

DOYLE **SOIL** **CONSULTING**



SITE AND SOIL EVALUATION REPORT ONSITE WASTEWATER ASSESSMENT

4550 Bruny Island Main Road

Lunawanna

November 2024 (amended Jan 2025)

Warning
Printed copies of this report must be in colour, and in full.
No responsibility is otherwise taken for its contents.

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SITE INFORMATION

Client: Frank Stokely

Address: 4550 Bruny Island Main Road, Lunawanna 7150 (CT 145345/2)

Site Area: Approximately 2540 m²

Date of inspection: 17/10/2024

Building type: New additional dwelling (existing dwelling to become an ancillary)

Services: Tank water supply and onsite wastewater management

Mapped Geology - Mineral Resources Tasmania 1:250 000 Southeast sheet:

Jd = Jurassic dolerite

Soil Depth: > 3.0 m

Subsoil Drainage: Imperfectly drained

Drainage lines/water courses: dam approximately 52 from LAA

Vegetation: Grass and gardens

Rainfall in previous 7 days: Approximately 24 mm

Slope at proposed LAA: Approximately 6-7° to the Northeast

SITE ASSESSMENT AND SAMPLE TESTING

Site and soil assessment in accordance with AS1547-2012 *Onsite domestic wastewater assessment and design*.

Emerson Dispersion test on subsoils. No dispersion detected.

Test holes were dug using a Christie Post Driver Soil Sampling Kit, comprising CHPD78 Christie Post Driver with Soil Sampling Tube (50 mm OD x 1600/2100 mm).

SITE AND SOIL COMMENTS

The natural soil profiles are formed from minor windblown sands over deep clayey colluvium derived from Jurassic dolerite. The profiles are very deep, with no refusal occurring at approximately 3.0 m (DCP test result for foundations). The field textures of the soil profile are dominated by clay, which is very highly reactive (H-2), moderately structured and non-dispersive.

For land application purposes, the soil profiles are limited by light clay subsoils, at and below approximately 0.1 m depth.

Site constraints (to be addressed by suitably designed OWMS):

- Light clay (Cat. 5) subsoils
- Due to the distance to downslope surface waterbodies, to comply with local planning requirements (E23.10.1.P2 of the *Interim Planning Scheme 2015*), the effluent must be treated to a secondary standard and land application via a raised system.
- maximum estimated linear loading rate (LLR) of approx. 28 L/m/day (per Table 2.2 of *Designing and Installing, Sydney Catchment Authority Current Recommended Practice*)
- relatively high design hydraulic loading (for 7 equivalent people - 840 L/day)

Site strengths: (to be exploited by suitably designed OWMS):

- deep soil profiles (> 3.0 m)

A suitably sized Primary treatment system with in-ground absorption (beds/trenches) cannot be accommodated on the site due to the site and soil constraints discussed. The site and soil constraints can be addressed by installing an accredited aerated wastewater treatments system (AWTS) with disinfection. The land application can then be safely spread over larger area using subsurface irrigation. To remain below the maximum LLR (of 28 L/m/day) the irrigation area shall not exceed 8.0 m in width when installed along the contour.

Irrigation lines to be installed in the upper of layers of a raised and retained area (total 280 m²). Landscaping required to reduce the surface slope to approximately 5° so that a DLR of 3 mm/day (per Table M2 of AS/NZS 1547:2012).

SOIL PROFILES – Test Hole 1



Depth (m)	Horizon	Description and field texture grade	Soil Cat.
0 – 0.15	A1	Brown (10YR 5/3), Silty Sandy Clay Loam , moist soft consistency, strong fine angular blocky structure, abundant roots.	4
0.15 – 0.7	B2 ₁	Reddish yellow (7.5YR 6/6), Silty Light Clay , massive breaking to moderate medium angular blocky structure, slightly moist firm friable consistency.	5
0.7 – 1.85	B2 ₂	Reddish yellow (7.5YR 7/8), Silty Light Clay , moist soft friable consistency, massive breaking to weak medium angular blocky structure.	5
1.85 – 2.0	B2 ₃	Reddish yellow (7.5YR 7/8) with common medium red (2.5YR 5/8) mottles, Silty Clay Loam , weak medium angular blocky structure. <u>No refusal.</u>	4

SOIL PROFILES – Test Hole 2



Depth (m)	Horizon	Description and field texture grade	Soil Cat.
0 – 0.1	A1	Brown (10YR 5/3), Silty Sandy Clay Loam , moist soft consistency, strong fine angular blocky structure, abundant roots.	4
0.1 – 0.8	B2 ₁	Yellowish brown (10YR 5/6), Silty Light Clay , moist soft friable consistency, massive breaking to weak medium angular blocky structure.	5
0.8 – 1.6	B2 ₂	Brownish yellow (10YR 6/6) with common medium red (2.5YR 5/8) mottles and a few white (2.5Y 8/1) mottles, Silty Light Clay massive breaking to weak medium blocky structure, slightly moist stiff consistency. <u>No refusal.</u>	5

SOIL PROFILES – Test Hole 3



Depth (m)	Horizon	Description and field texture grade	Soil Cat.
0 – 0.3	A1	Brown (10YR 5/3), Silty Sandy Clay Loam , moist soft consistency, strong fine angular blocky structure, abundant roots, charcoal rock at 0.25 – 0.3m.	4
0.3 – 0.8	B2 ₁	Yellowish brown (10YR 5/6), Silty Light Clay , moist soft friable consistency, massive breaking to weak medium angular blocky structure.	5
0.8 – 1.6	B2 ₂	Brownish yellow (10YR 6/6) with common medium red (2.5YR 5/8) mottles and a few white (2.5Y 8/1) mottles, Silty Light Clay , massive breaking to weak medium blocky structure, slightly moist stiff consistency. <u>No refusal.</u>	5

WASTEWATER LAND APPLICATION AREA SETBACKS

Required setback from cross-slope foundations: 2 m

Required setback from downslope surface water: 15 m (per E23.10.1.P2 of the *Interim Planning Scheme 2015*).

Required setback from downslope boundary: 1.5 m (per E23.10.1.P3 of the *Interim Planning Scheme 2015*).

Required setback from upslope and side boundaries: 1.5 m

Required vertical setback to bedrock: 0.5 m below the LAA (Table R1 of AS1547-2012)

WASTEWATER CLASSIFICATION AND DESIGN

According to AS1547-2012, the soil is **category 5** (Light Clay).

Secondary treatment recommended.

Wastewater loading: 7 persons @ 120 L/day (tank) - 840 L/day.

Design Irrigation Rate (DIR): 3 mm/day for LAA

Total minimum Land Application Area required: 280 m² subsurface irrigation area.

The proposed development (three-bedroom house and 2-bedroom ancillary dwelling) requires a design hydraulic load of 840 L/day. Due to the site and soil constraints (discussed), secondary treatment via an AWTs with tertiary disinfection is recommended.

Using a DIR of 3.0 mm/day, a **minimum total irrigation area of 280 m²** is required. This should be installed as subsurface irrigation under lawn in a raised and retained area. (see Site Plan and Spec Sheet).

Total **dimensions for the irrigation area to be 35.0 m x 8.0 m**, Dripper-line laterals to be installed 1.0 m apart and along the contour – see Spec Sheet. The system will have a total **8 runs of dripper line (laterals), each 35 m long (total 280 m irrigation line)**.

Use **Lilac Netafim Unibioline CNL (ID: 16 mm, dripper flow rate: 2.3 L/hr, dripper spacing: 0.3 m, pressure compensating, anti-siphon, non-leakage)**.

A **disk filter (130 micron / 120 mesh)** is required on the distribution main of the AWTS. All filters and valves to be housed in lilac-coloured valve boxes, installed flush with the ground surface.

The minimum irrigation pump capacity for the proposed design is **36 L/min @ 11.6 m head**. If the minimum pump capacity is not achievable with the standard pump of the AWTS unit (check pump curve data), suitable alternatives include the **Zenox ZHS-040-1A** or the **Davey D40A** (or make/model with similar capacity).

Total dynamic head (TDH) requirements calculated assuming 32 mm ID LDPE pipe used for delivery from AWTS. **Higher TDH required of pump if 25 mm ID pipe is used**. See Appendix 2 for hydraulic design calculations and minimum pump capacity requirements.

Construction / Installation

NOTE: To avoid compaction, the LAA is not to have vehicles or heavy machinery traffic during wet conditions - soil smearing/compaction will reduce permeability and may cause failure of the land application area. As discussed, cut-off drains should be installed along the eastern boundaries as part of the initial construction phase.

To prepare the LAA, the natural surface should be shallowly scarified (approx. 50 mm deep). Build-up the downslope side of each raised irrigation area with low retaining structures (e.g., sleepers, landscaped boulders, etc) to achieve **350 mm height**. Back-fill with sandy loam fill and grade so that the ground is **raised 200 mm at the upslope edge (approx. 75 m³ of specified fill required)**. This will create a 5° slope at the terraced area – refer to Spec Sheet. The **5° slope is required to enable a DIR of 2 L/m²/day**. (The natural (6-7°) slope would necessitate a lower DIR and, hence, a larger LAA).

Install the irrigation pipe at **100 mm depth into the imported sandy loam soil topsoil** and seed with grass (further details below) or plant out and mulch.

Install vacuum release valves at highest point/s of the irrigation area. Locate the flush-return, back to the AWTS discharge chamber, at the corner diagonally opposite the supply manifold.

A surface diversion drain required upslope of the LAA – see Diversion Drain Spec Sheet.

The Subsoils were tested for reactivity and the site is classified as **Class H-2**. All plumbing fixtures and fittings should be installed as per *Appendix G AS/NZS 3500.2.2021*.

All forms of livestock and vehicular traffic should be excluded from the finished LAA (fence-off necessary)

Additional Details – Short Term (first year)

The vegetative cover is an integral part of the system. The LAA relies on evapotranspiration for excess water removal and plant growth for nutrient removal. For lawns, grass species which are moderately-to-highly salt tolerant, winter active and tolerant to waterlogging are recommended. For heavier (clay-dominant) soils, a pasture mix which includes Tall Fescue (winter active), Phalaris and Kentucky Blue Grass is recommended. Successful establishment will ensure best possible long-term performance of the LAA. Depending on the environment, protection from wildlife (using temporary fencing) and supplementary watering may be necessary to establish full cover of the desired pasture species. Do not mow until the grass has matured - mowing too early/frequently will delay and/or compromise establishment. Installation of the LAA and grass establishment is ideally completed well in advance of house occupancy so that transpiration capacity exists for water removal, upon use.

If vegetating with landscaped gardens, refer to *Clarence City Council Fact Sheet: Plants Suitable for Aerobic Wastewater Treatment Systems*, appended to this report.

Additional Details – Long Term

When subjected to the maximum design hydraulic load of 840 L/day, the pump will run for a maximum of 23 minutes per day (Appendix 2).

The specified LAA design results in a linear loading rate (LLR) of up to 24 L/m/day. This is below the estimated maximum rate (28 L/m/day) for the soil/site (per Table 2.2 of *Designing and Installing, Sydney Catchment Authority Current Recommended Practice*). Therefore, all effluent applied to the soil should remain subsurface (with flows at and below the specified design loading rate).

Healthy plants are required for effective evapotranspiration. If the system is consistently underloaded (i.e., by low occupation), supplementary watering may be required – maintain green grass cover. The area should be mowed to encourage growth and nutrient removal. Clippings to be removed – see Loading Certificate.

To comply with E23.10.1 of Interim Planning Scheme 2015

A1 *Horizontal separation distance from a building to a land application area must comply with one of the following:*

(a) be no less than 6m;	Non-compliance
(b) be no less than; (i) 2m from an upslope or level building; (ii) if primary treated effluent be no less than 4m plus 1m for every degree of average gradient from a downslope building; (iii) if secondary treated effluent and subsurface application, no less than 2m plus 0.25m for every degree of average gradient from a down slope building.	Complies 2.0 from upslope building adopted

A2 *Horizontal separation distance from downslope surface water to a land application area must comply with any of the following:*

(a) be no less than 100m;	Non-compliance
(b) if the site is within a high rainfall area or the site soil category is 4, 5 or 6, be no less than the following; (i) if primary treated effluent standard or surface application, 50m plus 7m for every degree of average gradient from downslope surface water; (ii) if secondary treated effluent standard and subsurface application, 50m plus 2m for every degree of average gradient from down slope surface water.	N/A Non-compliance. 64 m required, min 52 m achieved – must address P2
(c) if the site is not within a high rainfall area or the site soil category is not 4, 5 or 6, be no less than the following; (i) if primary treated effluent 15m plus 7m for every degree of average gradient from downslope surface water; (ii) if secondary treated effluent and subsurface application, 15m plus 2m for every degree of average gradient from down slope surface water.	N/A

P2 Horizontal separation distance from downslope surface water to a land application area must satisfy all of the following:

(a) effluent must be no less than secondary treated effluent standard and applied through a subsurface land application system;	Complies
(b) be no less than 15m;	Complies
(c) the surface water is not of high resource or environmental value;	Complies
(d) the average gradient is no more than 16 degrees;	Complies
(e) the site is not in a flood prone area with an ARI of no less than 20 years;	Complies
(f) either of the following applies: (i) the site soil category is 1, 2 or 3; (ii) a raised bed is used.	Complies – raised system

A3 Horizontal separation distance from a property boundary to a land application area must comply with either of the following:

(a) be no less than 40m from a property boundary;	Non-compliance
(b) be no less than: (i) 1.5m from an upslope or level property boundary; and (ii) if primary treated effluent 2m for every degree of average gradient from a downslope property boundary; or (iii) if secondary treated effluent and subsurface application, 1.5m plus 1m for every degree of average gradient from a downslope property boundary.	Complies N/A Non-compliance. 9.5 m required, min 5.0 m achieved – must address P3

P3 Horizontal separation distance from a property boundary to a land application area must satisfy all of the following:

(a) effluent must be no less than secondary treated effluent standard and applied through a subsurface land application system;	Complies
(b) be no less than 1.5m	Complies
(c) the average gradient is no more than 16 degrees;	Complies
(d) either of the following applies: (i) the vertical separation between the land application area and groundwater or any limiting layer is no less than 1.5m; (ii) a raised bed is used to achieve a minimum vertical separation of 1.5m between the land application area and groundwater or any limiting layer.	Complies

A4

Horizontal separation distance from a downslope bore, well or similar water supply to a land application area must be no less than 50m.	N/A
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A5

Vertical separation distance between groundwater and a land application area must be no less than 1.5m.	Complies
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A6

Vertical separation distance between a limiting layer and a land application area must be no less than 1.5m.	Complies
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A7 *The arrangement of a land application area must comply with both of the following:*

(a) not include areas beneath buildings, driveways or other hard stand areas;	Complies
(b) have a minimum horizontal dimension of 3m.	Complies

P7 No performance criteria.

Compliance with *Directors Guidelines 2016* is shown in the attached table for acceptable criteria. It is recommended that during construction Doyle Soil Consulting be notified of any major variation to the soil conditions or loading rate as predicted in this report.



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APPENDIX 1 – TRENCH™

Doyle Soil Consulting

Land suitability and system sizing for on-site wastewater management
Trench 3.0 (Australian Institute of Environmental Health)

Assessment Report

OWMS for new 3-bedroom house and existing 2 bedroom ancillary dwelling

Assessment for	Frank Stokely	Assess. Date	5-Nov-24
	4501 BRUNY ISLAND MAIN RD LUNAWANNA	Ref. No.	
Assessed site(s)	4550 Bruny Island Main Road, Lunawanna	Site(s) inspected	17-Oct-24
Local authority	Kingborough Council	Assessed by	R Doyle

This report summarises wastewater volumes, climatic inputs for the site, soil characteristics and system 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 = 840 (using the 'No. of bedrooms in a dwelling' method)
 Septic tank wastewater volume (L/day) = 280
 Sullage volume (L/day) = 560
 Total nitrogen (kg/year) generated by wastewater = 6.1
 Total phosphorus (kg/year) generated by wastewater = 1.5

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	54	62	73	75	83	85	87	71	74	65	73
Adopted rainfall (R, mm)	54	54	62	73	75	83	85	87	71	74	65	73
Retained rain (Rr, mm)	46	45	52	62	63	71	72	74	60	62	55	62
Max. daily temp. (deg. C)	22	21	20	18	15	13	13	13	15	17	18	20
Evapotrans (ET, mm)	174	132	109	62	37	24	27	45	65	92	120	154
Evapotr. less rain (mm)	128	87	57	1	-26	-47	-45	-29	4	29	65	92
Annual evapotranspiration less retained rain (mm) =												315

Soil characteristics

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

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: Above-ground
 The preferred type of in-ground secondary treatment: None
 The preferred type of above-ground secondary treatment: Trickle irrigation
 Site modifications or specific designs: Are needed

Suggested dimensions for on-site secondary treatment system

Total length (m) = 25
 Width (m) = 8
 Depth (m) = 3
 Total disposal area (sq m) required = 280
 comprising a Primary Area (sq m) of: 280
 and a Secondary (backup) Area (sq m) of:

Sufficient area is available on site

To enter comments, click on the line below 'Comments'. (This yellow-shaded box and the buttons on this page will not be printed.)

Comments

The Adopted DIR for the category 5 soil with a (modified) 5-degree slope is 3 mm/day and an irrigation area of 280 sq m is required. The system should therefore have the capacity to cope with predicted climatic and loading events.

Doyle Soil Consulting
 Land suitability and system sizing for on-site wastewater management
 Trench 3.0 (Australian Institute of Environmental Health)

Site Capability Report
OWMS for new 3-bedroom house and existing 2 bedroom ancillary dwelling

Assessment for Frank Stokely	Assess. Date	5-Nov-24
4501 BRUNY ISLAND MAIN RD LUNAWANNA	Ref. No.	
Assessed site(s) 4550 Bruny Island Main Road, Lunawanna	Site(s) inspected	17-Oct-24
Local authority Kingborough Council	Assessed by	R Doyle

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		Remarks
					Trench	Amended	
	Expected design area	sq m	600			Moderate	
A	Density of disposal systems	/sq km	30			High	
	Slope angle	degrees	7			Low	
	Slope form	Convex spreading				Very low	
	Surface drainage	Mod. good				Low	
	Flood potential	Site floods <1:100 yrs				Very low	
	Heavy rain events	Rare				Low	
	Aspect (Southern hemi.)	Faces NE or NW				Low	
	Frequency of strong winds	Common				Low	
	Wastewater volume	L/day	840			Moderate	
	SAR of septic tank effluent		1.0			Low	
	SAR of sullage		2.5			Moderate	
	Soil thickness	m	3.0			Very low	
	Depth to bedrock	m	3.0			Very low	
	Surface rock outcrop	%	0			Very low	
	Cobbles in soil	%	0			Very low	
	Soil pH		6.0			Low	
	Soil bulk density	gm/cub. cm	1.4			Very low	
	Soil dispersion	Emerson No.	8			Very low	
	Adopted permeability	m/day	0.12			Very low	
A	Long Term Accept. Rate	L/day/sq m	3			High	

To enter comments, click on the line below 'Comments'. (This yellow-shaded box and the buttons on this page will not be printed.)

Comments

The site is suitable for onsite wastewater disposal with a sufficiently large area available for land application and deep soil profiles. The site is limited by light clay subsoils. Secondary treatment and subsurface irrigation under lawns in a slightly raised and retained area is recommended. Exclusion of vehicle traffic from the finished LAA is required.

Doyle Soil Consulting
 Land suitability and system sizing for on-site wastewater management
 Trench 3.0 (Australian Institute of Environmental Health)

Environmental Sensitivity Report
OWMS for new 3-bedroom house and existing 2 bedroom ancillary dwelling

Assessment for Frank Stokely	Assess. Date	5-Nov-24
4501 BRUNY ISLAND MAIN RD LUNAWANNA	Ref. No.	
Assessed site(s) 4550 Bruny Island Main Road, Lunawanna	Site(s) inspected	17-Oct-24
Local authority Kingborough Council	Assessed by	R Doyle

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	
A	Cation exchange capacity	mmol/100g	50		High		Factor not assessed
	Phos. adsorp. capacity	kg/cub m	0.7		Moderate		
	Annual rainfall excess	mm	-315		Very low		
	Min. depth to water table	m	3		Very low		
	Annual nutrient load	kg	7.7		Low		
	G'water environ. value	Agric non-sensit			Low		
	Min. separation dist. required	m	2		Very low		
	Risk to adjacent bores						
Surf. water env. value	Agric non-sensit			Low			
A	Dist. to nearest surface water	m	52		High		
	AA	Dist. to nearest other feature	m	2		Very high	
Risk of slope instability			Low		Low		
Distance to landslip		m	1000		Very low		

To enter comments, click on the line below 'Comments'. (This yellow-shaded box and the buttons on this page will not be printed.)

Comments

Site modifications/landscaping have been designed to address the site and soil limitations. The dimensions of the LAA result in a maximum LLR of 24 L/m / day - this is suitable for the site and soil conditions.

APPENDIX 2 – Hydraulic Design, System Componentry & Pump Requirements

System Sizing and Componentry - Subsurface Irrigation - 4550 Bruny Island Main Rd		
Design Hydraulic Load (L / day)	Max. DIR (L / m ² / day)	Min. LAA (m ²)
840	3.0	280
System width (m)	Lateral spacing (m)	Number of laterals
8	1.0	8
Dripper spacing (m)	Total length irrigation pipe (m)	Number of drippers
0.30	280	933
Dripper flow rate (L / hr)	System flow rate (L/hr)	System flow rate (L/min)
2.3	2146	36
Supply line material	Supply line internal dia. (mm)	Supply line length (m)
Lilac LDPE	31.7	15
Filter Type	Make/Model (or equivalent)	Filter grade
Disk	1.5 inch AZUD modular 100	120 mesh/130 micron (RED)

Dynamic Head Calculation	
Component	Approx. Head loss (m)
Supply line (friction @ flow rate)	0.3
Filter (friction @ flow rate)	0.2
Other Fittings (friction)	0.1
Approx. Elevation differential (from bottom of AWTS to highest point of LAA)	1.0
Dripper Operating head	10.0
Total	11.6 m

Pump Requirements	
Min. pump capacity	Max. Pump time @ Design Hydraulic Load
36 L / min @ 11.6 m head	23 mins / day

Note: If using 1" / 25 mm ID supply main and fittings, the pump TDH requirement increases to approx. 13.1 m at the same flow rate.

Demonstration of wastewater system compliance to *2016 Directors Guidelines for On-site Wastewater Disposal*

Acceptable Solutions	Performance Criteria	Compliance
<p>A1 Horizontal separation distance from a building to a land application area must comply with one of the following:</p> <ul style="list-style-type: none"> a) be no less than 6m; or b) be no less than: <ul style="list-style-type: none"> i) 3m from an upslope building or level building; ii) If primary treated effluent to be no less than 4m plus 1m for every degree of average gradient from a downslope building; iii) If secondary treated effluent and subsurface application, no less than 2m plus 0.25m for every degree of average gradient from a downslope building 	<p>P1 The land application area is located so that</p> <ul style="list-style-type: none"> a) the risk of wastewater reducing the bearing capacity of a building's foundations is acceptably low.; and b) is setback a sufficient distance from a downslope excavation around or under a building to prevent inadequately treated wastewater seeping out of that excavation 	<p>Complies with A1 (b) (iii) Land application area will be located with a minimum separation distance of 2.0 m of downslope building (2.0 m required)</p>
<p>A2 Horizontal separation distance from downslope surface water to a land application area must comply with (a) or (b)</p> <ul style="list-style-type: none"> a) be no less than 100m; or b) be no less than the following: <ul style="list-style-type: none"> i) if primary treated effluent 15m plus 7m for every degree of average gradient to downslope surface water; or ii) if secondary treated effluent and subsurface application, 15m plus 2m for every degree of average gradient to down slope surface water. 	<p>P2 Horizontal separation distance from downslope surface water to a land application area must comply with all of the following:</p> <ul style="list-style-type: none"> a) Setback must be consistent with AS/NZS 1547 Appendix R; b) A risk assessment in accordance with Appendix A of AS/NZS 1547 has been completed that demonstrates that the risk is acceptable. 	<p>Complies with A2 (b) (ii) Land application area will be located with a minimum separation distance of 52 m of downslope surface water (29 m required)</p>

<p>A3 Horizontal separation distance from a property boundary to a land application area must comply with either of the following:</p> <p>a) be no less than 40m from a property boundary; or</p> <p>b) be no less than:</p> <p>i) 1.5m from an upslope or level property boundary; and</p> <p>ii) If primary treated effluent 2m for every degree of average gradient from a downslope property boundary; or</p> <p>iii) If secondary treated effluent and subsurface application, 1.5m plus 1m for every degree of average gradient from a downslope property boundary.</p>	<p>P3 Horizontal separation distance from a property boundary to a land application area must comply with all of the following:</p> <p>a) Setback must be consistent with AS/NZS 1547 Appendix R; and</p> <p>b) A risk assessment in accordance with Appendix A of AS/NZS 1547 has been completed that demonstrates that the risk is acceptable.</p>	<p>Complies with A3 (b) (i) Land application area will be located with a minimum separation distance of 1.5m from an upslope or level property boundary</p> <p>Non-compliance with A3 (b) (iii) Land application area will be located with a minimum separation distance of 1.5m of downslope property boundary (9.5 m required)</p> <p>P3 (a) Complies</p> <p>P3 (b) risk assessment completed – risk considered LOW – see attached risk assessment</p>
<p>A4 Horizontal separation distance from a downslope bore, well or similar water supply to a land application area must be no less than 50m and not be within the zone of influence of the bore whether up or down gradient.</p>	<p>P4 Horizontal separation distance from a downslope bore, well or similar water supply to a land application area must comply with all of the following:</p> <p>a) Setback must be consistent with AS/NZS 1547 Appendix R; and</p> <p>b) A risk assessment completed in accordance with Appendix A of AS/NZS 1547 demonstrates that the risk is acceptable</p>	<p>No bore or well identified within 50m</p>

<p>A5</p> <p>Vertical separation distance between groundwater and a land application area must be no less than:</p> <p>a) 1.5m if primary treated effluent; or b) 0.6m if secondary treated effluent</p>	<p>P5</p> <p>Vertical separation distance between groundwater and a land application area must comply with the following:</p> <p>a) Setback must be consistent with AS/NZS 1547 Appendix R; and b) A risk assessment completed in accordance with appendix A of AS/NZS 1547 that demonstrates that the risk is acceptable</p>	<p>No groundwater encountered at at least 2.0 m</p>
<p>A6</p> <p>Vertical separation distance between a limiting layer and a land application area must be no less than:</p> <p>a) 1.5m if primary treated effluent; or b) 0.5m if secondary treated effluent</p>	<p>P6</p> <p>Vertical setback must be consistent with AS/NZS1547 Appendix R.</p>	<p>No limiting layer identified. System sized on light clay</p>
<p>A7 nil</p>	<p>P7</p> <p>A wastewater treatment unit must be located a sufficient distance from buildings or neighbouring properties so that emissions (odour, noise or aerosols) from the unit do not create an environmental nuisance to the residents of those properties</p>	<p>Complies</p>

ASSESSMENT OF HORIZONTAL AND VERTICAL SETBACK DISTANCES

(adapted from Table R1 in AS1547 - to be used in conjunction with Site Constraint Table)

Site feature	Setback distance range (m)	Site constraint items of specific concern (from Site Constraint Table)	Assessment	Adopted setback distance (m)
	Horizontal setback distance (m)			
Property boundary	1.5 – 50	A, D, J	Min 9.5 m downslope boundary setback per Building Act	1.5 m from downslope boundary
Buildings/houses	2.0 – > 6	A, D, J	3 m	3 m
Surface water	15 – 100	A, B, D, E, F, G, J	>100 m	>100 m
Bore, well	15 – 50	A, C, H, J	N/A	N/A
Recreational areas (Children’s play areas, swimming pools and so on)	3 – 15	A, E, J	N/A	N/A
In-ground water tank	4 – 15	A, E, J	N/A	N/A
Retaining wall and Embankments, escarpments, cuttings	3.0 m or 45° angle from toe of wall (whichever is greatest)	D, G, H	3 m	3 m
	Vertical setback distance (m)			
Groundwater	0.6 – > 1.5	A, C, F, H, I, J	N/A	N/A
Hardpan or bedrock	0.5 – ≥ 1.5	A, C, J	0.8 m	>0.5

SITE CONSTRAINT RATING

(adapted from Table R2 in AS1547 - used as a guide in determining appropriate setback distances)

Item	Site/system feature	Constraint scale (see Note 1)		Sensitive features	Comment	Constraint Rating
		LOWER	HIGHER			
		← Examples of constraint factors (see Note 2) →				
A	Microbial quality of effluent	Effluent quality consistently producing ≤ 10 cfu/100 mL E. coli (secondary treated effluent with disinfection)	Effluent quality consistently producing $\geq 10^6$ cfu/100 mL E. coli (for example, primary treated effluent)	Downslope surface water - dam	Secondary treatment with disinfection & raised irrigation area	Low
B	Surface water	Category 1 to 3 soils, no surface water down gradient within > 100 m, low rainfall area	Category 4 to 6 soils, permanent surface water <50 m down gradient, high rainfall area, high resource/environmental value	Surface water pollution hazard for low permeable soils, low lying or poorly draining areas	Downslope surface water >100m	Complies with Acceptable Solutions
C	Groundwater	Category 5 and 6 soils, low resource/environmental value	Category 1 and 2 soils, gravel aquifers, high resource/environmental value	Groundwater pollution hazard	No groundwater encountered	Complies with Acceptable Solutions
D	Slope	0 – 6% (surface effluent application) 0 – 10% (subsurface effluent application)	> 10% (surface effluent application), > 30% subsurface effluent application	Off-site export of effluent	Approx. 13% slope, subsurface effluent application	Low-medium
E	Position of land application area in landscape.	Downgradient of surface water, property boundary, recreational area	Upgradient of surface water, property boundary, recreational area	Surface water pollution hazard, off-site export of effluent	Downslope boundary minimum 6.5m	Complies with Acceptable Solutions
F	Drainage	Category 1 and 2 soils, gently sloping area	Category 6 soils, sites with visible seepage, moisture tolerant vegetation, low lying area	Groundwater pollution hazard	Category 5 soil	Complies with Acceptable Solutions
G	Flood potential	Above 1 in 20 year flood contour	Below 1 in 20 year flood contour	Off-site export of effluent, system failure, mechanical faults	Above 1:20 year flood contour	Complies with Acceptable Solutions

SITE CONSTRAINT RATING (cont)

Item	Site/system feature	Constraint scale (see Note 1)		Sensitive features	Comment	Constraint Rating
		LOWER	HIGHER			
		Examples of constraint factors (see Note 2)				
H	Geology and soils	Category 3 and 4 soils, low porous regolith, deep, uniform soils	Category 1 and 6 soils, fractured rock, gravel aquifers, highly porous regolith	Groundwater pollution hazard for porous regolith and permeable soils	Category 5 Soil Low permeability	moderate
I	Landform	Hill crests, convex side slopes, and plains	Drainage plains and incise channels	Groundwater pollution hazard, resurfacing hazard	Side slope	Complies with Acceptable Solutions
J	Application method	Drip irrigation or subsurface application of effluent	Surface/above ground application of effluent	Off-site export of effluent, surface water pollution	Subsurface application	Low

CERTIFICATE OF THE RESPONSIBLE DESIGNER

Section 94
Section 106
Section 129
Section 155

Form **35**

To: Owner name
 Address
 Suburb/postcode

Designer details:

Name: Category:
 Business name: Phone No:
 Business address:
 Fax No:
 Licence No: Email address:

Details of the proposed work:

Owner/Applicant Designer's project reference No.
Address: Lot No:

Type of work: Building work Plumbing work (X all applicable)

Description of work:

(new building / alteration / addition / repair / removal / re-erection / water / sewerage / stormwater / on-site wastewater management system / backflow prevention / other)

Description of the Design Work (Scope, limitations or exclusions): (X all applicable certificates)

Certificate Type:	Certificate	Responsible Practitioner
	<input type="checkbox"/> Building design	Architect or Building Services Designer
	<input type="checkbox"/> Structural design	Structural Engineer
	<input type="checkbox"/> Fire Safety design	Fire Engineer
	<input type="checkbox"/> Civil design	Civil Engineer
	<input checked="" type="checkbox"/> Hydraulic design	Building Services Designer
	<input type="checkbox"/> Fire service design	Building Services Designer
	<input type="checkbox"/> Electrical design	Building Services Designer
	<input type="checkbox"/> Mechanical design	Building Service Designer
	<input type="checkbox"/> Plumbing design	Plumber
	<input type="checkbox"/> Other (specify)	

Deemed-to-Satisfy: Performance Solution: (X the appropriate box)

Other details:

Design documents provided:	
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The following documents are provided with this Certificate –

Document description:

Drawing numbers:	Prepared by: Doyle Soil Consulting	Date: Nov 2024 updated Jan 2025
Schedules:	Prepared by:	Date:
Specifications:	Prepared by: Doyle Soil Consulting	Date: Nov 2024 updated Jan 2025
Computations:	Prepared by:	Date:
Performance solution proposals:	Prepared by:	Date:
Test reports:	Prepared by: Doyle Soil Consulting	Date: Nov 2024 updated Jan 2025

Standards, codes or guidelines relied on in design process:	
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AS1547-2012 On site domestic wastewater management.

AS3500 (Parts 0-5)-2013 Plumbing and drainage set.

Any other relevant documentation:	
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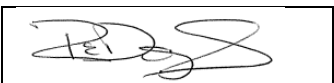
Site and Soil Evaluation Report

Attribution as designer:	
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I, Robyn Doyle, am responsible for the design of that part of the work as described in this certificate.

The documentation relating to the design includes sufficient information for the assessment of the work in accordance with the *Building Act 2016* and sufficient detail for the builder or plumber to carry out the work in accordance with the documents and the Act.

This certificate confirms compliance and is evidence of suitability of this design with the requirements of the National Construction Code.

	<i>Name: (print)</i>	<i>Signed</i>	<i>Date</i>
Designer:	R Doyle		17/1/2025

Licence No: CC7418

Assessment of Certifiable Works: (TasWater)	
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Note: single residential dwellings and outbuildings on a lot with an existing sewer connection are not considered to increase demand and are not certifiable.

If you cannot check ALL of these boxes, LEAVE THIS SECTION BLANK.

TasWater must then be contacted to determine if the proposed works are Certifiable Works.

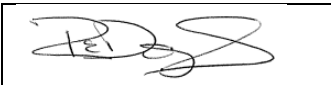
I confirm that the proposed works are not Certifiable Works, in accordance with the Guidelines for TasWater CCW Assessments, by virtue that all of the following are satisfied:

- The works will not increase the demand for water supplied by TasWater
- The works will not increase or decrease the amount of sewage or toxins that is to be removed by, or discharged into, TasWater's sewerage infrastructure
- The works will not require a new connection, or a modification to an existing connection, to be made to TasWater's infrastructure
- The works will not damage or interfere with TasWater's works
- The works will not adversely affect TasWater's operations
- The work are not within 2m of TasWater's infrastructure and are outside any TasWater easement
- I have checked the LISTMap to confirm the location of TasWater infrastructure
- If the property is connected to TasWater's water system, a water meter is in place, or has been applied for to TasWater.

Certification:	
-----------------------	--

I,Robyn Doyle.....being responsible for the proposed work, am satisfied that the works described above are not Certifiable Works, as defined within the *Water and Sewerage Industry Act 2008*, that I have answered the above questions with all due diligence and have read and understood the Guidelines for TasWater CCW Assessments.

Note: the Guidelines for TasWater Certification of Certifiable Works Assessments are available at: www.taswater.com.au

	Name: (print)	Signed	Date
Designer:	Robyn Doyle		17/1/2025



CERTIFICATE OF QUALIFIED PERSON – ASSESSABLE ITEM

Section 321

To: Owner name
 Address
 Suburb/postcode

Form **55**

Qualified person details:

Qualified person:
Address: Phone No:
 Fax No:
Licence No: Email address:

Qualifications and Insurance details: *(description from Column 3 of the Director's Determination - Certificates by Qualified Persons for Assessable Items)*

Speciality area of expertise: *(description from Column 4 of the Director's Determination - Certificates by Qualified Persons for Assessable Items)*

Details of work:

Address: Lot No:
 Certificate of title No:
The assessable item related to this certificate: *(description of the assessable item being certified)*
Assessable item includes –

- a material;
- a design
- a form of construction
- a document
- testing of a component, building system or plumbing system
- an inspection, or assessment, performed

Certificate details:

Certificate type: *(description from Column 1 of Schedule 1 of the Director's Determination - Certificates by Qualified Persons for Assessable Items n)*

This certificate is in relation to the above assessable item, at any stage, as part of - (tick one)

building work, plumbing work or plumbing installation or demolition work:

or

a building, temporary structure or plumbing installation:

In issuing this certificate the following matters are relevant –

Documents:

AS/NZS 1547-2012 On-Site Domestic Wastewater Management

Relevant calculations:

References:

AS1547-2012 On-Site Domestic Wastewater Management
Directors Guidelines for On-Site wastewater Management Systems -
CBOS -2017

Substance of Certificate: (what it is that is being certified)

Site and soil evaluation

Scope and/or Limitations

The classification applies to the site as inspected and does not account for future alteration to foundation conditions as a result of earthworks, drainage condition changes or variations in site maintenance.

I certify the matters described in this certificate.

Qualified person:

Signed:



Certificate No:

1631a

Date:

17/1/2025



AS1547:2012 – Loading Certificate – AWTS Design

This loading certificate is provided in accordance with Clause 7.4.2(d) of AS/NZS 1547:2012 and sets out the design criteria and the limitations associated with use of the system.

Site Address: 4550 Bruny Island Main Rd, Lunawanna

System Capacity: 840 L/day (7 persons @ 120 L/person/day)

Summary of Design Criteria

DIR: 3 mm/day.

Irrigation area: 280 m²

Reserve area location /use: Assigned – 100 % available

Water saving features fitted: Standard fixtures

Allowable variation from design flows: 1 event @ 200 % daily loading per quarter

Typical loading change consequences: Expected to be minimal due to use of AWTS and large land area

Overloading consequences: Continued overloading may cause hydraulic failure of the irrigation area and require upgrading/extension of the area. Risk considered acceptable due to monitoring through quarterly maintenance reports.

Underloading consequences: Lower than expected flows will have minimal consequences on system operation unless the house has long periods of non-occupation. Under such circumstances, additional maintenance of the system may be required. Long-term underloading of the system may also result in vegetation die-off in the irrigation areas, and additional watering may be required. Risk considered acceptable due to monitoring through quarterly maintenance reports.

Lack of maintenance /monitoring consequences: Issues of underloading/overloading and condition of the irrigation area require monitoring and maintenance, if not completed system failure may result in unacceptable health and environmental risks. Monitoring and regulation by the permit authority are required to ensure compliance.

Livestock are likely to cause soil compaction which may compromise the dripper system and should not be allowed on the LAA

Other considerations: Owners/occupiers must be made aware of the operational requirements and limitations of the system by the installer/maintenance contractor/leasing agent. A copy of the entire design report shall be provided at change of ownership.

4550 Bruny Island Main Road, Lunawanna

Cross-section: raised, terraced irrigation area

Shallow sub-surface covered drip irrigation under grass. Min total area: 280 m²

Used dims: 35.0 m x 8.0 m Long dimension to follow contour (See Site Plan).

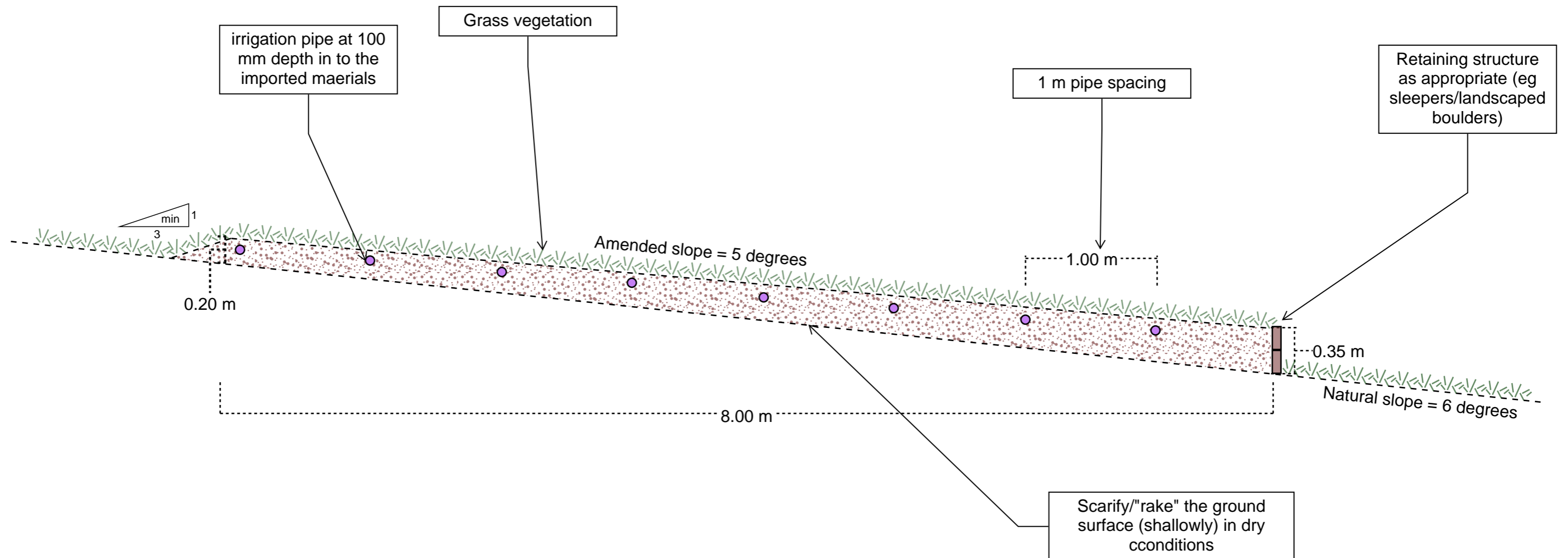
Landscape to form a terraced area, using suitable retaining structures (e.g. sleepers, blocks, large boulders). Min. 0.35 m high retaining wall required. Back fill with sandy loam fill. Grade so that the new surface is raised 200 mm at the up-slope edge. This will create a 5° slope in the terraced area (natural slope is approx 6 - 7°). An estimated total of 75 m³ of sandy loam fill is required.

Upslope edge of raised area to retained or with gentle (1:3) soil batter angle.

Ground surface to be prepared per the specifications in the design report.

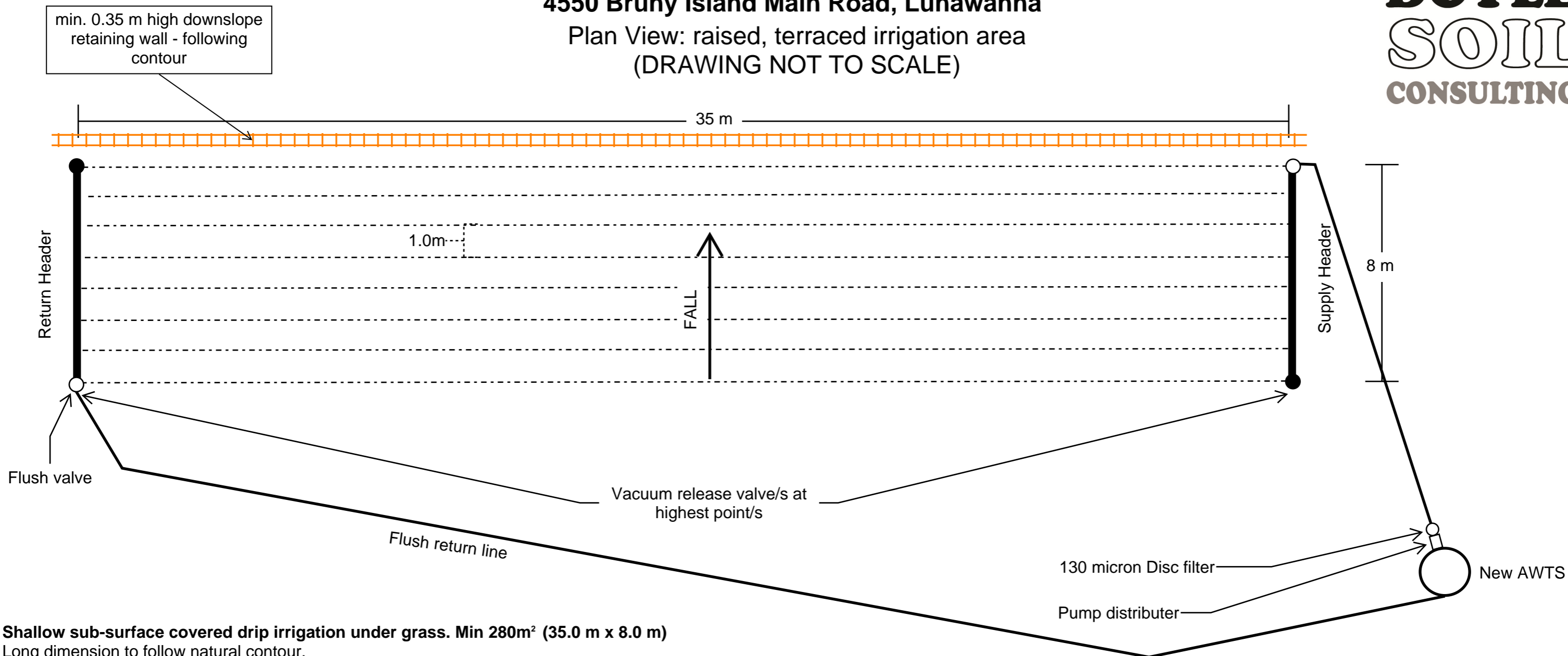
Netafim Lilac Unibioline CNL (ID: 16 mm, dripper flow rate: 2.3 L/hr, dripper spacing: 0.3 m, pressure compensating, anti-siphon, non-leakage). Dripper line to be laid along the contour at 1000 mm spacings. Bury at 100 mm depth into imported sandy loam fill. Seed with grass.

Additional watering may be required to establish the grass vegetation. Weed control during grass establishment may be necessary.



4550 Bruny Island Main Road, Lunawanna

Plan View: raised, terraced irrigation area
(DRAWING NOT TO SCALE)



Shallow sub-surface covered drip irrigation under grass. Min 280m² (35.0 m x 8.0 m)

Long dimension to follow natural contour.

Landscape to form a terraced area of 35.0 x 8.0 m using suitable retaining structures (e.g. sleepers, blocks, large boulders). Min. 0.35 m high downslope retaining wall required. Back fill with sandy loam fill and grade so that the ground is raised 200 mm at the up-slope edge. This will create a 5° slope in the terraced area. Approx. 75 m³ required of fill required.

Supply manifold from AWTS with 130 micron disc filter.

Ground surface to be prepared per the specifications in the design report.

Netafim lilac Netafim Unibioline CNL (ID: 16 mm, dripper flow rate: 2.3 L/hr, dripper spacing: 0.3 m, pressure compensating, anti-siphon, non-leakage). Dripper line to be laid along the contour at 1000 mm spacings. Bury at 100 mm depth into imported sandy loam fill.

Supply and Return manifolds, each comprising 32 mm diameter lilac coloured LDPE pipe, to be laid at either end of the dripper lines and buried to a depth of 100 – 200 mm.

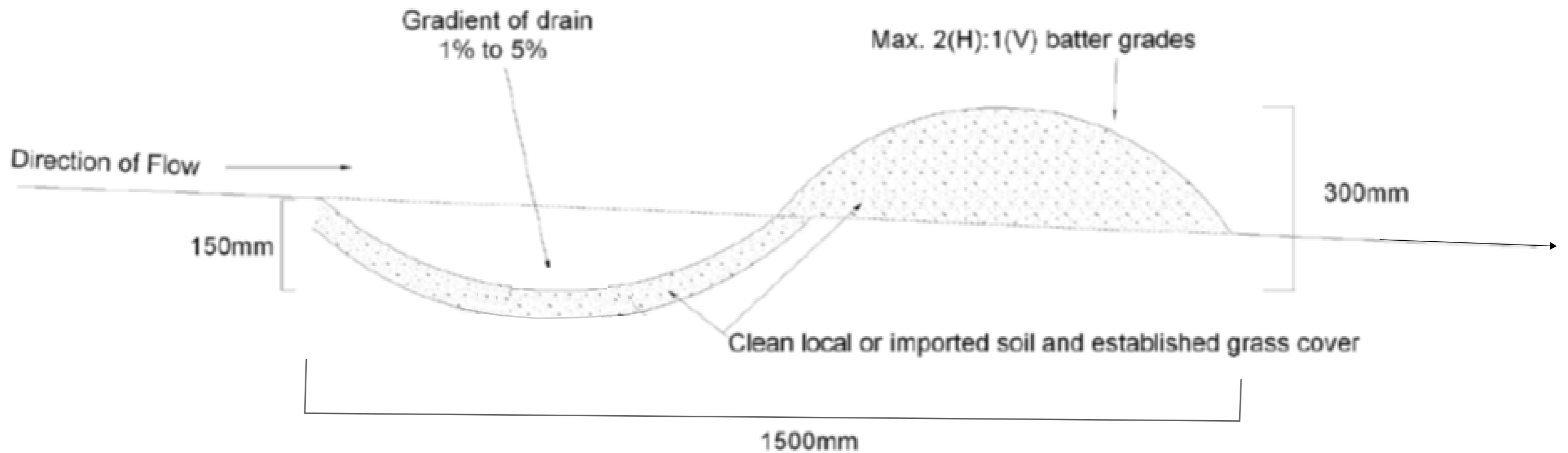
Install vacuum breakers at (all) high point(s). All valves to be placed in valve boxes with screw-down covers that are flush with the finished ground surface. Manual flush valve to be provided in return line, located diagonally opposite the supply line inlet, and discharging back to the AWTS distribution chamber.

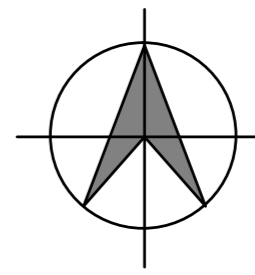
The minimum irrigation pump capacity for the proposed design is 36 L/min @ 11.6 m head. If the minimum pump capacity is not achievable with the standard pump of the AWTS unit (check pump curve data), a Zenoz-040-1A or Davey D40A are suitable units. See Appendix 2 for hydraulic design calculations and minimum pump capacity requirements. Calculation of TDH requirement assuming 32 mm (1.5") supply main and fittings - see Appendix 2 of design report.

Condition and performance of the land application area to be monitored and reported during routine quarterly maintenance inspections.

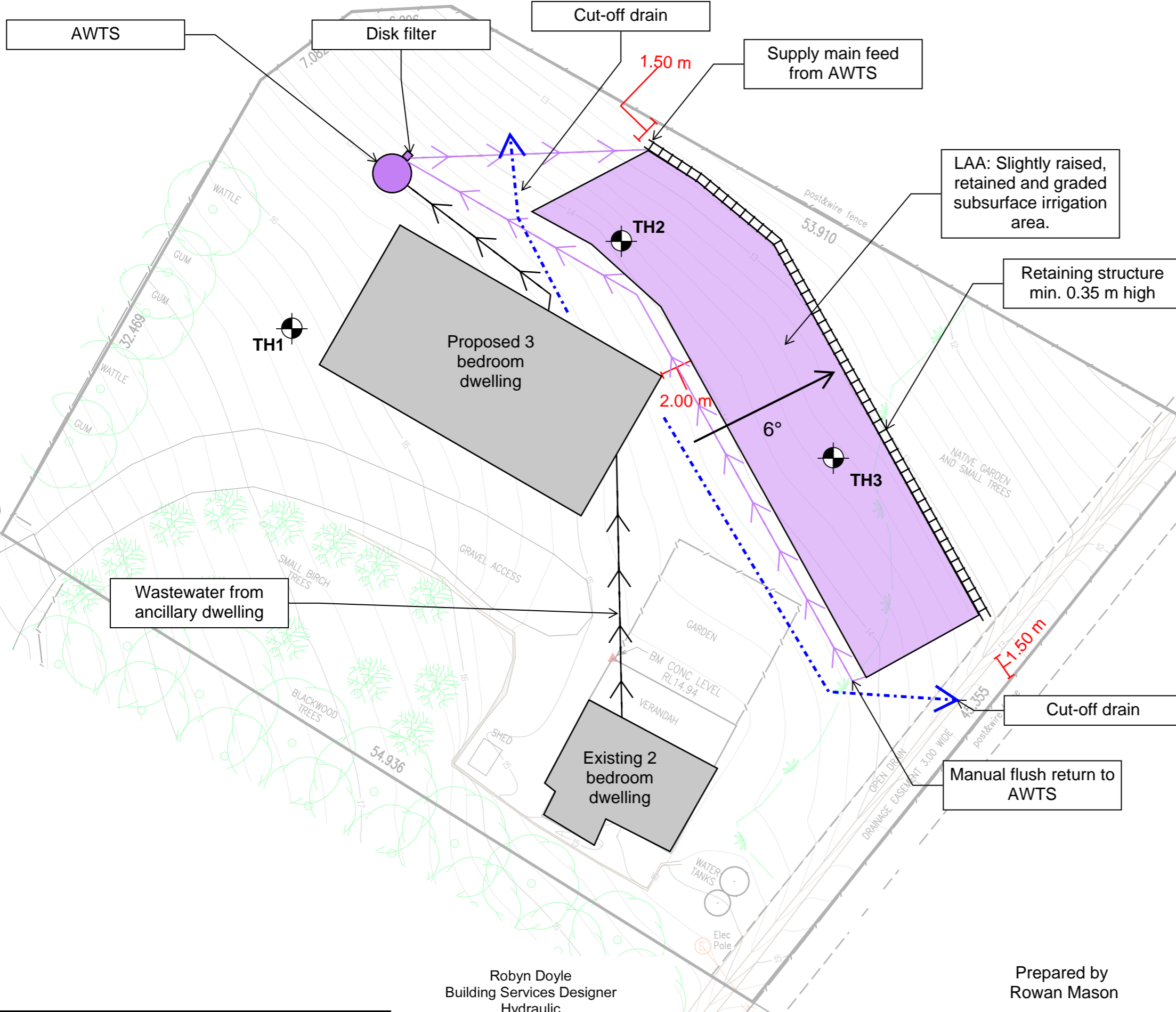
All onsite wastewater management systems are site-specific. Installer to refer DSC report in full. Please contact the system designer with any questions or proposed changes to the system design prior to proceeding with changes.

Cross Section: Upslope Diversion Drain





4550 Bruny Island Main Rd,
Lunawanna



Wastewater system:

- AWTS
- Min. total subsurface irrigation area: 280 m²
- Landscaping required to create raised irrigation area (refer to design report and Spec Sheets)
 - dimensions: 35.0 x 8.0 m **following contour**
 - laterals installed at 1.0 m spacing
 - Feed from the lowest (N) corner
 - Vacuum release valve(s) at high point(s)
 - Flush return to AWTS from diagonally opposite (S) corner
- Shallowly scarify the area of the LAA (approx. 50 mm deep) in dry conditions and treat with gypsum at 1.0 Kg/m² to reduce risk of clay dispersion.
- Build-up the downslope side of each raised irrigation area with appropriate retaining structures (e.g., sleepers, landscaped boulders, etc) to achieve 350 mm height.
- Back fill with sandy loam fill and grade so that the ground is raised 200 mm at the upslope edge. This will create a 5° slope in terraced area – See Spec Sheet.
- Dripper line to be laid along the contour at 1000 mm spacings. Bury at 100 mm depth into imported sandy loam fill.
- Min up and cross-slope foundations setback: 2.0 m
- Min. req. downslope boundary setback: 1.5 m
- Min req. upslope and side boundaries setback: 1.5 m
- Min req. downslope surface water setback: 15 m
- Surface diversion drain required upslope of LAA
- Approximate test hole locations
- Refer to DSC Design Report

All onsite wastewater management systems are site-specific. Installer to refer DSC report and design spec sheets, and contact the system designer with any questions or proposed changes to the system prior to proceeding with changes.

Robyn Doyle
Building Services Designer
Hydraulic
CC7418

11/11/2024
amended 17/1/2025

Prepared by
Rowan Mason

7/11/2024
amended 16/1/2025