



On-site Wastewater Management Assessment

**Proposed change of use from studio to
secondary dwelling**

**Lot 6 DP 793261
22 Left Bank Road Mullumbimby**

For:	Susanna Pohlen
Report no:	23582_ww.docx
Date:	November 21 2023



**Greg Alderson
Associates**



**Greg Alderson
Associates**

Contact Information

43 Main Street,
Clunes NSW 2480

Telephone: 02 6629 1552

office@aldersonassociates.com.au
www.aldersonassociates.com.au

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1. INTRODUCTION

Greg Alderson and Associates have been commissioned by Susanna Pohlen to provide an On-Site Wastewater Management Report to address sewage management at Lot 6 DP 793261, 22 Left Bank Road, Mullumbimby. The On-Site Sewage Management System (OSMS) designed in this report is prepared for the main dwelling and the approval of the use of the studio proposed as a secondary dwelling.

The existing system servicing the main dwelling and studio consists of primary treatment only requires upgrading to allow for the use of the structure as a dwelling.

The following report provides information for the site investigation and the proposed On-Site Sewage Management System (OSMS) that will treat wastewater from the above-described dwelling and proposed secondary dwelling.

1.1. Proposed New On-Site Wastewater Management System

The existing wastewater management system which comprises a septic tank and trench, which was initially installed to service the dwelling and the pump-well which has been installed to pump wastewater from the studio/secondary dwelling to the septic tank. It is proposed that this existing wastewater management system is replaced, to allow for the theoretical additional loading of the use of the studio as a secondary dwelling. It is proposed that the new wastewater management system will comprise of an Aerated Wastewater Treatment System which will be positioned to allow for gravity fall from both the dwelling and the secondary dwelling.

The following will be used for the design of the proposed OSMS:

- The design is for the existing 3-bedroom dwelling (4.5 people) and the proposed 1-bedroom secondary dwelling (2 people). Totalling 6.5 people;
- Decommissioning of the existing septic tank and pump well;
- **Water Conserving Devices** to be installed, and the base rate of 145L/person/day equating to a design loading of **942.5/day** total;
- Secondary treatment system, consisting of a proposed NSW Ministry of Health approved Taylex ABS 2000 NR **AWTS**.
- Wastewater disposal area consisting of a new **drip irrigation field**.

2. SITE CONSTRAINTS

The site is constrained due to limited area available for wastewater management as the lower sections of the site are subject to inundation during prolonged rain periods and an easement dissects this area. There is an existing dwelling and pool and associated paving between these areas. The remainder of the property is upgradient to the north, which is relatively steep and densely vegetated. This steeper, densely vegetated area is the only area available for wastewater management, although not ideal. However, even in the event of failure of the existing wastewater management system servicing the existing dwelling, the steep section would be the only reserve area available.

3. SITE DESCRIPTION

Staff of this office investigated the subject property and the proposed wastewater management system location. An inspection of the existing failing OSMS was also made.

The property is shown within its immediate locality on **Exhibit No. 1**.

3.1. Land Area

The total land area of the lot is approximately 4004 m². There is sufficient area available for wastewater treatment and disposal at the site provided the disposal area is incorporated into the steep vegetated area to the north of the dwelling. Appropriate setbacks are able to be achieved from boundaries and buildings.

3.2. Vegetation

The area proposed for wastewater disposal consists of large trees, with many rocks covering the ground. Any loose rocks would need to be removed, along with any loose branches. No trees will be required to be removed to allow for the installation of the new OSMS.

3.3. Slope

The southern portion of the property to the front of the house is relatively flat although is flood prone, and therefore unsuitable for wastewater disposal. The only other available area for disposal is to the north of the dwelling. This area is steep, with a gradient of approximately 45%.

3.4. Soil

The soils of the site consist of light clays and has numerous rock floaters in the proposed wastewater management area. The site lies within the Billinudgel Soil Landscape as located in the maps described in Morand (1994). In the location of the proposed disposal area the soil depth is assumed to be shallow with many rocks. Following is a summary of the soil landscape description by Morand (1994).

Soil Landscape: Mullumbimby Soil Landscape

Soils: Shallow to moderately deep (100cm), moderately well-drained Yellow Podzolic soils and Yellow Podzolic Soil/Soloth intergrades on crests and slopes. Deep (>100cm), moderately well drained Yellow Podzolic soils and red podzolic soils/red earths on siltstones.

Geology: Neranleigh-Fernvale Group.

Limitations: Hard setting, shallow, stony and erodible soils of low fertility. Steep slopes and localised mass movement.

Permeability: Slow- moderate

Some of the limitations as outlined in Morand (1994) were evident in the site assessment, including steep slopes and rocky, shallow soils. The proposed disposal area is steep (45%), although is the only suitable area for wastewater disposal at the site. Amelioration of the pH through the addition of lime can improve the conditions for plant growth.

The following (Table 2) is an assessment for the proposed disposal system in accordance with the *Environment and Health Protection Guideline On-site Sewage Management for Single Households* (EPA et al 1998).

Table 2: Soil Assessment for Wastewater Disposal in accordance to EHPG

SOIL FEATURE	COMMENT	LIMITATION RATING		
		Minor	Moderate	Major
DEPTH OF SOIL	Soil depth is estimated to be greater than 2000mm in depth where rock floaters are not present, however, there are numerous rocks and areas of shallow soils		✓	
DEPTH TO HIGH EPISODIC/ SEASONAL WATERTABLE	The water table was not intersected during borehole tests and no springs or other water discharges were observed. An allowance of 3.0 m to the water table was used in order to size the disposal area based of phosphorous movements	✓		
SOIL PERMEABILITY	The soils in the proposed disposal area are light clays which have an acceptable permeability.	✓		
COARSE FRAGMENTS	No floaters observed around disposal area		✓	
pH	Soil pH is generally acidic (4.5-5.5), and will require lime to be incorporated into the disposal area.	✓		
ELECTRICAL CONDUCTIVITY (dS/m)	Morand (1994) states that the Mullumbimby soil landscape has a very low electrical conductivity, there was no evidence of vegetation being affected by salt	✓		
PHOSPHOROUS SORPTION (kg/ha)	Morand (1994) states that the Billindugel soil landscape has a moderate to high phosphorous sorption rate of greater than 600mg/kg which is equivalent to greater than 10000kg/ha/year.	✓		
MODIFIED EMERSON AGGREGATE TEST	Morand (1994) states that the Billindugel soil landscape has a low dispersive percentage, there were no signs of dispersiveness when soil at site was examined	✓		

Overall, the EHPG (1998) would class the soil as being a moderate limitation for disposal of wastewater due to the presence of rock floaters. Although not ideal, it is the only available area for wastewater at the site.

3.4.1. Improvements to Soil

Increased acidity affects cation exchange capacity and can lead to deficiencies in calcium and magnesium while mobilising aluminium, which is toxic to plant growth. Lime can be added to the soil profile when preparing the area for disposal to increase the pH to a range between 6.5 – 8.5, which will enable plants to take up nutrients, which will be within the wastewater.

Given that the proposed disposal area does generally not involve excavations into the soil, no physical or chemical improvements to the soil are proposed.

3.5. Environment and Health Risk Assessment

The following (Table 3) is an environment and health risk assessment in accordance with the policy for *Design Guidelines for On-Site Sewage Management Systems* Byron Shire Council (December, 2004).

Table 3: Environment and Health Risk Assessment for Proposed Disposal Area.

SITE FEATURE	LIMITATION		REASONING
	NONE	MAJOR	
FLOOD POTENTIAL	✓		The proposed disposal area is not subject to flooding, other areas on the site are subject to flooding.
SOIL TYPE		✓	Light clays which have suitable permeability, however there are numerous rock floaters.
EXPOSURE		✓	Existing tree canopy limits sun exposure.
SLOPE %		✓	Moderately steep (43%).
LANDFORM	✓		Side of a minor ridge
EROSION POTENTIAL	✓		No signs of erosion present in disposal areas.
SUBSOIL DRAINAGE	✓		No visible signs of subsoil dampness in the proposed disposal area.
SURFACE DRAINAGE	✓		No signs of water logging or poor drainage is evident in the propose disposal area.
LAND FILLING	✓		No fill observed in the proposed disposal area.
LAND AVAILABLE FOR APPLICATION AREA AND BUFFERS	✓		Limited suitable land available for wastewater.
ROCKS AND ROCK OUTCROPS		✓	Large rocks were evident across the site and within the proposed disposal area.
TREATMENT SYSTEM	✓		Secondary Treatment via AWTS (replace primary treatment).
BUFFERS	✓		Buffer of 100m to the creek

3.6. Site Constraints and Proposed Best Practice

Tables 2 & 3 presented site constraints that may occur following the BSC Design Guidelines for On-Site Sewage Management Policy (2004) and the Environment and Health Protection Guideline On-site Sewage Management for Single Households (1998). It can be seen that the steep slopes and the rocky shallow soils within the proposed disposal area are constraints to wastewater management.

3.6.1. Rocky Shallow soils

The soils at the site are described as light clays with a high content of rock floaters. Therefore, a disposal area which has limited excavations is the most suitable. ETA beds would not be installable. It is proposed that surface drip irrigation will be installed to achieve wastewater distribution over the disposal area. The dripper lines would be pegged onto the ground after removal of any loose rocks and branches. In more

exposed areas, mulch may be required. While in areas with denser vegetation, accumulated leaf litter would be sufficient.

3.6.2. Steep Slopes

The only suitable disposal area on the property is steep (43%). To ensure the SSI is designed appropriately the following reductions to the Design Irrigation Rate (DIR) from Table M2 of AS/NZS 1547:2012 have been included. Due to the slopes within the disposal area being between >30%, it was concluded that DIR is to be reduced by 50%, and the use of pressure compensating dripper lines be used. This has been incorporated into the OSMS design by multiplying the disposal area generated in Council's design model by 1.5 to represent the 50% increase in area.

Table 1. Reductions to DIR relevant to slope (Source: AS/NZS 1547:2012).

Slope	Reduction in DIR
Flat up to 10%	No reduction
10% to 20%	20%
20% to 30%	50%
> 30%	Advice required from a suitably qualified and experience person
NOTE: See Table 1.1 for conversion of slope per cent grade into slope angle and slope ratio.	

4. JUSTIFICATION FOR THE PROPOSED DESIGN

The proposed wastewater management system, comprising an Aerated Wastewater Treatment System (AWTS) and surface irrigation area in the steep, rocky area of the site is considered the best option for wastewater management for the proposed development based on the following:

- The lower areas of the site which are flatter are constrained due to the easement, flooding, and existing driveways, and buildings therefore there is no area available for wastewater (regardless of an upgrade for the house or for the new system to accommodate the 2 person secondary dwelling);
- The existing system is relatively old and comprises a septic tank and trench, although appears to be working adequately as there are no signs of failure, the system only produces primary treated wastewater, and the proposed system is a vast improvement of the quality of wastewater for the site

5. OSMS DESIGN

It is proposed that the existing wastewater management system servicing the existing dwelling and studio is replaced with a new Aerated Wastewater Treatment System (AWTS) to allow for secondary treatment of all wastewater produced by the dwelling and proposed secondary dwelling. All treated wastewater after the AWTS will then be pumped to a new surface irrigation field for disposal.

The layout of the treatment and disposal system is shown on **Exhibit No. 2 & 3**.

5.1. Predicted Hydraulic Loading

The predicted hydraulic loads are based on the BSC Policy (December, 2004) using town water supply and standard water saving devices (145L/person/day). Below is the predicted hydraulic loading that the proposed OSMS is designed to manage:

Existing dwelling:	3 bedrooms x 1.5 people/bedroom x 145L/person/day	=	652.5 L/day
Secondary dwelling:	1 bedrooms x 2 people/bedroom x 145L/person/day	=	290 L/day
Total	=	942.5 L/day	

5.2. Predicted Nutrient Loading

5.2.1. Nitrogen

The base nutrient loadings are those from the BSC OSMS computer design model. It is proposed that a Taylex ABSNR - 2000 AWTS system is used for providing secondary treatment for the existing dwelling and proposed secondary dwelling. The Taylex ABSNR - 2000 AWTS is stated to provide a nutrient removal of up to 53% for Total Nitrogen (TN) and 26.46% for Total Phosphorous (TP) on the NSW Ministry of Health Accreditation.

The approved TN of the Taylex ABSNR - 2000 AWTS is used for sizing the disposal area. This was achieved by increasing the TN reduction in cell D9 to 53%. No TP reduction was included in the modelling of the disposal area.

A copy of the NSW Health Certificate of Accreditation is attached as Appendix A of this report.

5.3. Disposal Area Required

This section investigates the disposal area required based on the predicted hydraulic and nutrient loadings from the dwelling and studio, and environmental factors which influence the design. In order to ascertain the size of the disposal area, the model within the Byron Shire Council Design Guidelines for On-site Sewage Management for Single Households was used with the following parameters.

- 3 bedrooms in main house (4.5 persons) + proposed 1 bedroom secondary dwelling (2 persons): **6.5 people** total;
- Land area of 4004 m²;
- Setback to permanent water 100m;
- 145L/person/day for water conserving devices and tank water supply;
- Light Clays – Strongly structured soils;
- Taylex ABSNR - 2000 AWTS for secondary treatment using approved 53% TN reduction;
- 3.0 m distance to groundwater;
- No TP reductions factored into the model;
- SSI nominated for disposal method;

The disposal area required for the hydraulic and nutrient loadings is as follows:

Area Required for	Hydraulics:	333 m ²
	Nitrogen:	348 m ²
	Phosphorus:	76 m ²

The area required for disposal according to the nutrient loading was calculated to be 333m². As outlined in section 2.6.1, the calculated disposal area is required to be multiplied by 1.5 to factor in a 50% increase to the irrigation rate to account for the steep slopes, and this is factored on the hydraulic loading, not the nutrient loading (as that does not change). Therefore, the **required disposal area** to be installed is calculated as:

$$333\text{m}^2 \text{ hydraulic area} \times 1.5 = \mathbf{499.5 \text{ m}^2}$$

A copy of the design model calculations is attached as Appendix B.

5.4. Wet Weather Storage

It is proposed that wet weather storage will not be installed at this site, in accordance with BSC Policy (December, 2004). It is proposed that no wet weather storage is used based on the following:

- the disposal area is sized on the daily model where no cumulative storage is required;
- the size of the disposal area is conservative (i.e., lower hydraulic load application rates expected).

5.5. Suspended Solids

Some reduction in solids will occur with settling in the AWTS. Additional reduction in suspended solids will be in the use of a 120 mesh (130 micron) filter after the pump at the pump tank. This filter will aid in the prevention of the dripper emitters becoming clogged. The filter will need to be cleaned as part of the maintenance regime every 3 months.

5.6. Design of OSMS

Secondary treatment is to be provided by an Taylex ABSNR - 2000 AWTS. The AWTS is to be positioned in a garden bed just to the south of the pool, and the existing septic tank is to be decommissioned. To achieve the required pump duty of the SSI field, a Davey D42A/B submersible pump will be required to be installed in the pumping chamber of the AWTS. The NSW Ministry Health accreditation for this AWTS is attached as Appendix A.

A detailed irrigation design is attached to this report and consists of the following:

- A disposal area of **drip irrigation**;
- The area required for disposal of wastewater is 499.5 m²
- It is proposed that no trees are required to be removed for the installation of the irrigation field, although loose rocks and cut branches are to be removed. Irrigation lines are to be pegged into the ground and mulch (150mm layer) may be required in exposed areas, while accumulated leaf litter is sufficient in denser vegetated areas.
- The irrigation plan is shown on **Exhibit No. 2, 3 & 5**, with technical details presented. Technical details include:
 - Dripper line spacing
 - Emitter spacing
 - Pipe sizes (delivery main and submains)
 - Pump duties for all pumps
 - Dosages, irrigation time and number of blocks
 - Pegging requirements

- Mulch requirements

Exhibit No. 4 presents a step-by-step flushing detail of the irrigation fields.

The dripper line proposed to be used is Netafim Unibioline CNL. Appendix C provides a copy of the technical data for this dripper line

5.7. Decommissioning of Septic Tank

The following measures are to be taken in decommissioning the existing OSMS:

1. Disconnect the septic tank from the dwelling and divert wastewater to the new AWTs;
2. Have the septic tank pumped out and de-sludged by a licensed septic tank pumping company;
3. Apply hydrated lime over the insides of the septic tank;
4. Ideally the septic is to have holes broken into the base of the tank and the walls and lids collapsed in on the base and then covered over with soil.

Details of the decommissioning of the septic tank is attached.

6. MAINTENANCE PLANS

The following is a maintenance check list for the OSMS for the dwellings which is to be undertaken by the client and a qualified service agent.

6.1. General

- Bleach, bleach-based products, whiteners, nappy soakers and spot removers shall not be disposed of into the on-site system. They shall be disposed of on a disused area of a garden, well away from the disposal area.
- Hygiene products, condoms, tampons, sanitary napkins, disposable nappies and cotton buds shall not be disposed of via the on-site disposal system. They should be disposed of into garbage bins in sealed plastic bags.
- Only the recommended amounts of disinfectants should be used. Biodegradable products for septic systems are recommended. Runoff diversion banks to be inspected annually and maintenance as required undertaken to ensure that surface runoff is diverted around each of the disposal areas.

6.2. AWTs

Regular servicing and maintenance are required, commonly on a quarterly basis. The owner therefore must enter a service contract with a service agent. A copy of the service report is forwarded to Council within 14 days from the date of service. At each service, the treatment system and effluent disposal system should be checked, including:

- all pumps;
- the air blower, fan or air venturi;
- the alarm system;
- the operation of the sludge return system, where installed;
- pH from a sample taken from the irrigation chamber;
- check on sludge accumulation in the septic tank (primary treatment chamber) and the clarifier where appropriate;

- a thorough inspection & testing (if appropriate) of the effluent disposal field and all fixtures to ensure operation is in accordance with the approved design; and
- a sludge bulking test is required annually if activated sludge or contact aeration is used.

6.3. Disposal field

Sub-surface drip irrigation requires the following maintenance.

- Quarterly three (3) monthly flushing of the system.
- Cleaning of online filter.
- Checking the components are functioning as required. These components may be the flush valves, vacuum breakers/air release valves, indexing valve and pump.
- If a TECH filter is installed, replacement is made as per manufacturer's recommendations i.e. usually every two (2) years.
- Re-mulching as required to maintain 150mm cover over the irrigation

A step-by-step flushing detail is provided in Exhibit no. 4.

7. CONCLUSION

A new OSMS has been designed for the existing dwelling and proposed secondary dwelling at Lot 6 DP 793261 22 Left Bank Road, Mullumbimby. It is determined that on-site wastewater management can be achieved at the subject site conforming to the environmental and health objectives of BSC Policy (December, 2004) provided the following is undertaken:

- Decommission the existing septic tank, pump well and disposal area;
- Install a Taylex ABSNR - 2000 AWTS for treatment of all wastewater generated from the existing dwelling and proposed secondary dwelling;
- The AWTS to be positioned to allow for gravity fall from both dwellings on site (to be determine by plumber)
- Wastewater will be pumped from the AWTS to a 499 m² new drip irrigation disposal field which will achieve the requirement for the hydraulic and nutrient loads, and has taken into account the steep slopes. See Exhibit No. 2, 3 & 4 for details;
- A maintenance program listed in Section 5.0 & Exhibit No. 4 will be undertaken by a qualified service agent.

8. REFERENCES

Australian Standard AS/NZ 1547 - 2012 *On-Site Domestic-Wastewater Management*.

Byron Shire Council (December, 2004). *Design Guidelines for On-site Sewage Management Systems*. Protecting the Environment and Health of Byron Shire. Technical Guidelines for System Designers.

Cromer W C, Gardner E A & Beavers P D. (2001) An Improved Viral Die-Off Method for Estimating Setback Distances. *Proceedings of On-site '01 Conference: Advancing On-site Wastewater Systems*. Armidale: Lanfax Laboratories.

Davis, M L, Cornwell, D A (1998). *Introduction to Environmental Engineering*. McGraw Hill.

Environment Protection Authority, Dept. of Local Government, Department of Land & Water Conservation and NSW Department of Health (Feb 1998). *Environment and Health Protection Guidelines - On-Site Sewage Management Systems for Single Households*.

Morand, D.T. (1994). *Soil Landscapes of the Lismore-Ballina 1:100,000 Sheet* Report, Soil Conservation Service of NSW, Sydney.

Appendices

Appendix A – NSW Ministry of Health Certificate of Accreditation for the Taylex ABSNR – 2000 AWTS



Certificate of Accreditation

Sewage Management Facility

Aerated Wastewater Treatment System

Advanced Secondary Effluent

Nutrient Reduction

This Certificate of Accreditation is issued by the Secretary of the NSW Ministry of Health pursuant to Clause 41(1) of the Local Government (General) Regulation 2021.

System: Concrete ABSNR-2000 Advanced Secondary Nutrient Reduction AWTS

Manufacturer: Taylex Australia Pty Ltd

Address: 56 Prairie Road, Ormeau, Queensland, 4208

The Taylex Concrete ABSNR-2000 Advanced Nutrient Reduction AWTS as described in Schedule A, has been Accredited as a sewage management facility in accordance with the Secondary Treatment System Accreditation Guideline 2018 for use in single domestic premises in NSW. This Accreditation is subject to the conditions and permitted uses specified in Schedule B.

*Director, Environmental Health
for Secretary (delegation PH335)*

Issued: 20/12/2022

Certificate No: STS-AWTS069

Expires: 31 December 2027

Schedule A:

Specification: Taylex Concrete ABSNR-2000 Advanced Secondary Nutrient Reduction AWTS

Name and Model of STS: Taylex Concrete ABSNR-2000 Advanced Nutrient Reduction Secondary AWTS
(known as Taylex Concrete ABSNR-2000 Advanced AWTS)

The Taylex Concrete ABSNR-2000 Advanced AWTS is designed to treat sewage daily flow rate of 2000 litres per day from a residential dwelling occupied by 10 persons.

The STS is contained in one of the following concrete vessel(s):

- Vessel 1: A collection well with design capacity of 9,320L NSW Health Accreditation Number STCW-045; or
- Vessel 2: A collection well with design capacity of 11,000L NSW Health Accreditation Number STCW – 045; or
- Vessel 3: A collection with design capacity of 11,700L NSW Health Accreditation Number STCW – 045.

The vessels have the same diameter but vary in height.

Chamber	Design capacities
Primary treatment	2,526 L (1,684 + 842 L)
• Partition	yes
Secondary treatment	2,980 L (1,490 + 640 + 850 L)
• Aeration chamber	842 L
• Clarifier	2,071 L
• Irrigation chamber	602 L
Emergency storage	3,440 L
Operational water level (depth)	
• primary	1,430 mm
• secondary	1,410 mm

The emergency storage capacity is achieved by increased height of chambers.

The attached "Specification" should be consulted.

Schedule B: Conditions of Accreditation

1. General

- 1.1 Prior to installation the owner/occupier of the premises shall make an application, in accordance with Clause 26 of the *Local Government (General) Regulation 2021*, to the local authority for approval to install and operate the Taylex Concrete ABSNR-2000 Advanced AWTS as a Sewage Management Facility in accordance with Section 68, Part C of the *Local Government Act 1993*.
- 1.2 The local authority shall apply those Conditions of Accreditation, appropriate to the owner / occupier, to any approval to operate the Taylex Concrete ABSNR-2000 Advanced AWTS issued under Clause 45(4), *Local Government (General) Regulation 2021*.
- 1.3 In accordance with Clause 36 of the *Local Government (General) Regulation 2021*, the Taylex Concrete ABSNR-2000 Advanced AWTS shall have an expected service life of 5 years in the case of mechanical and electrical components and 15 years in the case of other components.
- 1.4 The owner / occupier shall ensure that the Taylex Concrete ABSNR-2000 Advanced AWTS is installed or constructed:
 - in accordance with the accredited specifications of the type tested unit and in accordance with good trade practice, and
 - so as to allow ease of access for maintenance, and
 - with regard to the health and safety of users, operators and persons maintaining the facility, and
 - must be installed or constructed so as to make appropriate provision for access to, and removal of, contents in a safe and sanitary manner, and
 - must, if it is intended to be a permanent fixture, be anchored to prevent movement.

- 1.5 The manufacturer / supplier shall ensure that the Taylex Concrete ABSNR-2000 Advanced AWTS is supplied, constructed, and installed in accordance with the design (including the disinfection unit) as submitted and accredited by the NSW Ministry of Health. The Taylex Concrete ABSNR-2000 Advanced AWTS shall not be modified or altered except that alternate individual mechanical and electrical components such as pumps, PLCs, etc, may be substituted provided that the component meets the accredited design specification.
- 1.6 Any permanent modification or variations to the accredited design of the Taylex Concrete ABSNR-2000 Advanced AWTS shall be submitted for separate consideration and variation of the Certificate of Accreditation by the NSW Ministry of Health. Modifications will be considered in accordance with section 2.3.13 of AS1546.3:2017.
- 1.7 Each Taylex Concrete ABSNR-2000 Advanced AWTS shall be permanently and legibly marked by the manufacturer in accordance with section 3 of AS1546.3:2017.
- 1.8 The manufacturer shall supply with each Taylex Concrete ABSNR-2000 Advanced AWTS an owner's manual, which sets out the care, operation, maintenance and on-going management requirements of the system. The owner's manual prepared by the manufacturer shall specifically contain a plan for the on-going management of the Taylex Concrete ABSNR-2000 Advanced AWTS. The manual shall include details of:
 - the treatment process,
 - procedures to be followed in the event of a system failure,
 - emergency contact numbers,
 - maintenance requirements,
 - inspection and sampling procedures to be followed as part of any on-going monitoring program developed by the local authority.
- 1.9 The manufacturer shall provide the following information to each local authority where it is intended to install a Taylex Concrete ABSNR-2000 Advanced AWTS in their area once Ministry Accreditation has been obtained:

<ul style="list-style-type: none"> • Statement of warranty • Statement of service life • Quality Assurance Certification • Installation Manual • Service Manual • Owner's Manual 	<ul style="list-style-type: none"> • Manufacturer's Service Report Form • Engineering Drawings • Specifications • A4 Plans • Certificate of Accreditation documentation from NSW Health.
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The manufacturer need not provide the above information to the local council where the information or document is contained on the manufacturer's web site.

2. Installation and Commissioning

- 2.1 The owner / occupier shall have the Taylex Concrete ABSNR-2000 Advanced AWTS inspected and checked by the manufacturer or the manufacturer's agent. The manufacturer or the agent is to certify that the system has been installed and commissioned in accordance with its design, conditions of accreditation and any additional requirements of the local authority.
- 2.2 The owner / occupier shall ensure that all electrical work is carried out on the Taylex Concrete ABSNR-2000 Advanced AWTS by a licensed electrician and in accordance with the relevant provisions of AS/NZS 3000.
- 2.3 The owner / occupier shall not commission the Taylex Concrete ABSNR-2000 Advanced AWTS unless the land application system has been completed.

3. Maintenance

- 3.1 The owner / occupier of the premises shall enter into a minimum 12-month contract or agreement with a service agent and ensure that the Taylex Concrete ABSNR-2000 Advanced AWTS is serviced:
- in accordance with the manufacturer's / supplier's service manual and using the manufacturer's / supplier's service sheet; and
 - by a service agent who
 - has completed a course on the servicing and maintenance of STS; and has some supervised servicing experience or extensive un-supervised experience;
 - is employed or authorised by the manufacturer / supplier of the Taylex Concrete ABSNR-2000 Advanced AWTS;
 - uses replacement parts which meet the minimum specification of the Taylex Concrete ABSNR-2000 Advanced AWTS;
 - has advised of their name, contact details and credentials to the local authority;
 - submits a completed NSW Health "Local Council Service Report" (template attached) to the local authority immediately after each and every service;
 - shall report to the local authority any instances where the owner / occupier refuses to authorise repairs, replacement of parts or maintenance; and
 - does not perform electrical work or enter confined spaces unless trained and is suitably qualified to do so.
- 3.2 The owner/occupier shall not service the Taylex Concrete ABSNR-2000 Advanced AWTS unless they are an authorised agent of the manufacturer.
- 3.3 The Taylex Concrete ABSNR-2000 Advanced AWTS once installed and commissioned shall be serviced at three (3) monthly intervals.
- 3.4 The manufacturer / supplier of the Taylex Concrete ABSNR-2000 Advanced AWTS shall place on its web site a copy of the service manual, service sheet or form and specifications for the Taylex Concrete ABSNR-2000 Advanced AWTS to facilitate servicing, maintenance and repairs. Commercial-in-confidence documents may be provided directly to the service agent without uploading to the web site.
- 3.5 Each three-monthly service shall, as a minimum where provided, include a check on all mechanical, electrical and functioning parts of the system including:
- The chlorinator and replenishment of the disinfectant,
 - Pump and air blower,
 - The alarm system,
 - Slime growth on the filter media,
 - Operation of the sludge return system,
 - The effluent irrigation area,
 - On-site testing for free residual chlorine, pH and dissolved oxygen at the appropriate check points.

4. Verification

- 4.1 Effluent from the Taylex Concrete ABSNR-2000 Advanced AWTS taken in any random grab sample shall comply with the following standard:
- BOD⁵ less than 30 mg/L
 - TSS less than 45 mg/L
 - E. coli less than 100 cfu/100 ml
 - Free residual chlorine greater than 0.2 and less than 2.0 mg/L

5. Permitted uses

- 5.1 The effluent is suitable for re-use for garden purposes by way of any of the forms of irrigation as described in AS/NZS 1547:2012:
- above ground spray irrigation; and/or
 - surface drip irrigation covered by mulch; and/or
 - sub-surface drip irrigation installed at around 100 mm depth; and or
 - any form of sub-soil application.
- Each of the forms of irrigation or application is subject to the approval of the local authority.

6. Advanced Secondary Treatment System

- 6.1 The Taylex Concrete ABSNR-2000 Advanced AWTs when tested by a Product Certification Body in accordance with AS1546.3:2017 was found to comply with the Advanced Secondary Effluent Criteria as follows:

**TABLE 2.1 (Abrev) AS1546.3:2017
ADVANCED SECONDARY EFFLUENT COMPLIANCE CRITERIA FOR A STS**

Parameter	Advanced secondary effluent	
	90% of Samples	Maximum
BOD5	≤ 10mg/L	12 mg/L
TSS	≤ 10 mg/L	8 mg/L
<i>E. coli</i> *	≤ 10 cfu/100mL	3 cfu/100mL
FAC p	Minimum 0.5 mg/L†	N/A
Turbidity ?	N/A	10 NTU

* Where disinfection is required.

p Where chlorine disinfection is used.

† Minimum level, not 90% of samples.

? Where UV light is used for disinfection.

7 Reduction in nutrient levels

During the testing of the Taylex Concrete ABSNR-2000 Advanced AWTs the treated effluent was tested for total Nitrogen (TN) and total Phosphorous (TP) concentrations. The treatment process has the capacity to reduce the TN and TP concentrations as follows:

- Total N from an average of 70.4 mg/l to 31.94 mg/l which represents a reduction of 54.7%.
- Total P from an average of 11.64 mg/l to 8.76 mg/l which represents a reduction of 24.74%.

Local Council STS (DGTS) Service Report: February 2018		
Owner's Name:		Local Council:
Installation Address:		
System Brand & Model:	<input type="checkbox"/> Domestic	<input type="checkbox"/> Commercial
Date of this service: / /	Date of last Service: / /	Next service due: / /
Has the STS/DGTS been serviced in accordance with the manufacturer's / supplier's requirements and using the service sheet? <input type="checkbox"/> Yes <input type="checkbox"/> No If "No" why not?		
STS/DGTS functioning correctly? <input type="checkbox"/> Yes <input type="checkbox"/> No If "No" why not?		
According to sludge-judge or other methodology is de-sludging needed? <input type="checkbox"/> Yes <input type="checkbox"/> No If "Yes" what action is recommended?		
Offensive odours? <input type="checkbox"/> Yes <input type="checkbox"/> No If "Yes" what action is recommended?		
Alarms tested and functional? <input type="checkbox"/> Yes <input type="checkbox"/> No If not "functional" what action is recommended?		
Final Effluent Quality Tested? <input type="checkbox"/> Yes <input type="checkbox"/> No Disinfected? <input type="checkbox"/> Yes <input type="checkbox"/> No Chlorine tablets remaining? <input type="checkbox"/> Yes <input type="checkbox"/> No Quality? <input type="checkbox"/> Satisfactory <input type="checkbox"/> Unsatisfactory On what evidence is this judgement made? If "Unsatisfactory" what action was recommended?		
Land Application Area Surface ponding? <input type="checkbox"/> Yes <input type="checkbox"/> No Run off? <input type="checkbox"/> Yes <input type="checkbox"/> No Excess plant growth? <input type="checkbox"/> Yes <input type="checkbox"/> No Effluent leaving premises. <input type="checkbox"/> Yes <input type="checkbox"/> No High risk areas contaminated? * <input type="checkbox"/> Yes <input type="checkbox"/> No * Patio, play areas, BBQ, etc Operating satisfactorily? <input type="checkbox"/> Yes <input type="checkbox"/> No If "Not operating satisfactorily" what action was recommended?		
Overall Condition of STS? <input type="checkbox"/> Excellent <input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor Comments / Action Recommended / Repairs Needed / Repairs Performed: Has the owner / occupier taken recommended actions? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Service Agent:		Contact Details:
Signature:		Date:

Source: Adapted from "Checklist 4.2: Operational AWTS inspection report for use by service providers and Council inspectors" in *Designing and Installing On-Site Wastewater Systems*, Sydney Catchment Authority, May 2012



Taylex
WASTEWATER

Specification

CONCRETE ADVANCED BLOWER SYSTEM

-Nutrient Reduction

-2000L/per day

ABSNR-2000

TAYLEX ADVANCED BLOWER SYSTEM NUTRIENT REDUCTION 2000L/ per day ABSNR -2000

Specification

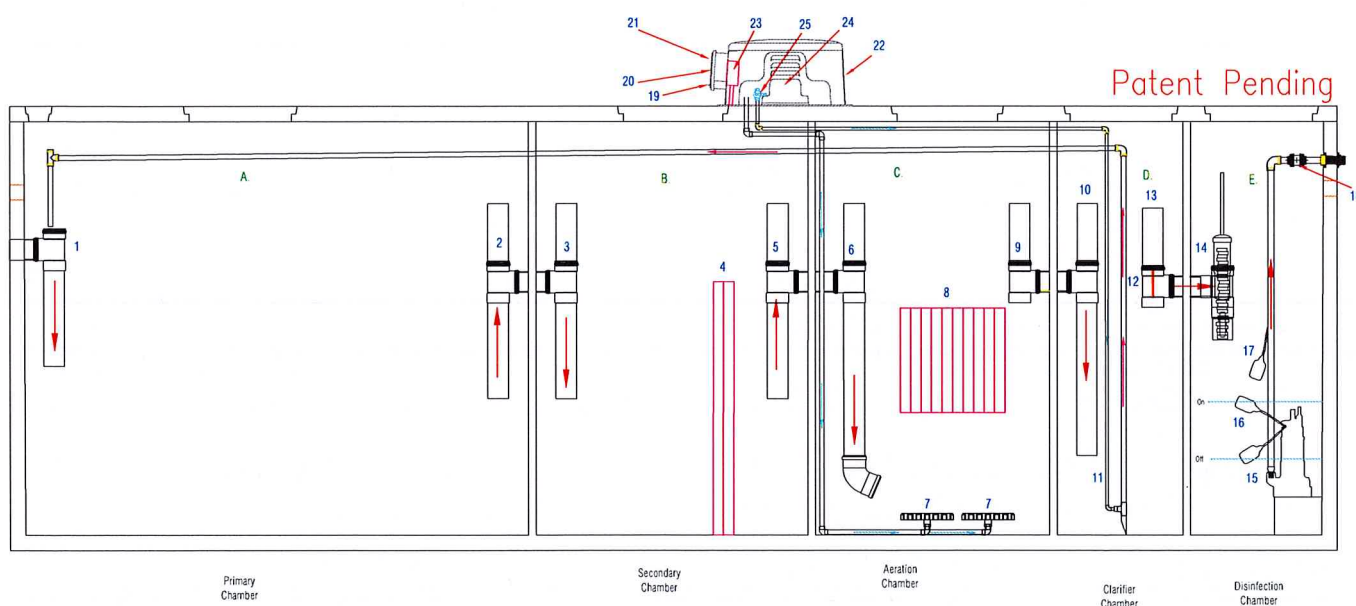
General Description:

The Taylex Advanced Blower System NR 2000 (ABSNR-2000) Secondary Treatment System (STS) is designed to treat the wastewater from a residential dwelling up to 2,000 Litres per day, with a daily flow of 150 Litres per person and an average daily BOD⁵ 70g per person.

The Taylex ABSNR-2000 STS is contained in one vertical axis type cylindrical precast concrete collection well with a design capacity of 9,320 Litres and an operating capacity of 5,880 Litres.

Flow path of wastewater:

1. A primary pre-treatment chamber, with a capacity of 1,684 Litres.
2. A secondary pre-treatment chamber, with a capacity of 842 Litres.
3. An aeration chamber, with a capacity of 2,071 Litres. This chamber is fitted with bio block media, 2, 9" disk diffusers.
4. A sedimentation / clarifier chamber, with a capacity of 662 Litres, containing a Taylex Filter Control (TFC) fitted to the outlet, and recirculation to the primary.
5. A Disinfection chamber, with a capacity of 621 Litres, incorporating a capacity of 300 Litres for chlorine contact of effluent. A chlorine disinfection unit is installed on the inlet to the irrigation chamber. The system is fitted with either a Davey D25 or D42 Irrigation Pump.
6. An Emergency Storage Buffer 3440 Litres.
7. The automatic irrigation pump transfers the treated effluent to the effluent disposal area / land application area (LAA).



Product Specification Table:

Australian Standards Compliance		
Effluent Testing	AS1546.3:2017	
Tank Design and Testing	In Ground	AS1546.1:2008
	Above Ground	AS3735.2001
System Model	ABSNR-2000	CONCRETE
Treatment Level	Advanced Secondary + % Nutrient Reduction	

Tank Capacity	
Total Tank Capacity	9320L
Operating Capacity	5880L

System Chamber Capacities	
Primary Chamber	1684L
Secondary Chamber	842L
Aeration Chamber	2071L
Clarifier Chamber	662L
Irrigation Chamber	621L
Emergency Storage	3440L
Maximum Hydraulic Loading Capacity	2,000 litres per day / 13EP

Design Parameters		
Parameter	Total Per Day	Total Per person Per Day
Daily Flow	2,000L / 13 EP	150L
Maximum Organic Loading BOD ⁵	910g	70g
Total Suspended Solids (TSS)	910g	70g
Total Nitrogen (TN)	135g	15g
Total Phosphorus (TP)	22.5g	2.5g

Effluent Compliance: AS1546.3:2017		
Biochemical Oxygen Demand (BOD ⁵)	<10mg/l	
Total Suspended Solids (TSS)	<10mg/l	
E.Coli	<10cfu/100ml	
Min. FAC	Min 0.5 mg/l	

Temperature		
Operating Temperature C°	Minimum	Maximum
	-2°C	45°C

Electricity Consumption	
Kilowatt hours per day (kWh/d)	2.50
Kilowatt hours per 1000L (kWh/1000L)	1.33

Servicing and Maintenance	
Servicing Frequency	Every 3 months

Components List & Repair/ Replacement Instructions:

- | | |
|-----------------------|--|
| 1. Primary Chamber | - 100mm inlet Junction, BIO Block |
| 2. Secondary Chamber | - 100mm Junction x 2 |
| 3. Aeration Chamber | - 100mm Junction x 2, BIO Block, Air Lift, Disk Diffuser |
| 4. Clarifier Chamber | - 100mm Junction, Taylex Filter Control, Recirculation Chamber |
| 5. Irrigation Chamber | - 100mm Junction, Chlorine Dispenser, Irrigation Pump, High Level Alarm Float, 100mm Elbow |

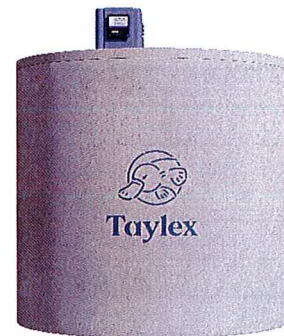
Component List

TANK

Concrete Tank and Lid
 Made from 32mpa concrete with SL 41Mesh

Repair / Replacement Details:
 Replacement lids available from Taylex Industries or your local Service Agents.

Chips and cracks can be repaired using Sika panel patch or mortar.



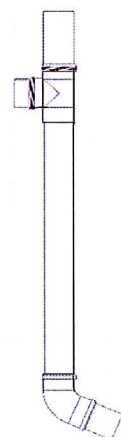
- 1) 100mm Sweep Tee With dropper pipe and riser
- 2) Repair / Replacement Details:
 Replacement tee and pipe can be purchased from a local plumbing store. Cut 100mm pipe at wall and using a 100mm slab repair coupling install new tee.
- 5)



- 4) BIO Block Media
 Width - 385mm
 Length - 110mm
 Height - 1400mm
 Surface Area - 20.6m²



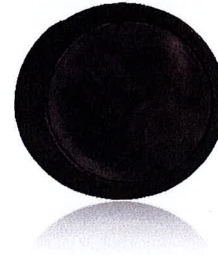
- 6) 100mm Sweep Tee With 1000mm dropper pipe and 100mm 45° M&F Bend
- Repair / Replacement Details:
 Replacement tee and pipe can be purchased from a local plumbing store. Cut 100mm pipe at wall and using a 100mm slab repair coupling install new tee.



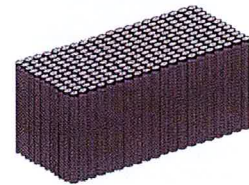
- 7) Diffuser x 2
 Material – EPDM
 Diameter – 250mm (9inch)

Repair / Replacement Details:

Turn the system off. Replace the diffuser by making a new complete aeration pipe assembly fitted with the Diffuser. Cut the main aeration supply line, place the new diffuser in the system, weighed down with a small concrete block and rotate the diffuser under the biomass. Re fix the new aeration pipe assembly complete with a joining socket. Removing the old Diffuser is not required. Turn the system on. Purchase the complete assembly from Taylex.



- 8) BIO Block Media
 Width - 550mm
 Length - 1100mm
 Height - 500mm
 Surface Area - 105m²



- 9) 100mm Sweep Tee With dropper pipe and riser

- 10) **Repair / Replacement Details:**
 Replacement tee and pipe can be purchased from a local plumbing store. Cut 100mm pipe at wall and using a 100mm slab repair coupling install new tee.
- 13)



- 11) Recirculation System

For the transfer of fluids using the 'Venturi Principle'. Air is injected toward the base of a vertical open ended PVC conduit. Continuous displacement occurs as the air moves vertically to the liquid, drawing liquid through the bottom of the conduit. The air/liquid mixture reaches a vertical maximum where it then moves through the 90° bend into the primary chamber. The conduit is arranged in the base of the clarifier so that the residual sludge constitutes the main vacuum target.

Sludge Base Removal

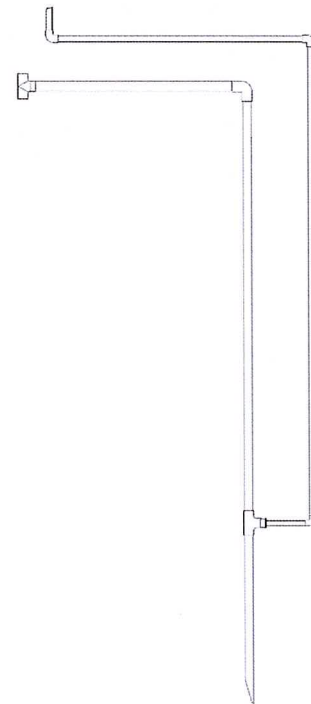
Sludge deposit removal is to be scheduled 1 time per 6 years or as determined necessary by a licenced Taylex Sales Technician or the client or due to mechanical failure.

Servicing

Routine maintenance/servicing of the Taylex ABSNR -2000 is to be scheduled quarterly or as determined necessary by an approved Taylex Sales Technician or due to mechanical failure. Refer to Field Service Report sheet for testing requirements.

Repair / Replacement Details:

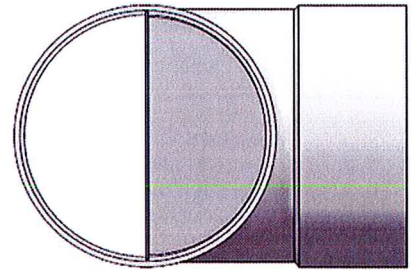
Turn the system off. Replace the Sludge Recirculation Assembly by cutting the main line and installing the new assembly with a joining socket. Turn the system on. Purchase the complete assembly from Taylex.



12) Taylex Filter Control (TFC)
 Material – Stainless steel

Repair / Replacement Details:

Replace the TFC assembly by cutting the 100mm slab repair coupling, install the replacement TFC assembly.



14) Chlorine Dispenser
 Material – HD Polyethylene
 Length – 500mm
 Diameter – 90mm

The chlorine dispenser is placed in the 100mm Tee located in the irrigation chamber.

Repair / Replacement Details:

Repairing the Chlorine Dispenser is not recommended. If the Dispenser is damaged, replace it with a new unit. Purchase the complete assembly from Taylex.



15) Irrigation Pump
 The irrigation pump is self-controlled via a ball bearing activated float switch. When the according volume is reached in the pump chamber, the ball bearing in the float moves and creates an active connection. The treated effluent is pumped to the approved dispersal zone, as the chamber reaches minimum volume, the float drops and de-activates the pump. The type and capacity of the pump will be in accordance with the land application requirements.

Repair / Replacement Details:

Turn the system off. Replace the pump by disconnecting the barrel union, be sure not to drop the internal valve assembly. Lift the Pump Assembly out of the tank. Undo the threaded fitting connect to the outlet of the pump. Re apply thread tape and fix the threaded fitting back onto the pump. Return the assembly to the tank and re-connect the barrel union, ensuring the valve is seated correctly. Turn the system on. Purchase the correct pump from Taylex or a local outlet, ensuring the performance is identical to the pump removed.

DAVEY D25 – 9m Head
 Voltage – 220 -240 IP 68
 AMPS – 1.9 Phase 1 50hZ
 Max Flow – 200L/min 7m

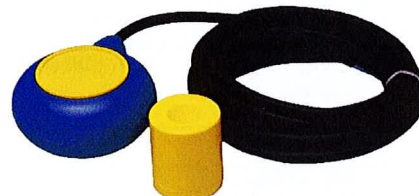
DAVEY D42A/B3 – 32m Head
 Voltage – 220 -240 IP 68
 AMPS – 4.3 Phase 1 50hZ
 Max Flow – 130L/min 7m



- 17) Alarm System High Water
 Material - PVC
 Length - 20mm
 Width - 90mm
 Trigger - High Water
 Code - 3
 Visual - Red L.E.D - 3 Flashes
 Audible - Micro Buzzer
 Voltage - 12V

Repair / Replacement Details:

Turn the system off. Replace the float by disconnecting the electrical connection in the terminal block, located in the lower section of the control box. Feed the new float cable into the control box and connect to the terminal block, fixing the screws firmly. Re fix the float to the pipe assembly and loop the lead around the barrel union, to set the float height. Turn the system on. Purchase the float from Taylex.



- 18) Non- Return Valve
 Height - 85mm
 Length - 140mm
 Width - 85mm

Repair / Replacement Details:

Turn the system off. Replace the Non- Return Valve by cutting the pipe in either side of the valve. Re-join the pipe using sockets and glue the Valve and sockets together. Ensure the glue is set before turning the system back on.



- 19) Control Panel Box
 Material - HD Polyethylene
 Height - 210mm
 Length - 190mm
 Width - 85mm

The weather proof control box is fixed to the side of the blower box using stainless steel screws. The control panel is fitted to the inside of this box and is connected to the power, high water alarm and pressure switch, via a gland at the back of the box.

Repair / Replacement Details:

Repairing boxes is not recommended. Replacements boxes be purchased from Taylex or your local service agent.



- 20) ECO Control Panel
 (240v to 12V Power Supply)
 Length - 160mm
 Height - 100mm

The Taylex ECO is a 12V controller powered by the 240v to 12v power supply plug. As the unit is 12V all works including replacements and repairs do not need to be completed by a Licenced Electrician. All service agents can therefore complete all works within the Control Box and on the Taylex ECO Controllers.

The Taylex ECO Controller Assembly (complete with Controller, Control Panel Box, 3 x GPO Assembly and Blower Box) is classed as electrical equipment and has been certified to comply with AS/NZS 3820, meeting the Electrical Safety requirements in Australia and New Zealand

Repair / Replacement Details:

Turn the system off. Replace the Control Panel by removing the 4 screws in the control box. Disconnect the Loom plug from the rear of the panel. Connect the loom to the new panel; return the new Control Panel to the control box and re fix the 4 screws. Turn the system on. Purchase the Control Panel from Taylex.



- 21) L.E.D Light
Height - 30mm
Length - 20mm

The LED visual alarm is constructed within the Eco Panel. This LED Red light will flash when an alarm is present. The number of flashes represent the particular code.

Repair / Replacement Details:

Replacement of the LED lights only is not possible; the complete Control Panel must be replaced. Purchase the Control Panel from Taylex.



- 22) Blower Box
Material - HD Polyethylene
Height - 350mm
Length - 600mm
Width - 400mm

The Blower box is fitted to the lid of the ABS using 4 x 30mm anchors.

Repair / Replacement Details:

Repairing boxes is not recommended. Replacement boxes can be purchased from Taylex or your local service agent.



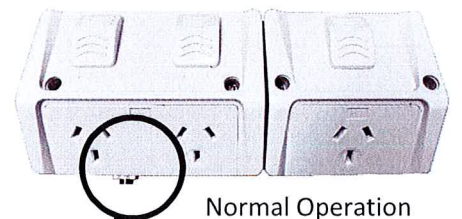
- 23) Weatherproof GPO's
Single
Height - 85mm
Length - 85mm
Width - 80mm
Double
Height - 85mm
Length - 115mm
Width - 80mm

Mains 10amp power is connected through the 25mm coupling provided on the side of the ABSNR -2000 and pulled up through a conduit into the Single GPO. The 12volt power pack plugs into the single GPO to power the control panel. The blower and irrigation pump are plugged into the double GPO.

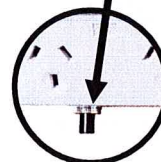
The double GPO contains a 5amp circuit breaker, which will activate if either the pump or blower (or both) draw too many amps, indicating a fault with the pump or blower. The breaker can be reset by pushing in the button if activated. The systems normal operation including alarms will continue to function, if the breaker is activated.

Repair / Replacement Details:

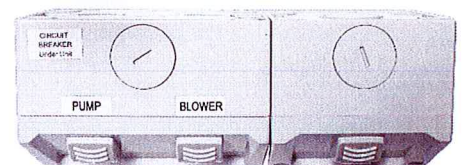
Replacing the GPO's can only be completed by a licenced electrician, please refer to the Taylex Electrical Connection instructions for details. Replacements can be purchased from Taylex or your local service agent.



Normal Operation



Circuit Breaker Activated



- 24) Nitto 120L Blower
Material – Alloy / Plastic
Height – 232mm
Width – 210mm
Length – 407mm
Weight – 9.7kg
Noise Rating: 40dB(A)
Capacity – 120L
Back Pressure Range – 5kpa – 25kpa
Motor Power – 130 Watts
Power Source – 240V 50hZ

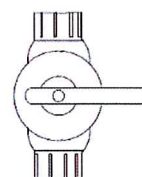
Repair / Replacement Details:
Purchase replacement Blowers and parts from Taylex.



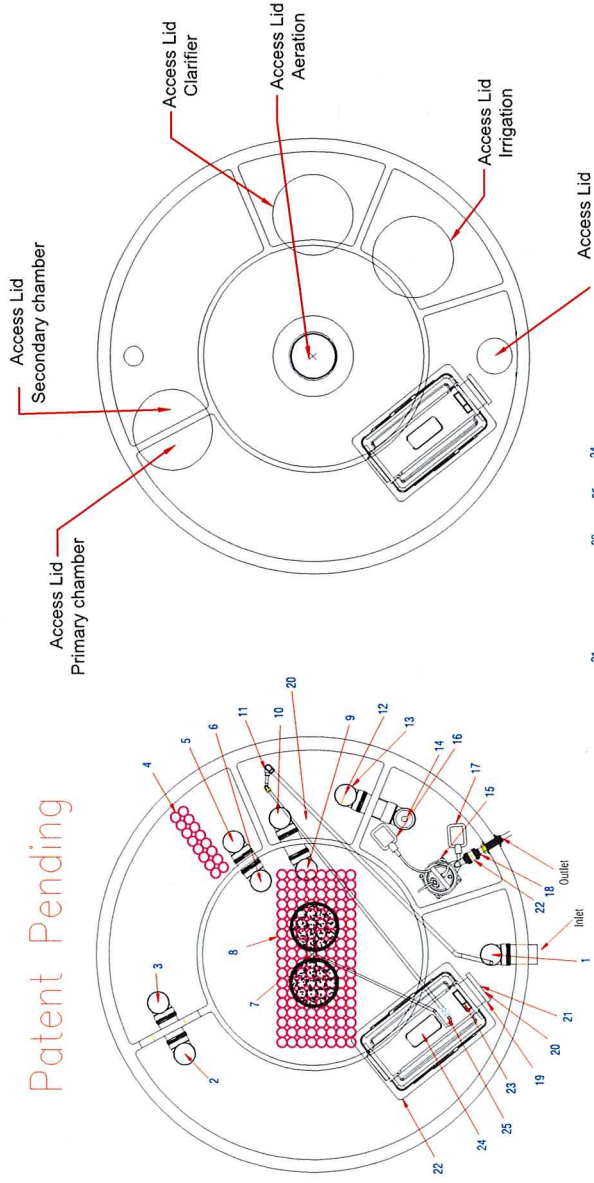
- 25) Recirculation Control Valve

The Recirculation system has been designed to recirculate a precise volume of bacteria and sludge back to the primary chamber for denitrification and sludge management. The control valve should be set to '10' on the dial for optimum operation.

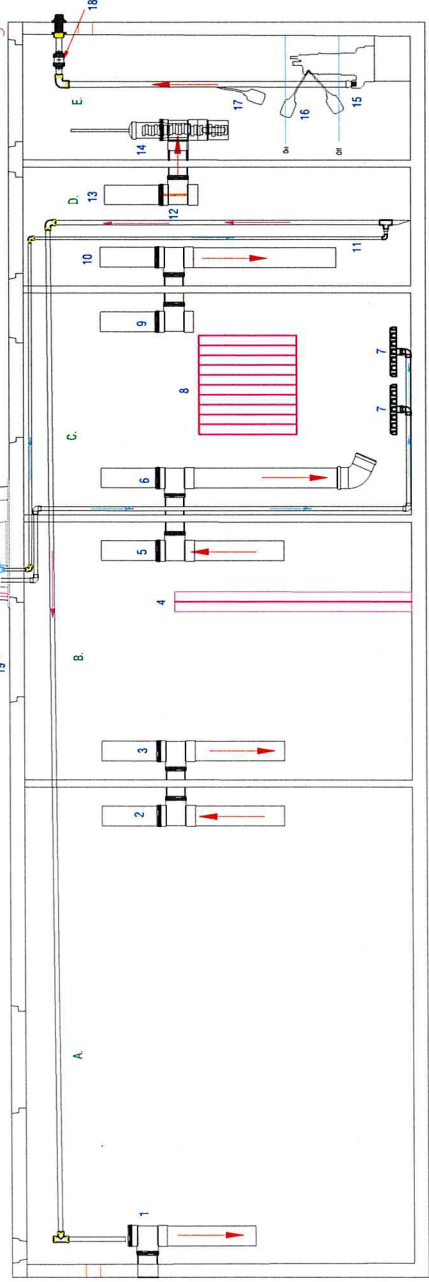
Repair / Replacement Details:
Turn the system off. Replace the Recirculation assembly by cutting the main line and installing the new assembly with a joining socket. Turn the system on. Purchase the complete assembly from Taylex.



Patent Pending



Patent Pending



TANK DETAILS

TAYLEX WASTEWATER

Concrete Tank

CHAMBER	CAPACITY 'L'
A PRIMARY	1684
B SECONDARY	842
C AERATION	2071
D CLARIFIER	662
E IRRIGATION	621
EMERGENCY STORAGE	3440

WORKING VOLUME 5880 Litres

TOTAL VOLUME 9320 Litres

INDEX

1. PVC JUNCTION 100MM X 90
2. PVC JUNCTION 100MM X 90
3. PVC JUNCTION 100MM X 90
4. BIO BLOCK
5. PVC JUNCTION 100MM X 90
6. PVC JUNCTION 100MM X 90
7. DISK DIFFUSER
8. BIO BLOCK
9. PVC JUNCTION 100MM X 90
10. PVC JUNCTION 100MM X 90
11. RECIRCULATION
12. TFC (PATENT PENDING)
13. PVC JUNCTION 100MM X 90
14. CHLORINE DISPENSER
15. IRRIGATION PUMP
16. IRRIGATION PUMP FLOAT CONTROL
17. HIGH LEVEL ALARM
18. NON-RETURN VALVE
19. ECO-PANEL BOX
20. ECO-PANEL CONTROL
21. ECO-PANEL ALARM LIGHT
22. BLOWER BOX
23. WEATHERPROOF GPO'S
24. BLOWER
25. RECIRCULATION AIR COCK

ACCREDITED

20 DEC 2022

NSW MINISTRY OF HEALTH

DESIGNED: DW	14.08.2022	STATUS: NTS	DESIGN: NTS	PROJECT: Certification Drawing	TITLE: ABSNR 2000
DRAWN: CZ	14.08.2022	SCALE: NTS	CLIENT: Taylex Australia Pty Ltd	SERIES: 2	ISSUE No.: 1 of 1
CHECKED: KO				DRAWING No.: 1 of 1	
CAD FILE:					



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Appendix B – On-site Wastewater Calculation Spreadsheet

Byron OSMS Design Model

Version: WW CALCS.xlsm

Set Defaults

bedrooms persons

STEP 1

persons (Grp 1) 4.5

persons (Grp 2) 2

STEP 2

STEP 3

Buffer to permanent water

Buffer to intermittent water

Block size (m²)

4004

100

STEP 4

Daily effluent flow accord. water supply type

Reticulated supply (bore, spring, creek) 180L/p.d

Reticulated + std. water saving devices 145L/p.d

Roof water harvesting 140L/p.d

Roof water harvesting + std. water sav. 115L/p.d

STEP 5

Grp1

Grp 2

STEP 6

STEP 7

Wastewater stream

Treatment system

Septic (primary treatment only)

AWTS

Septic + single pass sandfilter (SPF)

Septic + SPF, 25% septic return flow

Septic + recirculating sandfilter

Septic + reedbed

STEP 8

P soil sorption accord. soil type

"Alluvial" Soils 1 (dp, mu, my, te) 10,000 kg/ha/m

"Alluvial" Soils 2 (cr) 2,000 kg/ha/m

Red Basaltic Soils (bg, ca, co, el, ew, mb, ro, wo) 10,000 kg/ha/m

Duplex Soils (ba, bi, bu, mi, ni) 8,000 kg/ha/m

Podzol Soils (ab, bo, br, eb, fh, ki, ku, oq, po, ty, wy) 1,000 kg/ha/m

STEP 9

Soil texture & structure beneath system

Gravels, Sands Ksat > 3.0m/d

Sandy loams - weakly structured Ksat > 3.0m/d

Sandy loams - massive Ksat 1.4 - 3.0m/d

Loams - high/moderate structured Ksat 1.5 - 3.0m/d

Loams - weakly structured or massive Ksat 0.5 - 1.5m/d

Clay loams - high/mod structured Ksat 0.5 - 1.5m/d

Clay loams - weakly structured Ksat 0.12 - 0.5m/d

Clay loams - massive structured Ksat 0.06 - 0.12m/d

Light clays - strongly structured Ksat 0.12 - 0.5m/d

Light clays - moderately structured Ksat 0.06 - 0.12m/d

Light clays - weak. structured or massive Ksat < 0.06m/d

Med. to heavy clays - strong. struct. Ksat 0.06-0.5m/d

Med. to heavy clays - mod. structured Ksat < 0.06m/d

Med. to hvy clays - weak. struct. or massive Ksat < 0.06m/d

DISPERSIVE soil (Modified Emerson Aggregate test)

STEP 10

Water Table/ Bedrock Depth (m)

Buffer to Water Table (Bwt) (m)

Time for accumulation of P (years)

Final area (m²) 348

Phosphorus area (m²) 76

Water balance area (m³) 348

Specific Crop Coeff. (grass=1.00) 1.00

% Effective Rainfall 65%

Percolation (mm/d) 4

STEP 11

% Effective Rainfall

Mounded bed

Level bed with grass

STEP 12

Soil texture in root zone

Coarse Sand

Fine sand, Sandy loams

Loams, Clay loams, Silt

Clay (light, med, heavy)

STEP 13

Land Application Type

SSI

ETA

Lateral seepage width (m)

0.60

STEP 14

Calculate (or Cntl- q)

ETA trench separation

2.00

STEP 15

Minimum effluent application (mm/day/m²) 2.71

20

30

ETA bed separation

1.40

Nitrogen Report

N plant uptake (kg/yr) 6.97

Total N-load 10.26kg/yr

N load exceedence 0.00

N load percolated (kg/yr) 3.30

N released (perc+exceed.) (kg/yr) 3.30

Enviro.N limit (kg/yr) 3.30

Soil texture & structure beneath system

Gravels, Sands Ksat > 3.0m/d

Sandy loams - weakly structured Ksat > 3.0m/d

Sandy loams - massive Ksat 1.4 - 3.0m/d

Loams - high/moderate structured Ksat 1.5 - 3.0m/d

Loams - weakly structured or massive Ksat 0.5 - 1.5m/d

Clay loams - high/mod structured Ksat 0.5 - 1.5m/d

Clay loams - weakly structured Ksat 0.12 - 0.5m/d

Clay loams - massive structured Ksat 0.06 - 0.12m/d

Light clays - strongly structured Ksat 0.12 - 0.5m/d

Light clays - moderately structured Ksat 0.06 - 0.12m/d

Light clays - weak. structured or massive Ksat < 0.06m/d

Med. to heavy clays - strong. struct. Ksat 0.06-0.5m/d

Med. to heavy clays - mod. structured Ksat < 0.06m/d

Med. to hvy clays - weak. struct. or massive Ksat < 0.06m/d

DISPERSIVE soil (Modified Emerson Aggregate test)

Wetted depth (m) 0.50

TN% removal 50.0%

Reed bed area (m²) 12.9

BOD target of 20mg/L is

Current Outlet BOD

Wetted depth (m) 0.50

TN% removal 50.0%

Reed bed area (m²) 12.9

BOD target of 20mg/L is

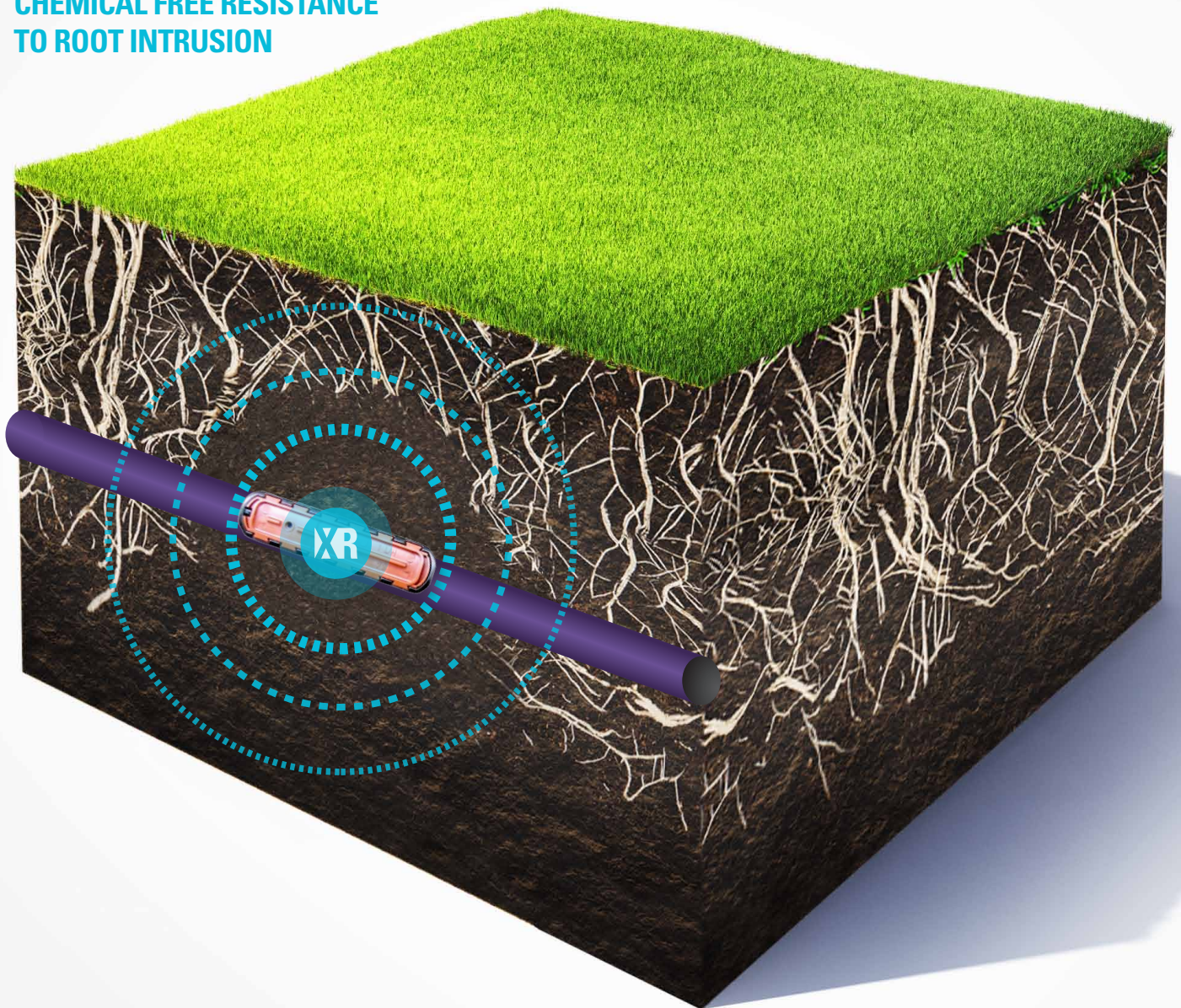
Current Outlet BOD

Appendix C — Netafim dripper line brochure

SMART SOLUTIONS FOR WATER RE-USE

UNIBIOLINE CNL XR

CHEMICAL FREE RESISTANCE
TO ROOT INTRUSION



UNIBIOLINE CNL XR

UNIBIOLINE CNL XR IS NETAFIM'S UNIQUE ADDITION TO OUR DRIPPERLINE RANGE AND ANOTHER NETAFIM WORLD-FIRST WITH NON-DETERIORATING, CHEMICAL FREE RESISTANCE TO ROOT INTRUSION.

Netafim's UniBioline CNL XR provides a unique cost effective solution to combat root intrusion. The diaphragm cover is impregnated with Copper Oxide as part of the mould. This means it does not deteriorate; giving you peace of mind that your crops are still getting the exact amount of water they need, where and when they need it.

APPLICATIONS

- Typically installed following a treatment process.
- Suitable for domestic and commercial on-site water re-use applications using a minimum of secondary 'treated' water.
- Not suitable for frost prone area - Use Bioline AS.
- Subsurface Drip Irrigation (SDI).

FEATURES & BENEFITS

- Copper Oxide impregnated diaphragm cover.
- Anti-Drain (**CNL**) for efficient pulse irrigation, prevents water drainage and reduces run-off (ideal for slopes). On system start up all drippers open simultaneously improving uniformity. The CNL feature also limits the risk of ponding by not allowing effluent to drain out of the lowest drippers
- Pressure compensated (**PC**) – self regulates to ensure uniform drip discharge.
- Anti-Siphon (**AS**) dripper – prevents suck back.
- Patented TurboNet Dripper Technology – wide and deep flow passage.
- UniRam™ AS drippers meet ISO 9261 Standards with production certified by the Standards Institute of Israel (SII).
- Centrally mounted dripper with large inlet filter.
- Operating Pressure: 100 kPa – 350 kPa.
- Recommended filtration: 120 mesh (130 micron).
- Tubing colour: co-extruded lilac tube (indicates non-potable water).

Additional flow rates, spacings and pipe sizes are available upon request.
Minimum quantities apply.

TECHNICAL DATA

UNIBIOLINE CNL XR

UNIQUE DESIGN

1 EXTERIOR

The exterior has been designed with a chemical free root intrusion barrier by incorporating Copper Oxide in the mold of the diaphragm cover.



2 INTERIOR

The interior has been designed to allow water to flow without being blocked by fine feeder roots or by sediment built-up in the dripperline.



DRIPPER TECHNICAL DATA

FLOW RATE	DRIPPER NAME	PACKAGING	INSIDE DIAMETER	OUTSIDE DIAMETER	WALL THICKNESS	PRESSURE RANGE
L/HR			MM	MM	MM	M
1.0, 1.6, 2.3 & 3.5	UniRam™ CNL	Strapped	14.2	16.2	1.0	10 – 35*

* The Uniram CNL emitter will function at 10m but for waste water we recommend a minimum of 12m.

TECHNICAL DATA & PRODUCT CODES

CODE	FLOW RATE	DRIPPER SPACING	COIL LENGTH	150 KPA	200 KPA	250 KPA	300 KPA
	L/HR	M	M	M	M	M	M
13964-002000	1.6	0.4	200	100	128	148	160
TBA	1.6	0.5	100	122	156	179	198
TBA	2.3	0.4	200	81	102	116	130
TBA	2.3	0.5	400	98	124	143	156
TBA	2.3	0.6	100	112	143	165	181
TBA	3.5	1.0	100	129	165	190	210

Maximum run length (m) for single lateral on flat ground to achieve 10m at the end of the lateral.

SUITABLE FITTINGS

PRODUCT CODE	DESCRIPTION	PRODUCT CODE	DESCRIPTION
32500-013750	16mm Start Take-off to suit LDPE	32500-012500	16mm Elbow
00005-011500	16mm Elbow Take-off to suit 16mm LDPE	32500-001130	16mm Tee
45000-001650	7mm Professional Punch Tool	32500-010700	16mm Joiner
32500-013700	16mm Straight Take-off with Grommet to suit PVC	76400-011750	16mm Herbie Clip Ratchet Clamp
00025-002400	Hold Down Stake (Asta)	00005-002200	16mm Ratchet Clamp
00005-010600	19mm x 16mm Barbed Elbow	00060-006020	16mm Stainless Steel Netafim Clamp (15/8)

SMART SOLUTIONS FOR WATER RE-USE



CHEMICAL FREE RESISTANCE TO ROOT INTRUSION

UNIBIOLINE CNL XR

Netafim's UniBioline CNL XR provides a unique cost effective solution to combat root intrusion.

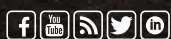
The diaphragm cover is impregnated with Copper Oxide as part of the mould.

This means it does not deteriorate; giving you peace of mind that your plants are still getting the exact amount of water they need, where and when they need it.

- Effective for the life of your dripperline
- No replacement of chemical injected filter units
- Reduced maintenance costs

GROW MORE WITH LESS®

WWW.NETAFIM.COM.AU



BR72 - UNIBIOLINE CNL XR
APRIL 2017

Appendix D — Septic Decommissioning information

Advisory Note 3 — Revised January 2017

Destruction, Removal or Reuse of Septic Tanks, Collection Wells, Aerated Wastewater Treatment Systems (AWTS) and other Sewage Management Facilities (SMF)

This advisory note has been developed to assist local councils when dealing with applications to reuse septic tanks, collection wells and or aerated wastewater treatment systems (AWTS). It should be read in conjunction with the Local Government (General) Regulation 2005.

UNDER NO CIRCUMSTANCES ARE SEPTIC TANKS, COLLECTION WELLS, AWTS, ETC TO BE REUSED AS VESSELS FOR HOLDING WATER FOR DRINKING PURPOSES, OR FOR ANY INTERNAL HOUSEHOLD DOMESTIC PURPOSE.

Existing septic tanks, collection wells and AWTS become redundant where reticulated sewerage progresses through an area and premises connect. Questions are asked periodically by the public about the fate of the redundant SMF. These onsite SMF may be demolished or potentially reused onsite as a storm water storage vessel. There is also potential for these systems to be sold second hand and reinstalled. The existing septic tank, where suitable, potentially may also be used when the premises is upgraded to an AWTS installation.

Where it is feasible to reuse a septic tank, collection well, or AWTS there are several precautions that need to be observed to ensure that public health risk is minimised. The reuse and/or removal of a septic tank, collection well or AWTS shall only be carried out after the premises are connected to sewer or to an alternative form of SMF.

During times of water restrictions the water supply authority should be contacted to determine if it is a permissible use of water to hose out a SMF prior to its reuse or relocation.

This guideline considers the following circumstances.

1. Septic Tanks / Collection Wells

- 1.1 Demolition
- 1.2 Reuse for Stormwater Storage
- 1.3 Upgrade to AWTS
- 1.4 Removed and Relocated

2. AWTS

- 2.1 Demolition
- 2.2 Used as Domestic Greywater Treatment System
- 2.3 Removed and Relocated

If reuse of a different type of SMF is under consideration then the intent of these guidelines should be met.

1. Septic Tank / Collection Well:

1.1 Demolition On-Site

1.1.1 The contents of the septic tank / collection well are to be removed by a method acceptable to the local council, either by tanker removal to an appropriate authorised site or pumped into the existing disposal trench if of sufficient capacity and which then should be sealed. The contents of a septic tank or collection well must not be broadcast or discharged above ground.

1.1.2 The sides, lid, baffle or partition (if fitted) and square junctions of the tank should be hosed down as the waste is being removed.

1.1.3 The tank is to be treated by liberally broadcasting "Builders' (hydrated) Lime" over the exposed surfaces. It is advisable to wear personal protective equipment.

1.1.4 Several holes should be punched or drilled into the base of the tank. The lid and those parts of the walls baffle and square junctions above the ground should be demolished and collapsed into the tank and the tank filled with clean soil or rubble and topped with clean soil. This should be performed to ensure that voids cannot develop which would allow collapse and injury in the future.

1.2 Reused On Site as a Storm Water Storage and Irrigation Tank

1.2.1 The water from such a stormwater or irrigation tank may be used for garden purposes but not for topping up swimming pools. Nor should the water be used for internal household purposes such

as for toilet flushing, or in laundry tubs, washing machines, bathrooms or kitchen.

1.2.2 For reuse on site as a non-domestic water containing vessel the contents are to be removed either to a site acceptable to the local council or pumped into the existing disposal trench if of sufficient capacity which then should be sealed. The contents of a septic tank or collection well must not be broadcast or discharged above ground.

1.2.3 The sides, lid, baffle or partition (if fitted) and square junctions of the tank should be hosed down as the waste is being removed.

1.2.4 The tank should be filled with fresh water and disinfected to a minimum level of 5 mg/L of free residual chlorine with a half hour contact time. The chlorine should be allowed to dissipate naturally at least overnight and not be neutralised.

1.2.5 The inlet(s) and outlet(s) of the vessel should be sealed. Pumps and other accessories may then be installed and connected to an irrigation system. The tank is to be mosquito proofed and fitted with a strainer or first flush device to prevent the introduction of coarse particles and materials.

1.2.6 The tank is to be labelled as containing water unfit for human consumption.

1.2.7 Pipes, fittings or fixtures in accordance with the water supply authority requirements may only be used. No cross connection is to be made with any potable water supply, nor should the vessel be likely to contaminate any potable water supply. Backflow prevention devices may need to be installed in accordance with the water supply authority directions.

1.2.8 Any overflow is to be directed to the storm water discharge or as specified by the local council.

1.3 Upgrading to AWTS

An existing septic tank may be used in conjunction with an AWTS on the same site provided:

1.3.1 The existing septic tank is of at least the same size and capacity of the septic tank of the accredited AWTS and the existing septic tank is not to be relocated elsewhere on the same site;

1.3.2 The contents of the septic tank are to be removed either to a site acceptable to the local council or pumped into the existing disposal trench if of sufficient capacity which then should be sealed. The contents of a septic tank or collection well must not be broadcast or discharged above ground.

1.3.3 The septic tank when inspected by a competent person such as the installer of the AWTS or a plumber / drainer is found to be in a suitable condition and in conformity with AS/NZS 1546.1:2008.

1.3.4 Written approval under section 68 of the Local Government Act from the local council to alter the SMF must be obtained prior to the upgrade and the approval to operate must be reassessed.

1.4 Removed and Relocated

1.4.1 Septic tanks and collection wells may only be removed, relocated and reused as such where the septic tank or collection well is subject to a current "Certificate of Accreditation" issued by the NSW Ministry of Health.

1.4.2 The contents of the septic tank and/or collection well are to be removed either to a site acceptable to the local authority or pumped into the existing disposal trench if of sufficient capacity which then should be sealed. The contents of a septic tank or collection well must not be broadcast or discharged above ground.

1.4.3 The sides, lid, baffle or partition (if fitted) and square junctions of the tank should be hosed down as the waste is being removed.

1.4.4 The inlets and outlets should be plugged and the tank should then be filled with clean water and disinfected to a minimum level of 5 mg/L of free residual chlorine, with a minimum one half hour contact time. The lid should be exposed to the chlorine solution. The chlorine should be allowed to dissipate naturally at least overnight and not be neutralised.

1.4.5 The contents of the tank and/or well may be then emptied as stated above in 1d.2 and the trench should be sealed. The septic tank and/or collection well may be removed if the structural integrity of the tank and/or well can be maintained.

1.4.6 Approval of the local council under section 68 of the Local Government Act is to be obtained before the vessel(s) is reinstalled.

2. AWTS

2.1 Demolition On-Site

2.1.1 The waste contents of the AWTS are to be removed by a method acceptable to the local council, either by tanker removal to an appropriate site or pumped into a disposal trench (if one exists) and sealed. The liquid content of the AWTS is not to

be irrigated using the land application system and is not to be discharged to the environment.

2.1.2 The sides, lid, baffles or partitions, components and square junctions of the AWTS should be hosed down as the waste is being removed.

2.1.3 The pumps, blowers and internal components of the AWTS may be either collapsed into the AWTS or selectively removed by the owner/occupier, an AWTS manufacturer or service agent for proper disposal to landfill. The owner/occupier, manufacturer or service agent must remove such parts in a manner which will not contaminate the environment or compromise the health and safety of themselves or others. Un-retrieved components must be left in the AWTS.

2.1.4 The AWTS and remaining components are to be disinfected by broadcasting "Builders' (hydrated) Lime" over the exposed surfaces. It is advisable to wear personal protective equipment.

2.1.5 Several holes should be punched or drilled into the base of the tank. The lid and those parts of the walls, baffle and square junctions above the ground should be demolished and also collapsed into the tank and the tank filled with clean soil or rubble and topped with clean soil.

2.1.6 All irrigation lines and spray head, sprinklers, drippers and the like are to be flushed with potable water for 5 minutes. If the irrigation lines are to be connected to the reticulated water supply the installation shall comply with the water supply authority requirements and a backflow prevention device installed.

2.2 Used as a Domestic Greywater Treatment System (DGTS)

The AWTS may be used as a domestic greywater treatment system provided:

2.2.1 The premises is connected to the sewer and the proposal is acceptable to the local council under its wastewater management strategy or policy;

2.2.2 The AWTS is subject to a current "Certificate of Accreditation" issued by the NSW Ministry of Health;

2.2.3 Only greywater is discharged to the AWTS, ie blackwater from any toilet, bidette or bidet is not connected;

2.2.4 Excess treated greywater or untreated greywater is discharged to the sewer when the land application system is overloaded;

2.2.5 The land application system has been reassessed by the owner/occupier to the local council's satisfaction as being suitable for the land application system management of treated greywater;

2.2.6 Prior approval is obtained from the local council to alter and to operate the AWTS as an DGTS; and

2.2.7 The maintenance of the AWTS is carried out by a service contractor suitable to the local council.

NOTE: *It is not necessary to pump out or recommission the AWTS unless maintenance such as desludging is required.*

2.3 Removed and Relocated

2.3.1 AWTS may only be reused where the AWTS is subject to a current "Certificate of Accreditation" by the NSW Ministry of Health.

2.3.2 The removal and relocation of an AWTS shall be performed by an AWTS manufacturer, installer or service agent familiar with the AWTS brand.

2.3.3 The waste contents of the AWTS are to be removed by a method acceptable to the local council, either by tanker removal to an approved site or pumped to a disposal trench if of sufficient capacity which then should be sealed. The contents of a septic tank or collection well must not be broadcast or discharged above ground.

2.3.4 The sides, lid, baffles or partitions, components and square junctions of the AWTS should be hosed down as the waste is being removed.

2.3.5 The tank should then be filled with clean water and disinfected to a minimum level of 5 mg/L of free residual chlorine, with a minimum one half hour contact time.

2.3.6 All irrigation lines and spray head, sprinklers, drippers and the like are to be flushed with potable water for 5 minutes. If the irrigation lines are to be connected to the reticulated water supply the installation shall comply with the water supply authority requirements and a backflow prevention device installed.

2.3.7 The tank may then be emptied and removed. Tanks of reinforced concrete may only be removed

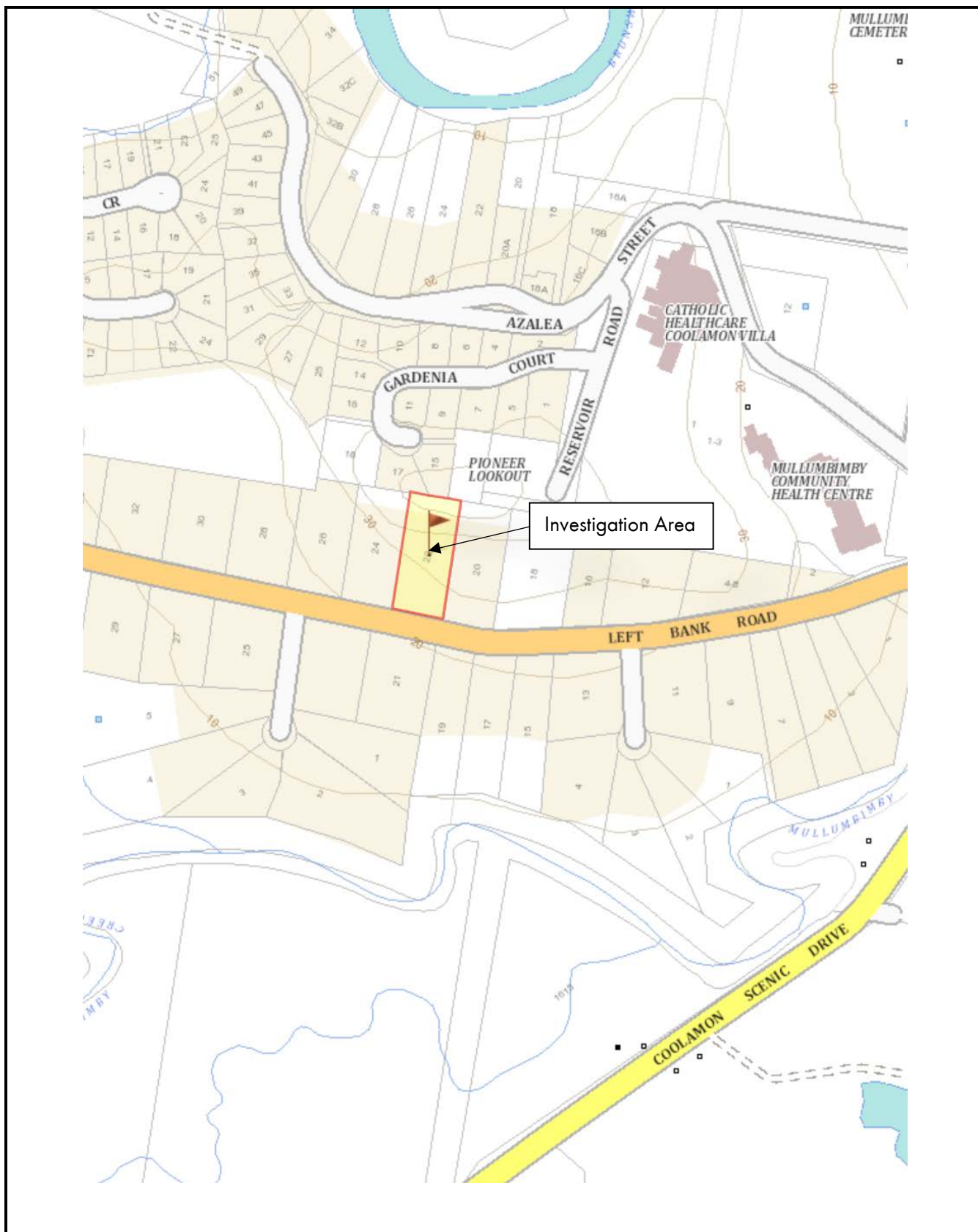
where the structural integrity of the tank can be maintained.

2.3.8 The pumps, blowers and internal components of the AWTs must be removed by an AWTs manufacturer or service agent for use only as spare parts. The manufacturer or service agent must remove such parts in a manner which will not contaminate the environment or compromise the occupational health and safety of themselves or others.

2.3.9 All mechanical and electrical items such as pumps and blowers must be renewed (not reconditioned), and covered by warranty. Valve diffusers and media may be reused and are to be cleaned and serviced.

2.3.10 Maintenance of the re-installed AWTs must be carried out by service contractor to the satisfaction of the local council.

2.3.11 Installation approval of the local council is to be obtained before the AWTs is reinstalled.



- Irrigation Notes:**
1. Pump to operate on float system of about 235.6 L doses.
 2. Dosing to be distributed to two 250m² irrigation blocks via a 2 port K-rain indexing valve.
 3. Pump duty min. 33.3m head @ 17L/min required, a Davey D53 A/B submersible pump is specified.
 4. All subsurface dripper lines to be Netafim Unibioline CNL XR pressure compensating and separated by 1m with in-line 1.6L/hr emitters spaced at 0.4 m.
 5. Dripper line to be placed on ground surface and mulched over in exposed areas. See Exhibit No. 5 for dripper line detail. Where dripper line can be buried 150mm deep it is to be done so.
 6. Delivery line buried to 200mm.
 7. Flush line is to flow back into AWTS tank. See Exhibit No. 3 for detail.
 8. Ensure surface water is diverted away from disposal fields.
 9. Filter to be cleaned quarterly. Manual cleaning of filter required in accordance with specifications.
 10. All storm water pipes are to be routed away from the disposal fields.
 11. Services to be located prior to any plumbing and excavation works

KEY

Two port K-rain indexing valve

Netafim Tech filter 130 micron 120 mesh

32mm PE100 PN12.5 polyethylene line

40mm PE100 PN12.5 Polyethylene line

Netafim Unibioline CNL XR subsurface pressurised drip irrigation line - 2.3L/hr emitters @ 0.4m spacings

NRV

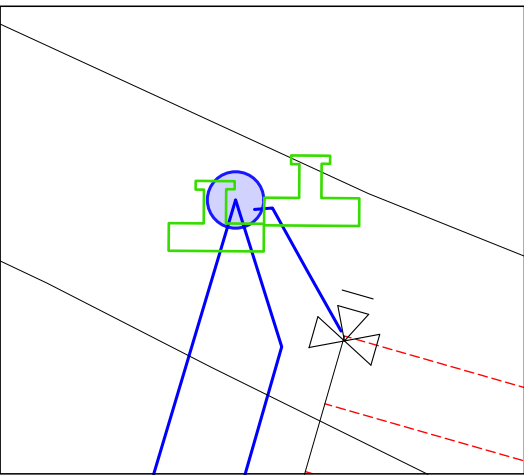
Non return valve

Combined vacuum breaker/Air release valve

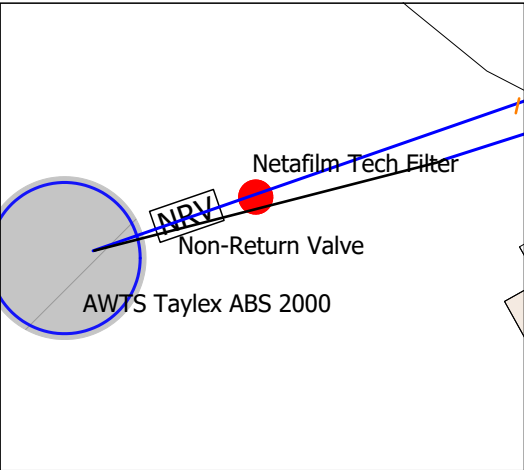
Air release valve

Isolation valve (ball valve)

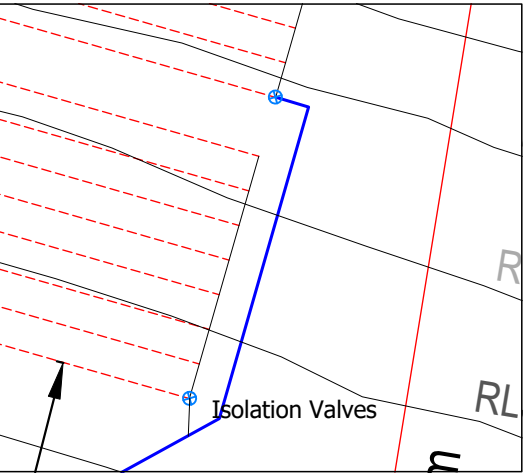
Disposal field Area	499.5 m2
Hydraulic Flow:	942.5 L/day
Number of Blocks:	2
Size of Block:	249.8 m2
Number of Doses/block	2
Hydraulic Flow:	235.6 L/dose/block
Dripper Line Spacing:	1 m
Emitter Spacing:	0.4 m
Emitter Flow Rate:	1.6 L/hr at 150kPa
Total No. of Emitters Req'd:	624 /block
Total Flow:	999 L/hour
Irrigation Time per dose:	0.24 hours/day
	14.15 minutes
Pumping Rate Required:	999 L/hr
(Flow rate)	16.65 L/min
	0.28 L/sec
System application rate:	4.00 mm/hour
Gross Irrigation Application (per dose):	0.9 mm/irrigation area
Length Lateral Per Block	249.8 m
Total Length Required	499.5 m



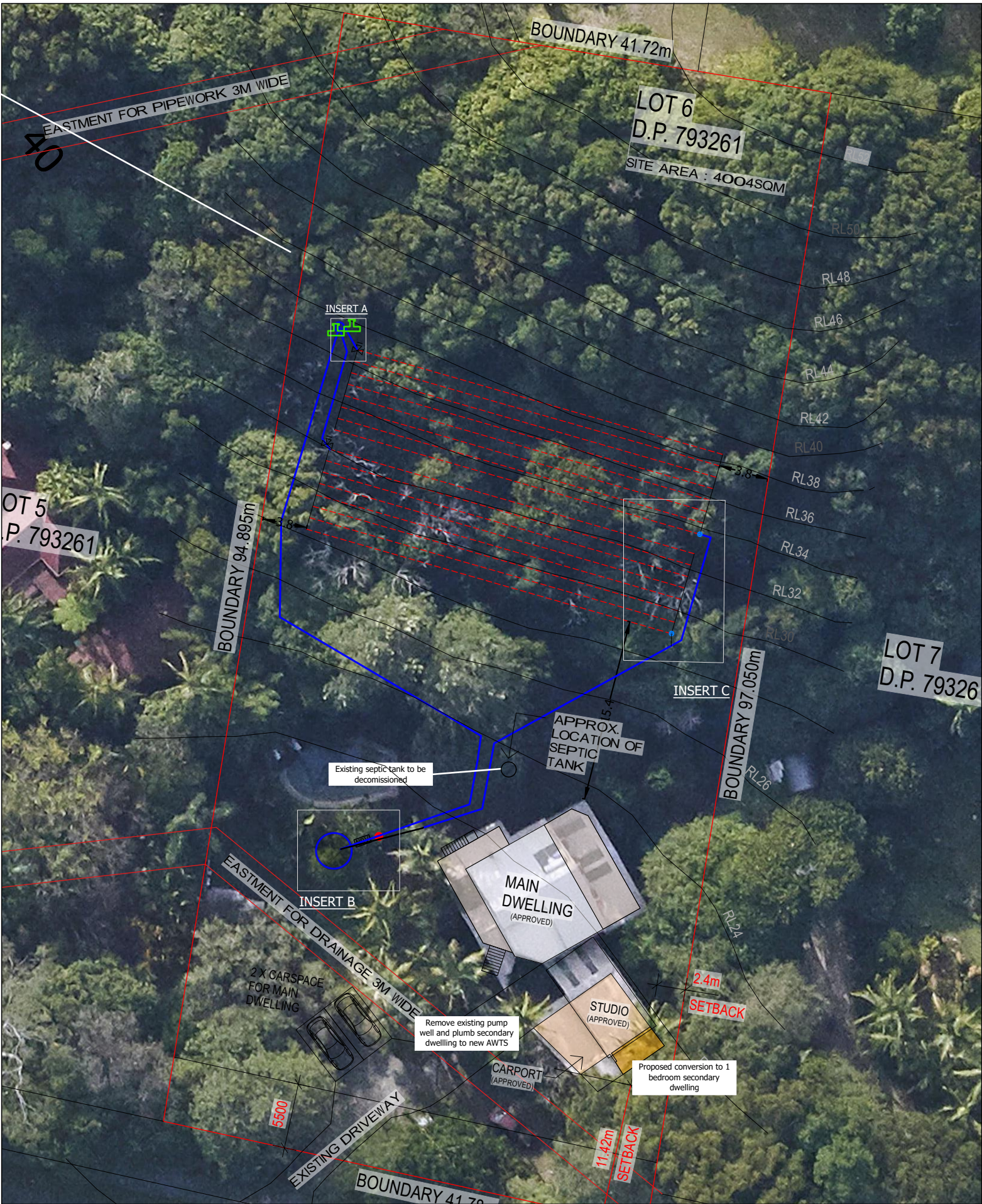
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INSERT C: Not to Scale



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Greg Alderson Associates

43 Main Street, CLUNES NSW 2480
PO Box 12344, CLUNES NSW 2480
P:(02) 6629 1552 E:office@aldersonassociates.com.au
W:aldersonassociates.com.au ABN 58 594 160 789

Client:	Susanna Pohlen	SITE LAYOUT AND LOCATION OF OSMS			
Site address:	Lot 2 DP 793261 22 Left Bank Road Mullumbimby	Drawn:	Source:	EXHIBIT NO:	Date:
		DB	Base image from Metromaps	2	16/11/23
		Scale:		Project:	Revision:
		1:400		PROPOSED CHANGE OF USE FROM STUDIO TO DWELLING TO FORM A DUAL OCCUPANCY	-
		Job Number:	Original Size:		
		23582	A3		

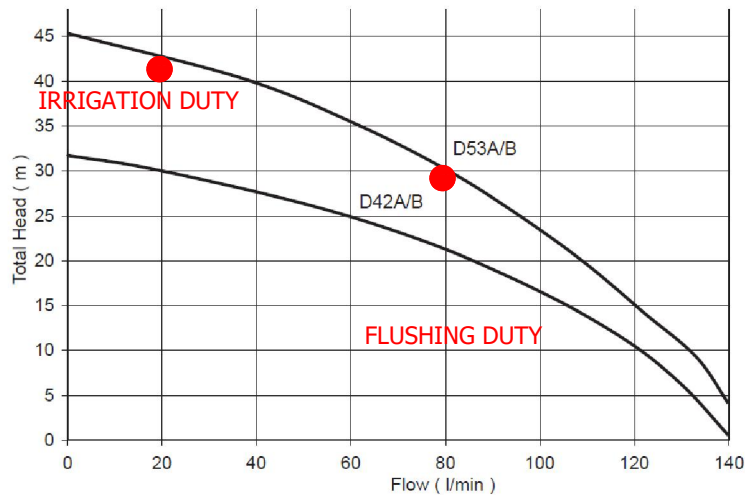
Irrigation Checklist	
Number of Equivalent People	6.5 (3 bedroom dwelling + 1 bedroom sec. dwelling.
Irrigation area	499.5 m ² (excl. seepage area outside of block)
Number of irrigation blocks	2
Number of doses per block	2
Irrigation block	249.75 m ²
Soil Type	Light clay
Max site slope	45 % in land application area
Effluent quality	<30 BOD (mg/L)
	<45 TSS (mg/L)

Cover Crop	leaf litter and mulch in more exposed areas
Soil long term acceptance rate	4.00 mm/day
Holding tank volume	0.621 m ³
Daily outflow from treatment system	0.9425 m ³ /day
Irrigation system flow rate	16.65 L/minute
Irrigation system application rate	4.00 mm/hour
Gross Irrigation application per dose	0.9 mm/irrigation area
Quantity of effluent/irrigation	1.0 m ³ /hour
Irrigation duration per dose	14.15 Minutes
Irrigation frequency interval per block	6 hours

Pump Performance	
Total Dynamic Head (irrigation cycle)	33.3 m
Flow rate head (irrigation cycle)	16.7 l/min
Total Dynamic Head (flush cycle)	29.7 m
Flush velocity through lateral	1.05 m/s
Note run flush for	3 mins/zone

Componentry	
Automation controls	Float switches - modify to suit 263L dose
Filter	min. 80 mesh (200 micron) 50mm disc filter
Gauges	Not required - filter to be cleaned quarterly
Alarm	alarm, connected to high water alarm
Main	40mm PN12.5 PE 100
Submains	32mm PN12.5 PE 100
Laterals	Netafim unibioline XR-1.6L drip @ 0.4m spacings
Flush Lines	32mm PN12.5 PE 100
Control heads/solenoid valves	N/A
Air/vacuum release valves	high point of delivery pipe & irrigation block
Scour valves	low point of block
Isolation valves	ball valve
Scour trench	none - return to AWTS
Pressure regulating valves	NA

HYDRAULIC PERFORMANCE



NOTES
1. Ground is to be cleared of sticks, litter, rocks etc in locations where dripper lines are to be placed so maximum contact between dripper lines and ground is made.
2. Dripper lines are to be trained around tree trunks so no removal of vegetation is required.

Dripper lines are to be Netafim Unibioline AS with 0.4 m dripper spacings and 1.6L/hr drippers

Minimum 100 mm coverage by hardwood woodchip in open areas

Dripper lines anchored by 200mm x 4mm galvanised pegs spaced every 2.0m

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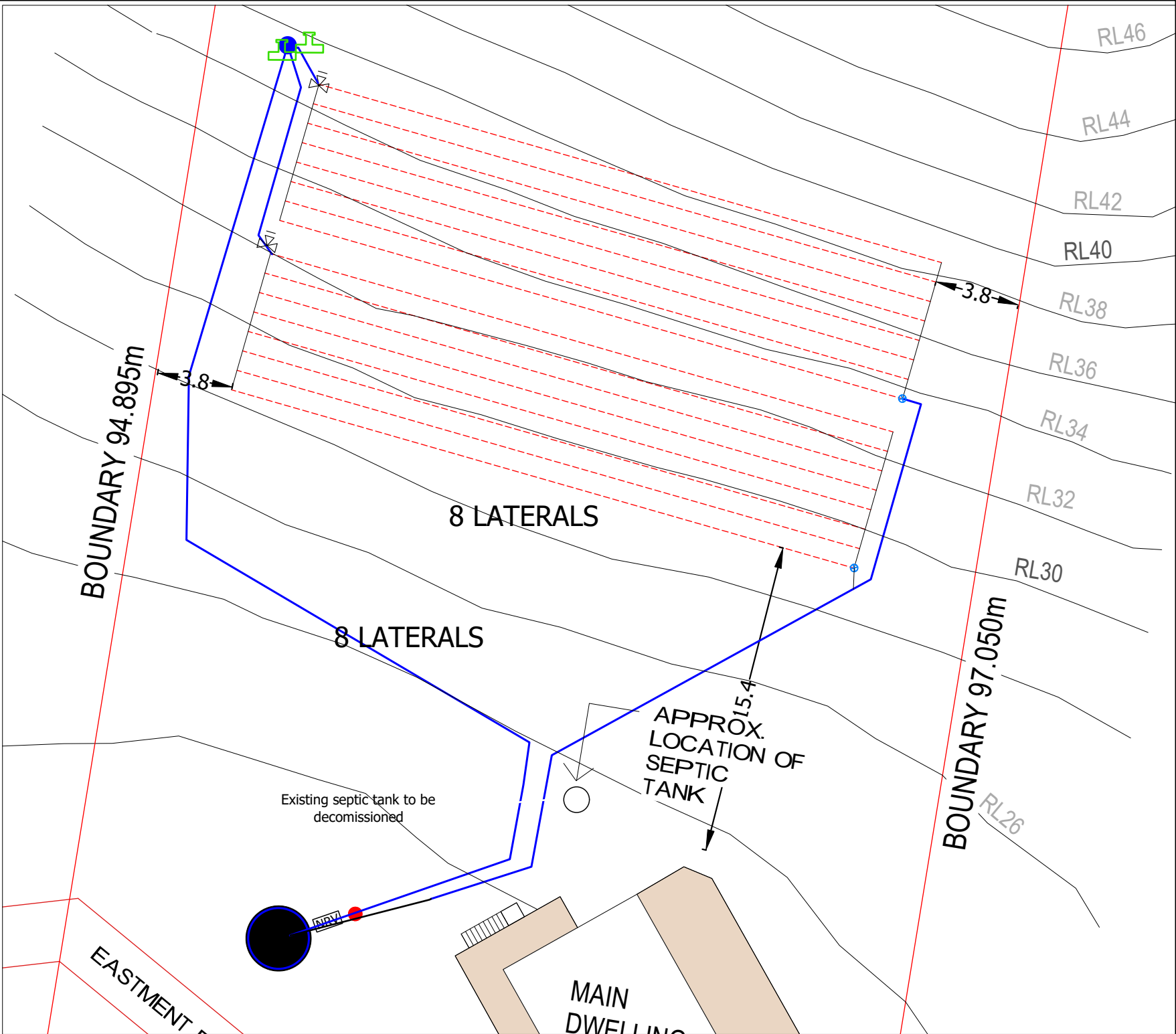


Greg Alderson Associates
43 Main Street, CLUNES NSW 2480
PO Box 12344, CLUNES NSW 2480
P:(02) 6629 1552 E:office@aldersonassociates.com.au
W:aldersonassociates.com.au ABN 58 594 160 789

Client:
Susanna Pohler

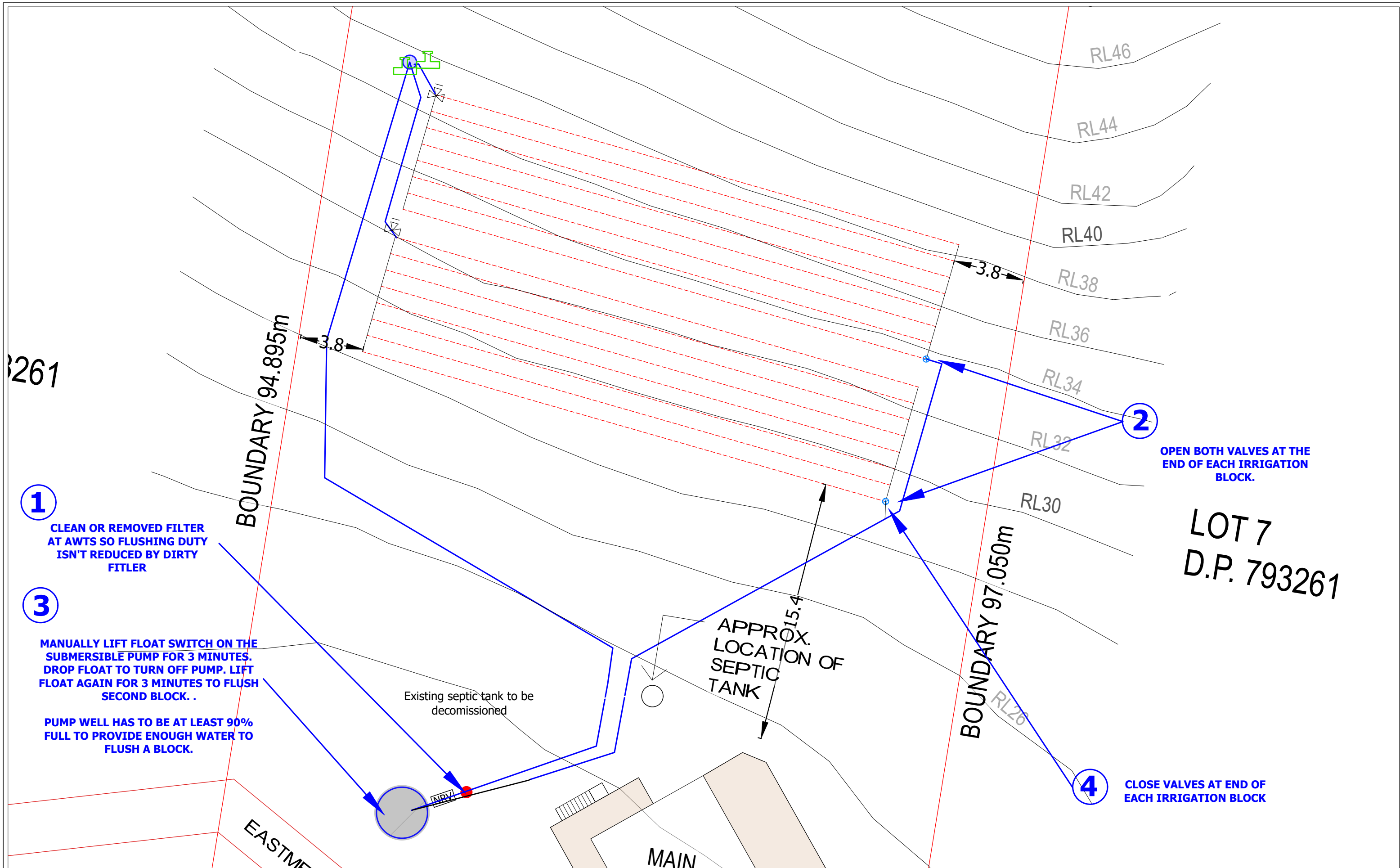
Site address:
Lot 6 DP 793261
22 Left Bank Road Mullumbimby


SSI LAYOUT & MEMBRANE DETAIL			
Drawn: DB	Source: Greg Alderson & Associates	EXHIBIT NO: 3	Date: 20/10/23
Scale: 1:200	Original Size: A3	Project: CHANGE OF USE FROM STUDIO TO DWELLING TO FORM DUALL OCCUPANCY	Revision: -
Job Number: 23582			



KEY

- Two port K-rain indexing valve
- Netafim Tech filter 130 micron 120 mesh
- 32mm PE100 PN12.5 polyethylene line
- 40mm PE100 PN12.5 Polyethylene line
- Netafim Unibioline CNL XR subsurface pressurised drip irrigation line - 2.3L/hr emitters @ 0.4m spacings
- Non return valve
- Combined vacuum breaker/Air release valve
- Air release valve
- Isolation valve (ball valve)



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		Site address: Lot 6 DP 793261 22 Left Bank Road, Mullumbimby	Drawn: DB	Source: Greg Alderson & Associates	EXHIBIT NO: 4	Date: 16/11/23
	Z:\JOBS\23\23582 - Susanna Pohen - 22 Left Bank Rd Mullumbimby\ENVIRONMENT\WASTEWATER\23582_vw_irrigation.dwg Tab: 44	43 Main Street, CLUNES NSW 2480 PO Box 12344, CLUNES NSW 2480 P:(02) 6629 1552 E:office@aldersonassociates.com.au W:aldersonassociates.com.au ABN 58 594 160 789		Scale: 1:200	Original Size: A3	Project: PROPOSED CHANGE OF USE FROM STUDIO TO DWELLING TO FORM DUAL OCCUPANCY
			Job Number: 23582			



Greg Alderson Associates

Greg Alderson and Associates

ABN 58 594 160 789

43 Main Street

Clunes NSW 2480

T +61 2 6629 1552

office@aldersonassociates.com.au



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House Plan Drafting



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Contaminated Land
Acoustics & Noise
Wastewater
Acid Sulfate Soil
Water Quality
Ecology