Wastewater Treatment for Escarpment Extended Mine, Denniston Plateau

Prepared for: Bathurst Mining Ltd

Date: July 2026

Courtenay Environmental Consultants Ltd

3/1314 West Coast Road

[redacted]

Quality Control Sheet

TITLE Wastewater Treatment for Escarpment Extended Mine, Denniston Plateau

CLIENT Bathurst Resources Ltd

JOB NUMBER CEC24080

Prepared b [redacted]

FINAL	Andrew Brough	For Consent	7 August 2026

Limitations:

This report has been prepared for Bathurst Resources Limited, with respect to the particular brief given to Courtenay Environmental Consultants Ltd (CEC) and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without CECs prior written agreement.

CEC understands and agree that our client will submit this report as part of an application for resource consent and that the Environment Protection Authority will use this report for the purpose of assessing that application.

This report has been prepared on the basis of information provided by Bathurst Resources Ltd. CEC has not independently verified the sourced information and has relied upon it as being accurate and sufficient for use by CEC in preparing the report. CEC accepts no responsibility for errors or omissions in, or the currency or sufficiency of, the sourced information.

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1. Introduction

Courtenay Environmental Consultants Ltd (CEC) has been engaged by Bathurst Resources Ltd (BRL) to assist with on-site wastewater management systems (OWMS) for sewage discharges for the Buller Plateaux Continuation Project (BPCP or 'the project'). CEC has separately investigated the capacity of the existing OWMS at the Stockton Mine (Courtenay, 2026b). This report provides recommendations for OWMS for sewage discharges proposed at Escarpment Mine Extension (ESE) as well as management of sewage from other minor locations including Mt Frederick South (MFS). This report summarises the environment and details the proposed wastewater flows, treatment and disposal options, recommendations and budget costs for sewage treatment for the ESE and MFS sub areas of the BPCP project.

2. Natural Environment

The proposed mining activities are going take place on the Denniston Plateau close to the existing Escarpment mine which is under care and maintenance, and at MFS. The land is situated at around 600 to 700 m above sea level. The main rock on the surface of the plateau is sandstone, which has eroded into coarse and acidic silica sand. This overlays the first of the coal seams. Further sandstone and coal seams are present at depth. The soil on the plateau is thin at best, often infertile and low in organic matter, poorly drained, and acidic. The impermeable layer of sandstone means the ground is frequently waterlogged and there are large expanses of bare, eroded rock with no soil at all. There is no practical drainage through the sandstone except through fissures and cracks formed by erosion. For a more detailed description of the geology and flora of the plateau please refer to the hydrological assessment prepared by Mine Waste Management (MWM, 2026p).

Andrew Brough of CEC visited the area in March 2025 and his observations match the site geology described above.

The climate is mild and wet with approximately 6m of rainfall per year. Drizzle and cloud are a feature of the area along with intense rainfalls. The plateau is exposed to winds from all directions. Fog is common on the plateau due to the moist ocean air ascending the escarpment then cooling. Due to the fog and rainfall sunshine hours are reduced.

The high rainfall, low water holding capacity of the soils, bare rock and low permeability through the rocks, creates a high probability of surface runoff if discharge of treated sewage onto land, e.g. via drip irrigation, were to take place.

3. Infrastructure Areas

The Project Description, as contained in the AEE, sets out the 4 areas at ESE where the infrastructure will be located. These are:-

(1) Gatehouse / admin office Area.
(2) Central Infrastructure Area (CIA).
(3) Coal Haulage infrastructure Area.
[redacted]

The locations of these areas are shown on Figure 1 below.

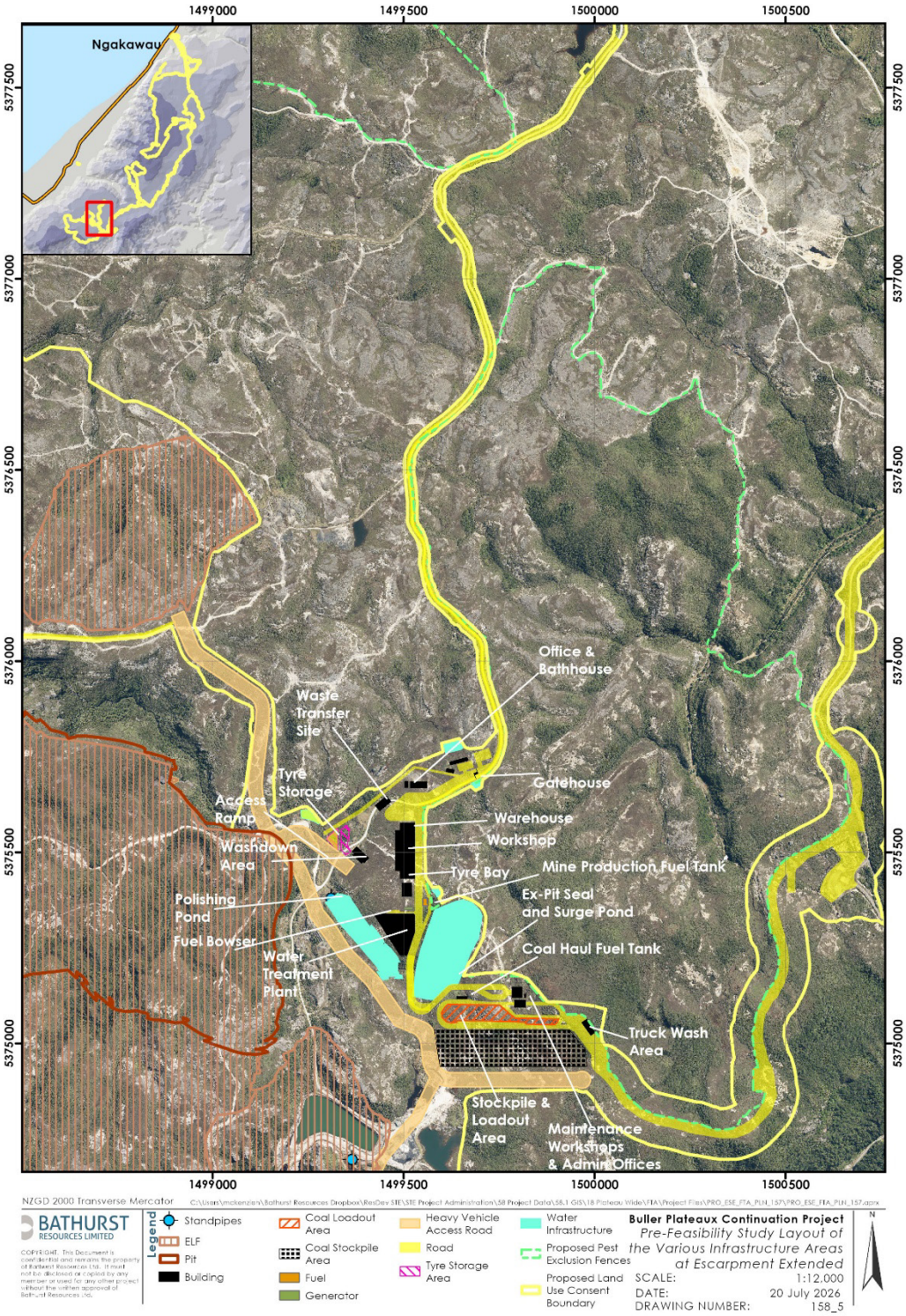


Figure 1: Location of ESE Infrastructure Areas (not to scale)

CEC understands that the Infrastructure areas will be constructed from sandstone overburden and granite sourced from either Brunner Coal Measure sandstone from cut in the CIA area, especially if this is low-non-acid forming (this would be crushed/screened on site with mobile screening plant to make suitable aggregate), or NAF aggregate brought in from off-site sized suitably, or from local granite sources. It is understood that seepage from these infrastructure areas will disperse to the receiving

catchments. This direct discharge has been assumed while assessing the nutrient impacts of the proposed project.

4. Proposed Staff Numbers

CEC has been provided with estimated staffing numbers based at the four infrastructure areas at ESE. Table 1 summarises the daily staff numbers.

Table 1: Summary of Daily Staff Numbers			
	Estimate	**Contingency**	**Total**
		20%	
Gatehouse/Admin Office	60.5	12	73
Central	245	49	294
Coal Haulage	28	6	34
All	4	1	5
[redacted]			
Total	**356**	**72**	**428**

It is assumed that the "All" staff could use any of the facilities. The contingency allowed for means that those staff could use any of the facilities and not impact on design wastewater requirements.

At this stage it is proposed that smaller satellite sites at ESE including crib huts and facilities at Mount Frederick South will use collection tanks. These would be periodically emptied and the contents transported by effluent tanker and emptied into one of the main treatment systems at Stockton for treatment and disposal. At this time the existing Stockton Bathhouse treatment system has sufficient capacity along with an existing buffer tank to handle the discharge of effluent from these smaller satellite sites. The Central Infrastructure Area treatment system at ESE does not allow for discharges of bulk collected sewage.

If the volumes from these satellite facilities are higher than initially estimated, treatment systems could be installed at those locations at a later date (subject to separate approvals being obtained).

5. Design Wastewater Flows

When the Stockton Mine was operated by Solid Energy the wastewater flows into and out of the Bathhouse sewage treatment system were recorded. The data from the Bathhouse treatment system during the period from 2012 to 2014 indicates that the typical daily volume of wastewater generated per person is in the order of 12 to 14 L/day. This was much lower than was originally estimated, probably as there was not a cafeteria making and selling food and staff do not generally shower on site as used to occur. For the purposes of estimating the sizes of the treatment systems a volume of 15 L/person/day has been adopted.

At the Stockton coal handling processing plant (CHPP) showering does occur and a higher wastewater flow (50 L/day) has been used to generate future predicted flows for that site and for a similar situation at Ngakawau.

It is understood for the ESE that there will not be an equivalent CHPP. However, on the basis that showers will be available at the Central Infrastructure Area, an additional approximate 1/3 allowance has been added to the flow calculated at 15 L/person/day.

Table 2 shows the design wastewater flows at each Infrastructure Area.

Table 2: Proposed ESE Treatment Locations and Design Volumes	
Treatment System Location	**Design Volume (L/day)**
Admin/Gate	1,100
Central-	5,900
Coal Haulage	600
[redacted]	

The Admin/Gate and Central service areas are shown approximately 120 m apart. Generally, this is too far apart for a single OWMS to be used as the final depth of the sewer lines would mean that the treatment tank would be buried too deep in the ground. As such, a separate treatment system has been selected for each location. However, during detailed design the possibility of combining these discharges into a single treatment system could be considered.

6. Treatment and Land Application Options

6.1 Treatment Options

The treatment of sewage is required to render it less harmful in the environment. The risks relate to pathogens (bacteria and virus) and nutrients. Pathogenic risk is usually associated with human contact and reinfection, while nutrients are mainly associated with the impact on the receiving environment. If the receiving environment is groundwater the risk is generally about whether that will be abstracted for drinking water and whether the nitrate nitrogen concentration exceeds acceptable levels. For surface water the nutrients are associated with whether they generate excessive growth of nuisance algae or aquatic fauna or raise the concentrations of nutrients in water that impact on fauna. Generally, in New Zealand treatment to a secondary standard with no additional nutrient removal treatment component is considered satisfactory to meet the nutrient environmental risk. In some specific cases more advanced systems are required to reduce the nutrient load to the environment. With regard to bacteriological risk small scale treatment systems are installed which generally avoid the need for tertiary treatment. Further removal of pathogens can be achieved using Ultra-violet light (UV) or the addition of chemicals, e.g. chlorine (usually as bleach [sodium hypochlorite]) or hydrogen peroxide.

Note the Secondary Effluent standard only relates to the effluent concentrations for Biochemical Oxygen Demand (BOD) and Total Suspended Solids (TSS). A treatment system that meets the secondary treatment standard complies with the following effluent requirements:-

(a) Ninety per cent of the samples shall have a BOD_5 less than or equal to 20 g/m^3 with no sample greater than 30 g/m^3; and

(b) Ninety per cent of the samples shall have TSS less than or equal to 30 g/m^3 with no sample greater than 45 g/m^3.

(Australian/New Zealand Standard, On-site domestic wastewater management [AS/NZS 1547:2012])

The standards do not specify a nutrient concentration. However, testing of wastewater treatment systems both here in New Zealand (Onsite Effluent Test Facility [OSET]) and similar facilities in Australia indicate that many systems can achieve a mean effluent concentration for Total Nitrogen (TN) of 30mg/L or less.

Neither do the standards set out a bacteriological concentration that needs to be met. In Australia where chlorine dosing of wastewater is required then the bacteriological concentration, as measured by testing for Faecal Coliforms (FC) should be less than 1 cfu[1]/100mL. In New Zealand the use of chlorine is not normally considered as chlorine can react with organic material in the wastewater to create disinfection by-products, such as trihalomethanes (THMs) and haloacetic acids (HAAs) which potentially have adverse effects on the aquatic environment and human health.

Generally, in New Zealand small scale on-site wastewater treatment systems are discharged onto or into land to allow for filtration and die-off of the bacteriological contamination as it passes through the soil profile and vadose zone to the underlying groundwater. Some secondary systems have a better die off of bacteria in the treatment system than others. Generally, a mean effluent concentration of 10^4 to 10^5 cfu/100mL can be expected.

An alternative to a secondary treatment system is to utilise a septic tank discharging to a bed of sand. This concept is used in larger treatment systems where the effluent is collected and discharged to the environment (a single pass sand filter) or recirculated to achieve lower concentrations of nutrients in the effluent (a recirculating sand filter). For an on-site treatment system the effluent from the septic tank is dose loaded onto the sand bed and is not collected but allowed to filter from the bottom of the sand bed to the underlying sub-soils, vadose zone and ultimately groundwater. Less control can be achieved when using a septic tank to a sand bed so the effluent quality is less able to be altered. However, the effluent is considered to meet the secondary effluent standard, FC concentrations are generally accepted as being in the order of 10^2 to 10^3/100 mL while mean TN concentration of around 37 mg/L can be expected. So a septic to sand bed option is better than a standard secondary system for removing FC but is not as effective for nitrogen removal.

Secondary treatment systems generally rely on aeration to grow bacteria to treat the wastewater, although passive systems do exist. Therefore, these rely on a regular power input. In addition, the discharge is generally pumped dosed to the environment. A septic tank and sand bed option has the septic tank effluent dosed to the sand bed once again generally using a pump while the discharge is drainage through the sand bed. No aeration is required.

6.2 Land Application Options

There are three main discharge options from secondary treatment systems generally and at ESE:-

1. Drip irrigation – either laid on the ground surface or buried in the topsoil layer;
2. Spray Irrigation; or
3. Discharge into the ground by dose loading a gravel or sand filled trench or bed.

[1] cfu – coliform forming unit

6.2.1 Drip Irrigation

Drip irrigation is carried out using irrigation line with built in pressure compensating drippers (PCD). The drip lines are laid at intervals from around 0.5 m to 1 m while the drippers are spaced along the dripline from 0.3 m to 1 m intervals. The most common layout is 1 m between drip lines and 0.6 m between drippers. Design application rates are in the range of 2 mm to 5 mm per day depending on the soil infiltration characteristics (higher rates for more free draining soils). As an example for a treatment flow of 2 m^3/day the area required for drip irrigation is 400 to 1,000 m^2. Drip irrigation can be done using undisinfected effluent.

6.2.2 Spray irrigation

Spray irrigation is carried out, generally, using small impact sprinklers. The design application rate is the same as for drip irrigation (i.e. an area required of around 400 to 1,000 m^2 for a wastewater volume of 2 m^3/day), however the effluent is normally disinfected (or large buffer distances are used) to minimise the risk of contamination to people from inhaling aerosolised droplets.

Both drip irrigation and spray irrigation can be utilised on all soil types.

6.2.3 Discharge into Ground.

Discharge into the ground is carried out by intermittently dosing a trench or bed with effluent. A large diameter pipe for a trench or pipes for a bed are laid on a bed of gravels. Holes are drilled in the pipes at regular intervals and hydraulic design is used to determine the hole spacing and diameter to achieve an even application of effluent at the design loading rate. Once again the design loading rate is based on the soil type. As indicated above the trench/bed are dosed loaded using a pump. However, the pump pressure required is low so where there is fall available an alternative is to use a Flout dosing unit (Appendix C) which operates without the use of power.

The uses of beds or trenches is usually limited to soils which are relatively free draining as the cost of the trench and gravels for the finer grained soils becomes more expensive than using drip irrigation.

Where free draining soils are available the use of trenches and beds provide a much more compact discharge system, usually about 1/10th the area of using drip irrigation.

7. Alternative Sewage Management Options

While collection of the sewage, treatment and discharge of the effluent to the environment at the source is commonplace when there is no reticulated sewage system present other alternative management options exists do exist. These options can be split into three main categories:-

1. Reduced wastewater generation using waterless/low waterless systems plus separate greywater management;
2. Separation of blackwater and greywater; and
3. Total sewage collection and removal off site.

7.1 Reduced Wastewater Generation

This option includes composting or incinerating toilets. These are really best suited to domestic situations or locations where there is a smaller volume of wastewater generated. These toilets only manage the blackwater (i.e. toilet and urinal wastes) and a separate grey water treatment system is required. There are package greywater treatment systems available but it is more difficult to break down the fats and other solids present in the greywater in the absence of the organic load from the black water. The toilets still generate some material that needs to be managed by either removal off site or composted on site. These generally require more intensive management than an OWMS system. CEC does not advise the use of this option in this situation.

7.2 Separation of Blackwater and Greywater

Where the existing receiving environment has high background concentrations of nitrogen the separation of the blackwater from the greywater is often promoted. This is because the blackwater contains the majority of the nitrogen. The blackwater would be stored in a holding tank for collection and removal from the location while the greywater would be collected, treated and discharged in the location of the source, as in the previous option. The advantage of collecting only the blackwater is that it represents approximately 25% (AS/NZS 1547:2012) of the sewage generated in a house but will contain approximately 60% of the nitrogen. It also means that a smaller volume of wastewater needs to be collected and taken away.

For this situation there will be minimal water generated from kitchen, showers etc so it is likely that the percentage of blackwater of the total flow will be significantly higher than for a domestic household and only small volumes of greywater would need to be managed. As discussed above greywater treatment systems typically need additional management. In addition, there needs to be two separate sewer systems to separately manage the blackwater and greywater. The blackwater will need to be collected in a sewage truck and conveyed to a treatment location. This may be at another location on the Denniston Plateau, e.g. the Stockton Bathhouse treatment system which has spare capacity, or off the plateau completely to an alternative treatment system, e.g. the Westport sewage treatment facility. This continual collecting and tankering of the blackwater creates an environmental risk of spillage of highly concentrated sewage into the environment.

7.3 Total Sewage Collection

This option requires a holding tank at each source site which is then sucked out and driven to a point of treatment, e.g. the Stockton bathhouse treatment system or another system down on the coast.

This is a simpler system to manage compared with the two options above but retains the risk of a significant highly concentrated discharge to the environment in the event of a spill. If the discharge is to the Stockton treatment system then it retains a discharge into the environment on the Plateau, though into an already modified environment due to the historic sewage discharges at that location.

All investigations CEC have done evaluating the cost of tankering sewage off site at other locations compared with on-site wastewater treatment systems indicate that the tankering option always costs significantly more than using an OWMS system over a 15 year period (a typical consent duration for OWMS discharge consents).

8. Recommended Treatment Systems

To make a recommendation of an appropriate treatment system for each location CEC has considered the capacities and limitations of on-site wastewater treatment systems.

8.1 Aerated Secondary Treatment Systems

Off the shelf aerated secondary treatment systems are limited to flows up to around 3 m^3/day. Domestic scale units usually have a peak capacity between 1,400 and 1,600 L/day. Wastewater flows of less than 40% of the peak flow into these treatment systems generally do not provide enough organic load for effective treatment. This is because the aerator is set to operate continuously and the continuous aeration promotes the growth of aerobic bacteria until there is no more energy available from the wastewater discharging to the treatment system. One system has become recently available in New Zealand which has a controller which switches the aerator on based on flow so does not provide too much aeration and can operate at lower wastewater flows. It is about 50% more expensive than the usual systems.

Once flows in exceed 3 m^3/day then specific designs are required based on flow and organic loading.

8.2 Septic Tank Plus Sand Bed Treatment Systems

Septic to sand beds are generally only used for flows of up to 2 m^3/day but are easily scalable to lower flows with the use of smaller septic tanks and sand beds selected for the predicted wastewater flow. The discharge from the base of the sand bed is considered to meet the secondary effluent standard.

8.3 Selected Options

For the predicted wastewater flows the options outlined in Table 2 are recommended. As the design flow for the Central Infrastructure treatment system exceeds 3 m^3/day CEC has sought an option from Hynds. The option Hynds recommended is a Oxyfix 6 Secondary treatment system. The specification sheet can be found in Appendix D.

Table 2: Recommended ESE Treatment Systems

Treatment System Location	Design Volume (L/day)	Recommended Treatment System
Admin/Gate	1,100	Septic to Sand Bed
Central-	5,900	Specifically designed secondary treatment system
Coal Haulage	600	Septic to Sand Bed
Bulk Explosives	350	Septic to Sand Bed

Note, there are a range of other manufacturers that also produce secondary treatment systems of this capacity. Bathurst may wish to seek alternative pricing and options when the project proceeds.

9. Recommended Land Application

The site visit by CEC in March 2025 indicated the presence of a thin topsoil with many areas of bare rock, consistent with the description of the environment in Section 2 above. While it was observed that the Stockton Bathhouse treatment systems discharged by drip irrigation onto the ground surface it did so on both bare rock and shallow topsoil. There is limited to no benefit of applying the effluent in this manner, except for evaporation during dry warm spells to avoid runoff.

Therefore, it is recommended that all discharges of sewage effluent from the Gatehouse/Admin office, the Coal Haulage area and the Bulk Explosives area are discharged into constructed sandstone fill platforms. For the Central Infrastructure Area this will require the design of a specific bed discharge system. For the other three locations there is no additional discharge system required as the effluent will drain through the base of the sand beds.

The secondary treatment system has been based on providing an effluent quality for total nitrogen of 30 mg/L while the average nitrogen concentration for the discharge from the sand beds is expected to be around 37 mg/L. The bacteriological concentration (as faecal coliforms (FC)) in the discharge from the secondary treatment system is expected to be in the range of 10^4 – 10^5/100mL while for the sand bed the concentration is expected to be in the range of 10^2 – 10^3/100mL.

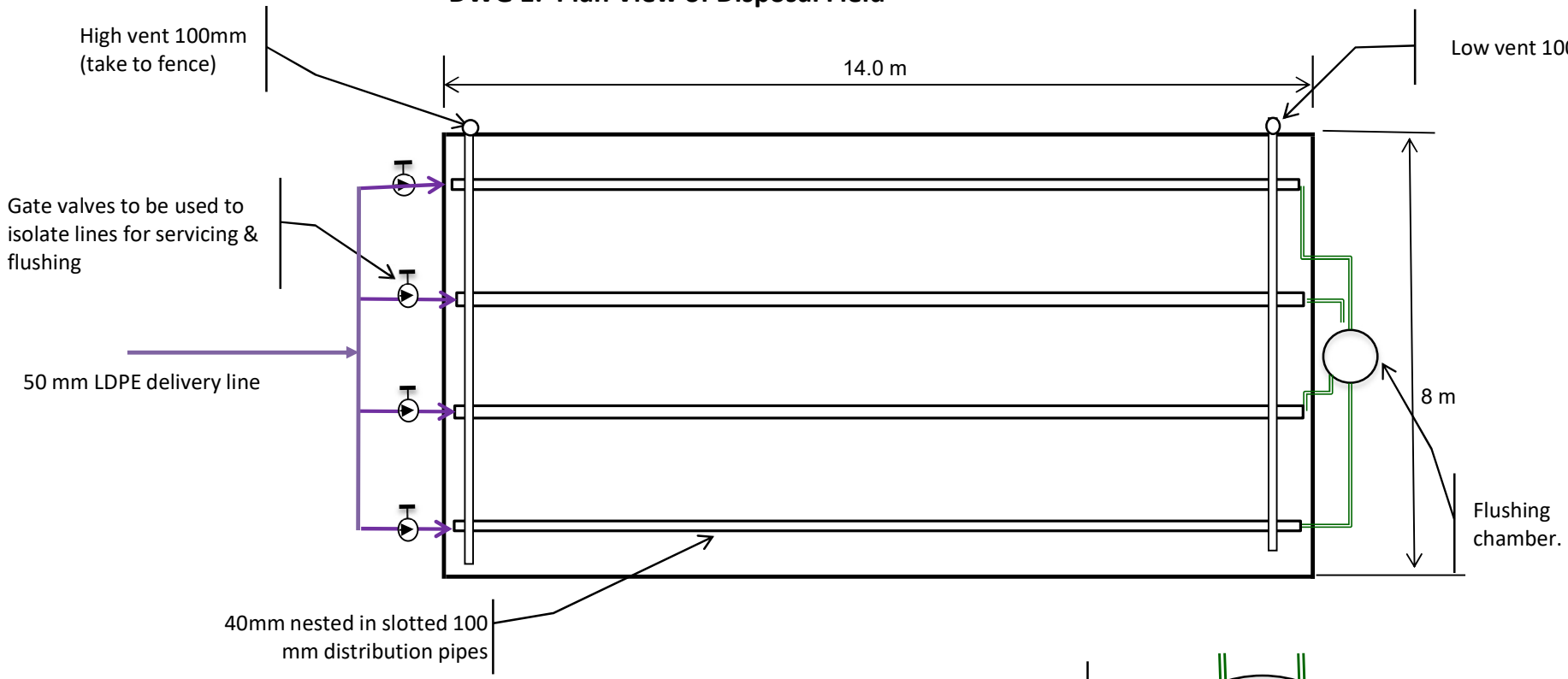
It would be expected that the effluent will mix with any stormwater drainage though the platforms and the seepage would discharge into the receiving catchments. The impact of nutrients on those receiving environments is discussed in the assessment of water quality protection (RMA Science, 2026). It is understood that the discharges from the on-site wastewater treatment systems are not going to result in adverse effects on the receiving catchments.

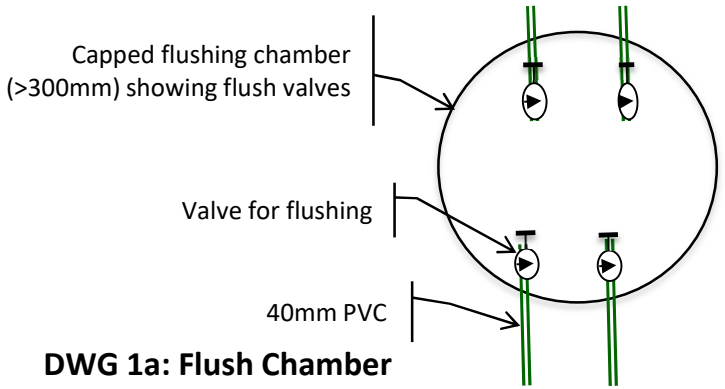
Appendix A presents a typical design of a conventional bed for the secondary treatment discharge and Appendix B shows a typical design for a septic/sand bed for the smaller systems. These are based on the maximum allowable design application rate (50 mm/day) allowed for in the standard for the freest draining gravels which could be expected from the constructed fill platforms. The conventional bed sizing shown in Appendix A for the secondary effluent design flow of 5.9 m^3/day while the septic/sand bed shown in Appendix B is for a design flow of 1.1 m^3/day. A conventional bed with an area of 118 m^2 would be needed for the Central Infrastructure Area. For the other locations the maximum sand bed area required is currently estimated at 22 m^2. These can be configured to be long and narrow or short and wide depending on the area available at each site. Areas for reserve fields will also be required.

Note these are examples only and do not represent a preliminary design. The hydraulic design requirements can be confirmed at a later stage. The conventional and sand bed systems can be located hundreds of metres from the treatment tank location if required. This is subject to the hydraulic design – pipe and pump selection.

APPENDIX A: CONVENTIONAL BED EXAMPLE

DWG 1: Plan View of Disposal Field





DWG 1a: Flush Chamber

Courtenay Environmental

[redacted]

Environmental Engineer

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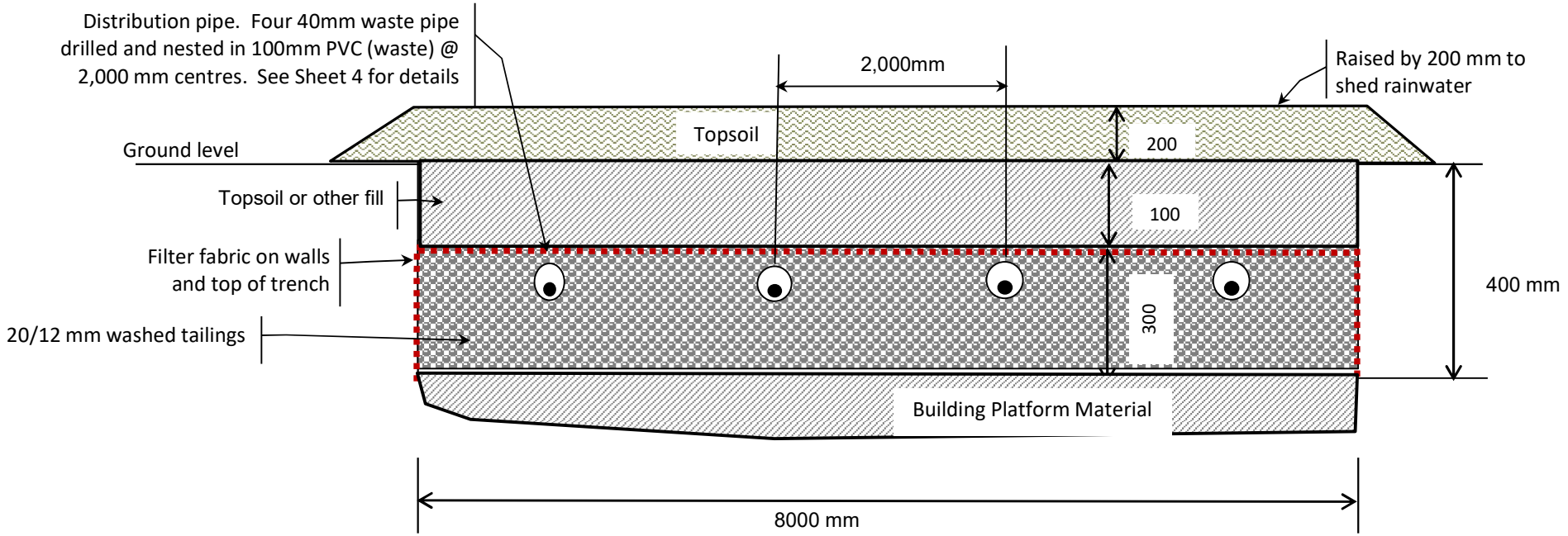
DWG 2: Section Through Conventional Bed



Notes:

1. Prior to construction, the depth of the excavation shall be confirmed by undertaking soakage tests at four representative locations across the the base as follows:
   - Excavate to at least 0.9 m, or until gravels are encountered.
   - Pre- wet the base with 10 L of water.
   - Allow to completely drain into gravel.
   - Repeat with second 10 L of water.
   - Add another 10 L of water and record the time for complete soakage.
   - If the soakage time is greater than 3 min increase depth of test pit until soakage is less than 3 min. Record test result on Installation Certificate (PS3)

Courtenay Environmental
Consultants Ltd
Andrew Brough [redacted]4
Environmental Engineer
3/1314 West Coast Rd, West Melton [redacted]

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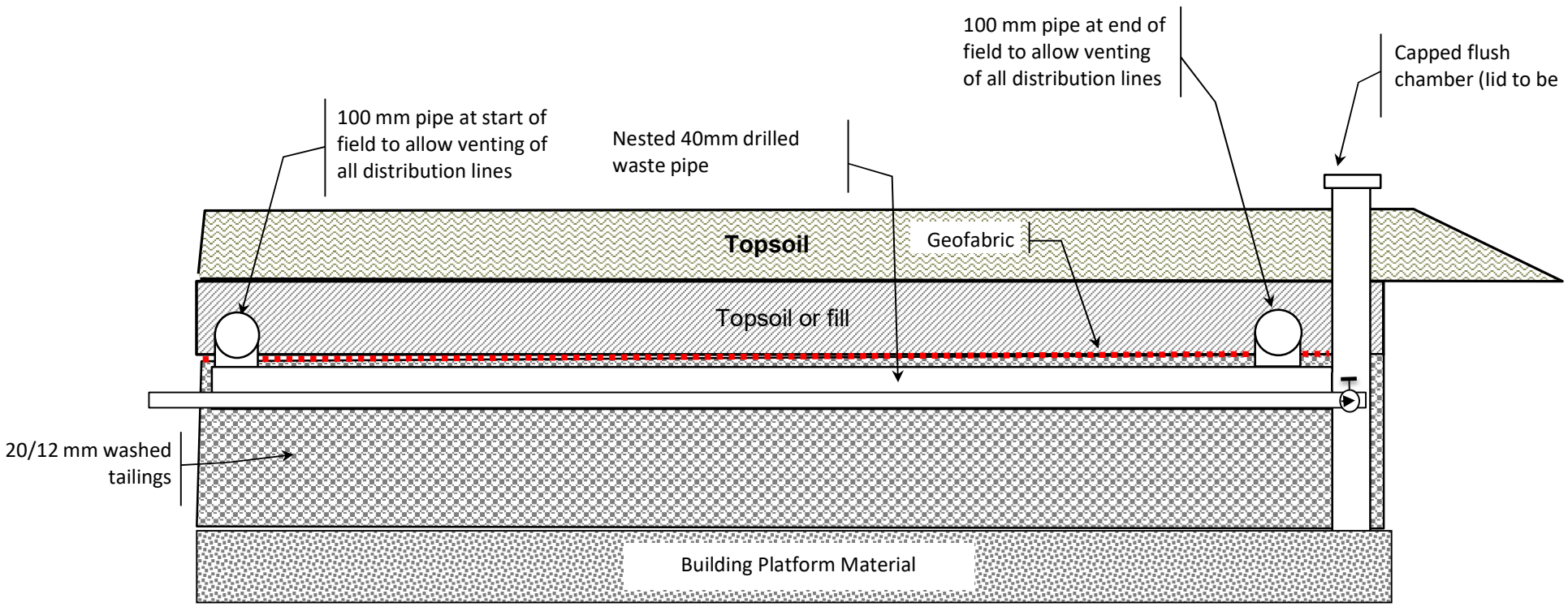
DWG 3: Side Elevation of Conventional Bed



Courtenay Environmental
Consultants Ltd
Andrew Brough PH: 021 776944
Environmental Engineer
3/1314 West Coast Rd, West Melton email: andrew.brough@courtenayenvironmental.co.nz

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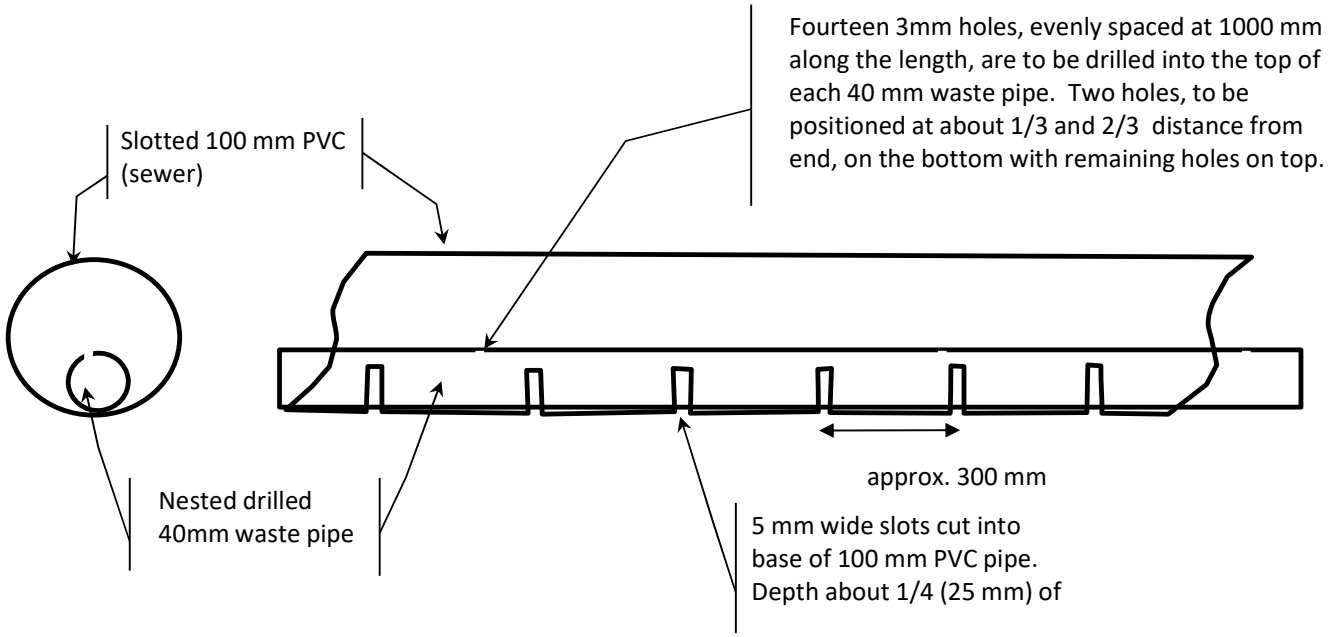
DWG 4: Distribution Pipe Detail



Notes:

1. Distribution pipe design depends on pump specification (brand and model), distance from pump to sand trench and change in elevation. Once the final bed location is determined and the pump specification are provided Courtenay Envrionmental Consultants Ltd will confirm the following details:
   - hole diameter and spacing in each 40 mm distribution pipe

Courtenay Environmental
Consultants Ltd
Andrew Brough
Environmental Engineer
3/1314 West Coast Rd, West Melton

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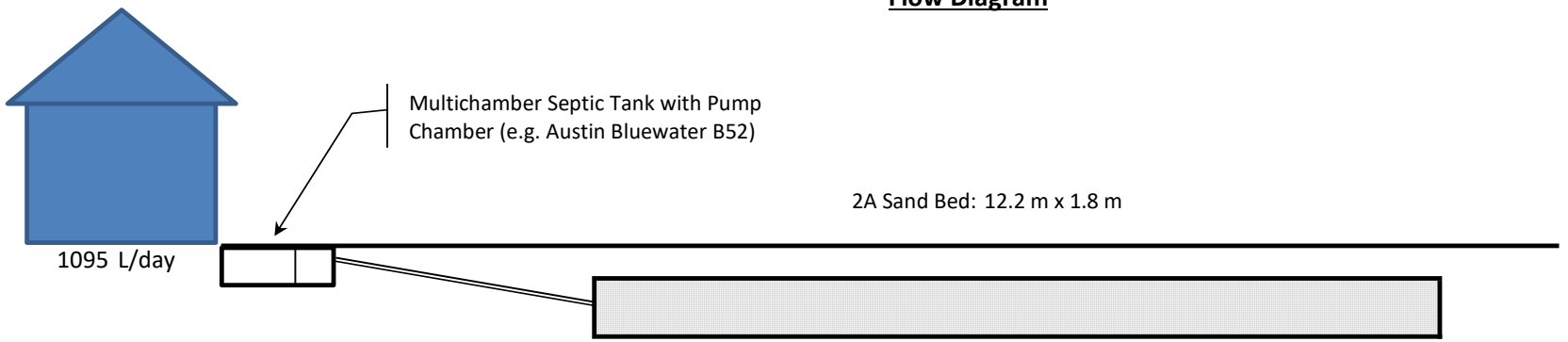
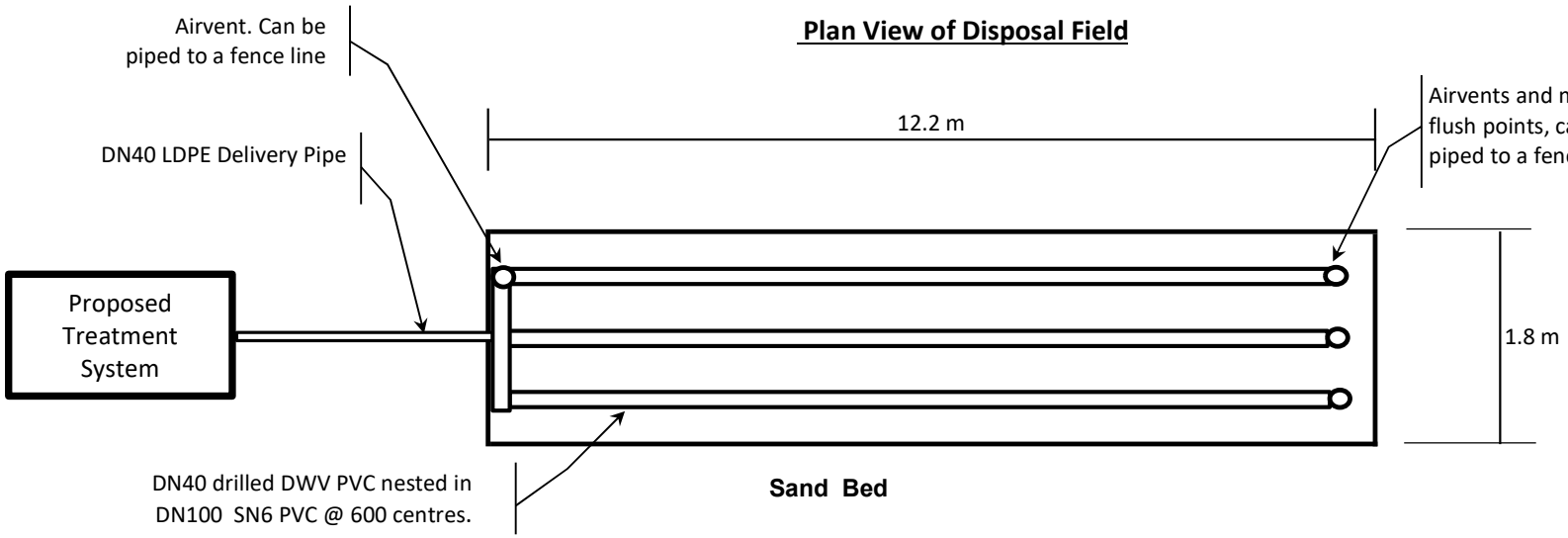
APPENDIX B: SAND BED EXAMPLE

Flow Diagram



Plan View of Disposal Field



All dimensions in millimetres (mm) unless otherwise stated

Courtenay Environmental
Consultants Ltd
Andrew Brough
Environmental Engineer
3/1314 West Coast Rd, West Melton

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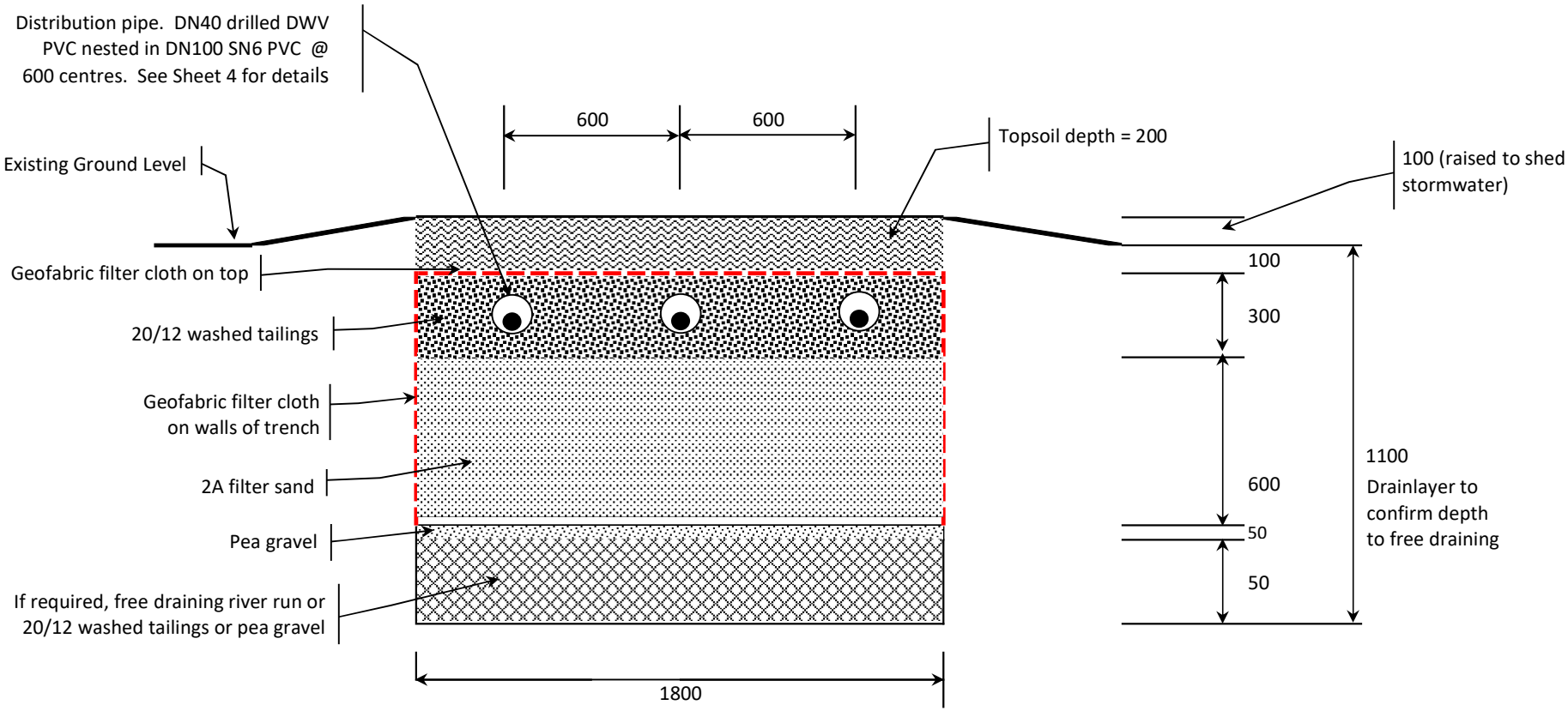
Section Through Sand Bed



Notes:

1. All dimensions in millimetres unless otherwise stated
2. 3 x DN100 access vents to the surface are required at far end of the trench (See Sheet 1). A single vent is required at the near end of the trench
3. Access to a flushing valve or screw cap is required at the end of each of the 40mm nested distribution pipes

Courtenay Environmental
Consultants Ltd
Andrew Brough
Environmental Engineer
3/1314 West Coast Rd, West Melton

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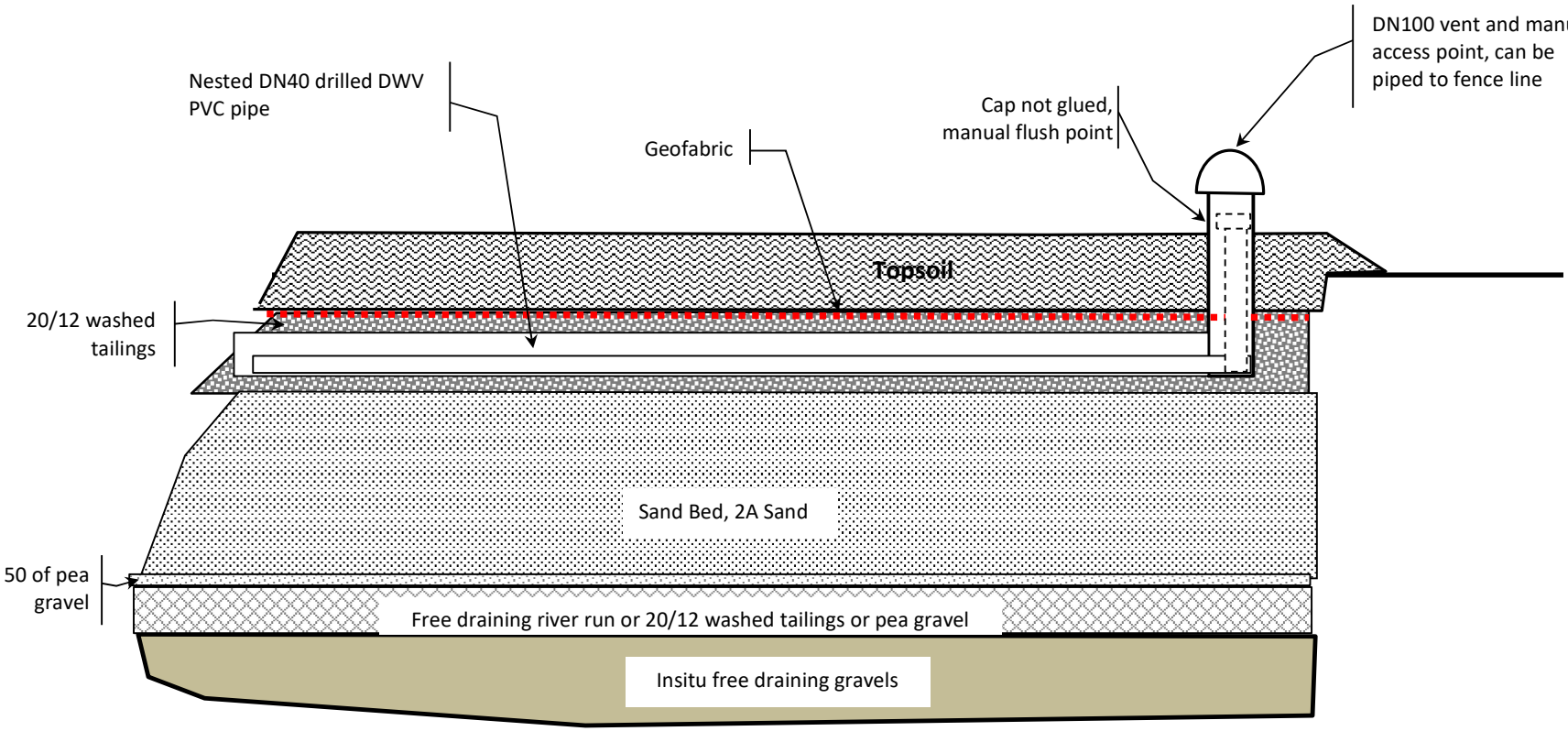


Notes:

1. All Dimensions in millimetres (mm) unless otherwise stated
2. Three DN100 access vents to the surface are required at far end of the trench. A single vent is required at the near end of the trench
3. Access to a flushing valve or screw cap is required at the end of each

Important: Soakage Test During Installation.

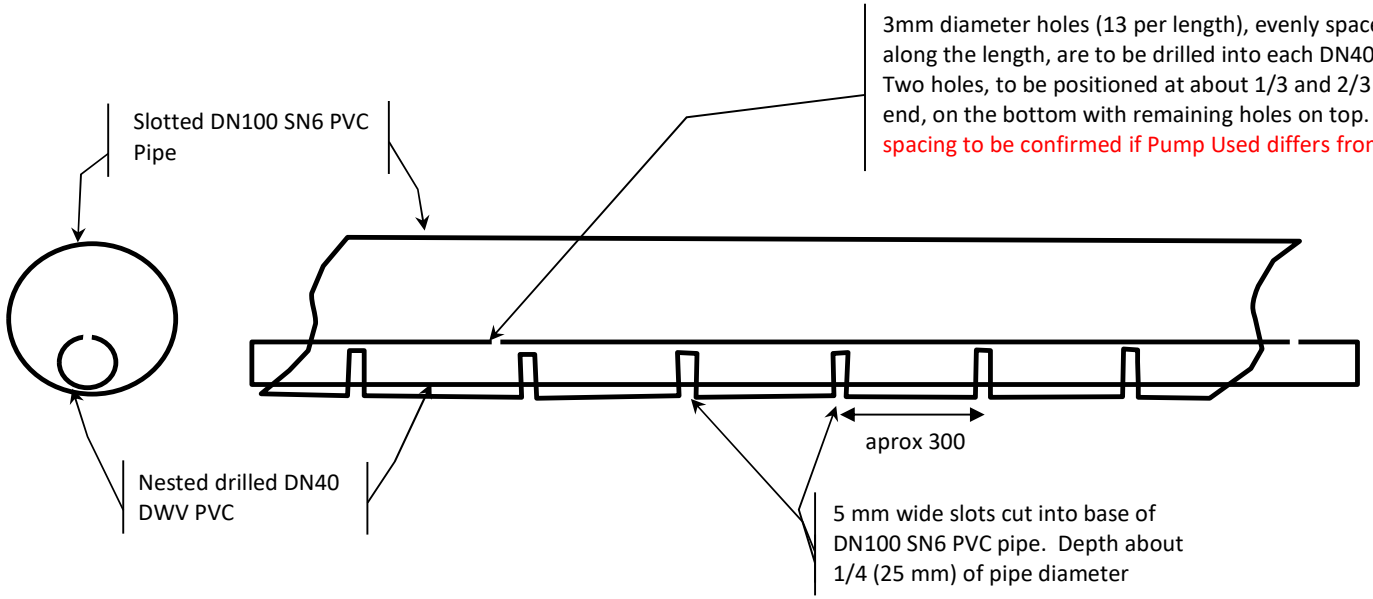
When excavating for the sand bed, check soakage rate at the base as follows:

- Pre- wet the base with 10L of water and allow to completely drain into soil
- Repeat with second 10L of water
- Add a third 10L of water and record the time for complete soakage.
- If the soakage time is greater than 3 min increase depth of excavation and repeat the above test until soakage is less than 3 min.
- Record test result on Installation Certificate (PS3)

Courtenay Environmental
Consultants Ltd
Andrew Brough [redacted]
Environmental Engineer
3/1314 West Coast Rd, West Melton [redacted]

Site:	ESE	Job No:	CEC24080	Date:	3/10/2025
Client:	Bathurst	Designed by:	AB	Scale:	NOT TO SCALE
Sheet No:	3			Version:	Preliminary

Distribution Pipe Details



Notes:

1. All Dimensions in millimetres (mm) unless otherwise stated
2. Distribution pipe design depends on pump specification (brand and model), distance from pump to sand trench and change in elevation. If these differ from the specified pump Courtenay Environmental Ltd will confirm the following details:
   - recommended diameter of delivery pipe from pump to sand trench
   - hole diameter and spacing in each 40 mm distribution pipe

Courtenay Environmental
Consultants Ltd
Andrew Brough
Environmental Engineer
3/1314 West Coast Rd, West Melton

Site:	ESE	Job No:	CEC24080	Date:	3/10/2025
Client:	Bathurst	Designed by:	AB	Scale	NOT TO SCALE
Sheet No:	4			Version:	Preliminary

APPENDIX C: FLOUT DOSING BROCHURE

The FLOUT® Dosing Device

A DEVICE FOR GRAVITY DOSING OF EFFLUENT OR STORMWATER

WHY DOSE?

The advantages of dosing effluent or storm water to the disposal areas are well known. The flooding action of the dose delivers effluent evenly to the disposal area and the subsequent resting allows oxygen to reach and help digest the biological mat, which may form and reduce the disposal area's efficiency. Dosing also aids as a counter to "creeping failure" which is common when effluent constantly trickles into a disposal field of a standard gravity type system.

TRADITIONAL DOSING METHODS

Traditional dosing systems may employ siphons, pumps, or other devices. Generally siphons must be primed and if one should dry out, operation may not automatically resume. Dips or pockets in the discharge can also interrupt the siphons operation. The problem can often be difficult to diagnose.

Pumps are the only option when dosing to a high elevation but are very expensive energy wasters when used on a downhill system. There is also an electric valve system but as with pumps, electricity and expensive controllers are necessary.

THE FLOUT®

Flout is a contraction of the name Floating Outlet®. Rissy Plastics of Connecticut USA has pioneered the technology since 1992 and the original test installation is still working perfectly. Thousands of Flout® installations are currently at work in North America, Europe, South Africa, New Zealand and the Pacific Islands.

Standard 20 inch Flout

Available in New Zealand from
Alpha Precasts Ltd
Ph (03) 528 1018
info@alphaprecasts.co.nz

HOW IT WORKS

A chamber of sufficient dimensions to retain the required dose has an upper inlet and lower outlet, usually at floor level. The outlet diameter is usually 80mm but there are other options. A box shaped vessel floats on the surface of the liquid that enters the chamber. There is an opening in the upper side of the vessel and a ballast weight is attached. A length of pipe extends into the vessel through the side and attaches to a special flexible connector the same diameter as the pipe. The other end of the connector is connected to the outlet, usually via a T fitting with a vent extending above the maximum liquid level.

The flexible connector acts as a hinge, allowing the vessel to float ever higher as the chamber fills. When the vessel can float no higher, liquid spills into the vessel, forcing it to sink to the floor, allowing liquid to flow through the outlet. When the liquid drops to the top of the vessel, flow stops and the vessel drains and refloats in the remaining liquid.

Multiple flouts can provide individual outlets for each section of the disposal area or can be combined for larger flow rates.

The Flout® is a proven method of dosing effluent or storm water to the disposal area. It is simple to install, works without power, and in the rare event of problem, is easily diagnosed. It is inexpensive and long lasting. A Flout® never needs to be primed.

Flout Chamber

APPENDIX D: OXYFIX SPECIFICATION SHEET

Oxyfix® 6.0

Aerated Wastewater Treatment Plant

Technical Sheet WW 6.0OXY
Updated August 2023

Technical Information

Product:	Oxyfix® 6.0
Model:	6.0 m³/day - Oxyfix C-90
Process:	Submerged Aerated Fixed Film Technology
Codes:	TBC

Dimensions | Volumes | Weights			
Measurements	**Unit**	**Tank 1**	**Tank 2**
Total height (incl. riser)	mm	2600	2600
Entry height	mm	2130	2130
Exit Height	mm	2090	2090
Length	mm	2600	3700
Width	mm	2380	2380
Total Volume	m³	10	15
Useful Volume	m³	9.19	13.68
Weight	T	5.75	9.5
Main Service Entry Ø	mm	600	600
Primary Filter Access Ø	mm	600	600
Desludge Port Ø	mm	600	600
Inlet/Outlet pipe Ø	mm	Inlet = 160 Outlet = 160	Inlet = 160 Outlet = 160

Material

Tank	High Perfomance Fibre Reinforced Concrete
Media (Oxybee©)	Recycled plastic (Polyethylene and Polypropylene)
Aeration Ramp	PVC PN 16

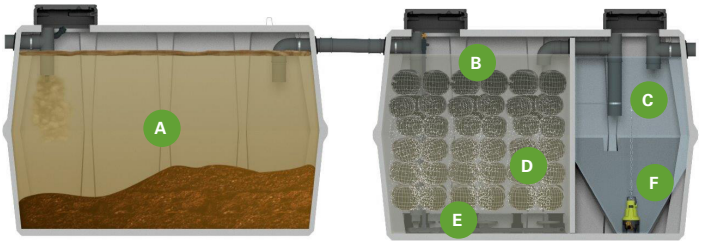
Performances

Influent Quality		
Parameters	**Unit**	**Results**
BOD_5	mg/L	400
	kg/day	2.4
TSS	mg/L	600
	kg/day	3.6
TN	mg/L	80
	kg/day	0.48
COD	mg/L	900
	kg/day	5.4
Fat & Oil*	mg/L	50
Detergent	mg/L	10
Daily flow	L/day	6000
Application Limits	Commercial wastewater	
	• Max. 40 people	

Effluent Quality		
Parameters	**Unit**	**Results**
BOD_5 **	mg/L	<20
TSS **	mg/L	<30
TN **	mg/L	<30
COD **	mg/L	<90

*** A grease trap is required for wastewater coming from a commercial kitchen**
**** Based on PIA-EN 12566-3**
Note: Performance results are based on a 24 hour composite sample taken after the irrigation filter

Features



Legend
A. Primary treatment tank
B. Biological reactor chamber
C. Clarifier chamber
D. Oxybee© media
E. Air diffusers
F. Settling cone

Operation

Installation Limits	
Recommended depth of cover to tank	300mm
Traffic Load with heavy duty steel lids	Light traffic(<3.5T)
Traffic Load with PE lids	Pedestrian
Safe Loading (Max depth of cover to tank)	800mm

Useful Volumes	
Primary Treatment Tank m³	9.19
Biological Reactor Chamber m³	8.56
Clarifier Chamber m³	5.12
Emergency Storage m³	2.13

Maintenance	
Desludging Required (Primary Tank)	70%
Servicing Frequency	6 monthly
Annual Power Requirement	3385.74kWh

Electromechanical Components	
Blower Type	Side Channel Airtech ASP0045
Blower Rated Output	0.648kW
Average Noise Level	58 dB
Voltage	1x230V or 3x400V
Air Diffusers	9
Type of Air Diffusers	Fine bubbles
Type of Sludge Recirculation	Pump
Controller	TBC
Sludge Recirculation Pump Type	Submersible KSB Amadrainer 354
Pump Rated Output	0.6kW

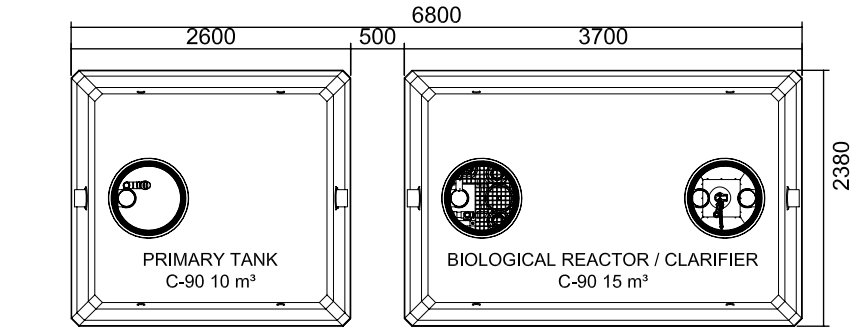
Consumables (Subject to Recommended Servicing)	
Air Filter	Every 1 year
Air Diffusers	Every 8 years

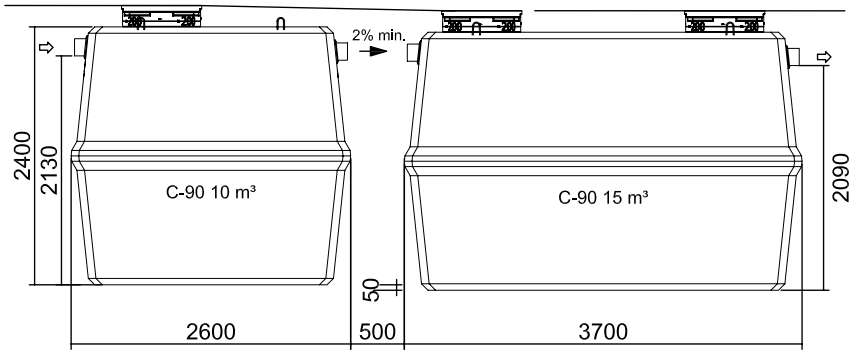
Components and Options

Oxyfix 6.0 Components					
Kit Components	**Quantity**	**Length (mm)**	**Diameter/ Width (mm)**	**Heights (mm)**	**Weight (T)**
Treatment System	2 Tanks	-	-	-	15.25
Primary Tank Access Lid	1	-	Ø600	-	-
Reactor and Clarifier Access Lid	2	-	Ø600	-	-
For further details please contact Hynds Wastewater Team					

Oxyfix 6.0 Options					
Kit Components	**Quantity**	**Length (mm)**	**Diameter/ Width (mm)**	**Heights (mm)**	**Weight (T)**
PE Riser + PE Lid	-	-	Ø600	200	-
Concrete Riser + Concrete Lid	-	-	Ø600	300	-
For further details please contact Hynds Wastewater Team					

Dimensions





Certifications/Accreditations/Testing Results		
CE EN 12566-3	Belgium-Wallonia Public service SPW	2020/04/005/A 2020/04/006/A
BENOR CRT-009-KW		

Warranties	Year	Extension
Tank	**10**	**NA**
Other Components	**2**	**NA**

Supporting Documents and Resources	
Performance Certificate	Installation & Commissioning Report
Field Service Report	Service Contract
	Claims Procedure & Certificate Warranty

Conditions of Warranty:
- Refer to Hynds Wastewater Warranty Terms and Conditions
- Commissioning report completed and returned by trained installer
- Documented service history commencing from commissioning date

Important Pump/s Disclaimer: The selected pump must match the hydraulic requirements of the land application system (LAS) for the specific on-site wastewater management system (OWMS). As there are several different LAS designs, each will require pumps to provide the required pressure and flowrate to ensure sustained and effective LAS performance. It is strongly recommended that the specifications of the selected pump for each OWMS are formally provided by the designer of each OWMS.

Disclaimer: While every effort has been made to ensure that the information in this document is correct and accurate, users of Hynds product or information within this document must make their own assessment of suitability for their particular application. Product dimensions are nominal only, and should be verified if critical to a particular installation. No warranty is either expressed, implied, or statutory made by Hynds unless expressly stated in any sale and purchase agreement entered into between Hynds and the user.

HYNDS WASTEWATER