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OSSMS Wastewater Report

Detailed Design Report

Blakebrook Public School,
417 Rosehill Road,
Blakebrook NSW 2480

Report #	TE233624
Date	9 Nov. 23

Document Control Table

	Taylor Environmental Project Number: TE233623 Site and Soil Evaluation On-Site Wastewater and Effluent Disposal Blakebrook Public School, 417 Rosehill Road, Blakebrook NSW 2480

Revision	Date	Revision Details	Author	Approver
	8 Aug. 23	Prelim	M. Mahony	C .Taylor
	12 Oct. 23	Detailed Design	M. Mahony	C .Taylor
C	9 Nov. 23	Updated swale location	M. Mahony	C .Taylor

Table of Contents

1 Introduction

1.1 Background

Taylor Environmental (Australia) Pty Ltd was engaged to prepare detailed design plans for a new onsite wastewater management system at the Blakebrook Public School located at 417 Rosehill Road, Blakebrook NSW 2480.

The school was impacted by extensive flooding in early 2022, which resulted in inundation and damage to the school buildings and wastewater system. Some buildings were damaged beyond repair, while others were not as severely impacted, including the toilet block which is still in operation. Demountable buildings have been moved to the site for temporary schooling.

To rebuild, the existing school buildings will be demolished and replaced with a large single building on the western side of the property. The new building will include amenities and a tuckshop, which requires a wastewater treatment system and an onsite land application area to dispose of the treated effluent.

A Preliminary Investigation was undertaken by Taylor Environmental in August 2023.

1.2 Project Description

The old wastewater system is to be decommissioned, including the septic tanks and associated components. The land application area could not be located at the time of the site inspection.

It is proposed to install a new all-waste septic tank, aerated treatment plants and Wisconsin Mound land application area for the re-built School. This design incorporates flood immunity to minimise damage from future flood events.

1.3 Scope of Works

The scope of works for this assessment are outlined below:

- Prepare detailed designs for the new wastewater system proposed during the Preliminary Investigation

1.4 Legislation and Standards

This report has been completed in accordance with the relevant legislative requirements:

- NSW Plumbing and Drainage Act 2011 No 59
- NSW Plumbing and Drainage Regulation 2017
- AS/NZS 1547 On-site Domestic Wastewater Management
- Plumbing Code of Australia (PCA)
- Lismore Council Onsite Sewage and Wastewater Management Strategy

2 Site Assessment

2.1 Property Details

A site assessment was undertaken by Taylor Environmental on 8 May 2023. Details of the subject property are presented in Table 1, below.

Table 1: Property Details

Feature	Details
Property Address	417 Rosehill Road, Blakebrook NSW 2480
Real Property Description	Lot 2 on DP859866
Local Authority	Lismore City Council
Size	1.276 ha

Figure 1 shows the property layout.

Figure 1: Site Layout

2.2 Soil Investigation

A geotechnical investigation for the new buildings was undertaken by Tetra Tech Coffey in July 2023. An additional test was undertaken by Taylor Environmental at the back of the school during the site visit. The typical details of the receiving soil are presented in Table 2.

Table 2: Soil Type

Feature	Detail
Soil Profile	0 – 200 Sandy Clayey Topsoil Low to medium plasticity Trace gravels Dark brown 200 - 4800 Clay Medium plasticity Red brown to mottled grey
Groundwater	Encountered by Coffey at approximately 4.2m below ground level
Soil Category	Category 4 – Clay Loams (medium plasticity clays)
Structure	Moderate
Indicative Permeability (K_{sat})	0.5 – 1.5 m/day
Ribbon Length	30mm
Coarse fragments	Trace gravels
Rock outcrops	Not encountered
Impermeable rock layer	Not encountered
Soil Dispersion	Not dispersive

2.3 Environmental Assessment

A review of the surrounding environment has been undertaken to identify factors that may be impacted by onsite wastewater disposal, and proposed mitigation measures. This assessment has been completed in accordance with the Lismore Council Onsite Sewage and Wastewater Management Strategy Section 5.4.3, which identifies limiting factors, as shown in Table 3 below.

Table 3: Environmental Assessment

Feature	No Limitation	Limitation Exists	Comments
Slope	<15%	>15%	• Less than 2% (virtually flat)
Land form	Divergent (drainage-spreading) land shape e.g. hill crests	Convergent (drainage-concentrating) land shape	• Linear Divergent
Exposure	Facing within NW or NE quadrant, and high sunwind exposure	Facing within SW or SE quadrant, and sheltered from sun-wind	• The proposed mound faces east, with high sun and wind exposure • Mound will be grassed to encourage evapotranspiration
Distance to water bodies	>100m to perennial and intermittent watercourse AND >250m to domestic groundwater wells AND >40m to gullies	<100m to perennial and intermittent watercourse OR <250m to domestic groundwater wells OR <40m to gullies	• No natural water bodies within a critical distance
Run-off/seepage entering site from above	Minor	Major	• Swales to be constructed along the top of the school to manage stormwater • Refer to civil engineering plans
Flooding Potential	Disposal system above 1 in 20 year flood contour AND Treatment system above 1 in 100 year flood contour	Disposal system below 1 in 20 year flood contour OR Treatment system below 1 in 100 year flood contour	• The site has historical flooding events, which has promoted the school rebuild • Land application area to be a mound, which elevates the area • Wastewater tanks to be installed with suitable anchors to prevent floating in flood waters • Electrical components on treatment plant to be elevated above flood level • Effluent quality: advanced secondary with nutrient reduction
Site Drainage	No visible signs of surface dampness	Signs of surface dampness	• Some areas of poor drainage • Elevated mound will prevent the LAA from ponding
Surface Condition	No bare ground or cracking	Bare ground or cracking	
Fill	• Disposal area not on fill	Disposal area contains fill	
Erosion/Mass Movement	• No sign of rills, slips	Rills, slips	

2.4 School Population

Blakebrook Public School is a moderately sized inner-regional school with a declining student body. Student and staff numbers were sourced from *MySchool* and are presented in Table 4 and Figure 2.

Table 4: School Population

Year	Students	Full Time Equivalent Staff	Total Population
2017	90	6	96
2018	76	6	82
2019	66	7	73
2020	64	7	71
2021	61	7	68
2022	51	2	53

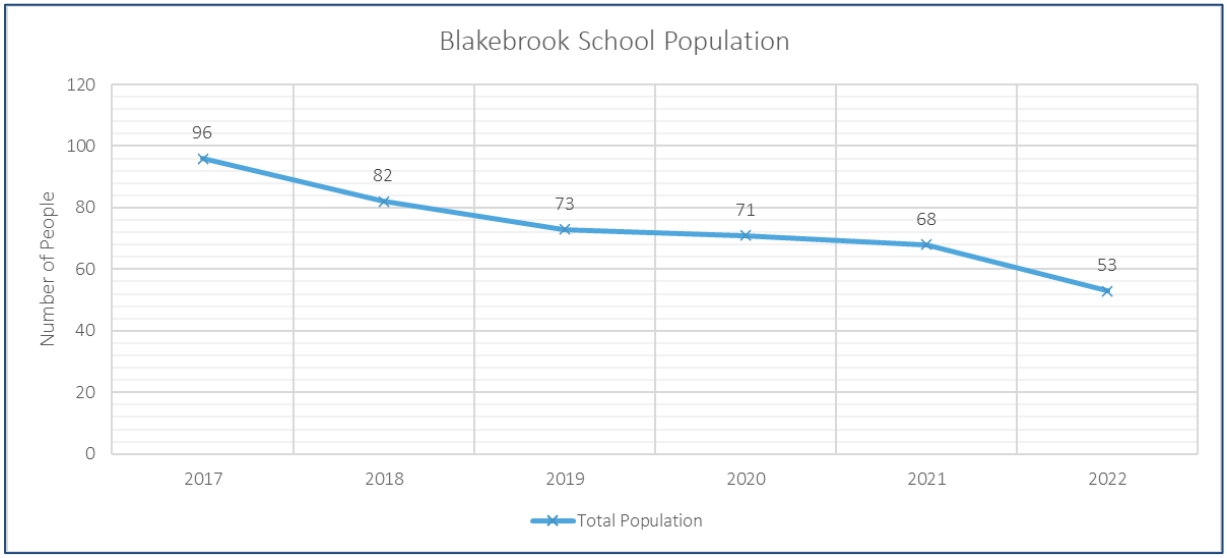


Figure 2: School Population

Figure 2 shows that there has been a prolonged decline in student numbers at the school.

3 Wastewater System Works

3.1 Decommissioning of Existing System

The existing school has several concrete septic tanks on the western side of the property. The land application area could be identified during the site inspection, however it is likely there are trenches within 10m downslope of the septic tanks.

The existing wastewater systems will be constructed over with the new school building and they are to be decommissioned:

- Licenced contractor to empty tanks
- Spread 5kg lime per tank
- Hole base and collapse walls to at least 300mm below ground level
- Backfill with free draining sand
- Cap inlet drainage (from building) and outlet drainage (to trenches) with concrete

Figure 3 shows the existing septic tanks.

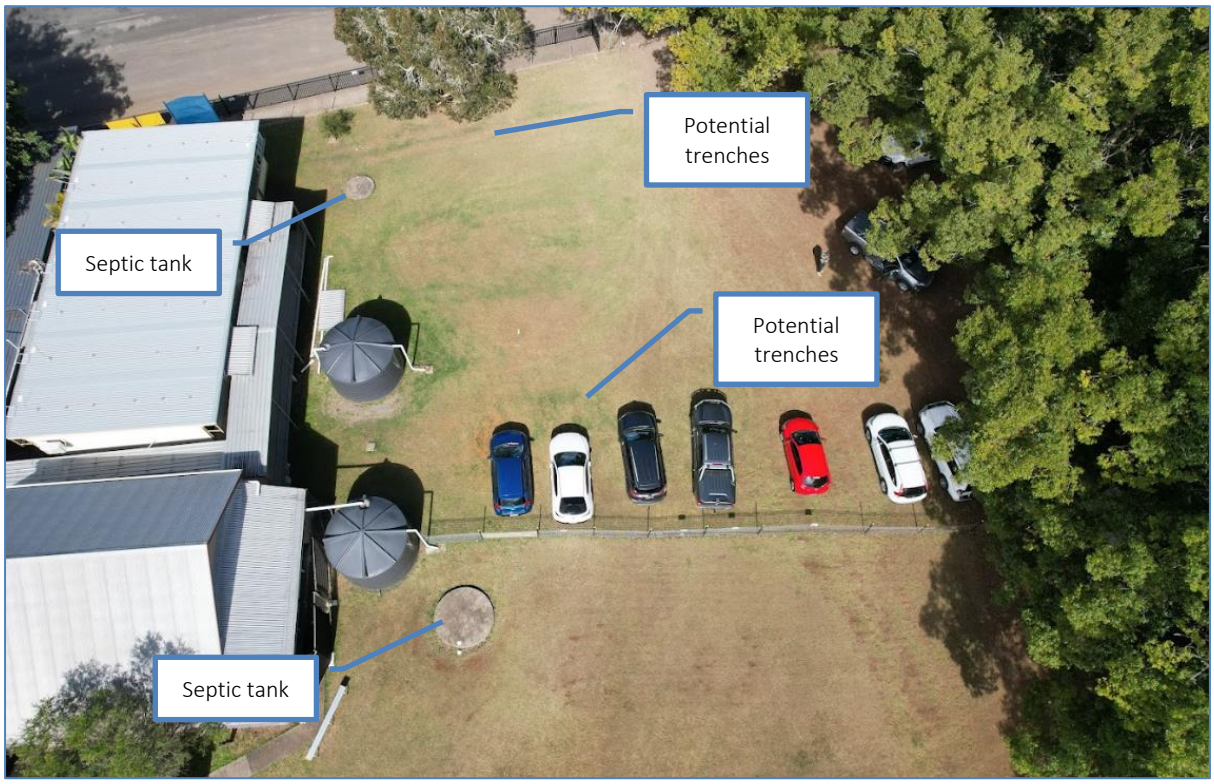


Figure 3: Existing septic tanks

3.2 Proposed Treatment System

3.2.1 Design volume

A design volume of 30 L/person/day has been adopted for the new system, with a design population of 100 people/day, based on the historical peak. This results in a total design volume of 3000 L/school day, however based on current student numbers, the realistic wastewater volume will be less than 2000 L/school day. It is noted that there will be no wastewater generated on weekends or school holidays.

3.2.2 System Selection

The proposed new wastewater system must meet current legislative requirements in addition to being safe and low risk for the school. The following factors were considered:

- Risk of human contact with effluent
- Area of land required for effluent disposal
- Flood immunity
- Soil and environmental constraints
- Effective treatment of influent

It is recommended to:

- Install a 4000L all-waste septic tank to receive all influent from the building. This tank will homogenise the influent and capture any foreign items flushed down the drain
- Install an advanced secondary nutrient reduction treatment system. A highly treated effluent is recommended because of flood inundation. 2x ATWS will be required to manage the peak design hydraulic loading of 3000 L/day
- Install a new Wisconsin Mound, which is to be fenced off from public access. A mound system will provide the best flood immunity

3.2.3 Treatment System Location

The location of the septic tank and treatment plant have been nominated by ADCO Construct and are to be positioned behind the new buildings as shown on the detailed design plans in Appendix A.

3.2.4 Septic Tank

A concrete all-waste septic tank is to be installed to receive all sanitary drainage from the building. Specifications of the tank are presented in Table 5.

Table 5: Septic Tank Specifications

Feature	Detail
Type	All-waste concrete septic tank
Capacity	4000L (min)
Brand	Everhard 11030 (or equivalent)
Tank Details (example only)	2.165m high; 1.925m diameter; 2.7 tonnes
Installation	Install as per manufactures specifications for flood impacted sites Install with concrete ground anchors to prevent floating
Servicing and Maintenance	Sludge and scum levels to be checked annually Tank to be pumped out when 1/3 full of solids or every 5 years

3.2.5 Treatment Plant

The proposed AWTS is a Taylex ABS-NR 2000 which produces advanced secondary effluent quality with nutrient reduction. Because of the calculated peak design volume of 3000 L, two treatment plants will be required. A 2-outlet distribution box is proposed at the septic tank outlet to split the wastewater between the two plants. Specifications of the Taylex are presented in Table 6 below.

Table 6: Taylex Specifications

Feature	Detail
Type	Aerated Wastewater Treatment System
Brand	Taylex ABS-NR 2000
Effluent Quality	Advanced Secondary, with Nutrient Reduction
NSW Health Certification	STS-AWTS-069
Hydraulic Capacity	2000 L/day each (design volume is 3000L/day, therefore 2x tanks required)

Feature	Detail
Tank Details	2.3m high; 2.45m diameter; 6.25 tonnes
Pump	Comes standard with Davey D42 Irrigation Pump Duty: 20m head @ 25 L/min
Air Blower	Comes standard with Nitto 120L Blower and Blower Box Box to be mounted above flood level in a location specified by ADCO
Controls and alarms	Controls and alarms come standard and attached to blower box
Installation	Install as per manufactures specifications for flood impacted sites. Install with concrete ground anchors to prevent floating
Servicing and Maintenance	3 monthly serving requirement, with inspection form submitted to Council

3.3 Proposed Land Application Area

3.3.1 Type of Land Application Area

A Wisconsin Mound is to be installed in the middle of the property, as nominated by ADCO Construction in consultation with Taylor Environmental and the other specialist consultants on the project (civil, landscaping etc). A mound was identified as the most suitable application method for the following reasons:

- Provides an elevated application area to increase flood immunity
- Subsurface application with no risk of human contact
- No reliance on maintenance staff to operate distribution or control valves
- Less disturbance of soils (potential Acid Sulphate Soils at ground elevations <20m AHD)
- Smallest footprint comparted to other application methods (SSI & ETA)

3.3.2 Land Application Area Location

The land application area is to be installed between the school buildings and play ground. Because this is located in a high foot-traffic area, the mound is to be fenced off from public access.

Figure 4 shows the proposed land application area on the current oval.

Figure 4: Proposed land application area

3.3.3 Sizing of Land Application Area

The land application area is to be sized based on the most limiting sized area calculated from the hydraulic load, water and nutrient balance. These calculations are shown in Appendix B and Appendix C, with the results outlined below:

Hydraulic loading	A = Q/DLR = 3000/16 = 187.5 m^2
Wisconsin mound specifications	A = 282.8m^2 (to achieve adequate linear loading rates)
Water Balance	A = 203 m^2 (based on entire year, not school year)
Nutrient Balance	A = 196 m^2 (Nitrogen) (based on yearly N loading rate)

The Wisconsin Mound loading area is the largest of the calculations and therefore is to be used for the system design.

3.3.4 Land Application Area Specifications

Specifications of the Land Application Area are presented in Table 7 below. Appendix A presents the detailed design.

Table 7: LAA Specifications

Feature	Detail
Design Volume (Q)	3000 L/school day
Soil Design Loading Rate (DLR)	16 mm/day
Disposal Method	Wisconsin mound
Area required	292.8 m^2 (to achieve adequate linear loading and gravel bed loading)
Footprint	12.2m x 24m
Height and slope	1.275m high on upslope end. Walls graded at 1:5 to allow a mower to traverse the bed
Distribution bed	4.6m x 16.4m = 75.44m^2 Graded river run aggregate (20 – 60 mm, non-crushed, rounded)
Distribution pipe	Ø13 Pressure Compensating dripline Drippers spaced 30cm apart with 3.0 L/hour flow rate Netafim Techline AS (or equivalent) Pressurised distribution network to ensure even distribution
Sand fill media	Medium sand with a grain size of 0.25 – 1.0 mm, a uniformity coefficient less than 4, less than 3% fines passing a 200 sieve (0.074 mm), free of clay, limestone, and organic material
Loading rates	Loading on gravel bed: 39.77 mm/day Linear loading on basal area: 125 L/m/day
Vegetation	Establish grass/turf over mound Grounds staff to mow as required, with clippings removed
Fence	Mound to be fenced off from public access Install gates for mower and maintenance access
Warning signs	Hang at least 4x effluent reuse warning signs around mound
Installation	The mound is constructed directly on to the natural ground surface. Existing grass to be removed prior, and natural soils ripped to 200mm deep. Spread gypsum at 1kg/m^2 on prepared base
Servicing and Maintenance	To be inspected quarterly at the time of the Taylex service

3.4 Additional Requirements and Considerations

3.4.1 Sanitary Drainage

The drainage layout of the buildings has been prepared by JHA Consulting Engineers.

3.4.2 Pump Main

The pump main from the STP to the land application area shall be Ø32od Ø26id PN12.5 lilac polyethylene, approximately 130m in length. The pipe is to be covered with flagging tape and buried at a depth of 300mm in non-trafficable areas and 600mm in trafficable areas.

3.4.3 Flood immunity

The following requirements are recommended to mitigate the risk of flood damage to the proposed wastewater system:

- Tanks to be installed in accordance with manufactures specifications for flood areas
- Tanks to be installed with concrete ground anchors to prevent floating in flood water
- Reflux valve fitted between building and connection point of OSSF
- Lids and IOs sealed with flexible sealant to reduce floodwater ingress
- Vents, alarms and controls to be 150mm min above flood level
- After a flood event which inundates the tanks and/or land application area, it is recommended that a suitably qualified person inspect the system prior to being used again

3.5 Recommended Setback Distances

AS1547:2012 Appendix R outlines recommended setback separation distances for land application areas. These distances are presented in Table 8.

Table 8: Separation Distances

Feature	AS1547:2012	Proposed	Comments
Property Boundary	1.5 – 50 m	20 m min	
Dwellings/buildings	2 – 6 m	>20 m	
Surface water	15 – 100 m	>100 m	No natural waterways within a critical distance
Recreation area	3 – 15 m	7.5 m	To play ground
Inground water tank	4 – 15 m	n/a	
Groundwater	0.6 - >1.5 m	>4m	
Bore	15-50 m	n/a	

3.6 Approvals

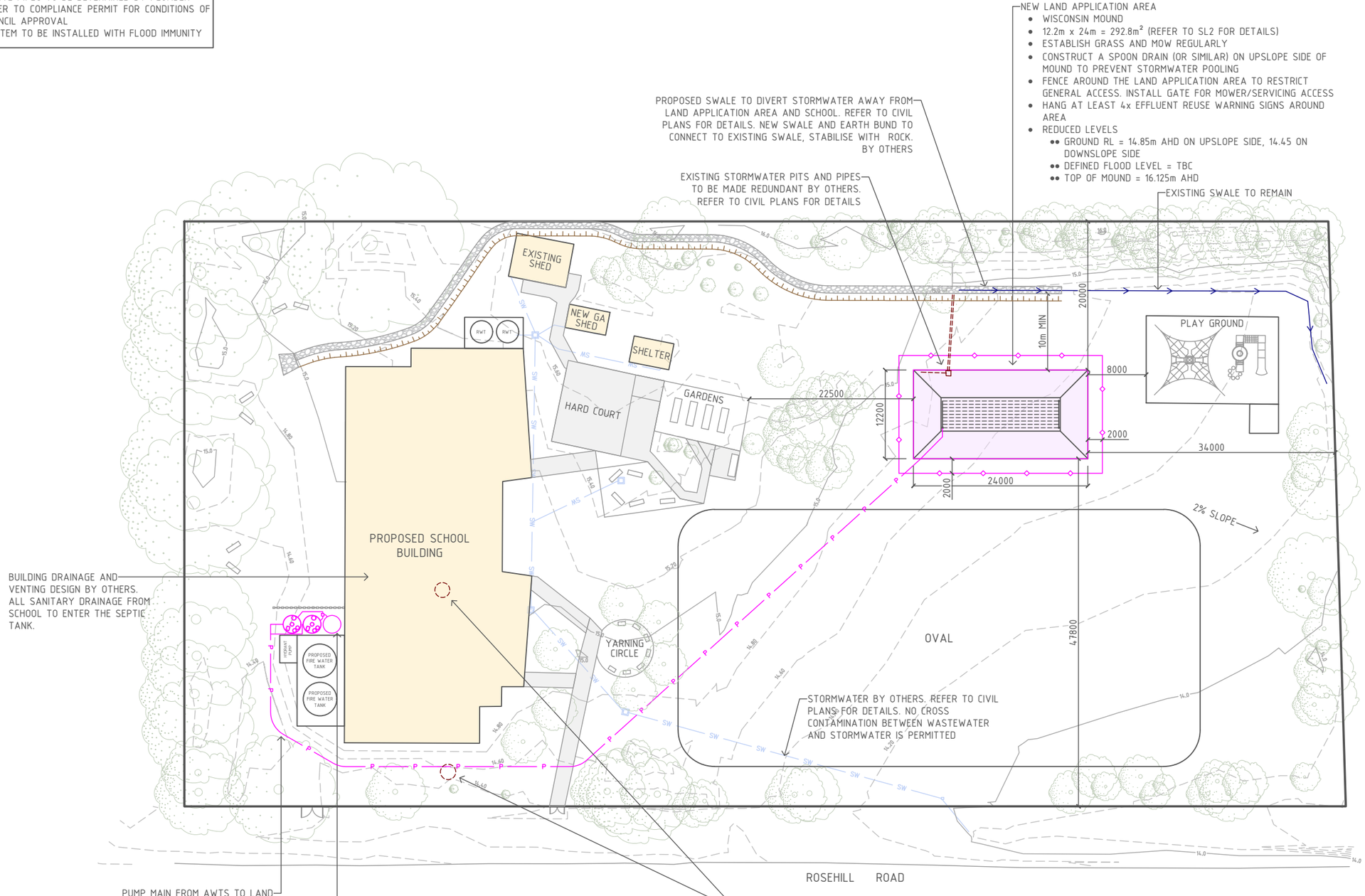
Prior to installation, this wastewater system design is to be approved by Lismore Shire Council. The system should be installed and operated in accordance with the approval permit.

This assessment and design was completed by Chris Taylor (QBCC Licence Number 150 556 72).

Chris Taylor MEnvMan, BAppSc(Chem), ADCivEng Cert IV DWM003
Director Taylor Environmental (Australia) Pty Ltd
9 Nov. 23

Appendix A Detailed Design Plans

GENERAL NOTES:
- LOCATION OF HSTP, ORG, VENT PIPE AND OTHER WASTE PIPES TO BE DETERMINED BY PLUMBER
- REFER TO COMPLIANCE PERMIT FOR CONDITIONS OF COUNCIL APPROVAL
- SYSTEM TO BE INSTALLED WITH FLOOD IMMUNITY



FULL SITE PLAN

1:600 @ A3

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REVISIONS

#	DATE	SUBJECT	AUTHORISED
A	09/08/2023	REVISION A	C. TAYLOR
B	12/10/2023	REVISION B	C. TAYLOR
C	09/11/2023	SWALE	C. TAYLOR

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taylor environmental

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WASTE WATER TREATMENT & EFFLUENT DISPOSAL SYSTEM

AUTHORISED FOR ISSUE — DATE

09/11/2023

STREET ADDRESS
BLAKEBROOK PUBLIC SCHOOL
417 ROSEHILL ROAD, BLAKEBROOK NSW 2480

LOT & PLAN
2 DP859866

COUNCIL
LISMORE CITY

NAME OF CLIENT
NSW DEPT. OF EDUCATION

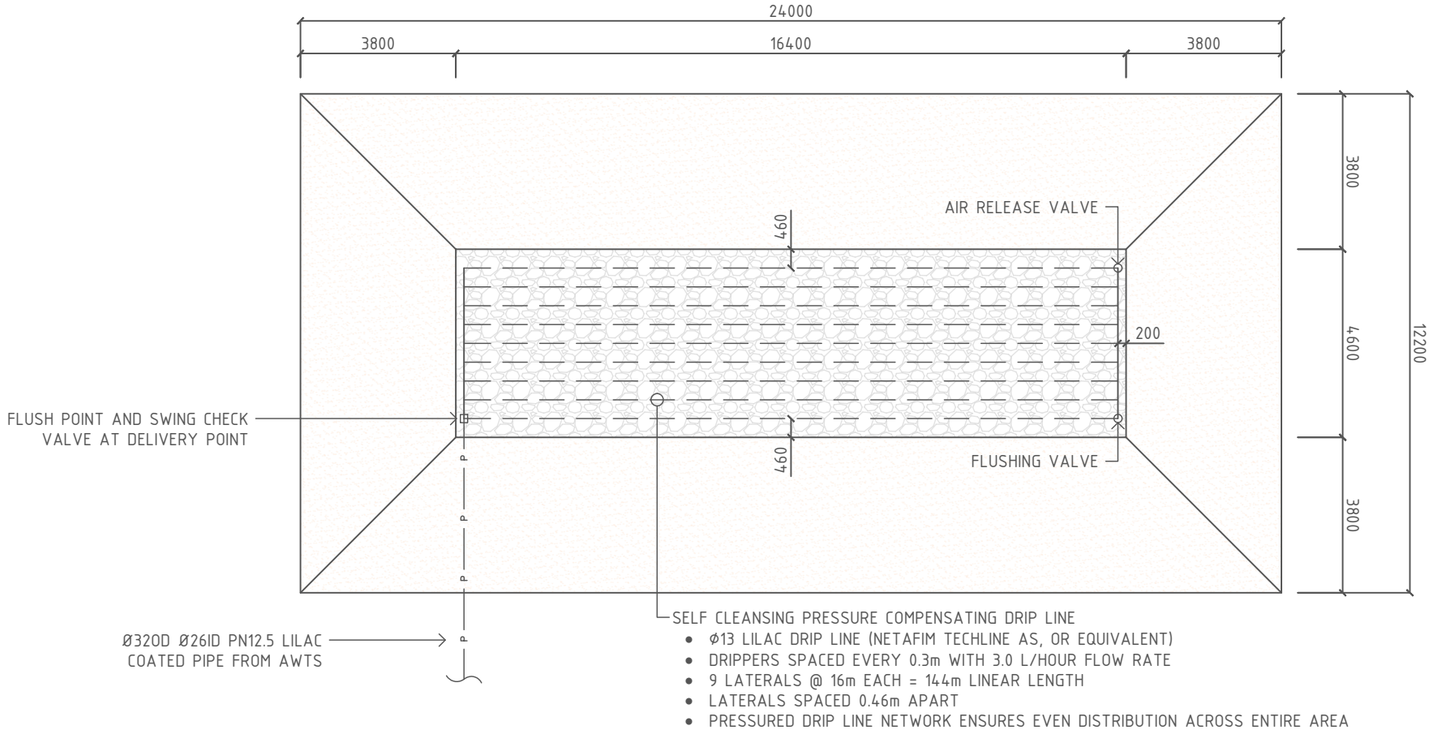
DESIGNER
C. TAYLOR

DRAWN
M. MAHONY

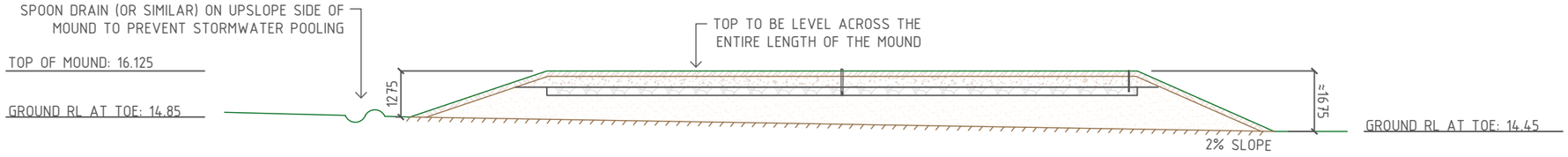
DRAWING DETAILS
SITE LAYOUT

JOB NUMBER
TE233623

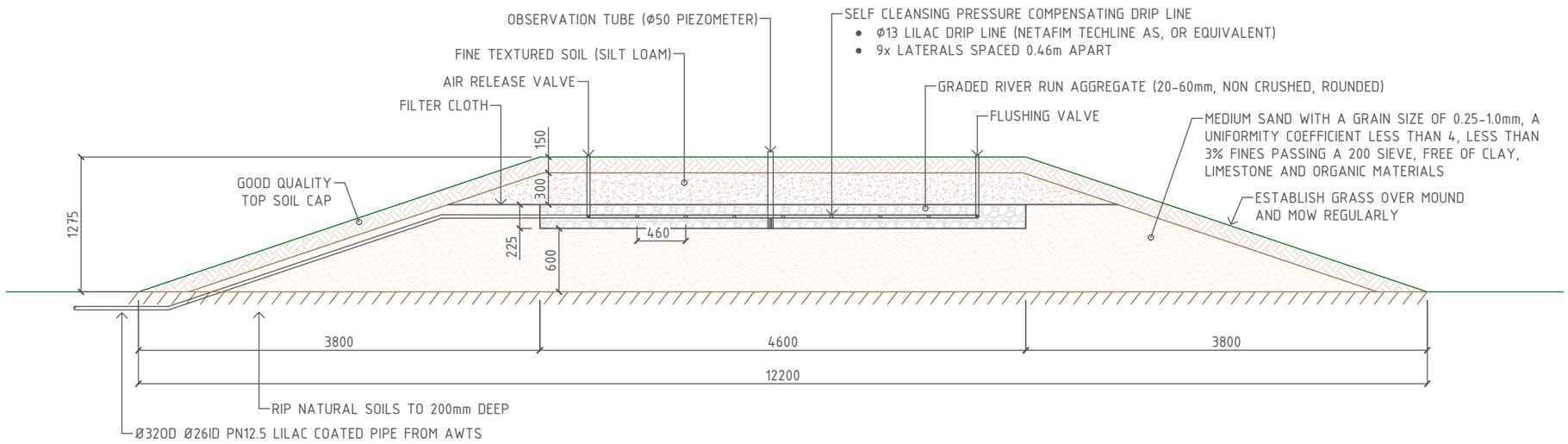
SCALE	REVISION	DWG #
1:600	C	SL1



WISCONSIN MOUND PLAN VIEW 1:150 @ A3



WISCONSIN MOUND SIDE VIEW 1:150 @ A3



WISCONSIN MOUND END VIEW 1:50 @ A3

REVISIONS

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B	09/11/2023	SWALE	C. TAYLOR

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WASTE WATER TREATMENT & EFFLUENT DISPOSAL SYSTEM

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STREET ADDRESS
BLAKEBROOK PUBLIC SCHOOL
417 ROSEHILL ROAD, BLAKEBROOK NSW 2480

LOT & PLAN
2 DP859866

COUNCIL
LISMORE CITY

NAME OF CLIENT
NSW DEPT. OF EDUCATION

DESIGNER
C. TAYLOR

DRAWN
M. MAHONY

DRAWING DETAILS
MOUND DETAIL

JOB NUMBER
TE233623

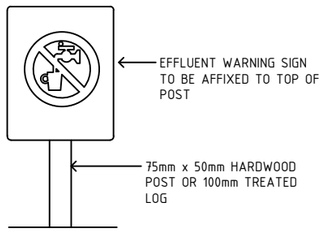
SCALE	REVISION	DWG #
N/A	B	SL2

INSTALLATION
- IT IS THE INSTALLERS RESPONSIBILITY TO ENSURE THAT ALL COMPONENTS COMPLY WITH THESE GUIDES UPON COMMISSIONING OF THIS SYSTEM
- THE INSTALLER SHALL ENSURE ALL IRRIGATION PIPEWORK AND FITTINGS COMPLIES WITH AS1477
- ALL BURIED PIPEWORK IS TO BE IDENTIFIED WITH UNDERGROUND MARKING TAPE PLACED ABOVE THE PIPEWORK AND ALL PIPE IS TO BE LILAC COATED
- ALONG THE BOUNDARY OF THE IRRIGATION AREAS THERE SHALL BE AT LEAST 2 WARNING SIGNS CLEARLY VISIBLE TO ADVISE THAT RECYCLED WATER IS USED FOR IRRIGATION (EACH SIGN SHALL COMPLY WITH AS1319 AND HAVE THE WORDING RECYCLED WATER - AVOID CONTACT DO NOT DRINK)

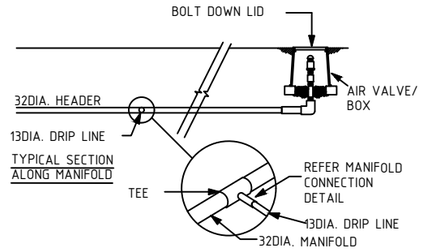
MAINTENANCE
- REGULAR ROUTINE MAINTENANCE CHECKS OF THE IRRIGATION SYSTEM SHALL BE CARRIED OUT BY A LICENSED SERVICE AGENT
- FITTINGS SHALL BE MAINTAINED IN CORRECT WORKING ORDER TO ENSURE PROPER PERFORMANCE BY THE LICENSED SERVICE AGENT

GENERAL NOTES - HSTP
1. THE SYSTEM INSTALLER IS RESPONSIBLE TO ESTABLISH THE LOCATION, LEVELS AND DEPTHS OF ALL EXISTING SERVICES ON-SITE PRIOR TO COMMENCING ANY WORKS
2. LOCATIONS AND SETOUT DIMENSIONS SHOWN ARE APPROXIMATE ONLY AND ARE TO BE CONFIRMED ON SITE.
3. ACCESS AND LAY DOWN AREAS ARE TO BE CONFIRMED BY THE SYSTEM INSTALLER
4. EXISTING BUILDINGS AND EXTERNAL STRUCTURES SHOWN ON THESE DRAWINGS ARE OBTAINED FROM THE AVAILABLE INFORMATION AND MAY NOT BE COMPLETE AND ACCURATE
5. PLUMBING AND DRAINAGE TO AS / NZS 3500
6. ALL PIPE WORK TO AS / NZS 4020
7. ALL TANKS TO BE INSTALLED AND ANCHORED IN COMPLIANCE WITH THE MANUFACTURERS SPECIFICATIONS
8. FLEXIBLE JOINTS ON ALL INSTALLED TANKS (AS / NZS 3500)
9. THERE SHALL BE NO CROSS CONNECTION BETWEEN ANY WASTEWATER / EFFLUENT PIPEWORK AND ANY POTABLE WATER SUPPLY PIPEWORK
10. MINIMUM DISTANCE BETWEEN TANKS AND BUILDINGS TO BE MAINTAINED (AS/NZS 3500)
11. GRADE ALL BATTERS EVENLY AT 1 IN 5, UNLESS NOTED OTHERWISE
12. IT IS THE INSTALLERS RESPONSIBILITY TO PROVIDE 3 COPIES OF ACCURATE ' AS CONSTRUCTED' DRAWINGS TO THE RELEVANT LOCAL AUTHORITY AND INCUR ALL ASSOCIATED COSTS
13. ALL DISTURBED AREAS TO BE TURFED AND RECTIFIED
14. EXISTING TOPSOIL IS TO BE RETAINED AND SET ASIDE (WINDROWED) TO PREVENT DAMAGE FROM MACHINERY AND REDISTRIBUTED ONCE INSTALLATION IS COMPLETE
15. AT LEAST A 5 TONNE MACHINE FOR EARTHWORKS TO UTILISED
16. IT IS THE RESPONSIBILITY OF THE INSTALLER TO ENGAGE TAYLOR ENVIRONMENTAL (AUSTRALIA) PTY LTD TO UNDERTAKE INSPECTIONS DURING INSTALLATION. FAILURE TO DO SO WILL RESULT IN THE FORM 8 / COMMISSIONING CERTIFICATE NOT BEING ABLE TO BE COMPLETED

SOIL CHARACTERISTICS	
TEXTURE	CLAY LOAM
STRUCTURE	MODERATE
SOIL CATEGORY	4
INDICATIVE PERMEABILITY	0.5 - 1.5 m/DAY
DESIGN LOADING RATE	16 mm/DAY
DESIGN VOLUME	
VOLUME ALLOWANCE	30 L/PERSON/SCHOOL DAY
PEAK NUMBER OF PEOPLE	100 PEOPLE/SCHOOL DAY MAX
TOTAL DESIGN VOLUME	3000 L/SCHOOL DAY
TREATMENT SYSTEM	
PRIMARY	4000L ALL-WASTE CONCRETE SEPTIC TANK
AWTS	2x TAYLEX ABS-NR 2000
TREATMENT LEVEL	ADVANCED SECONDARY WITH NUTRIENT REDUCTION
CERTIFICATION NUMBER	STS-AWTS-069
LAND APPLICATION AREA	
TYPE	WISCONSIN MOUND
AREA REQUIRED: HYDRAULIC	A = Q/DLR = 187.5 m^2
AREA REQUIRED: NITROGEN	196 m^2
PROPOSED MOUND FOOTPRINT	12.2m x 24m = 292.8 m^2
GRAVEL DISTRIBUTION BED	4.6m x 16.4m = 75.44 m^2
LOADING RATE ON GRAVEL BED	39.7 mm/DAY
LINEAR LOADING ON BASAL AREA	125 L/m/DAY
DRIP LINE EMITTER CALCULATIONS	
LENGTH OF DRIPLINE	144 m
EMITTER SPACING	0.3 m
TOTAL EMITTERS	480
EMITTER FLOW RATE	3.0 L/HOUR EACH
TOTAL FLOW RATE	1440 L/HOUR
TOTAL FLOW RATE	24 L/MIN
PUMP DUTY	
HEAD LOSS: HSTP	2 m
HEAD LOSS: ELEVATION	2 m
HEAD LOSS: DRIP LINE	10 m
FRICTION LOSS: RISING MAIN	6 m
TOTAL LOSS	20 m
PUMP DUTY	20m @ 24 L/MIN
TRANSFER TIME (200L)	8 MIN
EXAMPLE PUMP	DAVEY D42 (STANDARD WITH TAYLEX)



TYPICAL WARNING SIGN



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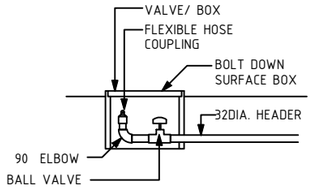
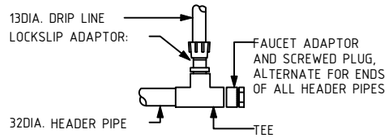


FLUSHING VALVE DETAIL



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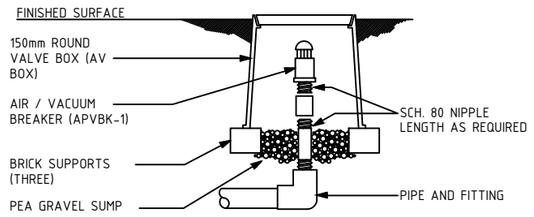

AIR VALVE DETAIL

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REVISIONS

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WASTE WATER TREATMENT & EFFLUENT DISPOSAL SYSTEM

AUTHORISED FOR ISSUE — DATE 09/11/2023

STREET ADDRESS
BLAKEBROOK PUBLIC SCHOOL
417 ROSEHILL ROAD, BLAKEBROOK NSW 2480

LOT & PLAN
2 DP859866

COUNCIL
LISMORE CITY

NAME OF CLIENT
NSW DEPT. OF EDUCATION

DESIGNER
C. TAYLOR

DRAWN
M. MAHONY

DRAWING DETAILS
DETAIL

JOB NUMBER
TE233623

SCALE	REVISION	DWG #
N/A	C	SL3

Appendix B Water Balance

Water Balance Calculation

On-Site Wastewater and Effluent Disposal System Design

Propery Details	
Property Address	Blakebrook State School
Real Property Description	Lot 2 DP859866
Local Authority	Lismore Shire
Property Size	1.2 ha
Water Supply	Rain water
Closest Weather Station	Lismore Airport (rainfall); Alstonville (evaporation)

Wastewater System Details	
Design Volue	3000 L/school day
Soil Type	Moderatley Structured Category 4 Clay Loam
Design Loading Rate	16 mm/day

Water Balance

Month	*Days*	*Daily Evaporation*	*Pan Evaporation E*	*Evapo-transpiration ET*	*Rainfall R*	*Retained Rain Rt*	*Monthly DLR*	*Month Disposal rate*	*Effluent applied*	*Required Disposal Area*
		mm	*mm*	*mm*	*mm*	*mm*	*mm*	*mm/month*	*L/month*	*m2*
January	31	5.7	176.7	141.4	144.3	115.4	496	521.9	93000	178.2
February	28	5	140	112.0	143.8	115.0	448	445.0	84000	188.8
March	31	4.3	133.3	106.6	181.4	145.1	496	457.5	93000	203.3
April	30	3.5	105	84.0	108.6	86.9	480	477.1	90000	188.6
May	31	2.7	83.7	67.0	66	52.8	496	510.2	93000	182.3
June	30	2.4	72	57.6	100.5	80.4	480	457.2	90000	196.9
July	31	2.7	83.7	67.0	34	27.2	496	535.8	93000	173.6
August	31	3.5	108.5	86.8	54.3	43.4	496	539.4	93000	172.4
September	30	4.4	132	105.6	44.6	35.7	480	549.9	90000	163.7
October	31	5	155	124.0	92.9	74.3	496	545.7	93000	170.4
November	30	5.4	162	129.6	91.5	73.2	480	536.4	90000	167.8
December	31	5.9	182.9	146.3	140.6	112.5	496	529.8	93000	175.5

Outcomes		
Required Disposal Area		
Water Balance: maximum	203.3	m2
Water Balance: average	180.1	m2

Appendix C Nutrient Balance

Nutrient Balance Calculations

On-Site Wastewater and Effluent Disposal System Design

Propery Details

Property Address	Blakebrook State School
Real Property Description	Lot 2 DP859866
Local Authority	Lismore Shire
Property Size	1.2 ha
Water Supply	Rain water

Wastewater System Details

	School days/year	200	schooldays/year
Design Volume	*Daily wastewater generation*	3000	L/school day
	Yearly wastewater generation	600000	L/year
Soil Type		Moderatley Structured Category 4 Clay Loam	
Effluent Quality		Advanced Secondary with Nutirent Reduction	

Nitrogen

Methodology

Area Requried	= (C * Q) / L	
Where		
C	concentration of nutrient (mg/L)	
Q	wasteater flow rate (L/day)	
L	critical loading rate of nutrient (mg/m2/day)	

Inputs

Volume of wastewater	Q	600000	L/year	
Nitrogen Loading Rate	C	31.94	mg/L	(Taylex Specs)
Nitrogen Losses in the Soil		20%		
Type of Vegetation		Managed Lawn		
N Uptake by vegetation	L	214	mg/m2/year	

Coefficients

Vegetation Type	N Uptake		
	kg/ha/year	kg/m2	mg/m2/day
Kikuyu	780	0.78	214
Perennial ryegrass	210	0.21	58
Lucerne	1015	1.015	278
Good quality woodland	90	0.09	25
Poor quality woodland	65	0.065	18
Shrubs and some trees	150	0.15	41
Vetiver Grass	1200	1.2	329

Note: In a subsurface land application area, degradation of the ammonia by microbes is rapid, releasing nitrogen as gaseous product that no longer takes part in biological activity. Hence, there is a need to devalue the nitrogen in the soil by upto 40%.

Outputs

Area required for Nitrogen Assimilation	**196**	**m2**

Phosphorous

Methodology

Area Required	= P_gen / (P_sorb + P_uptake)
Where	
P_gen	amount of P generated over the time frame
P_sorb	amount of P absorbed without leaching in the time frame
P_uptake	amount of vegetation uptake over the time frame

Inputs

Volume of wastewater	Q	600000	L/day	
Phosphorous Loading Rate		8.76	mg/L	(Taylex Specs)
Time frame		50	years	
Soil Type		Cat 4		
P soption of soil	P_sorb	0.4	kg/m3	
Type of Vegetation		Managed Lawn		
P Uptake by vegetation	P_uptake	0.09	kg/m2	

Coefficients

Vegetation Type	P Uptake		
	kg/ha	kg/m2	mg/m2/day
Kikuyu	90	0.09	25
Perennial ryegrass	18	0.018	5
Lucerne	116	0.116	32
Good quality woodland	25	0.025	7
Poor quality woodland	20	0.02	5
Shrubs and some trees	16	0.016	4
Vetiver Grass	100	0.1	27

Soil Type	P sorption capcity	
	mg/m2	kg/m3
Category 1 - Gravels/sands	50	0.05
Category 2 - Sandy Loam	100	0.1
Category 3 - Loam	200	0.2
Category 4 - Clay Loam	400	0.4
Category 5 - Light Clay	500	0.5
Category 6 - Clay	600	0.6

Outputs

Total P added over timeframe	P_gen	26	kg
Area required for P Assimilation		**54**	**m2**

References

NSW Silver Book Appendix 6

Appendix D Taylex ABS-NR Certification

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:

- Statement of warranty
- Statement of service life
- Quality Assurance Certification
- Installation Manual
- Service Manual
- Owner's Manual
- Manufacturer's Service Report Form
- Engineering Drawings
- Specifications
- A4 Plans
- Certificate of Accreditation documentation from NSW Health.

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:

- BOD^5 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
E. coli *	≤ 10 cfu/100mL	3 cfu/100mL
FAC þ	Minimum 0.5 mg/L†	N/A
Turbidity ?	N/A	10 NTU

* Where disinfection is required.
þ 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%.

NSW GOVERNMENT Health

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

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Specification

CONCRETE ADVANCED BLOWER SYSTEM
-Nutrient Reduction
-2000L/per day

ABSNR-2000

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

Specification

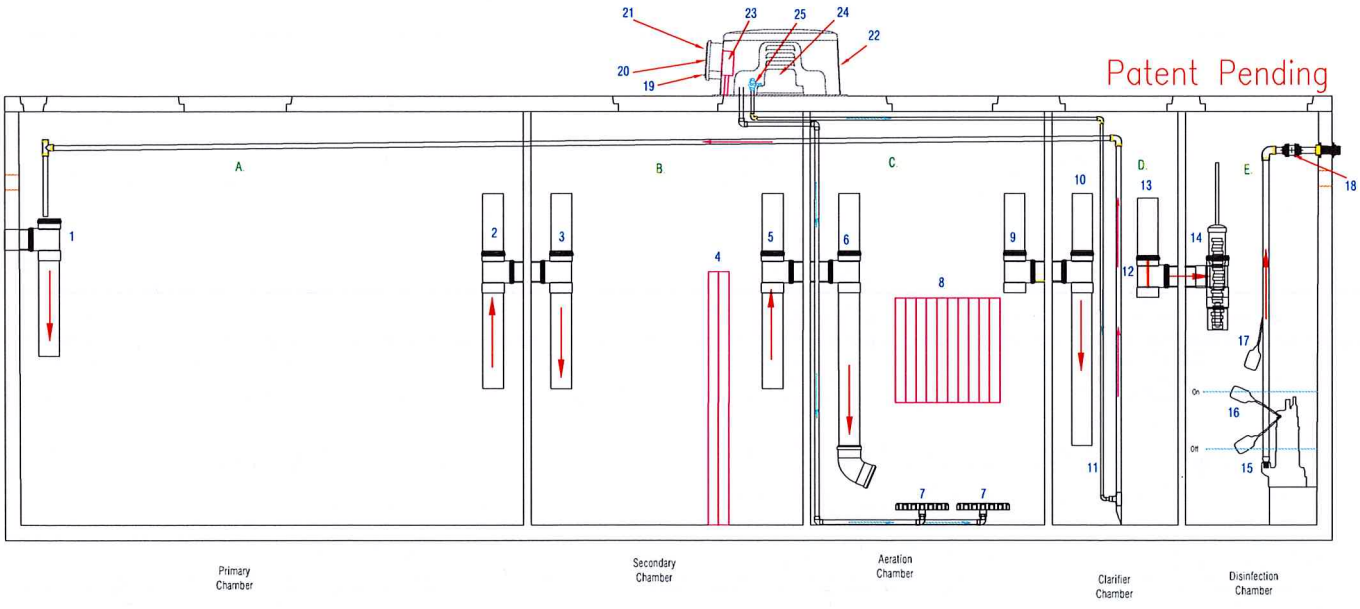
General Description:

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 BOD^5 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).



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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

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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

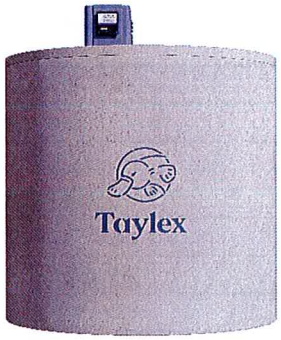
Component List

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.

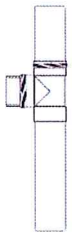
Chips and cracks can be repaired using Sika panel patch or mortar.



1) 100mm Sweep Tee With dropper pipe and riser
2)

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

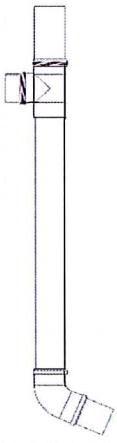
5)



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.



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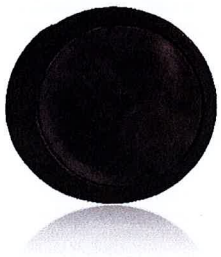
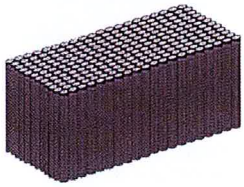
7) Diffuser x 2
Material – EPDM
Diameter – 250mm (9inch)

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.



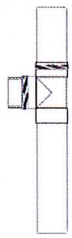
8) BIO Block Media
Width - 550mm
Length - 1100mm
Height - 500mm
Surface Area - 105m²



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)



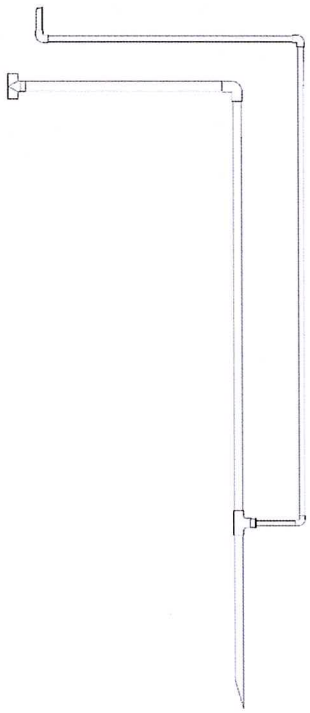
11) Recirculation System

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.



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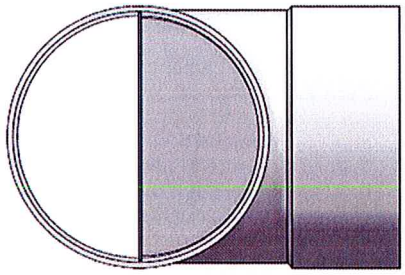
12) Taylex Filter Control (TFC)
Material - Stainless steel

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

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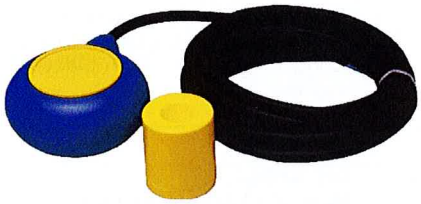
17) Alarm System High Water
Material – PVC
Length – 20mm
Width - 90mm
Trigger – High Water
Code – 3
Visual – Red L.E.D - 3 Flashes
Audible – Micro Buzzer
Voltage – 12V

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.

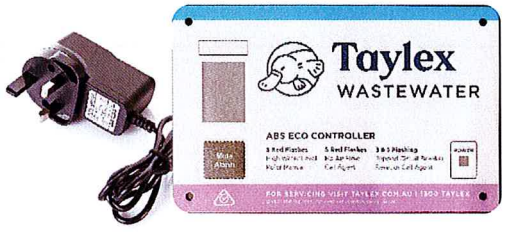
Repair / Replacement Details:
Repairing boxes is not recommended. Replacements boxes be purchased from Taylex or your local service agent.

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.



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WASTEWATER

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 boxed 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.

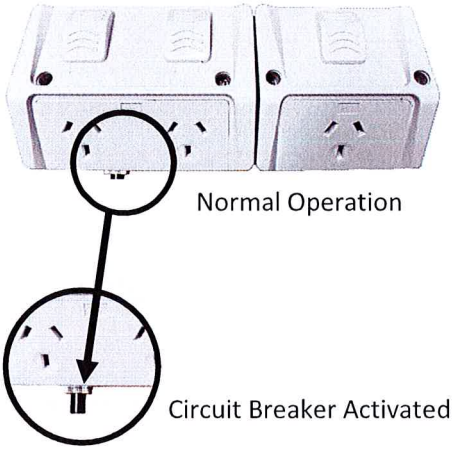
23) Weatherproof GPO's

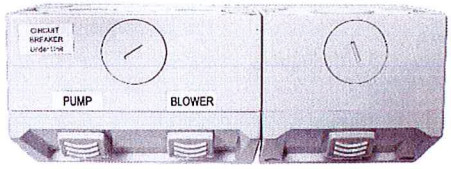
Single	Double
Height - 85mm	Height - 85mm
Length - 85mm	Length - 115mm
Width - 80mm	Width - 80mm

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.





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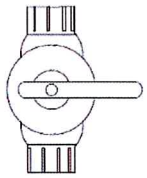
WASTEWATER

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.

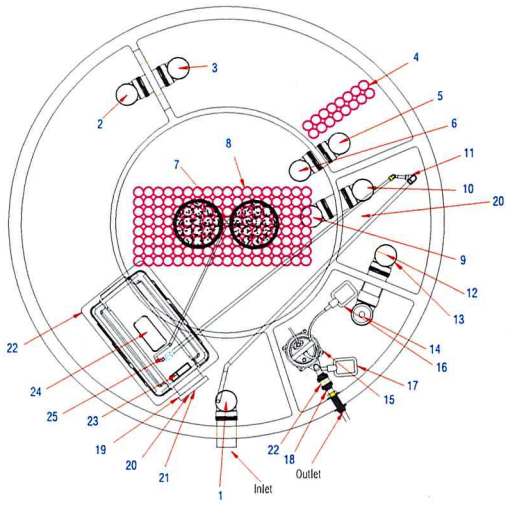
25) Recirculation Control Valve

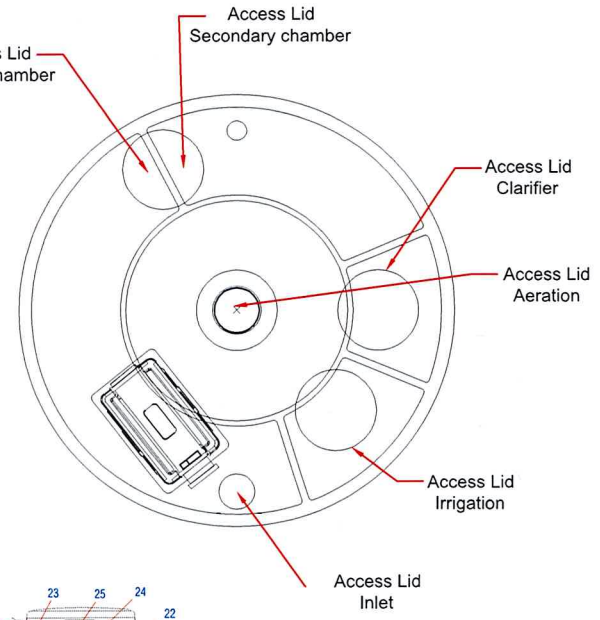
The Recirculation system has been designed to recirculate a precise volume of bacteria and sludge back to the primary chamber for denitrification and sludge management. The control valve should be set to '10' on the dial for optimum operation.



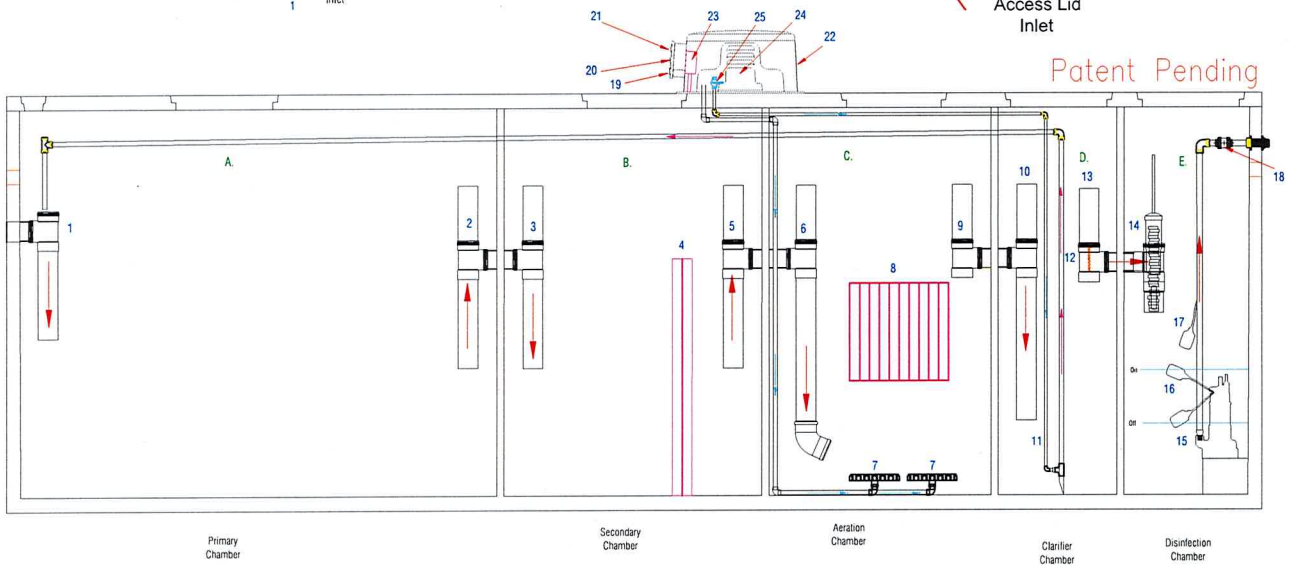
Repair / Replacement Details:
Turn the system off. Replace the Recirculation assembly by cutting the main line and installing the new assembly with a joining socket. Turn the system on. Purchase the complete assembly from Taylex.

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 PUIMP
16. IRRIGATION PUIMP 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

Taylex WASTEWATER

DESIGNED:	DW	14.09.2022	STATUS:	DESIGN
DRAWN:	CZ	14.09.2022	SCALE:	NTS
CHECKED:	KQ			
CAD FILE:				

CLIENT: Taylex Australia Pty Ltd

PROJECT: Certification Drawing

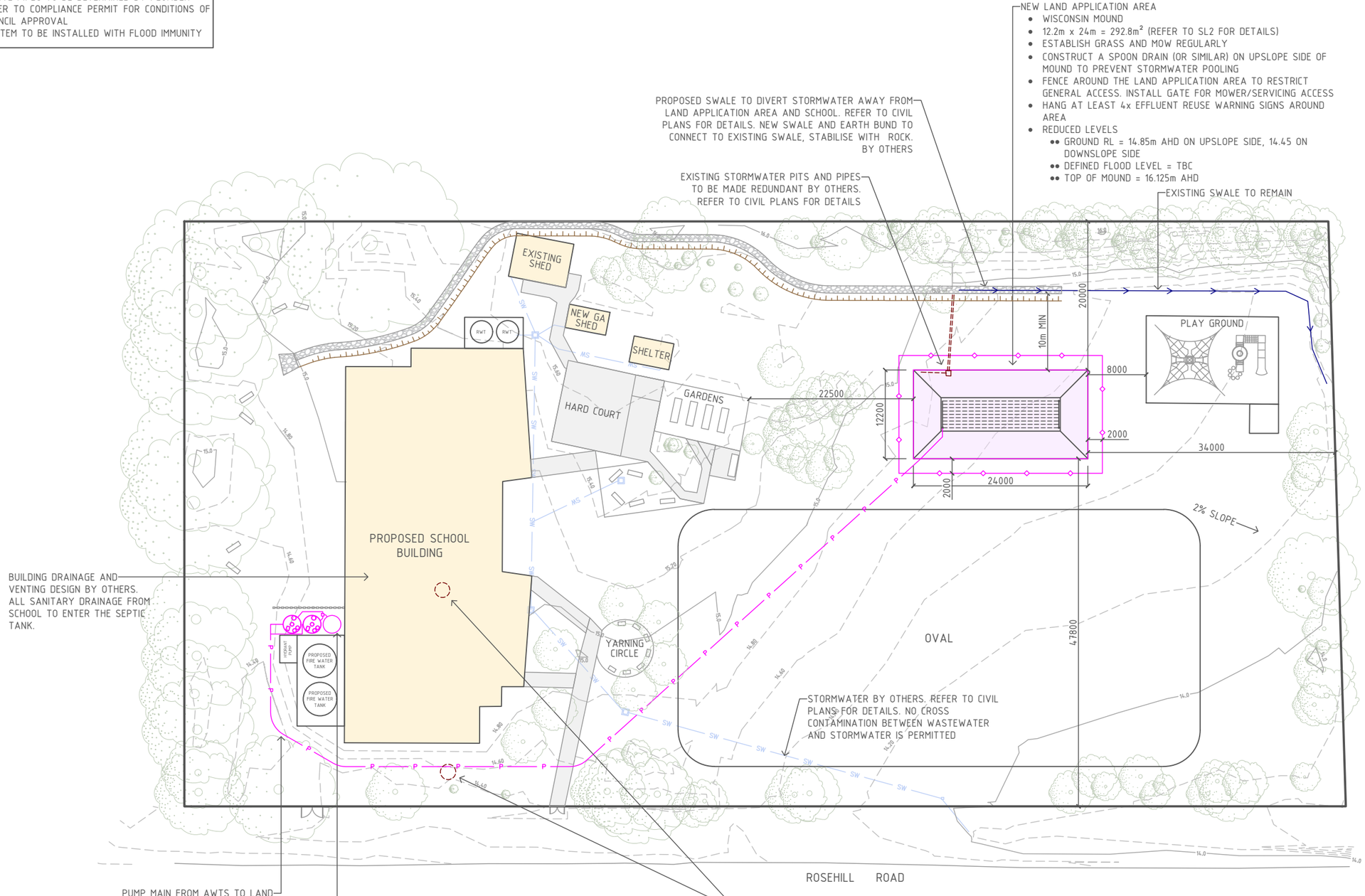
TITLE: ABSNR 2000

DRAWING No.: 1 of 1

SERIES: 2

ISSUE No.:

GENERAL NOTES:
- LOCATION OF HSTP, ORG, VENT PIPE AND OTHER WASTE PIPES TO BE DETERMINED BY PLUMBER
- REFER TO COMPLIANCE PERMIT FOR CONDITIONS OF COUNCIL APPROVAL
- SYSTEM TO BE INSTALLED WITH FLOOD IMMUNITY



FULL SITE PLAN

1:600 @ A3

N

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taylor environmental

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WASTE WATER TREATMENT & EFFLUENT DISPOSAL SYSTEM

AUTHORISED FOR ISSUE — DATE

09/11/2023

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BLAKEBROOK PUBLIC SCHOOL
417 ROSEHILL ROAD, BLAKEBROOK NSW 2480

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2 DP859866

COUNCIL
LISMORE CITY

NAME OF CLIENT
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DESIGNER
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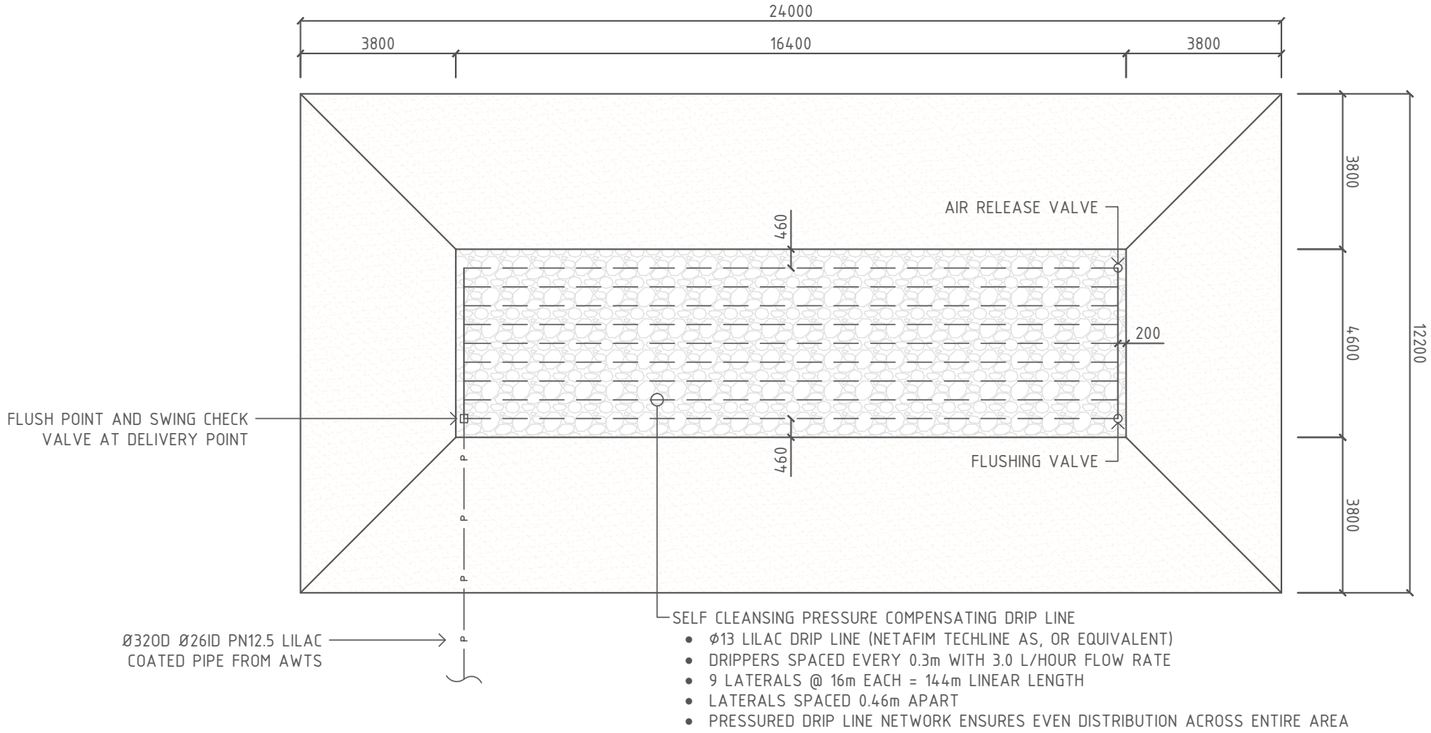
DRAWN
M. MAHONY

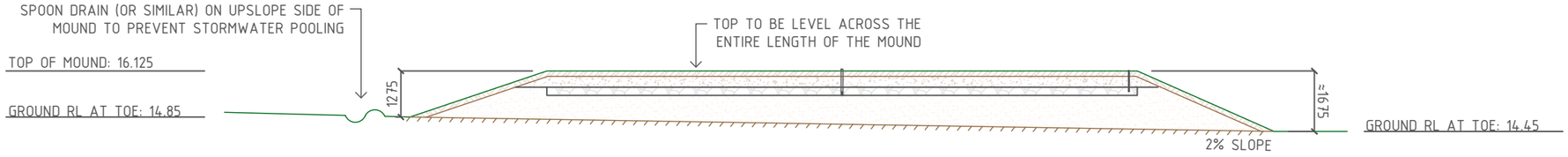
DRAWING DETAILS
SITE LAYOUT

JOB NUMBER
TE233623

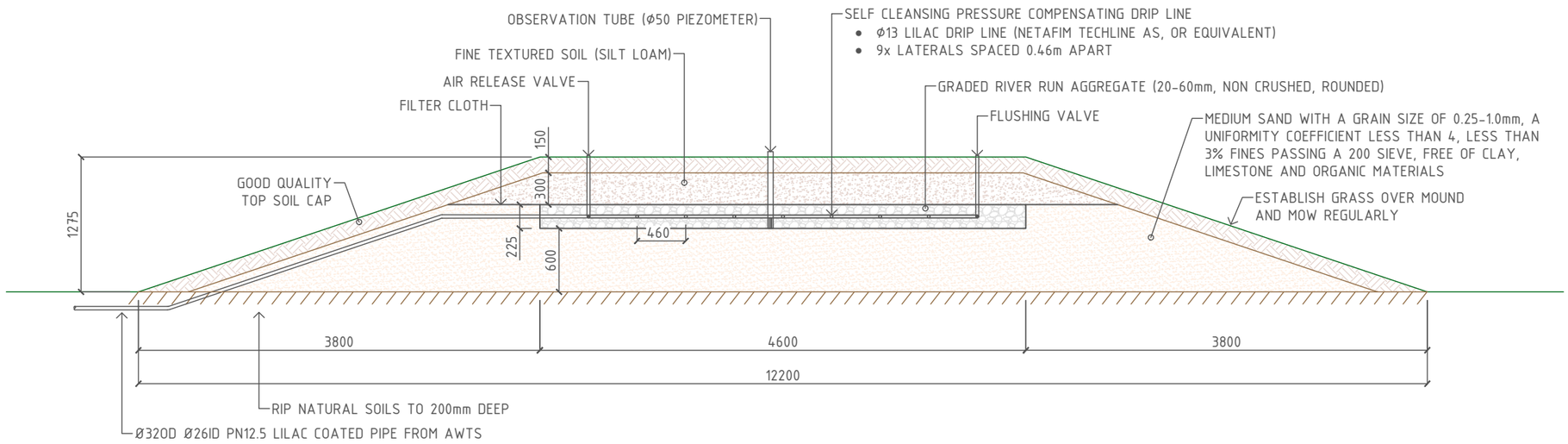
SCALE	REVISION	DWG #
1:600	C	SL1



WISCONSIN MOUND PLAN VIEW 1:150 @ A3



WISCONSIN MOUND SIDE VIEW 1:150 @ A3



WISCONSIN MOUND END VIEW 1:50 @ A3

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WASTE WATER TREATMENT & EFFLUENT DISPOSAL SYSTEM

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DRAWN
M. MAHONY

DRAWING DETAILS
MOUND DETAIL

JOB NUMBER
TE233623

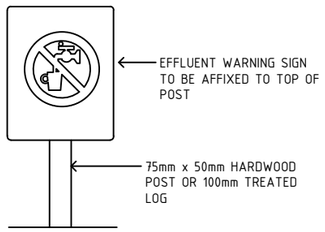
SCALE	REVISION	DWG #
N/A	B	SL2

INSTALLATION
- IT IS THE INSTALLERS RESPONSIBILITY TO ENSURE THAT ALL COMPONENTS COMPLY WITH THESE GUIDES UPON COMMISSIONING OF THIS SYSTEM
- THE INSTALLER SHALL ENSURE ALL IRRIGATION PIPEWORK AND FITTINGS COMPLIES WITH AS1477
- ALL BURIED PIPEWORK IS TO BE IDENTIFIED WITH UNDERGROUND MARKING TAPE PLACED ABOVE THE PIPEWORK AND ALL PIPE IS TO BE LILAC COATED
- ALONG THE BOUNDARY OF THE IRRIGATION AREAS THERE SHALL BE AT LEAST 2 WARNING SIGNS CLEARLY VISIBLE TO ADVISE THAT RECYCLED WATER IS USED FOR IRRIGATION (EACH SIGN SHALL COMPLY WITH AS1319 AND HAVE THE WORDING RECYCLED WATER - AVOID CONTACT DO NOT DRINK)

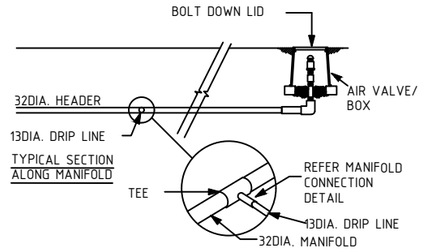
MAINTENANCE
- REGULAR ROUTINE MAINTENANCE CHECKS OF THE IRRIGATION SYSTEM SHALL BE CARRIED OUT BY A LICENSED SERVICE AGENT
- FITTINGS SHALL BE MAINTAINED IN CORRECT WORKING ORDER TO ENSURE PROPER PERFORMANCE BY THE LICENSED SERVICE AGENT

GENERAL NOTES - HSTP
1. THE SYSTEM INSTALLER IS RESPONSIBLE TO ESTABLISH THE LOCATION, LEVELS AND DEPTHS OF ALL EXISTING SERVICES ON-SITE PRIOR TO COMMENCING ANY WORKS
2. LOCATIONS AND SETOUT DIMENSIONS SHOWN ARE APPROXIMATE ONLY AND ARE TO BE CONFIRMED ON SITE.
3. ACCESS AND LAY DOWN AREAS ARE TO BE CONFIRMED BY THE SYSTEM INSTALLER
4. EXISTING BUILDINGS AND EXTERNAL STRUCTURES SHOWN ON THESE DRAWINGS ARE OBTAINED FROM THE AVAILABLE INFORMATION AND MAY NOT BE COMPLETE AND ACCURATE
5. PLUMBING AND DRAINAGE TO AS / NZS 3500
6. ALL PIPE WORK TO AS / NZS 4020
7. ALL TANKS TO BE INSTALLED AND ANCHORED IN COMPLIANCE WITH THE MANUFACTURERS SPECIFICATIONS
8. FLEXIBLE JOINTS ON ALL INSTALLED TANKS (AS / NZS 3500)
9. THERE SHALL BE NO CROSS CONNECTION BETWEEN ANY WASTEWATER / EFFLUENT PIPEWORK AND ANY POTABLE WATER SUPPLY PIPEWORK
10. MINIMUM DISTANCE BETWEEN TANKS AND BUILDINGS TO BE MAINTAINED (AS/NZS 3500)
11. GRADE ALL BATTERS EVENLY AT 1 IN 5, UNLESS NOTED OTHERWISE
12. IT IS THE INSTALLERS RESPONSIBILITY TO PROVIDE 3 COPIES OF ACCURATE ' AS CONSTRUCTED' DRAWINGS TO THE RELEVANT LOCAL AUTHORITY AND INCUR ALL ASSOCIATED COSTS
13. ALL DISTURBED AREAS TO BE TURFED AND RECTIFIED
14. EXISTING TOPSOIL IS TO BE RETAINED AND SET ASIDE (WINDROWED) TO PREVENT DAMAGE FROM MACHINERY AND REDISTRIBUTED ONCE INSTALLATION IS COMPLETE
15. AT LEAST A 5 TONNE MACHINE FOR EARTHWORKS TO UTILISED
16. IT IS THE RESPONSIBILITY OF THE INSTALLER TO ENGAGE TAYLOR ENVIRONMENTAL (AUSTRALIA) PTY LTD TO UNDERTAKE INSPECTIONS DURING INSTALLATION. FAILURE TO DO SO WILL RESULT IN THE FORM 8 / COMMISSIONING CERTIFICATE NOT BEING ABLE TO BE COMPLETED

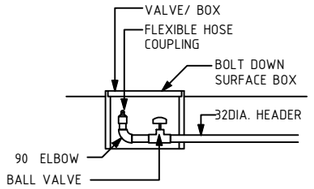
SOIL CHARACTERISTICS	
TEXTURE	CLAY LOAM
STRUCTURE	MODERATE
SOIL CATEGORY	4
INDICATIVE PERMEABILITY	0.5 - 1.5 m/DAY
DESIGN LOADING RATE	16 mm/DAY
DESIGN VOLUME	
VOLUME ALLOWANCE	30 L/PERSON/SCHOOL DAY
PEAK NUMBER OF PEOPLE	100 PEOPLE/SCHOOL DAY MAX
TOTAL DESIGN VOLUME	3000 L/SCHOOL DAY
TREATMENT SYSTEM	
PRIMARY	4000L ALL-WASTE CONCRETE SEPTIC TANK
AWTS	2x TAYLEX ABS-NR 2000
TREATMENT LEVEL	ADVANCED SECONDARY WITH NUTRIENT REDUCTION
CERTIFICATION NUMBER	STS-AWTS-069
LAND APPLICATION AREA	
TYPE	WISCONSIN MOUND
AREA REQUIRED: HYDRAULIC	A = Q/DLR = 187.5 m^2
AREA REQUIRED: NITROGEN	196 m^2
PROPOSED MOUND FOOTPRINT	12.2m x 24m = 292.8 m^2
GRAVEL DISTRIBUTION BED	4.6m x 16.4m = 75.44 m^2
LOADING RATE ON GRAVEL BED	39.7 mm/DAY
LINEAR LOADING ON BASAL AREA	125 L/m/DAY
DRIP LINE EMITTER CALCULATIONS	
LENGTH OF DRIPLINE	144 m
EMITTER SPACING	0.3 m
TOTAL EMITTERS	480
EMITTER FLOW RATE	3.0 L/HOUR EACH
TOTAL FLOW RATE	1440 L/HOUR
TOTAL FLOW RATE	24 L/MIN
PUMP DUTY	
HEAD LOSS: HSTP	2 m
HEAD LOSS: ELEVATION	2 m
HEAD LOSS: DRIP LINE	10 m
FRICTION LOSS: RISING MAIN	6 m
TOTAL LOSS	20 m
PUMP DUTY	20m @ 24 L/MIN
TRANSFER TIME (200L)	8 MIN
EXAMPLE PUMP	DAVEY D42 (STANDARD WITH TAYLEX)



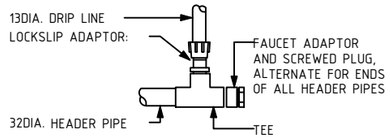
TYPICAL WARNING SIGN



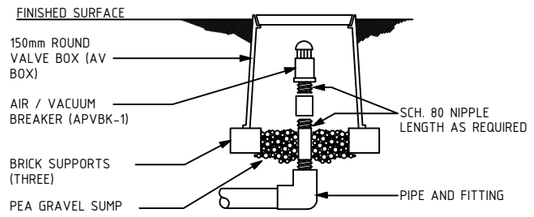
SUB-SURFACE PIPING DETAIL



FLUSHING VALVE DETAIL



MANIFOLD CONNECTION DETAIL



AIR VALVE DETAIL

N

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DETAIL

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