REF: 7115WW

VERSION [1.0]

OCTOBER 23, 2024

SOIL AND SITE ASSESSMENT FOR ONSITE WASTEWATER DISPOSAL – PROPOSED SUBDIVISION

61 FOORD ROAD, RUN-O-WATERS, NSW

LGA: Goulburn-Mulwaree

Lot 336 DP 750015

Project Manager: Tina Dodson

HARRIS ENVIRONMENTAL CONSULTING
6/1 MEMORIAL DRIVE, SHELLHARBOUR CBD, 2529, NSW
TEL: (02) 4236 0954
Info@hec.eco

VERSION CONTROL

Title	Soil and Site Assessment for Onsite Wastewater Disposal – proposed subdivision			
Site address	61 Foord Road, Run-O-Waters, NSW			
Proposed development	Proposed 2-Lot subdivision			
Created By	Duncan Meyer B. SocSc. GeogEnvMgmt (Hons) (UKZN)			
Approved by:	Sean Harris Msc Env Science (UOW), Grad dip Nat Res (UNE), BscAppSc, Agriculture (HAC)			
Date Created	Wednesday, 23 October 2024			
Version Number	**Modified By**	**Modifications Made**	**Date Modified**	**Status**
[1.0]	D.M..	Issue for client review	17/05/2024	Complete
				-
				-

Limitations

The findings and recommendations in this report are based on the objectives and scope of work outlined above. Harris Environmental Consulting performed the services in a manner consistent with the normal level of care and expertise exercised by members of the environmental assessment profession. The report and conclusions are based on the information obtained at the time of the assessment. Changes to the site conditions may occur subsequent to the investigation described herein, through natural processes or through the intentional or accidental addition of contaminants, and these conditions may change with space and time. The results of this assessment are based upon site assessment conducted by HEC personnel and information provided by the client and site management. All conclusions regarding the property are the professional opinions of the HEC personnel involved with the project, subject to the qualifications made above. While normal assessments of data reliability have been made, HEC assumes no responsibility or liability for errors in any data obtained from regulatory agencies, information from sources outside of HEC, or developments resulting from situations outside the scope of this project.

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1. INTRODUCTION

This Site and Soil Assessment for On-site Wastewater was prepared by Harris Environmental Consulting at the request of Tina Dodson. It relates to the proposed 2-Lot subdivision of Lot 336 DP 750015 at 61 Foord Road, Run-O-Waters, NSW.

Fieldwork was undertaken by Harris Environmental Consulting (HEC) on the 26th of September 2024. This plan is based on the primary investigation of the soils, topography and hydrology of the site observed on the day of inspection. Soil samples and photos of the site were taken for further analysis.

The wastewater disposal area has been sized for a conceptual 4-bedroom dwelling (within building envelope) on the proposed lot. Therefore, an Aerated Wastewater Treatment System (AWTS) for wastewater treatment and subsurface irrigation is proposed for a potential 4-bedroom dwelling on the proposed vacant lot.

This report was prepared to demonstrate that the proposed subdivision can achieve compliance with the relevant requirements for on-site wastewater management. The proposed lots will henceforth be referred to as Lots 1 and Lot 2. Proposed

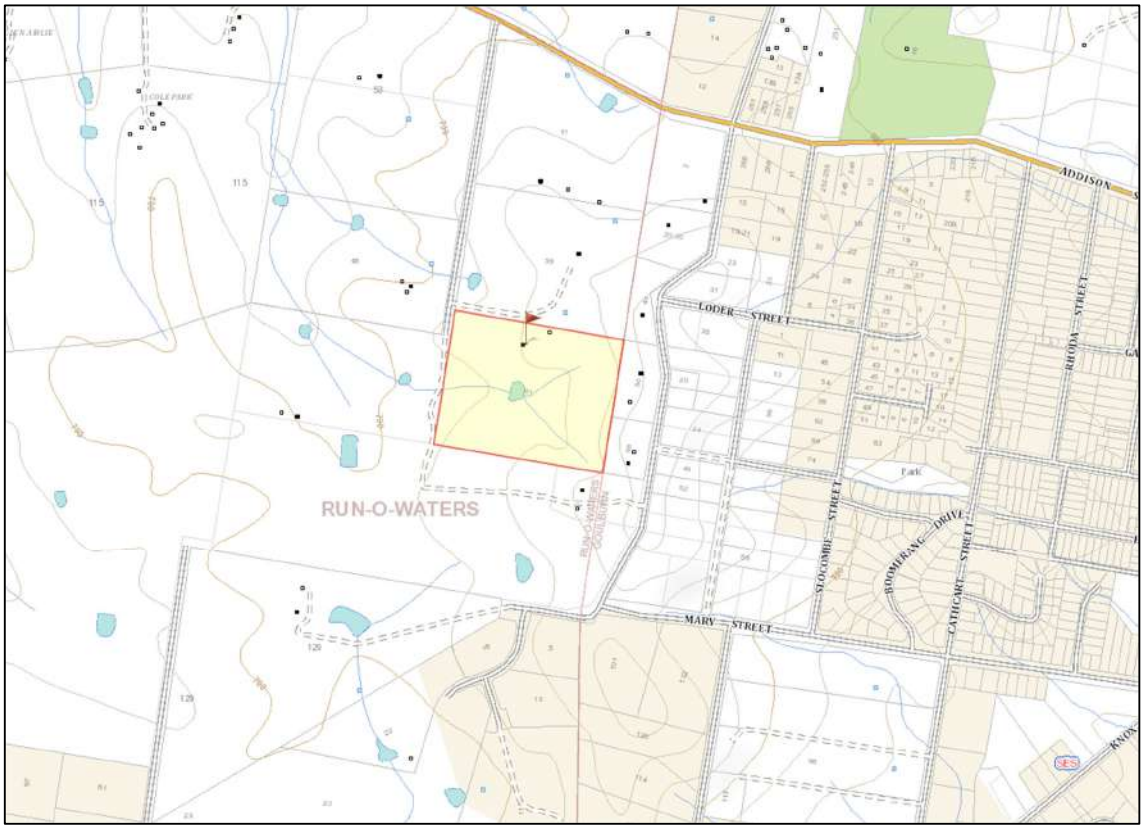
Only proposed Lot 1 will be considered in this report, as the existing dwelling on proposed Lot 2 is connected to its own on-site wastewater system and does not seem to be near the proposed boundaries.

Harris Environmental Consulting (HEC) was commissioned to undertake this Soil and Site Assessment for On-Site Wastewater Management and System Design in accordance with:

- Goulburn Mulwaree Regional Council Development Control Plan (2009); and
- Local Government Act 1993; and
- Australian Standard AS/NZS 3500 Plumbing and Drainage 2018; and
- Environment and Health Protection Guidelines (1998) On-site Sewage Management; for Single Households (Department of Local Government); and
- AS/NZ 1547:2012 On-site wastewater management (Standards Australia, 2012); and
- WaterNSW (2019), Designing and Installing On-Site Wastewater Systems. A Sydney Catchment Authority Current Recommended Practice.

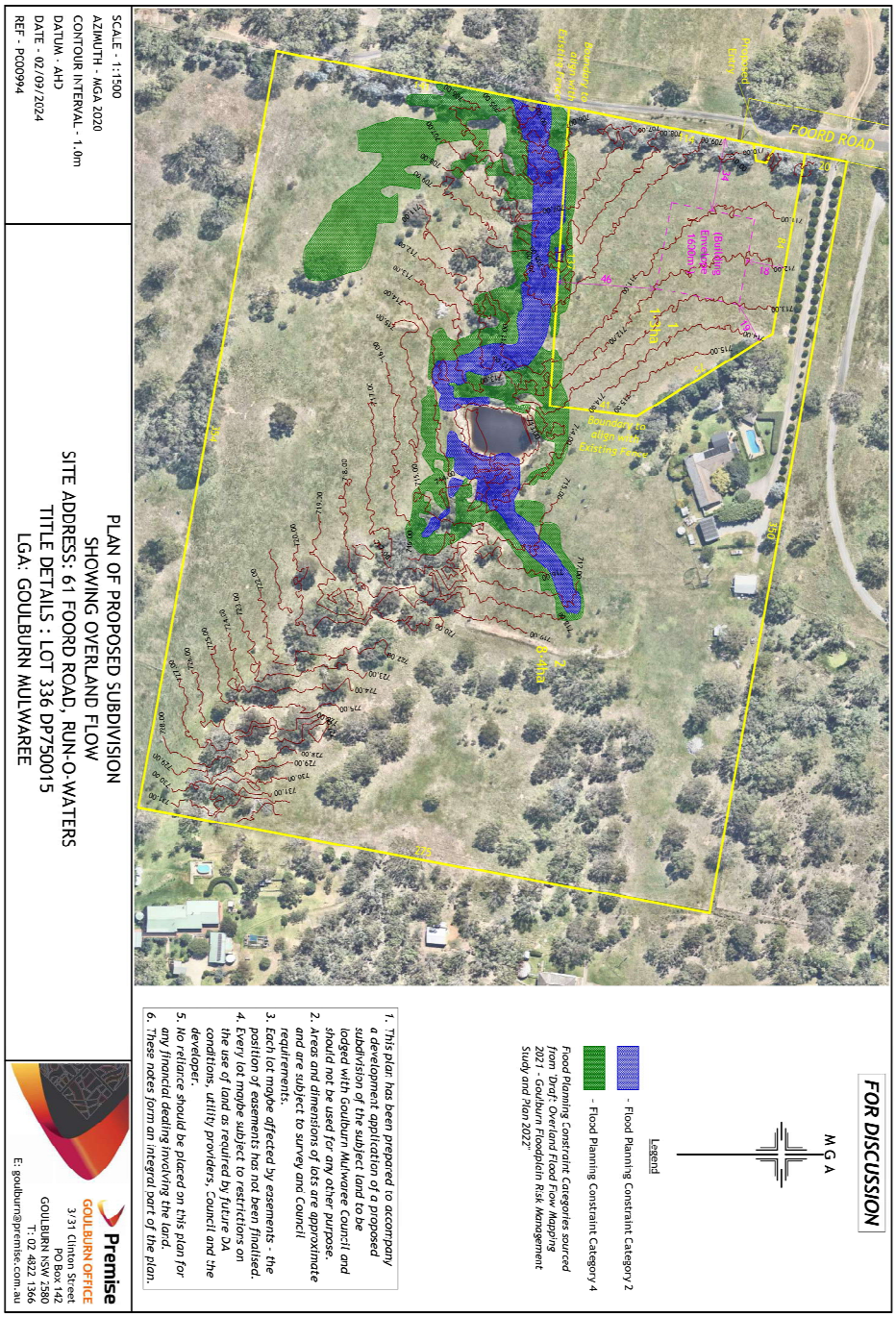
Location of the site is in Figure 1 and the proposed subdivision is in Figure 2.

FIGURE 1 LOCATION OF THE PROPOSED SUBDIVISION

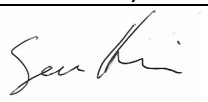


Source: SixMaps

FIGURE 2 PROPOSED SUBDIVISION



2. SITE INFORMATION

Owners:	Mr I & Mrs M Cumming	
Project Manager:	Tina Dodson *Premise* P: 0400 321 109 E: tina.dodson@premise.com.au	
Size of property:	~9.7 ha	
Legal title:	Lot 336 DP 750015	
Local Government:	Goulburn-Mulwaree Council	
Water supply:	Tank	
Design Wastewater load and daily wastewater (L/day):	No. bedroom in the proposed building envelope on the proposed vacant lot 1 *(As per WaterNSW)*	Assume 4 bedrooms **= 800 L/day**
Proposed wastewater treatment:	AWTS	
Proposed wastewater disposal:	Subsurface irrigation	
Date site assessed:	26 September 2024	
Date report prepared:	23 October 2024	
Report prepared by	Duncan Meyer B. SocSc. GeogEnvMgmt (Hons) (UKZN)	
Site assessor:	 Sean Harris	Msc Env Science (UOW), Grad dip Nat Res (UNE), BscAppSc, Agriculture (HAC)

3. SITE ASSESSMENT

Climate - rainfall	Goulburn TAFE median monthly rainfall
Climate - evaporation	SCA Zone 3 evaporation data
Flood potential	Proposed wastewater treatment system is above 1 in 100-year flood level; minor limitation. Proposed wastewater disposal area above 1 in 20-year flood level; minor limitation.
Frost potential	The site is not known to be subject to severe frosts, minor limitation
Exposure	Southwestern aspect – minor limitation
Slope	8.5%; minor limitation for treated wastewater disposal
Landform	Side slope, minor limitation
Run-on and seepage	Minor upslope stormwater run-on; minor limitation
Erosion potential	Minor erosion potential
Site drainage	Moderate to well drained soil profile; minor limitation
Evidence of fill	No evidence of fill; minor limitation
Domestic groundwater use	No groundwater bores within 100m
Surface rock	No surface rock; minor limitation
Area available for effluent disposal	Area available for effluent disposal within designated Effluent Management Area (EMA), minor limitation

4. SOIL ASSESSMENT

Method:	Mechanical augur/crowbar/shovel		
Depth to bedrock (m):	1000mm to restrictive layer; minor limitation		
Depth to high soil water table:	No groundwater or subsoil mottling encountered at a depth of 1000mm; minor limitation		
Coarse (%):	No coarse fragments in subsoil, minor limitation		
pH (soil/water):	pH 6-6.5; minor limitation		
Electrical conductivity:	<4, indicating salinity is not a constraint; minor limitation		
Salinity hazard:	No salinity information available.		
Domestic groundwater use:	The Department of Primary Industries Office of Water search of groundwater bores found there are **no known groundwater bores** within 100m of the proposed effluent management area		
Geological unit: *(From Department of Regional New South Wales)* Soil landscape: *(From eSPADE by NSW DPIE)* Australian Soil Classification *(From Geoscience Australia Portal)*	Residual Deposits - *A weakly consolidated regolithic residuum such as soil or saprolite mostly developed in-situ as a result of advanced weathering and/or pedogenesis.* Monastery Hill Soil Landscape – *The landscape has formed on teschenite (dolerite) intrusions. On crests and sideslopes are duplex orange-coloured soils with acid to alkaline reaction, no development of A2 horizons and massive to moderately structured upper B horizons. These are similar to yellowish Chocolate Soils. Below about 1 m an alkaline mottled grey clay occurs. Prairie Soils, Grey Clays and Alluvial Soils occur on footslopes and in drainage lines. More information on this landscape can be found in Scown, Murphy and Johnston (1988).* Soils belonging to the Kurosols order - *Duplex soil with an acidic subsoil of greater clay content than the topsoil. Moderate capacity to adsorb phosphate. The lower hydraulic conductivity of the subsoil can lead to interflow, however if the design of the absorption field is on the basis of subsoil hydraulic properties (as is normally the case), this is a moderate risk soil.*		
Surface rock:	No surface rock in proposed effluent management area		
Soil Profile (Representative of all proposed lots)	Layer 1		DIR
	Texture Colour Depth Structure Coarse frag.	Loam Dark brown 0-300mm Moderately structured N/A	N/A
	Layer 2		DIR
	Texture Colour Depth Structure Coarse frag.	Clay loam Tan 300-1000mm Moderately structured N/A	**3.5mm/day**

Photo 1 On-site soil assessment

Photo 2 Looking north over the proposed effluent area

5. SUMMARY OF SOIL AND SITE CONSTRAINTS

There are no major soil or site constraints that would prevent the installation of an Aerated Wastewater Treatment System (AWTS) for wastewater treatment and subsurface irrigation for treated wastewater disposal for the proposed building envelope.

The proposed subsurface irrigation is proposed at a location that is compliant with the buffers and setback distances required by Goulburn-Mulwaree Council and Water NSW. This includes:

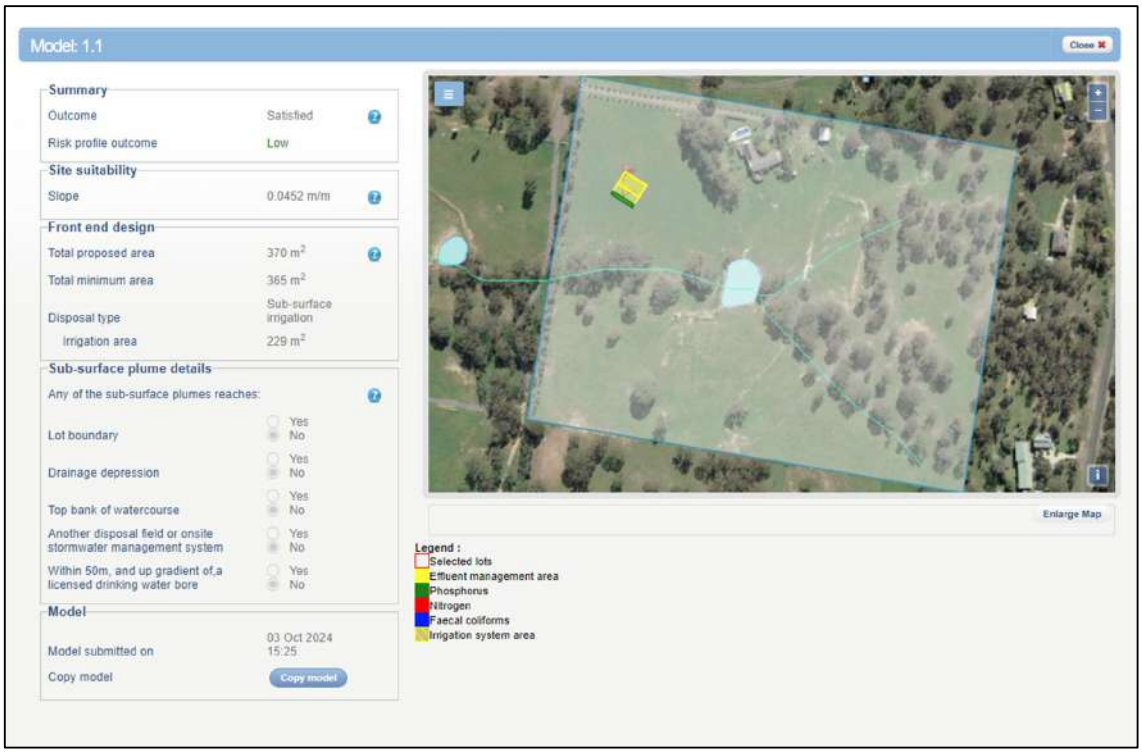
- More than 100m from permanent watercourses, 40m from drainage depressions
- 4m from downslope driveways/boundary lines
- 3m from upslope driveways/ boundary lines
- 6m from downslope buildings and 3m from upslope buildings

The light clay subsoil has suitable permeability and nutrient absorption properties for this method of wastewater treatment and disposal.

The wastewater management system was modelled in the WaterNSW NORBE Assessment model with the proposed wastewater disposal area and found to be compliant. See Appendix for NORBE assessment outcome report.

The NorBE assessment was conducted assuming adequate stormwater quality improvement devices (SQIDs) are included in the design.

FIGURE 3 OUTCOMES OF NORBE ASSESSMENT



Note: The NORBE model does not represent the actual orientation and position of the proposed subsurface irrigation area and is unable to do so.

6. SYSTEM DESIGN

6.1 WASTEWATER TREATMENT SYSTEM

An Aerated Wastewater Treatment System is proposed for wastewater treatment for each future lot. The owner will be required to provide the Council with the AWTS manufacturer's specifications of the proposed treatment system. (Information on proposed AWTS can be obtained from the manufacturer or NSW Heath Register of Accredited Sewage Management Systems at

http://www.health.nsw.gov.au/publichealth/environment/water/waste_water.asp.

The owner will need to lodge an application to install/operate a Sewage Management System under the Local Government Act 1993, Section 68. Council will require the owner to have selected an AWTS manufacturer and provide Council with the necessary plans and specifications including NSW Health Accreditation, tank dimensions and capacity, operation and maintenance details, plus Licensed Plumber's name, address, phone number and license number.

The AWTS will be installed and maintained in accordance with Section 5 of the guidelines 'On-site Sewage Management for Single Households' (Department of Local Government, 1998) and AS/NZS 1547-2012 'On-site Domestic Wastewater Management' (Standards Australia, 2012). **Upon approval from Goulburn-Mulwaree Council, the owner is to enter into a servicing contract with an approved servicing agent for the life of the system. Copies of the written service reports should be lodged with Goulburn-Mulwaree Council following each quarterly service.**

6.2 LOCATION OF PROPOSED AWTS

The location of the AWTS should be decided in conjunction with the licensed plumber in consultation with the property owner. The AWTS must be positioned on a stable, level base and be downslope of the building so there is sufficient fall from drainage outlets in the dwelling. The location of AWTS must:

- Be at least 1.5m from any building.
- Have a power supply (and telephone line if telemetry or an automated monitoring/ alarm is fitted), will be required to deliver power to the treatment unit.
- Be located above the 1% AEP (1:100) flood contour.

AWTS installation must comply with the manufacturer's recommendations, AS/NZS 3500.2:2018 Plumbing and Drainage Part 2 Sanitary Plumbing and Drainage' and Council requirements.

6.3 INSTALLATION OF PIPES

The sewer pipes between the plumbing amenities, AWTS and irrigation area must conform with 'AS/NZS 3500(Set):2018 Plumbing and Drainage Set' specifying the nominal pipe sizes and respective minimum grades. Table 1 contains these specifications.

In addition, where a sewer carrying untreated wastewater to a treatment system is longer than 60 metres, the minimum grade should be doubled, and inspection ports should be installed at least every 30 metres or at an angle or change of grade.

The sewer pipes between the plumbing amenities, AWTS and irrigation area must be buried at a depth that provides protection against mechanical damage or deformation, in accordance with 'AS/NZS 3500.2:2018 Plumbing and Drainage Set'. Table 2 shows the minimum pipe depth for trafficable areas.

TABLE 1 MINIMUM PIPE DIAMETER AND GRADE CALCULATIONS

Nominal pipe size (DN)	Minimum grade %	Minimum grade ratio
65	2.5	1:40
80	1.65	1:60
100	1.65*	1:60
125	1.25	1:80
150	1.00	1:100

* Except for drains from septic tanks, sewage treatment plants and unvented discharge pipes from tundishes, which may have a minimum grade of 1%,
Source: 'AS/NZS 3500.2:2018 Plumbing and drainage Part 2 Sanitary plumbing and drainage' Table 3.4.1. NB: pipe grades are expressed as a percentage of vertical to horizontal distances.

TABLE 2 MINIMUM PIPE DEPTH FOR TRAFFICABLE AREAS

Location	Minimum depth of cover (mm) for all materials other than cast iron
Where subject to vehicular traffic	500
Elsewhere	300

Source: 'AS/NZS 3500 (Parts 0-4):2018 Plumbing and drainage Set'. Table 3.7.2 Minimum Cover for Buried Pipes'

The installation is to be done in accordance with the AWTS manufacturer's Installation Manual. The wastewater treatment unit is to be buried near ground level but 100mm above ground level to avoid accumulation and ingress of stormwater under the tank lid.

A buried 25mm poly pipe will run from the AWTS/filter and manifolds.

7. SIZING THE IRRIGATION AREA

The irrigation area needed to manage the design flow of **800L/day** was calculated using monthly water and nutrient balance, following the method described in DLG (1998). Soil texture classification for Design Irrigation Rate is from ASNZ1547(2012).

The ***water balance*** requires a **370m^2** irrigation area as shown in Table 3 based on the following variables:

- Goulburn TAFE median monthly rainfall.
- SCA Zone 3 monthly average evaporation; and
- Slope is <10% so no DIR reduction required.
- Application rate of 24.5mm/week or 3.5mm/day for clay loam soils.

The ***nitrogen balance*** requires a **329m^2** irrigation area as shown in Table 3 based on the following variables:

- AWTS will reduce Total Nitrogen to 27mg/L; and
- Vegetative rate for managed pastures is assumed to be 240kg/N/ha/year

The ***phosphorus balance*** requires **233.6m^2** irrigation area as shown in Table 3 based on the following variables:

- AWTS will reduce Total Phosphorus to 12mg/L;
- P-sorption of 400mg/kg for clay loam subsoil;
- Bulk density of 1.5g/cm^2 for clayey soils;
- Soil depth of 1000mm. Crop uptake is assumed to be 30kg/ha/annum; and
- 50-year design life of system.

TABLE 3 PROPOSED IRRIGATION AREAS

Wastewater Source	Design wastewater load (L/day)	Water balance requires irrigation area (m^2)	Nitrogen balance requires irrigation area (m^2)	Phosphorus balance requires irrigation area (m^2)	Required effluent disposal area – largest of the three methods (m^2)
Proposed Lot 1	800	370	329	233.6	**370**

In accordance with WaterNSW (2019), the irrigation area should be sized using a hydraulic balance, with a dedicated nutrient uptake area downslope and/or around the irrigation field, determined by the difference in area between the nutrient load and hydraulic load area. WaterNSW (2019) states *that this approach will help ensure that the vegetation is maintained, at least on the area required to satisfy the hydraulic balance and reduce the likelihood of vegetation die-off over the whole area in extended dry periods.* Given the hydraulic balance is the most limiting in this Assessment, no nutrient uptake area will be required.

The NorBE Assessment for the proposed dwelling (Figure 2) nominated the *irrigation area* to be 229m^2. This is the minimum area that NorBE requires to be installed. By contrast, the

water balance undertaken for this assessment (see above and Appendix) calculates the need for a **370m^2** irrigation area.

The proposed location and setback distances of the land application area relevant to the site are to be consistent with the requirements in the Conditions of consent, Wingecarribee Shire Council Development Control Plan, WaterNSW and this report.

8. COMPLETION OF WORKS

The last stage of this process involves submitting an Installation Certificate provided by the installer. This is to certify that the systems have been installed according to the System Design. A copy of the installation certificate must be provided to the council and the system designer. A council certifier will make a final inspection before the system is approved for use.

The treatment and application systems must be installed by a contractor(s) licensed by NSW Fair Trading. That could be a licensed plumped or a licensed irrigation contractor (or both), each with at least three years' experience in effluent disposal.

9. SUMMARY

This assessment has demonstrated that on-site wastewater management can be undertaken on the proposed 2-lot subdivision. This assessment recommends the following:

- Installation of an aerated wastewater treatment system capable of treating at least 800L/day for the proposed building envelope on proposed lot 1; and
- Installation of **370m**^{2} of subsurface irrigation for treated wastewater disposal, as described in the Appendix and shown on the Site Plan.

10. REFERENCES

Department of Local Government (1998) *On-site Sewage Management for Single Households*. NSW Government.

Standards Australia (2012) Australian/New Zealand Standard 1547:2012 *On-site domestic wastewater management*. Standards Australia.

NSW Health Septic Tank Accreditation Guidelines (2001).

Hazelton, P.A and Murphy, B.W ed. (1992) *What Do All the Numbers Mean? A Guide for the Interpretation of Soil Test Results.* Department of Conservation and Land Management (incorporating the Soil Conservation Service of NSW), Sydney.

WaterNSW (2019), Designing and Installing On-Site Wastewater Systems. A Sydney Catchment Authority Current Recommended Practice)

Goulburn Mulwaree Regional Council Development Control Plan (2009)

APPENDIX I Designer Producer Statement

DESIGN PRODUCER STATEMENT

On-site Wastewater and/or Effluent Disposal System Design

ISSUED BY:	Harris Environmental Consulting
TO:	Goulburn-Mulwaree Council
DA NO:	
TO BE SUPPLIED TO:	Tina Dodson
IN RESPECT OF:	Soil and Site Assessment for Onsite Wastewater Disposal – proposed subdivision, 61 Foord Road, Run-O-Waters, NSW
AT:	Lot/DP: Lot 336 DP 750015

Harris Environmental Consulting has been engaged by Tina Dodson to provide the technical design details for an on-site wastewater system.

The design has been carried out in accordance with:

- WaterNSW, 2019 'Designing and Installing On-Site Wastewater Systems: A WaterNSW Current Recommended Practice'.
- DLG, 1998 'Environment and Health Protection Guidelines: On-site Sewage Management for Single Households'
- AS/NZS 1547:2012 'On-site Domestic Wastewater Management'

For details of site assessment and design, refer to **the Soil and Site Assessment for Onsite Wastewater Disposal – proposed subdivision, 61 Foord Road, Run-O-Waters, NSW ,** dated October 23, 2024

This System Design was prepared with reference to WaterNSW, 2019 'Designing and Installing On-Site Wastewater Systems: A WaterNSW Current Recommended Practice'.

This is an independent design, covered by a current policy of Professional Indemnity Insurance.

DECLARATION:

I believe on reasonable grounds that this design has been carried out in accordance with agency and council requirements, and best practice in on-site wastewater design principles and procedures.

NOTE: This statement does not approve the installed system.

Under certain conditions, **Harris Environmental Consulting** is available to certify the installed system. These conditions include:

- the technology supplier(s) take(s) full responsibility for the stated quality and performance of technologies and other equipment supplied.
- the installer(s) take full responsibility for installing the system as specified by all conditions of consent and **Harris Environmental Consulting** design reports unless departure from the station specification(s) is subsequently agreed between the installer and **Harris Environmental Consulting** and approved by the consent authority.
- **Harris Environmental Consulting** is to be informed before installation, and engaged, under separate contract, if required to supervise installation of all specified system components.

DISCLAIMER:

Approval is to be sought from **Harris Environmental Consulting** should variations to the specification and layout in this report/ drawing be considered necessary by the installer before or at the time of installation. Failure to do so will invalidate the Design Producer Statement and **Harris Environmental Consulting** will no longer take responsibility for the design.

The client is to make full disclosure of relevant information on existing and/or proposed activities on the site that will influence estimation of likely daily wastewater quantity (based on the number of potential bedrooms and other wastewater producing activities) and quality (in particular any chemicals in the water supply and/or wastewater

stream potentially toxic to biological wastewater processes). This design is based on the site assessment carried out by **Harris Environmental Consulting.**
Subsequent changes to the site that might affect the topography and soil profiles are to be notified by the client. Failure, by the Client, to provide this information will invalidate this Design Producer Statement.

Name	Sean Harris, Harris Environmental Consulting
Signature	 Msc Env Science (UOW), Grad dip Nat Res (UNE), BscAppSc, Agriculture (HAC)
Title:	Soil and Site Assessment for Onsite Wastewater Disposal – proposed subdivision, 61 Foord Road, Run-O-Waters, NSW
Date:	October 23, 2024

APPENDIX II EXAMPLE OF INSTALLATION CERTIFICATE

WaterNSW

COMPLETION OF WORKS

INSTALLATION CERTIFICATE

On-site Wastewater and/or Effluent Disposal System

(to be prepared and issued by the licensed installer)

ISSUED BY: ***On-Site System Installers Pty Ltd***

TO BE SUPPLIED TO: ***Catchment Council (DA No. XXX/YYYYY)***

IN RESPECT OF: *Mr & Mrs Consumer, On-site wastewater service for 1 Rural Road, Septicville (Catchment Council)*

SITE DETAILS: Lot/DP: *XXX/YYY*
Description: ..... *[insert relevant description]*

DESCRIPTION OF PROJECT:

- *Installation of an on-site wastewater system for a ..... [insert relevant proposal e.g. a four bedroom dwelling].*
- *Treatment system: NSW Health accredited ..... [insert relevant system and model number].*
- *Nature of disposal system / Land application: ..... [insert relevant land application e.g. 400m² subsurface drip irrigation].*

INSTALLED IN ACCORDANCE WITH: *Conditions of consent and Wastewater System Designers Pty Ltd System Design, 1 Rural Road, Septicville, dated DD/MM/YYYY*

DATE OF SITE INSTALLATION INSPECTION: *DD/MM/YYYY*

REPORT: *Variations: None. Installed as indicated on Site Plan in System Design.*

DECLARATION:
I believe on reasonable grounds that all of the wastewater works have been completed in accordance with Council Consent Number 123456 and Wastewater System Designers Pty Ltd System Design dated DD/MM/YYY.

Name: .....

Title: .....

Signature: .....

For: *On-Site System Installers Pty Ltd*

Date: *DD/MM/YYYY*

cc: Mr & Mrs Consumer

APPENDIX III SUBSURFACE IRRIGATION

i) If wastewater is split into equal zones, each zone must receive an even proportion of wastewater, using a sequencing valve, such as a water rotor or similar.

ii) Immediately after the AWTS, a disc filter or a 100-to-150-micron filter is to be installed (ie, before the sequencing valve). The filter must be cleaned regularly (at least every 3 months).

iii) The distribution pipe from the AWTS to the water rotor shall consist of a 25mm uPVC or polythene pipe, buried 300mm underground. Where vehicles pass over the line, it should be 450mm for light traffic and 500mm for heavy traffic.

iv) Pressure compensating subsurface drip line is used with emitters and laterals at approximately 750mm spacing's (maximum of 1000mm) and buried to a depth of 100-150mm below finished ground level (in accordance with ASNZ1547:2012).

v) The drip line is to be impregnated with root inhibitor or include a tech filter that dispenses a root inhibitor (a chemical injector assembly or impregnated emitter tube) to protect drip line from root ingress.

vi) Air release valves should be located at the highest point and flush valves at the lowest point of each sub-surface zone and shall be contained within a durable protective housing with a lilac lid to indicate wastewater.

vii) Additional air/vacuum valves, pressure-reducing valves and non-return / tube non-leakage valves are to be included into the design as needed. ie., where the effluent irrigation area is located above the treatment system or pump well, a non-return valve.

viii) The system must have capacity to enable flushing to remove any suspended solids and organic growth that may accumulate.

ix) The effluent irrigation system should be tested to ensure there is uniform effluent delivery to all parts of the irrigation area.

x) The effluent management area must be fenced off from livestock and vehicles.

xi) The irrigation area should be vegetated with grass before commissioning. The grass within the irrigation should be mown on a regular basis and dispose of clippings outside the irrigation area.

APPENDIX IV IN-FIELD SOAKAGE PIT OPTIONS

Part No.	Dimensions
HR0690-SVBRW	Top: 165mm Bottom: 185mm Depth: 150mm
OVERLAY LID	

Part No.	Dimensions
0690VBRW	Top: 150mm Bottom: 215mm Depth: 220mm
OVERLAY LID	

Part No.	Dimensions
HR0910VBRW	Top: 235mm Bottom: 335mm Depth: 255mm
OVERLAY LID	

Part No.	Dimensions
HR606-6SQVBRW	Top: 150mm Depth: 150mm
OVERLAY LID	

Part No.	Dimensions
HR606SQVBRW	Top: 150mm Depth: 210mm
OVERLAY LID	

Part No.	Dimensions
HR909-8VBRW	Top: 215mm Depth: 215mm
OVERLAY LID	

Part No.	Dimensions
HR909SQVBRW	Top: 215mm Depth: 260mm
OVERLAY LID	

Part No.	Dimensions
HR1419-6VBRW	Width: 305mm Length: 420mm Depth: 160mm
INSERT LID	

APPENDIX V GENERAL RECOMMENDATIONS TO MANAGE WATER QUALITY AND QUANTITY

Insinkerator style kitchen garbage disposal units should be avoided as they increase water consumption and raise the nutrient and BOD concentrations of household effluent.

Water conservation can reduce the volume of wastewater that needs to be treated and discharged on site. The residence should include appliances that are rated under the Water Efficiency Labelling and Standards (WELS) Scheme that includes:

i. 4-star dual-flush toilets;
ii. 3-star showerheads;
iii. 4-star taps (for all taps other than bath outlets and garden taps);
iv. 3-star urinals; and
v. Water-efficient washing machines and dishwashers are to be specified and used wherever possible.

Chemical cleaning compounds and other chemicals that enter the treatment system should be low in phosphate and salt. Anti-bacterial chemical cleaning compounds and other chemicals that enter the treatment system should be avoided. This includes chlorine, disinfectants, bleaches etc.

APPENDIX VI REQUIRED BUFFERS

The following buffers must be applied when installing all onsite sewage management systems in accordance with WaterNSW and the Goulburn-Mulwaree Council's Development Control Plan.

Table 2.6 – Buffer distances

Feature	Level of effluent treatment	Effluent application method	Buffer distance (minimum)	Achievable
Buildings, retaining walls	Primary	Subsoil	2.0m downslope and where flat, or 6.0m upslope of the feature	□ Yes □ No □ N/A
	Secondary (disinfected)	Subsurface and surface (including drip or trickle) irrigation	2–6m (<3m only for drip irrigation on low rate)	□ Yes □ No □ N/A
Premises boundaries, paths and walkways, recreation areas	Primary	Subsoil	3.0m downslope and where flat, or 6.0m upslope of the feature; 15m to recreation areas, if by LPED irrigation	□ Yes □ No □ N/A
	Secondary (disinfected)	Subsurface irrigation	3.0m downslope and where flat, or 4.0m upslope of the feature	□ Yes □ No □ N/A
		Surface irrigation	15m up- or downslope of the feature	□ Yes □ No □ N/A
In ground potable water tanks, in ground swimming pools	Primary	Subsoil	15m and downslope from water tank or pool	□ Yes □ No □ N/A
	Secondary (disinfected)	Subsurface and surface irrigation	4.0m - should not be located upslope of feature	□ Yes □ No □ N/A
Watercourse, lakes and the full supply level for all water supply reservoirs	Primary	Subsoil	100m from the high water level	□ Yes □ No □ N/A
	Secondary (disinfected)	Subsurface and surface irrigation	100m from the high water level	□ Yes □ No □ N/A
Bore or well licenced for domestic^ consumption	Primary	Subsoil	100m	□ Yes □ No □ N/A
	Secondary (disinfected)	Subsurface and surface irrigation	100m	□ Yes □ No □ N/A

Feature	Level of effluent treatment	Effluent application method	Buffer distance (minimum)	Achievable
Drainage depressions, farm dams and roadside drainage and lot scale stormwater quality improvement devices	Primary	Subsoil	40m from the high water level	◻ Yes ◻ No ◻ N/A
	Secondary (disinfected)	Subsurface and surface irrigation	40m from the high water level	◻ Yes ◻ No ◻ N/A
^ If within 100 metres of a bore or well licenced for domestic consumption, a draw-down analysis is required using an appropriate methodology, such as Cromer, Gardner and Beavers, 2001 'An improved viral die-off method to estimate setback distances'. Domestic consumption is taken to mean for drinking, watering of edible plants etc.				

APPENDIX VII WATER BALANCE

Nominated Area Water Balance for Zero Storage

Site Address: 61 Foord Road, Run-O-Waters

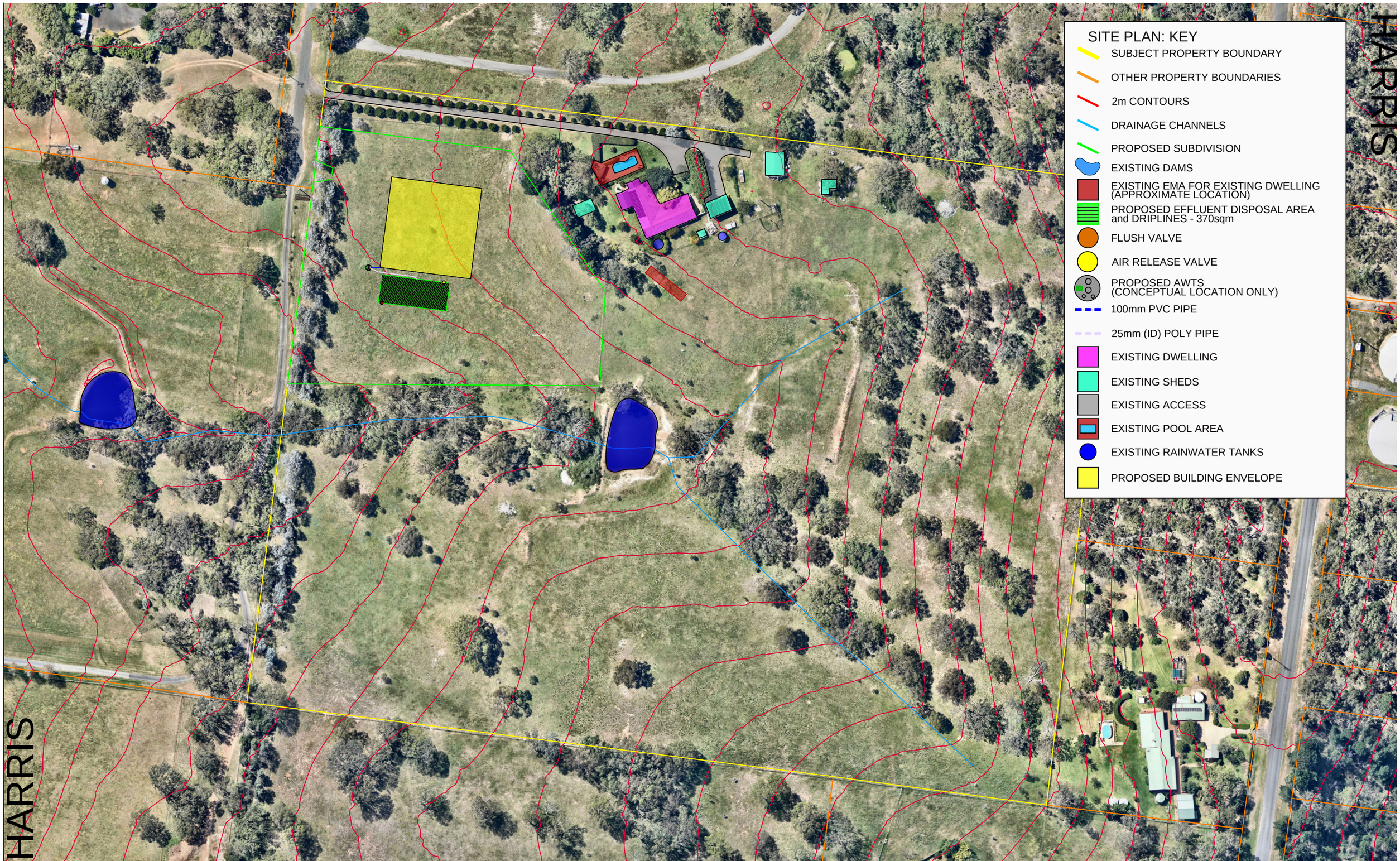
INPUT DATA			
Design Wastewater Flow	Q	800	L/day
Design DIR (from AS/NZ 1547:2012)	DIR	24.5	mm/week
Daily DIR		3.5	mm/day
Nominated Land Application Area	L	**370**	m sq
Rainfall Data Station (Monthly Medians)		Goulburn TAFE	
Evaporation Data (Monthly Average)		SCA Zone 3	

Parameter	Symbol	Formula	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Days in month	D	\	days	31	28	31	30	31	30	31	31	30	31	30	31	**365.0**
Rainfall	P	\	mm/month	58.2	49.7	55.2	26.6	35.2	39	38.2	46.5	45.6	47.2	64	49	**505.4**
Evaporation	E	\	mm/month	187	145	124	79	51	34	39	61	88	123	146	185	**1262.0**
Crop Factor	C			0.80	0.75	0.70	0.65	0.60	0.60	0.60	0.60	0.65	0.70	0.75	0.80	
INPUTS																
Precipitation	(P)		mm/month	58.2	49.7	55.2	26.6	35.2	39	38.2	46.5	45.6	47.2	64	49	505.4
Effluent Irrigation	(W)	(Q x D) / L	mm/month	67.0	60.5	67.0	64.9	67.0	64.9	67.0	67.0	64.9	67.0	64.9	67.0	**789.2**
Inputs		(P+W)	mm/month	125.2	118.7	116.7	120.1	93.6	100.1	106.0	105.2	111.4	112.6	112.1	131.0	1352.8
OUTPUTS																
Evapotranspiration	ET	ExC	mm/month	150	109	87	51	31	20	23	37	57	86	110	148	**908.3**
Percolation	B	(DIR/7)xD	mm/month	108.5	98	108.5	105.0	108.5	105.0	108.5	108.5	105.0	108.5	105.0	108.5	**1277.5**
Outputs		ET+B	mm/month	258.1	206.75	195.3	156.4	139.1	125.4	131.9	145.1	162.2	194.6	214.5	256.5	**2185.8**
Storage remaining from previous month			mm/month	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Storage	S	(P+I)-(ET+B)	mm/month	-132.9	-88.0	-78.6	-36.3	-45.5	-25.3	-25.9	-39.9	-50.8	-82.0	-102.4	-125.5	
Cumulative Storage	M		mm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.00**
Largest M	**(V)**		mm	**0.00**												
		(V x L)/1000	m^3	**0.0**												

APPENDIX VIII NUTRIENT BALANCE

NITROGEN BALANCE				
SITE ADDRESS	**61 Foord Road, Run-O-Waters**			
Daily volume	800	L/day		
TN effluent conc	27.0	mg/L		
TN	0.0216	kg/d		
	7.884	kg/yr		
Irrigation Area	**329**	**m2**	**0.03285**	ha
TN annual application rate	0.024	kg/m2/yr		
	240.0	kg/ha/yr		
TN Uptake (managed land)	240	kg/ha/yr		
TN available for leaching	0	kg/ha/yr		
Or for site	**0.00**	kg/yr		

PHOSPHORUS BALANCE				
SITE ADDRESS	**61 Foord Road, Run-O-Waters**			
Daily hydraulic load	800	L/day		
TP effluent conc	12	mg/L		
TP effluent conc per day	9600	mg/day		
	3504	g/year		
P sorption rate of soil	400	mg/kg		
Bulk density of soil	1.5	g/cm3		
	1500	kg/m3		
Land application area	**233.6**	**m2**		
Soil depth	1	m		
Volume of soil	233.600	m3		
Mass of soil	350400	kg		
Total P sorption capacity	140160	g		
Vegetation	Grass			
P annual uptake by vegetation	30	kg/ha/yr		
	700.8	g/yr		
Net annual P (in soil)	2803	g/yr		
Life of system	50.0	years		



Issue:	Description:	Date	Drawn	Approved
v0.1	Issue for client review	03/10/2024	DM	SH
v1.0	Issue for client submission	22/10/2024	DM	SH

North

CLIENT:
MRS M AND MR I CUMMING

E: iancummingbuilding@gmail.com
P: 0418 165 871

PROJECT MANAGER:
TINA DODSON
PREMISE

E: tina.dodson@premise.com.au
P: 0400 321 109

Harris Environmental Consulting
Unit 6/1, Memorial Drive,
Shellharbour City Centre, NSW 2529
T: +61 2 4236 0954
E: info@hec.eco
ABN: 54128740549

Wastewater | Bushfire | Stormwater

Project:
PROPOSED 2-LOT SUBDIVISION

LOT 336 DP 750015
61 FOORD ROAD, RUN-O-WATERS
LGA: GOULBURN-MULWAREE

Drawing Title:
WASTEWATER MANAGEMENT PLAN DETAILS SHEET No.1

Drawn:	Date:	Paper Size:	Q.A. Check: Date:
DM	22/10/2024	ISO Expand A3	Complete 22/10/2024
Designed:	**Our reference:**	**Scale:**	**Issue:**
DM	7115WW	1:1500	v1.0

Issue:	Description:	Date	Drawn	Approved
v0.1	Issue for client review	03/10/2024	DM	SH
v1.0	Issue for client submission	22/10/2024	DM	SH

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P: 0400 321 109

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Unit 6/1, Memorial Drive,
Shellharbour City Centre, NSW 2529
T: +61 2 4236 0954
E: info@hec.eco
ABN: 54128740549

Wastewater | Bushfire | Stormwater

Project:
PROPOSED 2-LOT SUBDIVISION

LOT 336 DP 750015
61 FOORD ROAD, RUN-O-WATERS
LGA: GOULBURN-MULWAREE

Drawing Title:
WASTEWATER MANAGEMENT PLAN DETAILS SHEET No.2

Drawn:	Date:	Paper Size:	Q.A. Check: Date:
DM	22/10/2024	ISO Expand A3	Complete 22/10/2024
Designed:	**Our reference:**	**Scale:**	**Issue:**
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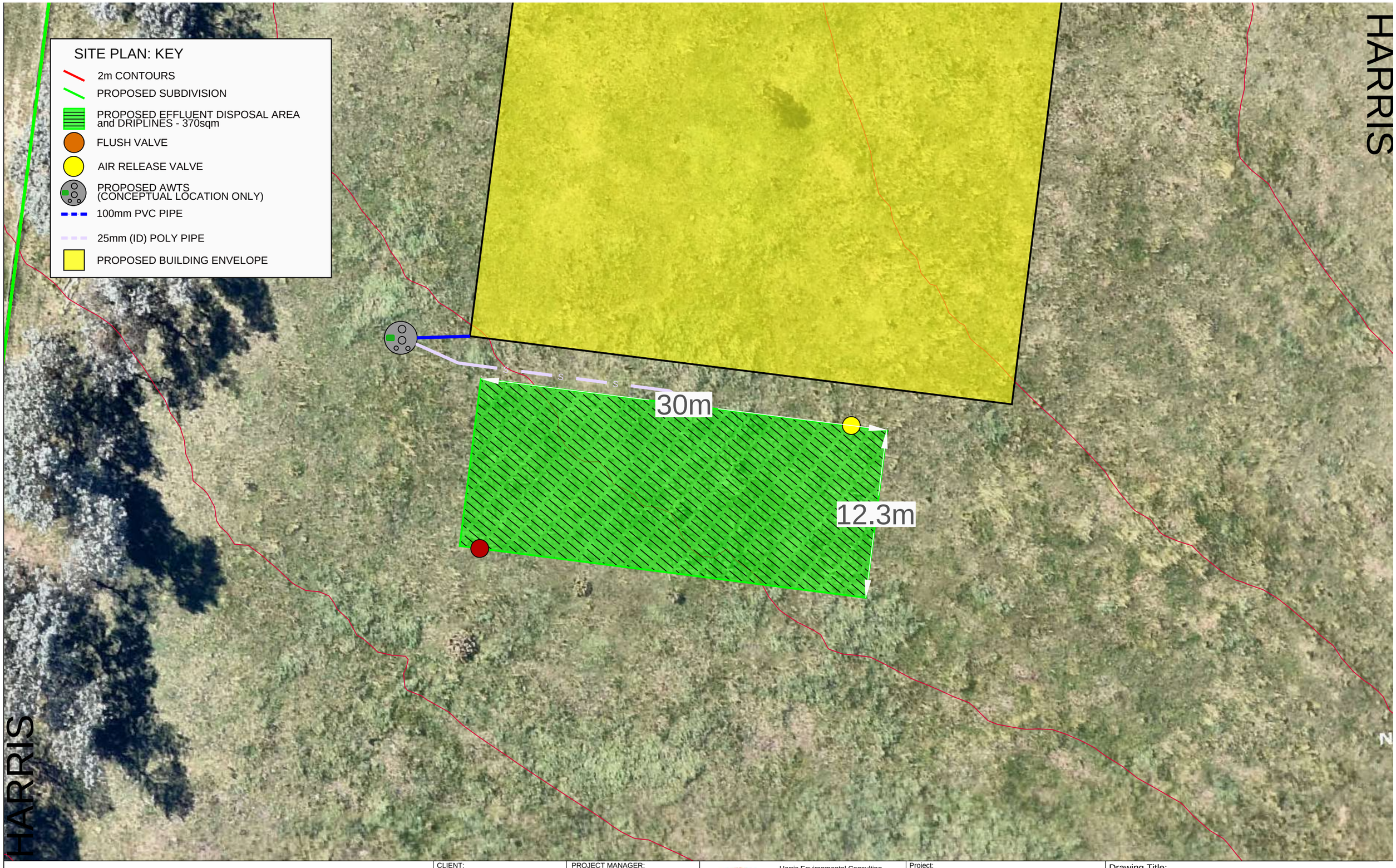

Issue:	Description:	Date	Drawn	Approved
v0.1	Issue for client review	03/10/2024	DM	SH
v1.0	Issue for client submission	22/10/2024	DM	SH

North

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MRS M AND MR I CUMMING
E: iancummingbuilding@gmail.com
P: 0418 165 871

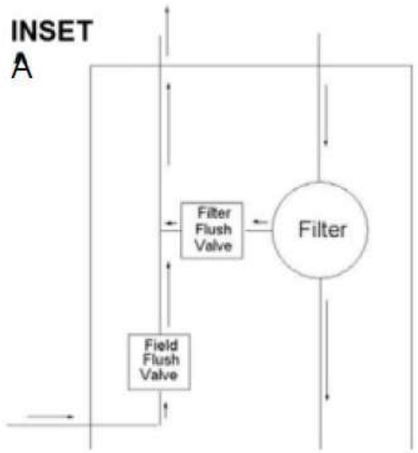
PROJECT MANAGER:
TINA DODSON
PREMISE
E: tina.dodson@premise.com.au
P: 0400 321 109

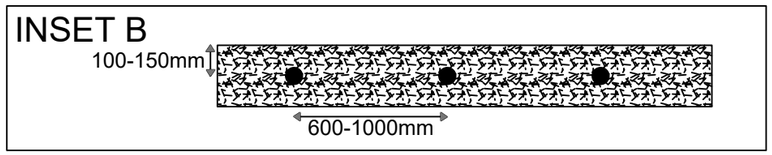
Harris Environmental Consulting
Unit 6/1, Memorial Drive,
Shellharbour City Centre, NSW 2529
T: +61 2 4236 0954
E: info@hec.eco
ABN: 54128740549
Wastewater | Bushfire | Stormwater

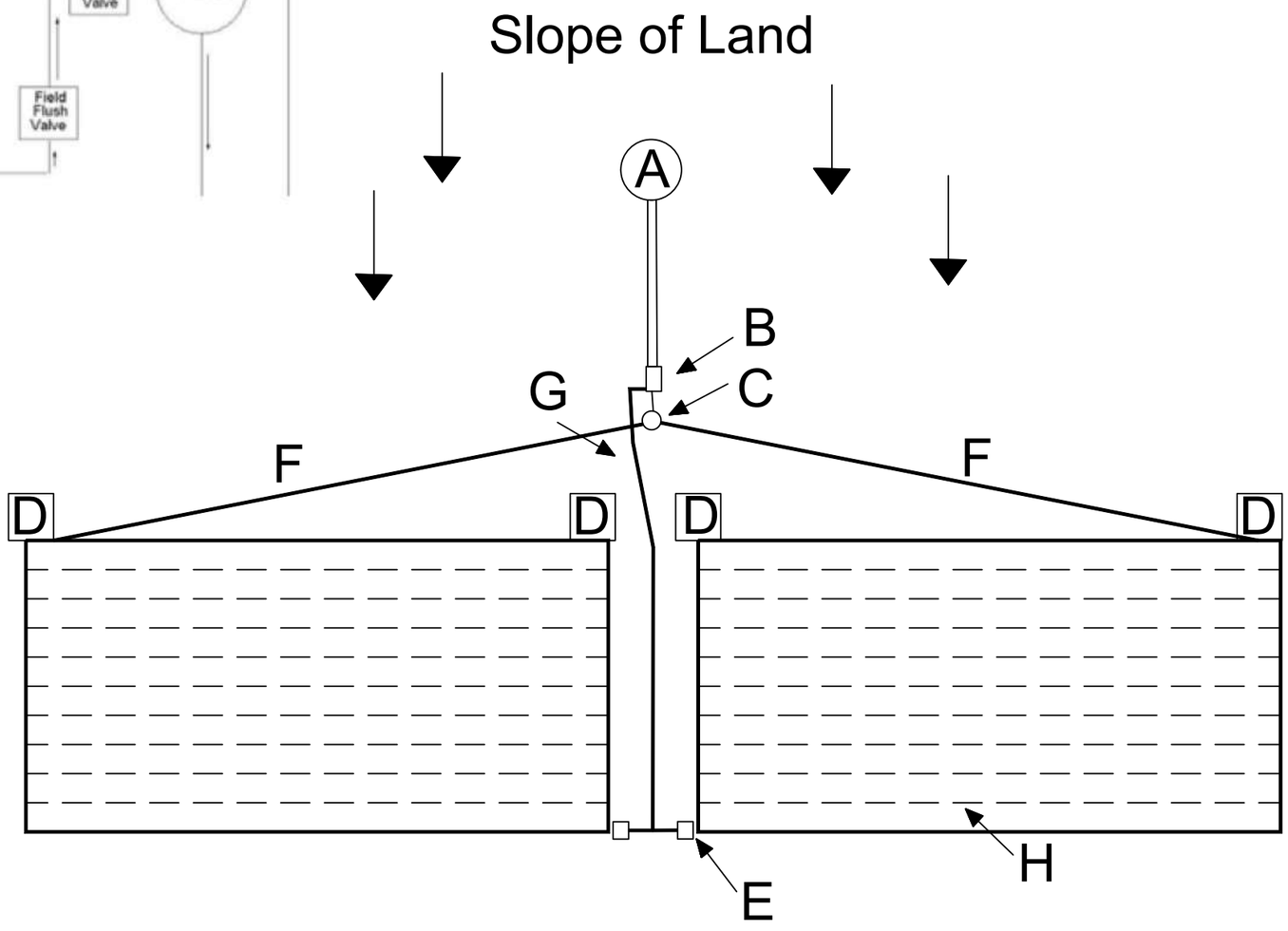
Project:
PROPOSED 2-LOT SUBDIVISION
LOT 336 DP 750015
61 FOORD ROAD, RUN-O-WATERS
LGA: GOULBURN-MULWAREE

Drawing Title:
WASTEWATER MANAGEMENT PLAN DETAILS SHEET No.3

Drawn:	Date:	Paper Size:	Q.A. Check: Date:
DM	22/10/2024	ISO Expand A3	Complete 22/10/2024
Designed:	**Our reference:**	**Scale:**	**Issue:**
DM	7115WW	1:600	v1.0







GENERAL DESIGN AND CONSTRUCTION

The irrigation area should be split into equal zones. Each zone is to receive an even proportion of wastewater, using a sequencing valve (C), such as a water rotor or similar.

A) The irrigation pump must provide a minimum 20m head and a flow rate that matches the design output of the selected dripline. Flow rate will vary depending on emitter spacing, flow rate and lineal metres of line. Each area should be capable of discharching a minimum of 80L/min.

B) Filtration and flushing mechanism (see Insert A) - a filed flush valve must be installed on the return line to facilitate periodic flushing to the treatment tank. An additional filter flush valve should be installed downstream of the filed flush valve. A (minimum) 150 mesh; 100 micron cylindrical filter should to be installed and cleaned regularly.

C) An automatic, hydraulically operated sequencing valve should be installed to deliver effluent evenly to each zone.

D) Air release valves must be installed at high points in each area. Additional air release valves may be required in undulating terrain.

E) Check valves are required for each irrigation field to facilitate periodic flushing. It must be install at at the lowest point of each sub-surface zone and shall be contained within a durable protective housing with a lilac lid to indicate wastewater.

F) Distribution pipes should be 25mm uPVC or polyethylene pipe buried 300mm below the ground surface.

G) Flushing return manifold (See Inset A) should be 25mm uPVC or polyethylene pipe buried 100-150mm below the ground surface within the irrigation area. Outside this area, the pipe must be buried at a minimum of 300mm depth.

H) Pressure compensating (PC) subsurface drip line (typically 16mm) with emitters and laterals at 600mm (max. 1000mm) spacing and buried to a depth of 100-150mm below finished ground level. Only subsurface dripline specifically designed for effluent irrigation must be used.

Note: Where Soil depth is less than 0.25 m, this is considered not suitable for the majority of effluent disposal systems, with the exception of mound systems. Therefore, it is important to closely examine soil values, in particular soil depth, to ensure this is adequate for the proposed system, and that this is confirmed during the site inspection where possible.

Insert B: Cross-Section View

HARRIS

Issue:	Description:	Date	Drawn	Approved
A	HEC Standard Drawing	31/10/2022		SH

Harris Environmental Consulting
PO Box 70,
Jamberoo, NSW 2533
T: +61 2 4236 0954
E: info@harrisenvironmental.com.au
ABN: 54128740549
Wastewater | Bushfire | Stormwater

Designed in accordance with ASNZ1547 (2012) and WaterNSW

To be read in accordance with construction notes in Appendix

Drawing Title:
SUBSURFACE IRRIGATION STANDARD DRAWING - NON-SYDNEY CATCHMENT AREA

Drawn:	Date: 31/10/2022	Paper Size: ISO Expand A3	Q.A. Check: Date:	
Designed:	Our reference:	Scale: NTS	Dwg. No.	Issue:

NorBE Assessment

WEM Summary

version 3

General Information

WEM model ID	**3119790**	Associated DA number	
Model description			
Consultancy	**Harris Environmental Consulting**	Consultant	**matt@harrisenvironmental.com.au**
Consultant reference number	**61 Foord Road**		
Council	**Goulburn Mulwaree**	Assessing officer	
Nominated lot	**336//750015**	Associated lots	
Development class	**Subdivision unsewered <=3 lots**		
Date of model run	**10/3/2024 3:30:38 PM**		

Lot	Section	Plan
336		750015

WEM Model Run Summary

Model run outcome **Satisfied**

Any of the sub-surface plumes reaches:

Lot boundary	**No**
Drainage depression	**No**
Top bank of watercourse	**No**
Another disposal field or onsite stormwater management system	**No**
Within 50m, and up gradient of,a licensed drinking water bore	**No**

Proposed Front End Design

Length (across slope)(m)	**20.0**	Width (up slope)(m)	**18.5**
Proposed area(m2)	**370.0**	Minimum Required area (m2)	**365.0**
Number of trenches	**0**		
Effluent volume proposed (l/day)	**800**		
Effluent volume calculated (l/day)	**800**		

WEM Model Inputs

Location

Easting	**9545532.470524**	Northing	**4329920.064430**
Slope (m/m)	**0.04520**	Slope is suitable based on site inspection (Applicable to some disposal systems on steep slopes)	**N/A**

Development

Development type	**Dwellings**	Development detail	**4 bedrooms**

WaterNSW

NorBE Assessment

WEM Summary

version 3

Water supply type	**Rainwater**	Spa Bath	**No**
Continuous system use	**Yes**		
Treatment system	**AWTS standard**	Disposal system	**Irrigation sub-surface**

Site

Lot size(m2)	**96786**		
Subject to severe frost	**No**	Bulk density(g/cm3)	**1.50**
Vegetation for nutrient uptake	**Lawn - fully managed (clippings removed)**	Phosphorus sorption (mg/kg)	**400**
Soil depth (to impermeable layer) (m)	**1.00**	Soil structure	**High/moderate**
Saturated hydraulic conductivity (Ksat)(m/day)	**0.75**		
Soil texture	**Clay loams**		

Effluent disposal risk factors

Depth to water table	**0.4 - 1.0**
Flood potential of disposal system	**Above 1 in 50 year ARI**
Landform score	**Hill crests, convex side slopes and plains**
Run-on and upslope seepage	**None-low, diversion possible**
Rock outcrops, scarp and bedrock	**< 5%**
Distance to drainage dpression	**> 50**
Distance to watercourses and water supply reservoirs	**> 120**
Distance to licenced drinking water bores	**> 150**

WaterNSW

WEM Summary

WEM Plume Map

NorBE Assessment

WEM Summary

version 3

Legend:	
	Selected lots
	Efffluent management area
	Phosphorus
	Nitrogen
	Faecal colifroms

WaterNSW

NorBE Assessment

Assessment Summary

General Information

Consultancy	**Harris Environmental Consulting**
Consultant	**matt@harrisenvironmental.com.au**
Consultant reference number	**61 Foord Road**
DA number	**-**
Assessing officer	**-**
Council	**Goulburn Mulwaree**
Development class	**Subdivision unsewered <=3 lots**
Date of assessment	**10/23/2024 8:47:28 AM**

Lot	Section	Plan
336		750015

Assessment Summary

Assessment status	**Lodged**		
System outcome	**Satisfied**	User outcome	
WaterNSW concurrence outcome			
Determination outcome	**Pending**	Determination date	

Pre-Assessment

Located within Sydney drinking water catchment?	**Yes**
Is development consistent with any existing SCA/WaterNSW S88 instruments on title?	**Yes**
Crown perpetual leasehold land?	**No**
Water quality impact ?	**Yes**
Documentation is complete?	**Yes**
Does Water Cycle Management Study meet WaterNSW/Council requirements?	**Yes**
Description	

Module 2

Development site slope	**All < 20%**
Construction area(m2)	**1595**
Swimming pool?	**No**
(if yes) Only a swimming pool proposed?	**-**
Proposed system consistent with recommendation in wastewater management report?	**Yes**
Wastewater treatment type emerging technology?	**No**
Pump-out?	**No**
(if yes) Will the property be connected to the sewer in the near future?	**-**

WaterNSW

NorBE Assessment

Assessment Summary

Adequate SSSQM certificate provided?	**Yes**
Development site within 1% AEP flood level flood prone land?	**No**
More than 250m2 of vegetation clearing for dwellings/access/roads/APZ:s?	**No**
(if yes) Have appropriate management measures been proposed?	**-**
Significant cut and fill required for dwellings/access/roads?	**No**
(if yes) Have appropriate management measures been proposed?	**-**
Dwellings/access/roads or within 40m of watercourse?	**No**
(if yes) Have appropriate management measures been proposed?	**-**
Drainage feature crossing Proposed?	**No**
(if yes) Have appropriate management measures been proposed?	**-**
Development areas has widespread salinity and/or sodicity risk?	**No**
(if yes) Have appropriate management measures been proposed?	**-**
Other site constraints?	**No**
(if yes) Have appropriate management measures been proposed?	**-**
All road/access works wholly contained within the road reserve or defined easements?	**N/A**

Wastewater Effluent Models

Model Name	Model Run	Model Reviewed	Model Nominated
1	Y	Y	
1.1	Y	Y	Y

Site Visit

Site inspection date	**26 Sep 2024**
inspectors name	**Sean Harris**
Does EMA meet boundary and infrastructure setback and WaterNSW's buffer requirements?	**Y**
Are the soil parameters used in the WEM consistent with the site?	**Y**
Does this assessment match site visit observations (including major site limitations)?	**Y**

Required NorBE conditions of consent

WaterNSW

NorBE Assessment

Assessment Summary

Condition	Assigned At
The applicant shall implement the proposed stormwater management measures identified on the Small-Scale Stormwater Quality Model (SSSQM) certificate to prevent impacts on water quality.	10/3/2024 11:25:11 AM
An Erosion and Sediment Control Plan shall be prepared by a person with knowledge and experience in the preparation of such plans for all works required as part of the development (of each stage for staged development). The Plan shall: • meet the requirements outlined in Chapter 2 of the NSW Landcom's Soils and Construction: Managing Urban Stormwater (2004) manual • be prepared prior to issuance of a Construction Certificate and be to the satisfaction of Council, and • include controls to prevent sediment or polluted water leaving the construction site or entering any natural drainage system or stormwater drain. 	10/3/2024 11:25:11 AM

Assessment notes

No notes