocycle, Ozzikleen etc.), given that under the current proposal there would be insufficient land area available to support a primary treatment system on any of the proposed lots due to site and soil conditions and setback requirements.

For proposed Lots 1 and 2, with a wastewater loading of 600L/day and a Design Loading Rate (DLR) of 10L/m^2/day an absorption area of 60m^2 would be required. If disposing of treated wastewater via irrigation, an area of 250m^2 would be required using a Design Irrigation Rate (DIR) of 2.4mm/day to account for the slope on site.

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.

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. Wastewater disposal on all lots will take into account any drainage lines, water courses, and landslide hazard areas.

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 10° utilising the Trench program and with reference to the Acceptable Solutions outlined in E23.10.1 of the Kingborough Interim Planning Scheme 2015:

Upslope and level buildings:	2m
Downslope buildings:	4.5m
Upslope and level boundaries:	1.5m
Downslope boundaries:	11.5m
Downslope surface water:	70m

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 2 which is required to be removed as part of the development. The proposed boundaries are not expected to have any impact on the wastewater systems on adjacent properties.

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

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	Resul Kucukakyuz	Assess. Date	16-May-25
		Ref. No.	
Assessed site(s)	22 Ferry Road, Kettering	Site(s) inspected	7-May-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) = 2 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 dual purpose septic tank(s)
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) =	21
Width (m) =	12
Depth (m) =	0.4
Total disposal area (sq m) required =	250
comprising a Primary Area (sq m) of:	250
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 2.4mm/day results in a minimum irrigation area of 250m^2.

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Land suitability and system sizing for on-site wastewater management

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Site Capability Report

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		Ref. No.	
Assessed site(s)	22 Ferry Road, Kettering	Site(s) inspected	7-May-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	10	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 N		V. high	Very 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		
AA	Soil dispersion	Emerson No.	2	V. high	Very high		
	Adopted permeability	m/day	0.12	Mod.	Very low		
	Long Term Accept. Rate	L/day/sq m	2	High	High	Moderate	Other factors lessen impact

Comments

Secondary treatment of wasterwater is required. Soil taken for laboratory testing did exhibit some dispersion.

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Land suitability and system sizing for on-site wastewater management

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Environmental Sensitivity Report

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Assessed site(s)	22 Ferry Road, Kettering	Site(s) inspected	7-May-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		Remarks
					Trench	Amended	
	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		
A	Surf. water env. value	Recreational		V. high	High		
	Dist. to nearest surface water	m	70	V. high	High	Moderate	Other factors lessen impact
	Dist. to nearest other feature	m	11.5	V. high	High	Moderate	Other factors lessen impact
	Risk of slope instability	Very low		V. high	Very low		
	Distance to landslip	m	35	V. high	High	Moderate	Other factors lessen impact

Comments

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