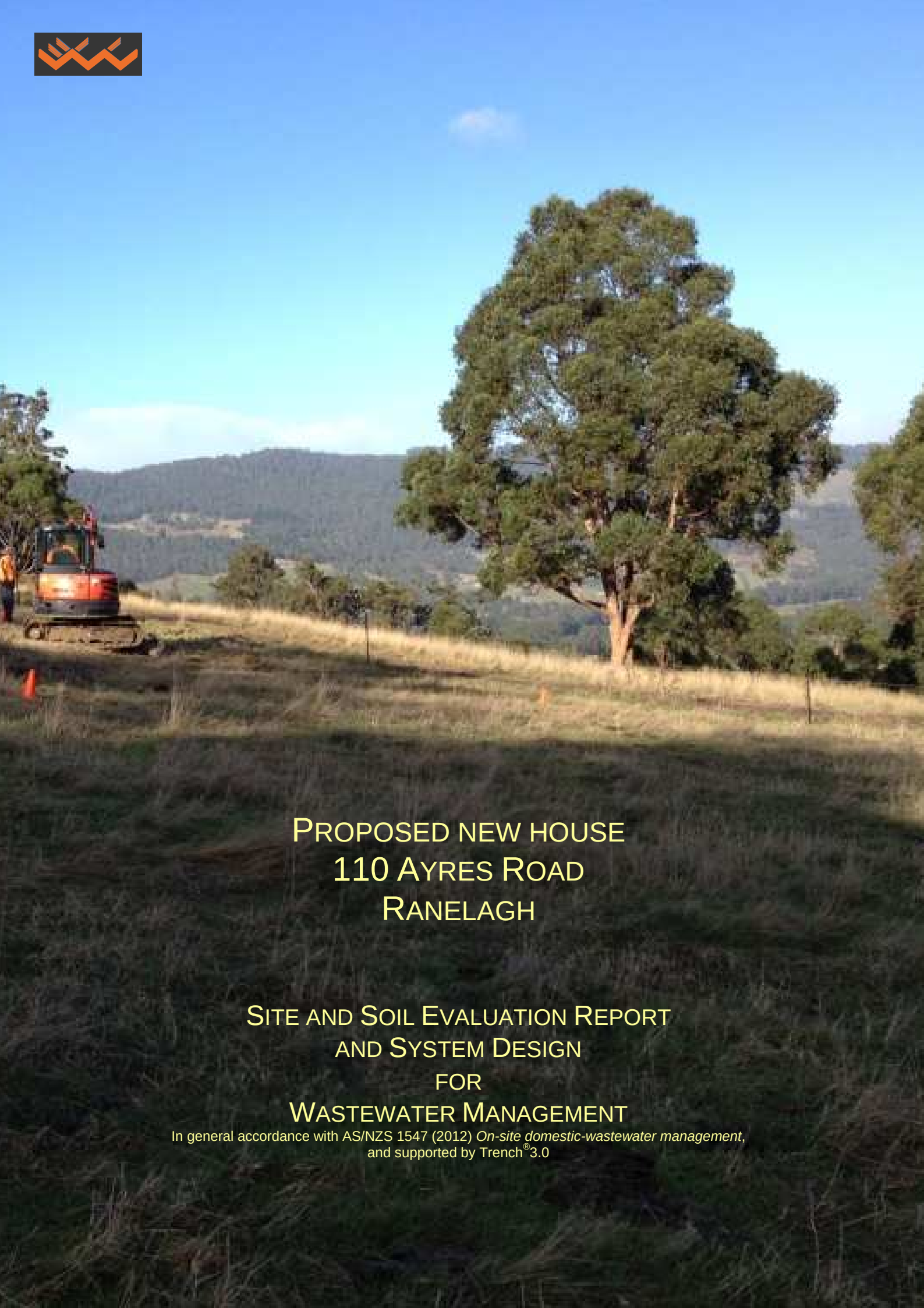


PROPOSED NEW HOUSE
110 AYRES ROAD
RANELAGH

SITE AND SOIL EVALUATION REPORT
AND SYSTEM DESIGN
FOR
WASTEWATER MANAGEMENT

In general accordance with AS/NZS 1547 (2012) *On-site domestic-wastewater management*,
and supported by Trench®3.0

Cover

View (May 2014) looking south below the house site, over the area proposed for wastewater disposal.

Refer to this report as

Cromer, W. C. (2014). *Site and soil evaluation report, and system design for domestic wastewater management, 110 Ayres Road, Ranelagh.* (Unpublished report for I. and J. Urquhart by William C. Cromer Pty. Ltd., 19 May 2014; 23 pages).

William C Cromer Pty Ltd may submit hard or electronic copies of this report to Mineral Resources Tasmania to enhance the geotechnical database of Tasmania.

IMPORTANT NOTES FOR CLIENT

Scope and intent of this report

This document includes

- a Site and Soil Evaluation Report in accordance with AS/NZS1547(2012) and
- suggestions for wastewater management.

There is usually more than one way of acceptably managing on-site domestic wastewater and it is the intent of this document that the client or client's agent determines the preferred method of management from the suggestions included here. If only one treatment system is recommended, it means the client has already indicated a firm preference.

Defined in this document are three important site attributes:

- the location and extent of the available area for wastewater disposal,
- the minimum wetted area requirements for each suggested method, and
- the minimum setback requirements.

Accordingly, this document is intended to support, not replace, an application to local Council for a Special Plumbing Permit.

Appointment of designer

If required, William C Cromer Pty Ltd accepts the role of Designer for the design(s) suggested in this report. A **Form 35B** is included with this document.

The designer is required to make as many site inspections as is necessary to be able to certify to the client and the local Council that:

- the installed system conforms with the approved design, and
- the system, as installed, conforms with AS/NZS 1547(2000)

Usually, certification is required before the dwelling can be occupied and the wastewater disposal system used.

Inspection arrangements

It is the responsibility of the client or the client's agent to contact the designer before construction starts on the wastewater disposal system, in order to establish the stages of construction required to be inspected by the designer.

SUMMARY STATEMENT

A new house is proposed to be built at 110 Ayres Road, Ranelagh. Water is from rain tanks. A daily wastewater volume of 750L has been assumed. In the area proposed for wastewater disposal, a Category 4 equivalent clayey silt and clay soil profile is about 1.5m thick. A Design Loading Rate (DLR) of 6mm/day, and a Design Irrigation Rate of 3mm/day, have been adopted for primary and secondary treated wastewater respectively.

Water balance calculations using Trench®3.0 indicate that:

For primary treated wastewater,

- the minimum wetted area requirement for the disposal (eg via a non-conventional bed) of an adopted 750L/day of wastewater into Category 4 soil profile with a DIR of 6mm/day is 120m^2 and

- the recommended setback distances to downgradient and upgradient/crossgradient sensitive features are 15m and 5m respectively.

For secondary treated wastewater

- The minimum wetted area requirement for the disposal (eg via shallow subsurface irrigation) of an adopted 750L/day of wastewater into Category 4 soil profile with a DIR of 3mm/day is 240m^2, and

- the recommended setback distances to downgradient and upgradient/crossgradient sensitive features are 5m and 2m respectively.

Two wastewater designs are recommended in this report:

- secondary treated wastewater via an aerated wastewater treatment system (AWTS) directed to mulch-covered or shallowly buried drippers or equivalent, or

- primary treated wastewater discharging under gravity from a dual purpose septic tank ot one or more non-conventional beds.

The client will select from these tow choices.

There are no significant site capability or environmental sensitivity issues with wastewater management.

1 SITE AND SOIL EVALUATION

Topography and drainage

Moderately-sloping at about 10 – 12^0 SE, steepening to over 20^0 below the proposed disposal area

No other internal drainage lines.

Vegetation

Cleared to pasture

Land use

Rural residential

Water and power supply

Rain water tanks; electrical power available.

Assumed daily wastewater

Assume 120L/day/person (say, 250L/day/bedroom) of wastewater in accordance with Table H1 in Appendix H of AS/NZS1547:2012. Three bedrooms= 750L/day.

Soils and Geology

Published geology of the property

The geological map[1] of the area (Attachment 1) shows the property as wholly underlain by Permian-age sedimentary rocks.

My interpretation of the geology

Published geology confirmed byobservation of surface exposure, and test pitting.

Soils

Soils comprise dulex profiles. The topsoi (Layer 1) is a dark then light coloured clayey silt (CL) about 0.6m thick, overlying a moderately structured subsoil clay (CH) at least 0.9 – 1m thick.

Fill

Fill has been placed as a (presumably) uncontrolled wedge of soil and weathered bedrock at the house site, where it forms an outer embankment several metres high. Topsoil from the excavation has been placed at the base of the embankment (just upslope from the proposed wastewater disposal area) and can be used for a non-conventional bed if required..

Evidence of slope instability at the house site

Evidence of slope instability in the vicinity, but proposed wastewater disposal area at lew risk.

Groundwater

No seepages observed.

Deeper, permanent groundwater is present beneath the property, but its occurrence will have no impact on wastewater management, and vice versa.

[1] Farmer, N. (1981). Geological atlas 1:50,000 series. *Kingborough*. Tasmanian Department of Mines.

Table 1. Summary of test pit logs (see Attachment 2 for test pit locations)

Client URQUHART
Location 110 Ayres Road, Ranelagh
Date dug 06-May-2014

Test hole	A	B	C	D	E	F	G
Depth dug (m)	1.5	1.4	1.5	0.6	2.3	1.1	2.2
Easting (GDA94)	500745	500739	500733	500735	500770	5007768	500763
Northing (GDA94)	5238870	5238847	5238856	5230874	5238868	5238860	5238855
Water inflow (depths in m)	None	None	None	None	None	None	None

No.	Layer	Details	USCS	Interp.	Figures are depths to top and bottom of layer, in metres						
1	**Grav silty CLAY**	Includes clayey silt; variable (mainly orange cream) colour and thickness; low plasticity M; Fb	CL, GC	FILL						0 to 0.5	0 to 0.7
2	**Clayey SILT**	Grey brown; M; Fb	CL	A1 horizon	0 to 0.1	0 to 0.1	0 to 0.1	0 to 0.1	0 to 0.1		
3	**Sandy SILT**	Light grey; hardsetting; some fine andstone gravel; D, Fb	SM	A2 horizon	0.1 to 0.5	0.1 to 0.5	0.1 to 0.5	0.1 to 0.5	0.1 to 0.5		
4	**CLAY**	Includes silty clay grading to clayey sand; mottled orange and grey; mod to high plasticity decreasing with depth; weakly fractured; M<>PL; VSt	CH to CL, SC	B horizon	0.5 to 1.5 D0.6 EAR	0.5 to 1.4 D0.6 EAR	0.5 to 1.5 D0.6 EAR	0.5 to 0.6 D0.6 EAR	0.5 to 2.3 U50 0.7-1.0 EAR		
5	**Grav silty SAND**	Includes gravelly sand; orange; matrix nonplastic M; D	GW	Extremely weathered bedrock							
6	**SANDSTONE**	Orange and brown; strongly fractured; mainly highly weathered, with local joint infills of grey high plastifity clay; subhorizontal		Permian Abels Bay Formation (bedrock)						0.5 to 1.1 EAR	0.7 to 2.2 EAR

Notes and abbreviations

USCS = Unified Soil Classification System
Grey cells indicate a missing layer or layers in a test pit
D 0.1 = disturbed sample at 0.1m depth; U50 = undisturbed 50mm diameter drive tube sample at stated depth interval
SV 50 @ 1.2 = shear vane reading was 50kPa at 1.2m depth; PP = pocket penetrometer (figure is reading in kPa)

Excavability Equipment = 5.5t excavator, 0.45m bucket with 4 teeth; operator Neil Page
EAR = end as required; NR = no refusal; CR = close to refusal; R = refusal.

Weathering For rock only. F = fresh; SW = slightly weathered; MW = moderately weathered; HW = highly weathered;
EW = extremely weathered (ie soil properties; material can be remolded in the hand, with or without water)

Moisture D = dry; M = moist (M<=>PL = moisture less than, equal to or greater than Plastic Limit); W = wet.

Consistency Fb = Friable (crumbles to powder when scraped with thumbnail)
S = Soft (Easily penetrated by fist; 25 – 50kPa)
F = Firm (Easily penetrated by thumb; 50 – 100kPa)
St = Stiff (Indented with thumb; penetrated with difficulty; 100 – 200kPa)
VSt = Very stiff (Easily indented with thumbnail; 200 – 400kPa)
H = Hard (Indented by thumbnail with difficulty; >400kPa)

Rel density VL = Very loose (ravelling)
L = Loose (easy shovelling)
MD = Medium dense (hard shovelling)
D = Dense (picking)
VD = Very dense (hard picking)

Soil selected for wastewater disposal

Texture

Clayey silt and CLAY: Equivalent AS/NZS1547:2012 Soil Category 4

Thickness

Assume 1.5m over the area proposed for wastewater disposal

Modified Emerson Test

Testing of 4 samples (1 from each of pits A, B, C and D) in accordance with Section 4.1D7 of AS/NZS1547:2000 returned Emerson Dispersion numbers of 6 (non-dispersive) for all samples.

Design Loading Rate (DIR)
For primary treated effluent in beds: 6mm/day, and for secondary treated effluent for subsurface irrigation, 3mm/day, and a full water balance conducted, in accordance with AS/NZS1547:2012 and using Trench®3.0[2].

Site capability issues for on-site wastewater management

The Trench®3.0 Site Capability Report (Attachment 5) flags one sensitive issue. A default ranking of High for this factor has been amended for this site, for the reason summarised in Table 2.

Table 2. Site Capability issues

Factor	Trench®3.0 default rank	Amended rank for this site	Reason for amendment
Heavy rain events	High	Moderate	Addressed in system sizing (10% extra monthly rainfall added to average)

Environmental Sensitivity issues for on-site wastewater management

The Trench®3.0 Environmental Sensitivity Report (Attachment 5) flags two sensitive issues. Default rankings of High or Very High for these factors have either been left unchanged, or have been amended for this site, for the reasons summarised in Table 3.

Existing wastewater management system

None.

Table 3. Environmental Sensitivity issues

Factor	Trench®3.0 default rank	Amended rank for this site	Reason for amendment
Distance to nearest surface water	High	Moderate	Exceeds suggested setback distance
Distance to landslide	High	Moderate	Addressed in system location (landslide feature is cross-gradient)

2 IMPLICATIONS FOR WASTEWATER MANAGEMENT

There are no significant environmental issues that cannot be adequately addressed in the disposal of wastewater on the property. Key design issues are:

Primary treated wastewater
The suggested minimum wetted area requirement for the disposal (eg via a non-conventional bed) of an adopted 750L/day of primary-treated wastewater into Category 4 soil profile with a DIR of 6mm/day is 120m^2.

For primary-treated wastewater, the recommended setback distances to downgradient and upgradient/crossgradient sensitive features are 15m and 5m respectively.

[2] See Cromer, W. C. (1999). *Trench™3.0: An AIEH computer software application for managing on-site wastewater disposal*. Environmental Health Review, May 1999, pp 23-25, and Cromer, W. C. (1999). Trench™3.0: A computer application for site assessment and system sizing, in Patterson, R. A. (Ed.) *On-site '99 – Proceedings of the On-Site '99 Conference: Making on-site wastewater systems work*. Univ. of New England, Armidale, 13-15 Jul 1999, pp 85-88.

Secondary treated wastewater
The suggested minimum wetted area requirement for the disposal (eg via shallow subsurface irrigation) of an adopted 750L/day of secondary-treated wastewater into Category 4 soil profile with a DIR of 3mm/day is 240m^2.

For secondary treated wastewater from an AWTS, the recommended setback distances to downgradient and upgradient/crossgradient sensitive features are 5m and 2m respectively.

3 SUMMARY OF ASSUMPTIONS

It is emphasised to regulatory authorities, designers, installers and owners of on-site wastewater systems that the three pages of the Trench®3.0 computer assessment attached to this report summarise the site and environmental factors relevant to the sizing and location of an on-site wastewater disposal system for this site or sites. Other assumptions are listed in the text of this report.

System performance may be affected by site, operational or climatic factors which differ from those assumed.

4 SYSTEM DESIGN

Two acceptable disposal options for wastewater management for the property are summarised below.

Approval to install either design rests with local council. System designs other than the following suggestions may also be environmentally acceptable.

1. AERATED WASTEWATER TREATMENT SYSTEM

Method	AWTS and pumped discharge of wastewater to shallow subsurface or mulch covered irrigation via drippers or equivalent.
Wetted Area	Min. 240m^2 assuming a wastewater volume of 750L/day (3 bedroom equivalents; 80m^2/bedroom). Amend for a different number of bedroom equivalents.
Primary Disposal Area	As for wetted area. The PDA should be wholly contained within the ADA for secondary treated wastewater in Attachment 2. It may be any shape, or several separate shapes, provided minimum wetted area requirement is achieved.
Second. Disposal Area	Available if required.
Cut-off drain(s)	Not required
Setback(s)	5m to downgradient sensitive features (ie buildings, property boundary) and 2m to upslope and cross-gradient boundaries.

SEPTIC TANK AND NON-CONVENTIONAL BED(S) – SHOWN IN ATTACHMENT 2

Method	Gravity discharge of wastewater to conventional bed(s)
Septic tank	Min 3,500L, with filter on outlet
Lint filter	Required at septic tank outlet. Check and clean regularly.
Grease trap	Install grease trap in discharge from kitchen; minimum size approx 40 – 60L or to Council specifications
Pump and pit	Not required.
Dosing facility	Install *Drainwave* or similar dosing facility after septic tank.
In-ground details	
Wetted Area	Min. 120m^2 assuming a wastewater volume of 750L/day.
Primary Disposal Area	Min 130m^2. This should be wholly contained within the ADA in Attachment 2. It may be any shape, or several separate shapes, provided at least 120m^2 of ground is wetted. See Attachment 2 for a

	possible location. At this site, it may be stepped downhill as shown in Figure 1.
Second. Disposal Area	Available if required.
Bed design	See the schematic cross section (Figure 1). Also see the design notes and example photographs on the design pdf[3] from my website.
Cut-off drain(s)	Required.
Setback(s)	15m and 5m to downgradient and upgradient/crossgradient sensitive features respectively.

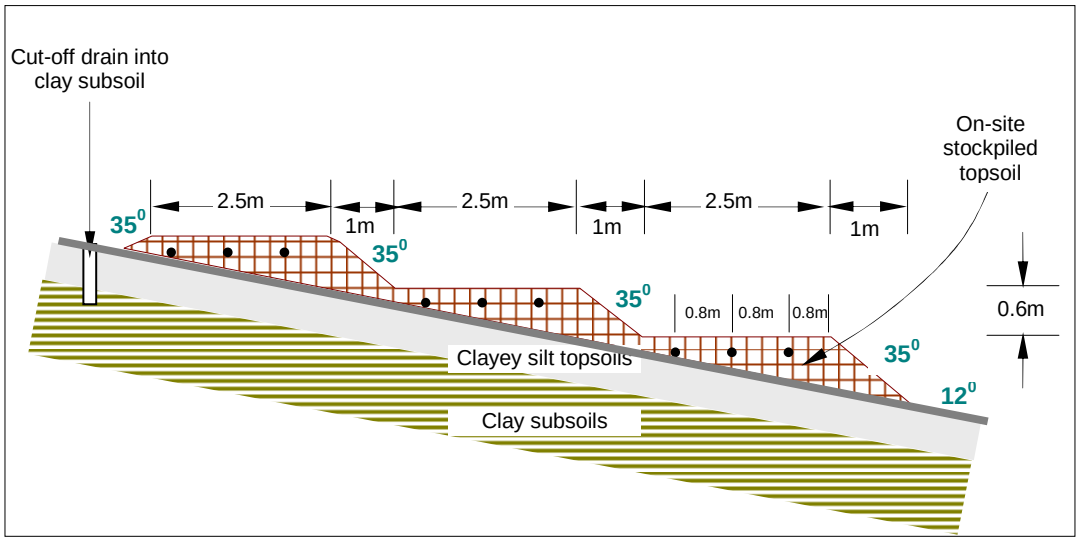


Figure 1. **Suggested schematic cross section for a stepped non-conventional bed at this site.**

5 GENERAL NOTES

Depending on the type of wastewater disposal system installed, owners may be required by Council to satisfy all or some of the following, which would usually form a set of conditions of approval for a Special Plumbing Permit.

1. The system shall comply with the currently-adopted version of AS/NZS1547.

2. All tank and system openings shall be accessible at finished surface level for inspection and servicing, and adequately sealed to prevent stormwater infiltration.

3. Where pumps are fitted and power is required for system operation, a hard-wired audible and visible (indicator light) alarm shall be installed to warn of pump failure, blower failure and power failure.

4. Where an existing disposal system is being added to or altered and the existing septic tank is going to be used, a filter will need to be retro-fitted to the existing septic tank. Owners will need to advise their plumber to ensure that this matter is taken into consideration when purchasing a new septic tank or where the filter is to be retro-fitted.

5. The minimum wetted area requirement for wastewater disposal must be installed and maintained in the approved locations as per the design by the Designer and lodged with the application for a Special Plumbing Permit.

[3] Go to: http://williamccromer.com/content/uploads/2012/11/Nonconventional-bed-design-notes-24-September-2013.pdf. My website is http://williamccromer.com

6. All wastewater disposal (including irrigation) areas shall be completed, approved and formally signed off by the Designer as complying with AS/NZS1547:2000 prior to commissioning of the system. Certification, in a format approved by Council; shall include a site plan to scale showing the wastewater disposal locations and areas property boundaries, infrastructure, GPS grid coordinates.

7. All pipes, pipe sleeves, identification tapes, and outlets on an irrigation system shall be coloured lilac (P23), in accordance with AS2700.

8. If one or more wastewater irrigation systems are proposed, they shall be constructed and installed in accordance with approved plans accompanying the Special Plumbing Permit, and the following:

Spray Irrigation Systems:

- The sprinklers used for distributing the wastewater must of a type that minimise formation of small droplets and aerosols. Impact and pencil type sprays shall not be used.
- A flush valve is to be installed on each irrigation area so that the lines can be flushed. The discharge from the flush valve must discharge either onto the irrigation area or piped back to a suitable chamber of the treatment system, having regard to whether the wastewater is chlorinated or not, so that the efficacy of the treatment plant is not compromised by the introduction of the flush water.
- Flush valves are to be installed in valve boxes to enable inspection and service.

Drip and Sub-surface Irrigation Systems:

- Only pressure compensated drip line shall be used.
- Vacuum breaker valves are to be provided at the high point(s) of all irrigation fields. Such valves are to be installed in valve boxes to enable inspection and service.
- A flush valve is to be installed on the low point of each irrigation field with piping discharging the flush water to a suitable chamber of the treatment system, having regard to whether the wastewater is chlorinated or not, so that the efficacy of the treatment plant is not compromised by the introduction of the flush water. Flush valves are to be installed in valve boxes to enable inspection and service.
-

9. Unless specifically advised by the Designer as unnecessary or inappropriate, an effective surface water diversion drain or mound shall be provided and maintained on the high side of wastewater disposal (including irrigation) areas. Note that all concentrated stormwater must be retained on the property.

10. Weed matting, plastic or other materials that impede water penetration into the soil shall not be used between the irrigation system and the soil surface.

11. All wastewater irrigation areas shall be maintained in good order at all times. Such maintenance includes but may not be restricted to weeding, mowing, and replacement of mulch or plants.

12. Council shall be provided with an amended plan if the location of the irrigation area is altered or changed from the "as installed" plan. The owner shall ensure that any altered wastewater disposal (including irrigation) areas meet minimum setback distances from boundaries and buildings and any other conditions contained within this permit.

13. The wastewater treatment system shall be regularly maintained in accordance with the conditions of accreditation issued under the Tasmanian Plumbing Code.

14. Any septic tank associated with the disposal system shall be desludged at least once every three years.

15. Where required, the owner shall enter into and maintain an on-going service maintenance agreement with a person with appropriate qualifications and experience to

maintain the wastewater disposal system in accordance with the Plumbing Regulations 2004 and the Tasmanian Plumbing Code. A copy of the signed agreement shall be submitted to Council before commissioning of the system.

16. Where required, effluent quality for land application shall meet the criteria specified in the installed system's certificate of accreditation or, if not specified, as follows (from AS/NZS1547:2000):

5-day Biological Oxygen Demand (BOD5)	20mg/L
Suspended Solids (SS)	30mg/L
Thermotolerant coliforms	10 per 100mL
Free chlorine residual	0.5mg/L

17. Only when these tests indicate compliance will the unit be regarded as being commissioned. A NATA approved laboratory should conduct such tests. Testing shall be conducted as follows:

a) Commissioning phase: Mandatory testing after three months from the final installation inspection (to coincide with the normal on-going scheduled maintenance visits) but fortnightly in the event of failure to comply
b) On going operational phase: Mandatory testing for a free chlorine residue is required every three months. Remedial works should be undertaken when the minimum fire chlorine residual is not met. Random surveillance for BOD5, SS and thermotolerant coliforms shall be done at no less than once each 4 years. An authorised person may require sampling for BOD5, SS and thermotolerant coliforms or to undertake other chemical analyses to help identify operational problems.

18. Where required, monitoring details for individual on-site waste water management systems are to be recorded on a standardised form and lodged with the Council each quarter.

19. A final inspection of all installations may be conducted by a Council Environmental Health Officer following receipt of the written certification from the system designer. Plumbers and owners should be made aware that a minimum number of working days notice is required for such inspections and the building will need to be open for inspection as required.

W. C. Cromer
Principal

This report is and must remain accompanied by the following Attachments

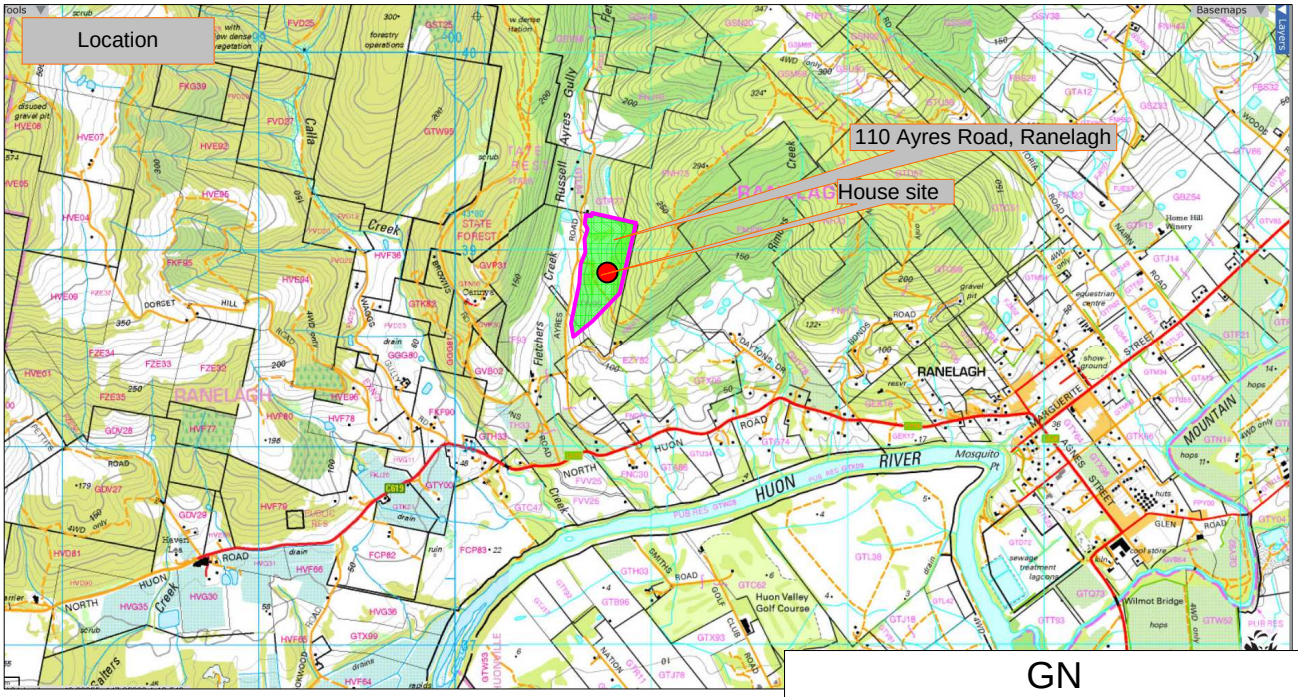
Attachment 1. Location, satellite imagery and published geology of the property (2 pages)
Attachment 2. Site sketch showing locations of test pits, and recommended ADA for wastewater management via a septic tank (2 pages)
Attachment 3. Site photographs (3 pages)
Attachment 4. The three Summary Report pages from a Trench®3.0 assessment for the site (3 pages)

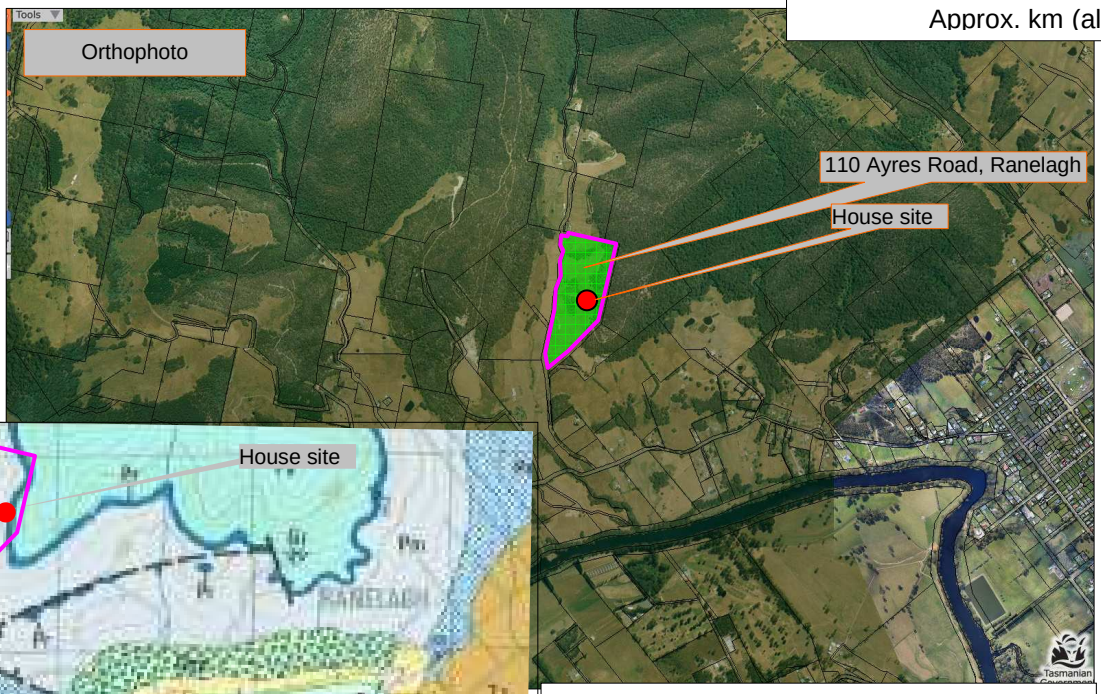
Attachment 1

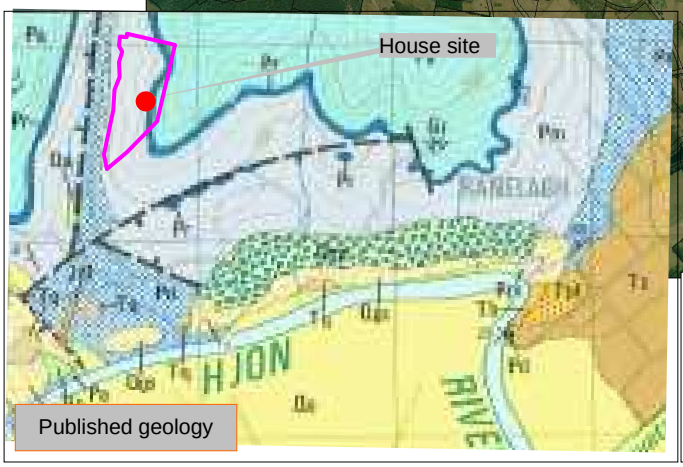
(2 pages)

Location, satellite imagery and published geology of the property

Sources www.thelist.tas.gov.au, Google Earth, Mineral Resources Tasmania







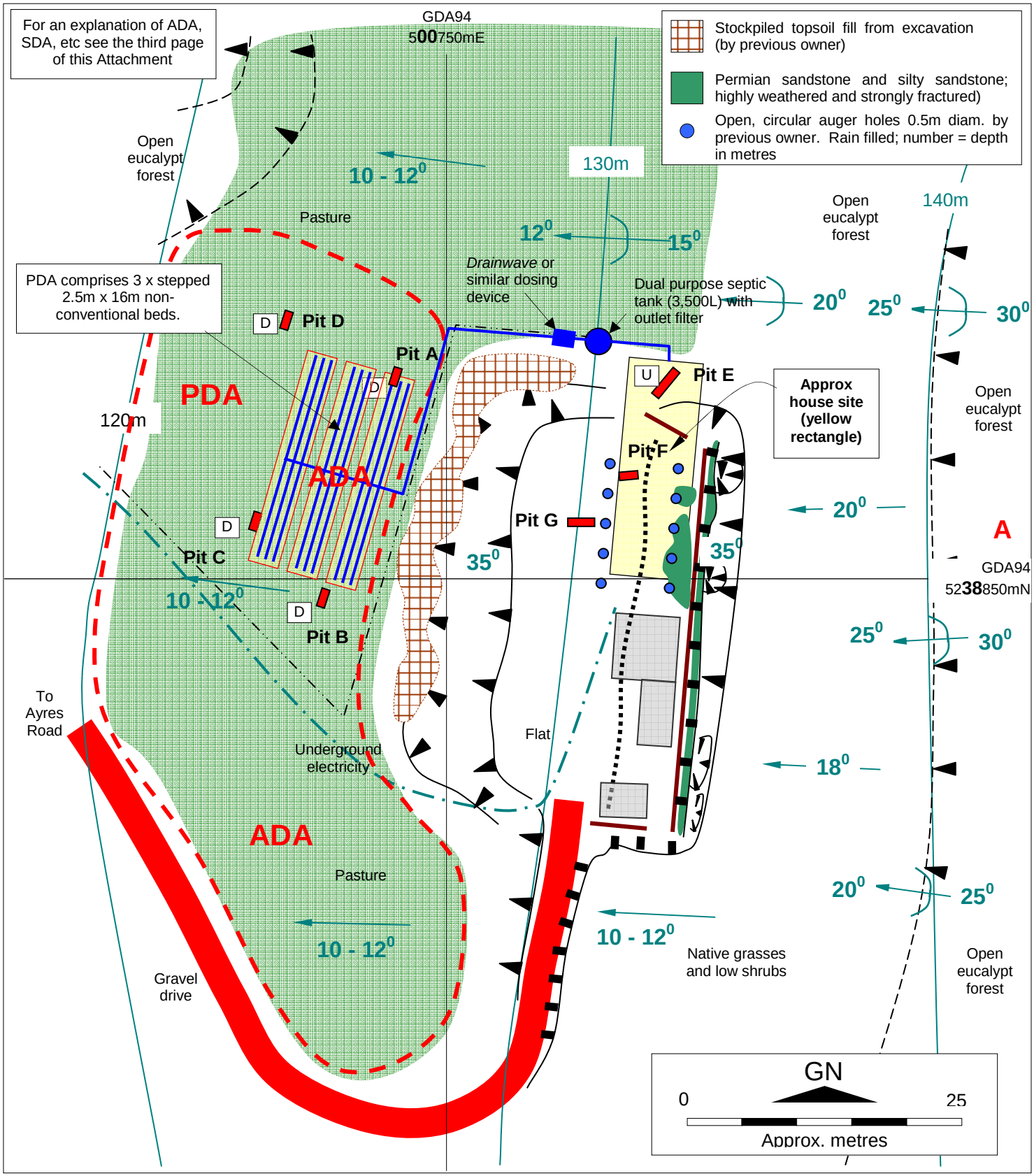
Source for geology
Farmer, N. (1981). Geological atlas 1:50,000 series. *Kingborough*. Tasmanian Department of Mines.

Key to colours: All shades of blue = Permian sedimentary rocks; brown = Tertiary sediments; Yellow = Quaternary alluvium

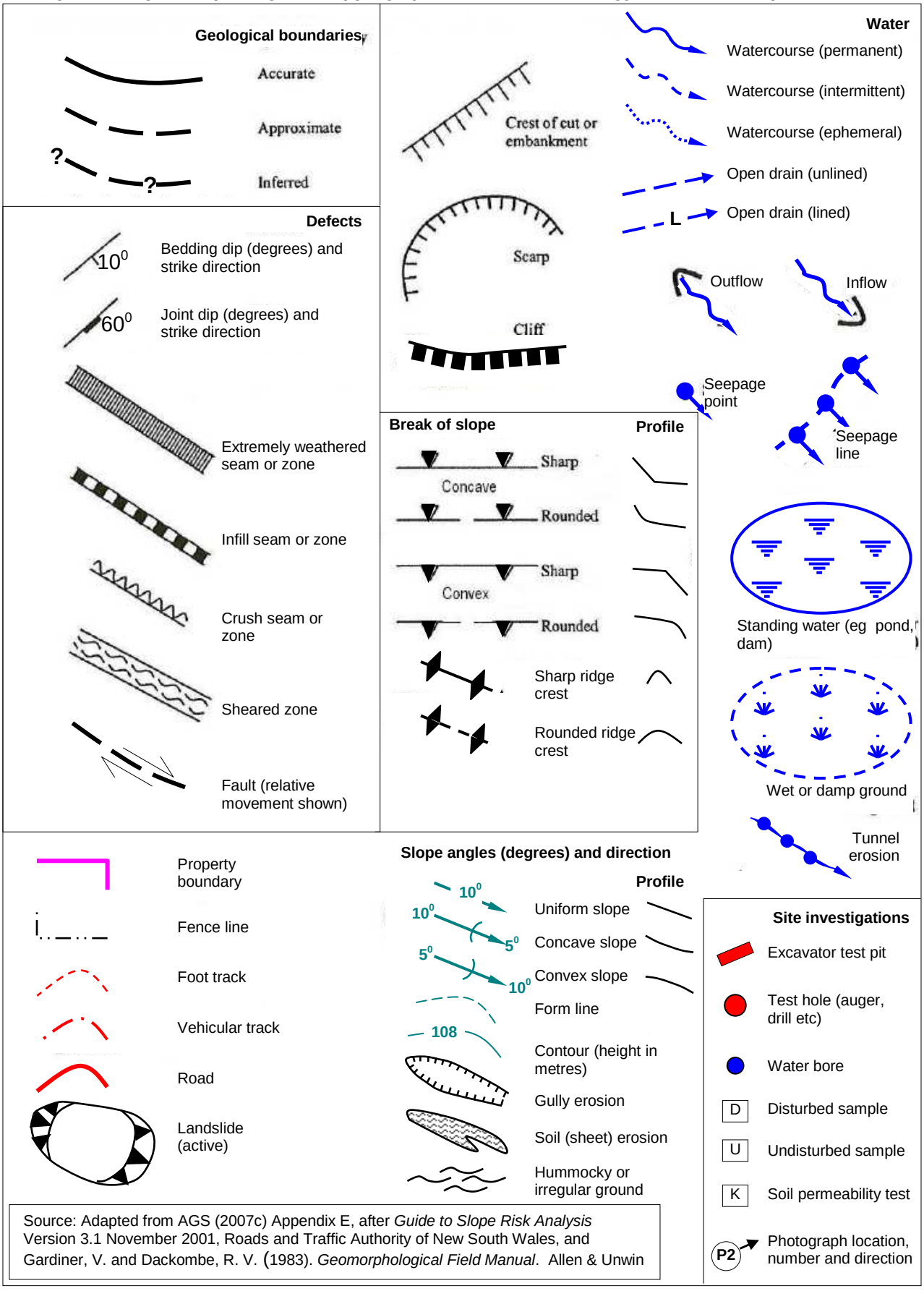
Attachment 2

(3 pages)

Site sketch showing locations of test pits (red rectangles), and recommended ADA (dashed red line) for wastewater management



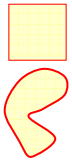
Geological and geomorphological mapping symbols and terminology used in this report



Source: Adapted from AGS (2007c) Appendix E, after *Guide to Slope Risk Analysis* Version 3.1 November 2001, Roads and Traffic Authority of New South Wales, and Gardiner, V. and Dackombe, R. V. (1983). *Geomorphological Field Manual*. Allen & Unwin

Explanation of ADA, PDA, SDA, Disposal System and Setback Distance

The Available Disposal Area (ADA) is the area reasonably available for wastewater disposal, after applying any setbacks (see below) and subtracting the areas covered by permanent infrastructure. The ADA may be a single area, or two or more separate areas. The total size of the ADA may vary depending on whether the effluent to be disposed of is treated to primary level or secondary level. The heavy dashed area ('a' at left) is the ADA for either type of effluent; the fine dotted area ('b' at left) is the ADA for secondary treated effluent only.



Primary Disposal Area (PDA). This must be wholly within the ADA. It consists of (a) the disposal system (eg bed(s) or trench(es)), (b) any separation distances between the beds or trenches, and usually but not always (c) a perimeter strip to protect the system. The system area must be at least equal to the minimum wetted area requirement, but will usually be greater by the area of the perimeter strip, etc. A Secondary Disposal Area (SDA) may be required by regulatory authorities for a back-up system in the event of failure, or changed circumstances. The SDA must be the same size as the PDA, and must be located within the ADA.

Disposal system. It must be wholly within the PDA, and may consist of one or more beds or trenches, or other suitable designs. The system may comprise perforated arches, or a line or grid of rigid perforated distribution pipework ('a' at left) if low pressure (eg small gravity head), or an irregular layout of smaller diameter perforated polyethylene pipework ('b' at left) if sufficiently pressurised (eg via pumping or with adequate gravity head). Whatever the construction details, the area of the disposal system must be at least equal to the minimum wetted area required from water balance calculations, and the system must be able to wet the required minimum area.

Setback distance. This is the minimum distance required between the lowest point of a wastewater disposal area and any downgradient feature (eg property boundary, watercourse, dam, house, road cutting, etc.) The setback distance is always measured at right angles to topographic contours. It applies only to subsurface movement of wastewater, not overland flow. It may be estimated using the separation distance module in Trench®3.0.

Attachment 3

(3 pages)

Site and test pit photographs

Plate 1 (above). View (May 2014) looking south below the house site, over the area proposed for wastewater disposal.

Plate 2 (below). Topsoil from the house excavation stockpiled at the base of the embankment is suitable for a non-conventional bed, provided its grass cover is destroyed before emplacement.

In the following photographs of test pits, the staff is graduated in yellow and white segments each one metre long. The numbering is in decimetres.


ROAD
RANELAGH
6 MAY 2014
PIT B


RANELAGH
6 MAY 2014
PIT C


AY 2014
PIT D

Attachment 4

(3 pages)

The three Summary Report pages from a Trench®3.0 assessment for the site

William C Cromer Pty Ltd

Land suitability and system sizing for on-site wastewater management

Trench 3.0 (Australian Institute of Environmental Health)

Site Capability Report

On-site domestic wastewater management

Assessment for	I and J Urquhart	Assess. Date	19 05 14
		Ref. No.	Urquhart
Assessed site(s)	110 Ayres Road	Site(s) inspected	06-May-14
Local authority	Huon Valley Council	Assessed by	W C Cromer

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	1,500	High	Low		
	Density of disposal systems	/sq km	2	Mod.	Very low		
	Slope angle	degrees	11	High	Moderate		
	Slope form	Straight simple		V. high	Low		
	Surface drainage	Imperfect		High	Moderate		
	Flood potential	Site floods <1:100 yrs		V. high	Very low		
	Heavy rain events	Common		Mod.	High	Moderate	Other factors lessen impact
	Aspect (Southern hemi.)	Faces E or W		V. high	Moderate		
	Frequency of strong winds	Common		Mod.	Low		
	Wastewater volume	L/day	750	Guess	Moderate		
	SAR of septic tank effluent		2.8		Moderate		
	SAR of sullage		2.9	Guess	Moderate		
	Soil thickness	m	1.5	High	Very low		
	Depth to bedrock	m	1.5	High	Moderate		
	Surface rock outcrop	%	0	High	Very low		
	Cobbles in soil	%	0	High	Very low		
	Soil pH		6.5	Mod.	Very low		
	Soil bulk density	gm/cub. cm	1.6	Mod.	Moderate		
	Soil dispersion	Emerson No.	6	High	Low		
	Adopted permeability	m/day	0.1	Mod.	Moderate		
	Long Term Accept. Rate	L/day/sq m	6	Mod.	Moderate		

Comments

William C Cromer Pty Ltd

Land suitability and system sizing for on-site wastewater management

Trench 3.0 (Australian Institute of Environmental Health)

Environmental Sensitivity Report

On-site domestic wastewater management

Assessment for	I and J Urquhart	Assess. Date	19 05 14
		Ref. No.	Urquhart
Assessed site(s)	110 Ayres Road	Site(s) inspected	06-May-14
Local authority	Huon Valley Council	Assessed by	W C Cromer

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	100	Mod.	Low		
	Phos. adsorp. capacity	kg/cub m	0.6	Mod.	Moderate		
	Annual rainfall excess	mm	-41	Guess	Very low		
	Min. depth to water table	m	10	Mod.	Very low		
	Annual nutrient load	kg	10.0	Guess	Moderate		
	G'water environ. value	Agric sensit/dom irrig		High	Moderate		
	Min. separation dist. required	m	15	Mod.	Low		
	Risk to adjacent bores		Low	High	Low		
	Surf. water env. value	Agric sensit/dom drink		High	Moderate		
	Dist. to nearest surface water	m	100	High	High	Moderate	Other factors lessen impact
	Dist. to nearest other feature	m	80	Mod.	Low		
	Risk of slope instability		Moderate	High	Moderate		
	Distance to landslip	m	50	High	High	Moderate	Other factors lessen impact

Comments

William C Cromer Pty Ltd

Land suitability and system sizing for on-site wastewater management

Trench 3.0 (Australian Institute of Environmental Health)

Assessment Report

On-site domestic wastewater management

Assessment for	I and J Urquhart	Assess. Date	19 05 14
		Ref. No.	Urquhart
Assessed site(s)	110 Ayres Road	Site(s) inspected	06-May-14
Local authority	Huon Valley Council	Assessed by	W C Cromer

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 = 750 (using the 'No. of bedrooms in a dwelling' method)
Septic tank wastewater volume (L/day) = 250
Sullage volume (L/day) = 500
Total nitrogen (kg/year) generated by wastewater = 6.4
Total phosphorus (kg/year) generated by wastewater = 3.7

Climatic assumptions for site (Evapotranspiration estimated using mean max. daily temperatures)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean rainfall (mm)	60	55	55	68	75	78	97	120	105	97	76	72
Adopted rainfall (R, mm)	56	50	62	62	52	58	77	90	80	68	70	85
Retained rain (Rr, mm)	45	40	50	50	42	46	62	72	64	54	56	68
Max. daily temp. (deg. C)	20	22	19	17	15	13	12	13	15	17	18	19
Evapotrans (ET, mm)	74	69	58	49	43	46	45	49	54	64	65	71
Evapotr. less rain (mm)	**30**	**29**	**9**	**0**	**2**	**-1**	**-16**	**-23**	**-10**	**10**	**9**	**3**

Annual evapotranspiration less retained rain (mm) = 41

Soil characterisitics

Texture = clayey silt and clay Category = 4 Thick. (m) = 1.5
Adopted permeability (m/day) = 0.1 Adopted LTAR (L/sq m/day) = 6 Min depth (m) to water = 10

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:	Evapotranspiration bed(s)
The preferred type of above-ground secondary treatment:	None
Site modifications or specific designs:	Are needed

Suggested dimensions for on-site secondary treatment system

Total length (m) =	16
Width (m) =	7.5
Depth (m) =	0.6
Total disposal area (sq m) required =	260
comprising a Primary Area (sq m) of:	130
and a Secondary (backup) Area (sq m) of:	130

Sufficient area is available on site

Comments
The system dimesnions listed above (130m2) are for a three bedroom house and primary treated wastewater. The adopted setback is 15m from downgradient sensitive features. An AWTS system is also suitable for this site. See Section 4 of report.