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20th October 2020
Our Ref: 20100-A

Waste and Emergency Services
Central Coast Council
PO Box 21
GOSFORD NSW 2250

**Re: Further Information
Lot 89 in DP755221, Glenworth Valley
Multi Purpose Building
Glenworth Valley Outdoor Adventures**

1. Introduction and Background

A Wastewater Management Plan (WMP) and several amendments have been historically prepared for the On-Site Sewerage Management system (OSSM) for a Multi-Purpose Building on Lot 89 (the site). Central Coast Council (Council) requested further information in an email dated 7th August 2020. The requested information is transcribed as follows:

The use of the multi-purpose building independent of any other uses on the site has the potential to result in the frequency of usage being increased which will result in additional hydraulic loading on the on-site sewage management system. There is also the potential that the multi-purpose building may be utilised for an event or function at the same time as a festival or event is occurring elsewhere on the property, thus impacting further on the system.

To determine the impacts of this, a wastewater management report will be required to be submitted to Council, post Gateway, which addresses the following:

- The estimated frequency of functions and likely numbers of patrons utilising the function centre, entertainment facility and food and drink premises.*
- The ability of the existing on-site sewage management system to accommodate any additional hydraulic loading.*
- Recommendations for any modifications required to either the treatment or disposal system to accommodate the additional hydraulic loading.*

As discussed, the waste water management report should also address the increased floor area of the multi-purpose building proposed in the Planning Proposal.

In response we would like to submit the following information to address the issues raised by Council:

2. Statement

The multi-purpose building has been in operation for almost 3 years. There are 2 main purposes for the building:

- First and foremost, to provide better services and facilities to our existing adventure activity guests who attend the property to participate in the Council approved activities conducted at the site.
- Secondly to improve the standard of facilities we offer to markets such as weddings, conferences, corporate team building and school groups who have long been attending GV but who needed better quality facilities than what we were previously able to provide.

3. Increased Frequency of Usage Due to Potential Independent Usage of the Building and Impacts on Hydraulic Loading

During the 3 years that the multi-purpose building has been in operation, the building has always operated strictly in accordance with the Council approval and conditions of consent related to the use of the building. As a result, booking enquiries from potential customers have only been refused on one or two occasions during that time where the customer was not seeking to utilise the building in a manner which was ancillary to the approved activities occurring on the property. Accordingly, due to the nature of the business and the location of Glenworth Valley, regardless of whether the multi-purpose building is approved to operate independently as a separate use from the remainder of the business or not, any increase in hydraulic loading will be very minimal.

Likewise, due to the nature of the business and the usage of the building being primarily designed to cater for groups and small events, means the building remains empty for 90% – 95% of the time when measured over a 24/7 basis. Furthermore, the vast majority of bookings are for a maximum 4 – 5 hours duration. A consequence of this pattern of usage are fluctuating hydraulic loadings. This attendance and duration pattern were anticipated and duly incorporated in the design of the On-Site Sewage Management system, in particular the design of the capacity and operation of the treatment system.

The treatment system was designed to manage up to 4,000 L/day with a 10,000 L balance tank originally proposed to manage peak loads. As a voluntary conservative approach, the capacity of the balance tank was increased to 20,000 L to ensure sufficient capacity exists in the system to allow for future increases in demand that may be placed on the system and to provide greater capacity to ensure the system was never exceeded. To date the system has always operated well within its design capacity and there have never been any high level (over capacity) warning alarms triggered.

Apart from there being no increase in frequency of usage a result of the multi-purpose building operating as an independent use from time to time, the existing 5 tank treatment system already has sufficient in-built design capacity to manage any significant increases in the hydraulic load.

4. Potential for the Multi-Purpose Building to be Used for an Event or Function at the Same Time as a Festival or Event Located Elsewhere on the Property and the Impacts this may have on the System.

This potential issue has already been investigated and addressed to Councils satisfaction during an assessment of DA 2839/99 in 2017 when Council officers raised potential concerns about the multi-purpose buildings OSSM being overloaded as a result of a function or event occurring in the building at the same time as a festival or event occurs elsewhere on the property.

The business management team are highly aware of this possibility and already have in place a simple solution that is already part of their ongoing management plans. The building (and facilities) can at any time be made completely out of bounds (locked off) so that those attending any festival or event located elsewhere on the property have no access to the building. A most recent example was the Lost Paradise Festival when approximately 15,000 attendees camped on-site, and the multi-purpose building was used by artists to check in before their performances. In this case the outside festival attendees and artists were kept separate via locked doors which also prevented them accessing the buildings amenity facilities, and the strategic placement and use of security personnel.

Furthermore, the OSSM connected to the multi-purpose building is protected by contractual arrangements with all function organisers that requires all festivals and events held at the valley to supply a sufficient quantity of their own amenity facilities such as transportable toilet blocks with 'built in' holding tanks. These units are pumped out by a licenced haulage contractor at the conclusion of each event, with all liquid waste disposed of at an appropriately licenced offsite facility for this purpose.

Furthermore, a management plan entitled *Event Wastewater Management Plan: Glenworth Valley Adventures was prepared by wastewater consultants Decentralised Water Consulting* in 2017 (dated 22 September 2017). A copy of this report is provided in **Appendix A**. The report was approved by Council and provided a management plan for the management of the storage and handling of large volumes of wastewater generated on-site from events in the situation that the facilities in the building were used in conjunction with outside other events. Waste from such events could be either transferred and stored on-site before being recirculated through the on-site treatment system with dosed disposal or removed from the site by bulk tanker truck for ultimate disposal at an appropriately licenced facility.

5. The Estimated Frequency of Functions and Number of Patrons Utilising the Function Centre, Entertainment Facility and Food and Drink Premises

This is clearly difficult to predict. As noted in section 3 above, during the three years of operation, the multi-purpose building has operated strictly in accordance with the conditions of consent attached to the building and will continue to be compliant. Booking inquiries from potential customers have only been refused on only one or two occasions where the customers were not seeking to utilise the building in a manner which was ancillary to the approved activities occurring on the property. Due to the nature of the business and the location of Glenworth Valley, regardless of whether the multi-purpose building is approved to operate independently as a separate use from the remainder of the Glenworth Valley business or not, any increase in hydraulic loading will clearly be very minimal

6. The Ability of the Existing Onsite Sewage Management System to Accommodate any Additional Hydraulic Loading.

The existing OSSM is inspected and maintained on a quarterly contractual basis by Wastewater Australia. Without exception, over the three years of operation, the OSSM has been operating in a satisfactory manner in accordance with its Council approved and system design specifications. It is noted that at no time in the last three years since the onsite sewage management system was installed has any of the high-water alarms ever been activated. This is because the sporadic and very limited usage of the building and the appropriate Council-approved design of the treatment system (OSSM) which easily manages the current hydraulic load with sufficient storage capacity to manage any temporary peak loads that may occur from time to time.

As noted in Section 4, a council-approved management plan prepared by *Decentralised Water Consulting* for bulk pump out and off-site removal of excess waste provides an appropriate and effective backup plan in the unlikely event that the hydraulic load temporarily exceeds the capacity of the system if it was ever planned for large events to use the buildings amenities.

In the event that the Glenworth Valley business expands to the point that an additional disposal area is required, there is sufficient additional area available on the Site that complies with the guideline buffer setback distances. In this regard, investigation some three years back identified an area close to the main Glenworth Valley operations suitable for the disposal of secondary treated wastewater. An area totalling approximately 2,000 m² is available approximately 370m south-southwest of the multi-purpose building. The location of the possible additional land application area is shown in **Figure 1** and in an enlarged Near Maps image in **Figure 2**. The earlier site investigations revealed that silty sandy loam soils are at least 0.70m in depth and considered suitable for sub-surface drip irrigation. This area was considered initially as a suitable primary land application area.

7. Any Recommendations for any Modifications to the Treatment or Disposal System to Accommodate any Increased Hydraulic Loading

The five-tank treatment system has demonstrated in-built capacity to manage an increase in the hydraulic load. An additional suitable 2,000 m² land application area has been identified and described in Section 6. Of critical importance is the ongoing contractual inspections and maintenance of the OSSM by Wastewater Australia. The quarterly inspections effectively constitute an effective monitoring program which should incorporate an assessment of the performance of the OSSM especially if the average hydraulic load appears to be increasing.

8. The Planning Proposal Allows for a Potential Increase in Floor Area from the Current 800m² to up to 1500m². Please Confirm the Site is Capable of Coping with an Increased Hydraulic Loading Associated with a Potential Increase in the Floor Area from 800m² to 1500m².

Glenworth Valley Outdoor Adventures is a 1,200 hectare (3,000-acre) property with ample suitable and available areas for the on-site disposal of secondary treated wastewater generated from the treatment system in full compliance with Council's

sewage management policy and the state government guideline buffer setback distances.

In addition, the existing treatment system can be readily expanded to manage any significant increase in the average design hydraulic load should it become necessary.

9. Closure

Please do not hesitate to contact Larry Cook on 0428 884645 if you have any questions or you require further information.

For and on Behalf of
Larry Cook Consulting

A handwritten signature in cursive script that reads "Larry Cook".

Larry Cook
Environmental Consultant and Hydrogeologist

Attachments: Appendix A
Figures 1 and 2

cc: Barton Lawler - Glenworth Valley Outdoor Adventures

APPENDIX A

**EVENT WASTEWATER
MANAGEMENT PLAN:
GLENWORTH VALLEY ADVENTURES**

September 2017



DECENTRALISED WATER CONSULTING

Event Wastewater Management Plan: Glenworth Valley Adventures

Final Plan

22/09/2017

DOCUMENT CONTROL SHEET

Decentralised Water Australia Pty Ltd trading as Decentralised Water Consulting PO Box 480 Warners Bay NSW 2282 0408 023 265 ben@decentralisedwater.com.au	Document	R.0139.003.02_69cooksrd_Glenworthvalley_EWMP_Final
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	Project Manager	Scott Jordan
	Author(s)	Scott Jordan
	Client	Glenworth Valley Outdoor Adventures
	Client Contact	Barton Lawler
	Client Reference	

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1 Introduction

This Event Wastewater Management Plan has been prepared by Decentralised Water Consulting (DWC) for Glenworth Valley Outdoor Adventures.

It is understood that the client is seeking approval from Central Coast Council (CCC) modify a Development Application (DA) for Music Festivals held on the site. CCC require submission of an Event Wastewater Management Plan (EWMP) that outlines how the existing Onsite Management System servicing the Multi-Function Centre will be managed and protected from any hydraulic loads (generated by the music festival patrons) that exceed its design capacity. Glenworth Valley Outdoor Adventures have advised that the design capacity of the existing treatment system is 4kL/Day (designed and installed by others).

It is DWC's understanding that Glenworth Valley Outdoor Activities envisages conducting a three (3) day Music Festival each year in addition to a number of smaller functions throughout the year.

DWC has based our design directly on the existing Onsite Treatment System's daily hydraulic capacity, largely due to limited availability of site specific data including:

- Number of Festival attendees
- Number of Event Staff
- Details on the provision of portable amenities of events
- Details of the amenities within the existing Multi-Function Centre and surrounding facilities

The location of the site and the proposed development is shown in Figure 1. The concept design plan for the proposed on-site wastewater management system is presented in Figure 2.

1.1 Site Information

Details of the site are summarised Table 1. The design summary for the existing Wastewater Management System is summarised in Table 2.

Table 1 Summary of Site Information

Site Information	
Property	69 Cooks Road, Glenworth Valley, Lot 19 DP 755221, Lot 37 DP 755221, Lot 89 DP 755221, Lot 145 DP 755221
Owner / Applicant	Glenworth Valley Outdoor Adventures
Water Supply	Tank / Creek
Description of proposed development	Upgrades to existing Secondary Treatment System - <i>designed to prevent hydraulic overload during Events / Functions</i> Supported by operational protocols
Sewer Availability	Nil
Council Area	Central Coast Council
On-site Sewage Hazard Class	Commercial

Table 2 Design Summary for the Existing Wastewater Management System

Design Summary	
On-site wastewater management system	Existing Secondary treatment system with subsurface and surface irrigation (by others).
Facilities serviced by the wastewater management system	Multi-Function Centre
Design Wastewater Flow profile	4kL/Day
Proposed flow balancing / holding tank capacity	150 kL enabling re-direction to the existing treatment system over approximately 40 days.



DWG-139-003-00 Location Plan - Glenworth Valley Outdoor Adventures - 69 Cooks Road, Glenworth Valley



Existing LAA

Existing AWTS -
approx. location

Function Centre -
approx. location

Existing LAA

Possible location of
Flow Balance Tank



DWG-0139-001-00 SITE PLAN - Glenworth Valley Outdoor Adventures - 69 Cooks Road Glenworth Valley

Legend

- Existing Secondary Treatment System
- Existing Multi-Function Centre
- Remotely located Flow Balance/Storage Tank



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2 Performance Objectives

2.1 Legislation

The proposed wastewater management system will require approval to install under Section 68 of the *Local Government Act (1993)*. Generally, the performance objectives set out in the *Local Government (General) Regulation (2005)* are;

- The council must consider whether the proposed sewage management facility (or the proposed sewage management facility as altered) and any related effluent application area will make appropriate provision for the following:
 - preventing the spread of disease by micro-organisms,
 - preventing the spread of foul odours, contamination of water, degradation of soil and vegetation, discouraging insects and vermin,
 - ensuring that persons do not come into contact with untreated sewage or effluent (whether treated or not) in their ordinary activities on the premises concerned,
 - the re-use of resources (including nutrients, organic matter and water),
 - the minimisation of any adverse impacts on the amenity of the land on which it is installed or constructed and other land in the vicinity of that land.
- Guidelines and directions: the council must consider any matter specified in guidelines or directions issued by the Director-General in relation to the matters referred to in the above performance objectives.

The proposed development must also consider the following legislation relevant to wastewater management.

- Environmental Planning and Assessment Act (1997).
- Protection of the Environment Operations Act (1997).

2.2 Policies, Standards and Guidelines

The key policies used in this assessment include;

- Central Coast Council On-site Sewage Management Strategy;
 - NSW Groundwater Policy (specifically the Groundwater Quality Policy);
 - Local Planning for Healthy Waterways using NSW Water Quality Objectives;
 - NSW Sustainable Aquaculture Strategy (2006); and
-

- Using the ANZECC Guidelines and Water Quality Objectives in NSW.

At a broad level, the *ANZECC Water Quality Guidelines for Fresh and Marine Waters (2000)* and *NSW Sustainable Aquaculture Strategy* have been used (in accordance with NSW policy) to determine water quality objectives for the system (where applicable).

The following guidelines and technical references are used by local and state government in assessing applications for systems of this scale.

- AS/NZS1547:2012 On-site domestic wastewater management.
 - Environment and Health Protection Guidelines: On-site Sewage Management for Single Households (NSW DLG, 1998).
-

3 Proposed Existing Treatment System Modifications

The existing Onsite Wastewater Treatment System servicing the Multi-Purpose Building (MPB) has been approved to treat a daily hydraulic load of 4kL. During peak periods such as Music Festivals which attract large crowds of patrons (estimates over 5,000 people) the peak daily flow will exceed the treatment system's stated operational capacity.

To ensure the existing treatment system is protected from exceeding the 4kL daily hydraulic flow it is proposed to utilise a flow balance tank, utilising timed dosing into the treatment system to cap the maximum daily flow to 4kL.

Both of the following options have been proposed to return the stored effluent back to the treatment system in manner not to exceed the 4kL/day design flow, however an alternative is use tanker removal with offsite treatment as the sole method of treatment and disposal. The ongoing economic costs of this method of removal and offsite treatment should be investigated prior to commitment.

Suitable safe guards, such as alarms and operational procedures, will be mandatory for either option if selected to ensure that no impacts (i.e. discharge/spillage) occur to the environment and that public health is not compromised.

3.1 Option: 1 - Separate Pump Chamber

Under this option, the existing "Trash" tank discharge will be disconnected from the treatment system and directed into a 10kL tank incorporating a pump chamber of approximately 3kL. This tank would be located adjacent to the Trash tank. DWC recommend the installation of dual septic tank outlet filters prior to the inlet of the pump chamber of the tank, these filters are designed to minimise the ingress of solids into the pump chamber. Dual submersible pumps (one operating on standby) located within the pump chamber will transfer the effluent into a remotely located flow balance tank with minimum capacity of 150kL.

To prevent the discharge of effluent from the Trash Tank and combined primary tank and pump chamber during pump failure or discharge pipework blockage a high-level alarm is to be incorporated with both visual and audible indicators (located in a prominent position/s, such as an office and/or resident's cottage). An option would be to utilise an SMS messaging function to contact the relevant staff and contractor's mobile phones 24/7.

The 150kL (minimum) flow balance tank will provide effluent storage and will be fitted with dual transfer pumps. The transfer pumps will be configured as an alternating duty / standby pump. A pump controller will be programmed to transfer a maximum daily hydraulic flow of 4kL to the existing treatment system via a suitably sized pipeline into 'Balance' Tank 1 for secondary treatment and disposal via the existing Land Application Areas (LAA).

Level switches within the flow balance tank will ensure that the pumps do not operate when effluent levels are low, preventing pump damage. Additional switches will be configured to activate warning alarms (fitted with audible and visual indicators, located in a prominent position/s), an SMS messaging function may be an option. These alarms will be utilised to indicate that a road tanker pumpout of the excess effluent from the flow balance tank is required or that the maximum storage capacity has been reached requiring urgent attention, including closing of the MPB facilities and effluent pumpout to prevent environmental and public health impacts.

The Flow Balance tank will incorporate a Road Tanker connection point for the removal offsite of excessive volumes of effluent for treatment and disposal as required.

3.2 Option: 2 - Existing Treatment System Balance Tank

Option 2 has been based on a phone conversation undertaken with Mr Shaune Speed from Waste Water Australia (Manufacturer of the existing Treatment System). The advice provided by Mr Speed was that the treatment system was suitable for the existing Balance Tanks to be reconfigured to enable an upgraded pump/s (with a suitable controller) to transfer all excess effluent (above the treatment systems design flow of 4kL/Day) into the proposed flow balance tank for controlled return to the treatment system for processing and disposal without exceeding the design flow of 4kL/day for the system.

By selecting this option the requirement for an additional pumpwell is removed along with the increase in the "Trash Tank" volume as proposed in option one.

In this option the 150kL (or larger) flow balance tank will again provide effluent storage and will be fitted with dual transfer pumps. The transfer pumps will be configured as an alternating duty / standby pump. A pump controller will be programmed to transfer a maximum daily hydraulic flow of 4kL to the existing treatment system via a suitably sized pipeline into 'Balance' Tank 1 for secondary treatment and disposal via the existing Land Application Areas (LAA).

Level switches within the flow balance tank will ensure that the pumps do not operate when effluent levels are low, preventing pump damage. Additional switches will be configured to activate warning alarms (fitted with audible and visual indicators, located in a prominent position/s), an SMS messaging function may be an option. These alarms will be utilised to indicate that a road tanker pumpout of the excess effluent from the flow balance tank is required or that the maximum storage capacity has been reached requiring urgent attention, including closing of the MPB facilities and effluent pumpout to prevent environmental and public health impacts.

The Flow Balance tank will incorporate a Road Tanker connection point for the removal offsite of excessive volumes of effluent for treatment and disposal as required.

If selected as the preferred option, full details regarding the design alterations to the treatment system along with operational procedures will be required from the installer prior to council approval.

4 Existing Treatment System

No assessment of the existing secondary treatment systems design, including hydraulic flow calculations have been undertaken for this Event Wastewater Management Plan. DWC have based the daily hydraulic flows on stated design specifications provided by Glenworth Valley Outdoors Adventure representatives. Likewise, no additional assessment of the land application areas has been conducted by DWC. It is assumed that the system as installed and approved is capable of managing 4kL/day of wastewater with constituent concentrations typical of event / function based facilities.

5 Design Basis for Modification

This section of the EWMP documents the design basis for the proposed upgrades to the existing treatment system. It has been used to determine;

- the most suitable method of effluent management for the site;
- sizing and locating of key components; and
- development of key performance requirements for the system and for the installer.

The design process has been based on relevant elements of *AS/NZS1547:2012*.

5.1 Wastewater Flows and Loads

The design basis for the proposed wastewater management system has been developed based on the stated hydraulic flow of the existing secondary treatment system. Hydraulic flows based on calculations around the daily usage rates of the fixtures provided within the Multi-Function Centre's amenities were initially considered during the design stage, but due to uncertainties around patron numbers, usage timing and cistern volumes it was deemed that this approach was unreliable and possibly excessive.

We have therefore based our design on the stated daily hydraulic flow rate of the existing secondary treatment system along with a reasonable nominated flow balancing / holding tank volume (150 kL).

We understand that up to three major music festivals per year are proposed. Given the uncertainty around both the volume of wastewater generated and the frequency of functions, DWC has incorporated a modest amount of redundancy in the design to enable higher than typical wastewater generation and function frequency to be managed in the long-term.

The following design principles have been included.

- Option 1: The installation of an additional 10kL tank (incorporating a pump chamber) directly after the existing trash tank. Effluent will be direct away from the existing treatment tanks into a flow balance tank via dual pumps.
 - Option 2: The reconfiguration of the existing treatment systems balance tank to direct the excessive hydraulic load (via a pump/s) into a flow balance tank.
 - A flow balance tank / chamber will enable the wastewater volume to be stored during Events and time dosed back to the existing secondary treatment system and LAA over a number of days.
-

- Flow balance tank sizing has made allowance for smaller functions to be held on weekends in between the major festivals / events whilst enabling effluent levels to reduce back to the low-level float prior to the next major event.
- Any effluent volumes in excess of the design capacity of the flow balance system will need to be either:
 - Managed via separate temporary, portable event amenities: and/or
 - Removed by tanker so as to avoid overflow.

These measures provide flexibility in treatment and disposal capacity which is important when designing for an intermittent use commercial facility with variable wastewater strength and volumes.

A summarised weekly design wastewater flow is displayed in Table 3, a conceptual plan is presented for option 1 is shown in DWG 0139 – 003-00, option 2 is shown in DWG 0139-004-00 below.

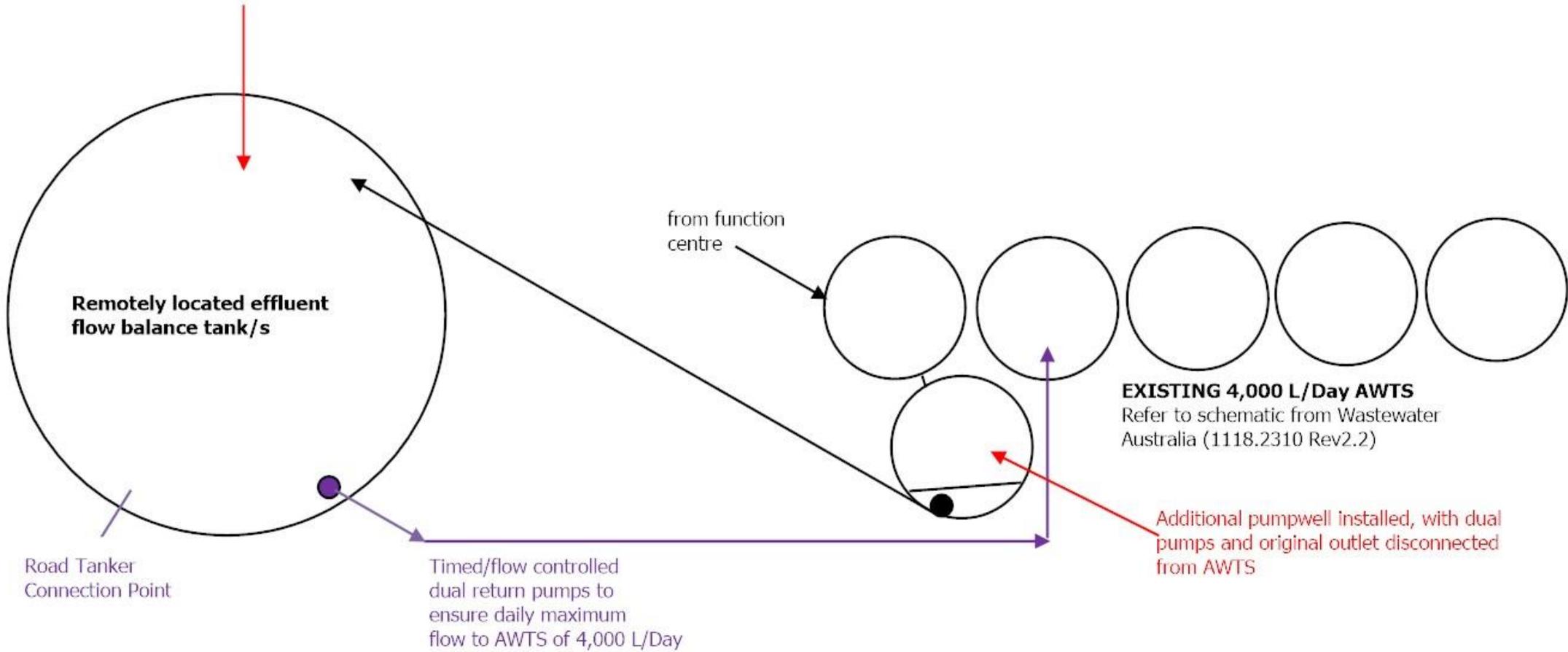
Table 3 Example Wastewater Flow used in Wastewater System Upgrade Design

Balance Tank Size	Estimated No. Patrons/Day (@20 L/person) over 3-day event ¹	Estimated Hydraulic Load per Day during a 3-day event ¹	Estimated Days required for Treatment (including flow from 1 small function per week) ²
150kL (less 5kL tank free board)	2,417 patrons/day	48,333 L/Day	36
300kL (less 5kL tank free board)	4,917 patrons/day	98,333 L/Day	78

Note 1: These numbers equate to the MPB amenities users only. They exclude amenities usage managed via temporary, portable facilities.

Note 2: Usage of MPB amenities by festival patrons that exceed these values will either require a longer period between festivals or effluent removal by tanker.

Flow balance tank/s fitted with a high level alarm and effluent pumpout connection for tanker removal during high flows and emergencies



TITLE: DWG_0139_003_00_Option1

DRAWING NO: 0139.003.00

REV: A

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CLIENT: Glenworth Valley

Sheet: 1 of 1

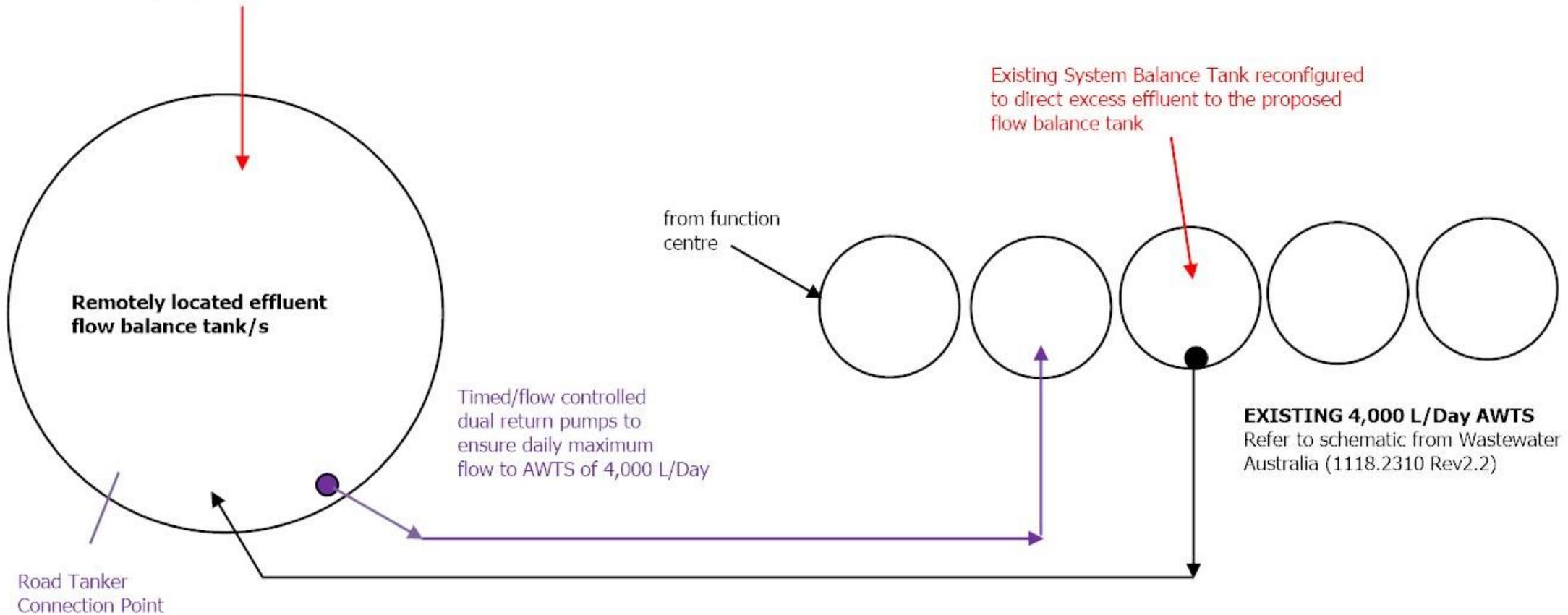
Drawn: SJ

PROJECT: 0139

Scale: NTS

Checked: BAA

Flow balance tank/s fitted with a high level alarm and effluent pumpout connection for tanker removal during high flows and emergencies



TITLE: DWG_0139_004_00_Option2

DRAWING NO: 0139.004.00

REV: A

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CLIENT: Glenworth Valley

Sheet: 1 of 1

Drawn: SJ

PROJECT: 0139

Scale: NTS

Checked: BAA

5.2 Land Application

The existing land application of treated effluent is via:

- Pressure compensating subsurface irrigation.
- Surface spray irrigation

No assessment of the existing Land Application Areas has been undertaken for this management plan. No change in daily hydraulic load or size and configuration is proposed. Reference should be made to the report by Larry Cook Consulting dated 4 February for further detail.

6 Event Management Protocols

The following procedure should be incorporated into existing operation and management activities for the MPB on-site wastewater management system and festival event management. They are the operating principles recommended by DWC to accompany the bypass, storage, pump out and flow balancing modifications documented in this report.

- Prior to the event, approximate patron numbers should be used to determine the number of portable, temporary amenities required (above the ~2,400 persons/day capacity of the MPB amenities).
 - Ensure Flow Balance Tank effluent levels are at minimum, prior to next festival (arrange tanker removal if required)
 - Monitor the entire treatment system (including balance tank) twice per day during events to ensure correct pump operation, effluent levels & alarm functions etc.
 - When first the high-level alarm in the flow balance tank is activated, arrange for a tanker pump out of the Flow Balance Tank.
 - If second high level alarm is activated, close MPB amenities and follow up immediately the arranged pump out.
 - When levels are reduced to first alarm level, MPB amenities can be re-opened.
-

7 References

Environment Protection and Heritage Council., 2006. *Australian Guidelines for Water Recycling: Managing Health and Environmental Risk (Phase 1)*. Natural Resource Management Ministerial Council and Environment Protection and Heritage Council.

Department of Local Government (1998) *NSW Environment and Health Protection Guidelines: on-site sewage management for single households*.

Standards Australia (2017) *AS/NZS1546:2017 On-site domestic wastewater treatment units*. Standards Australia.

Standards Australia (2012) *AS/NZS1547:2012 On-site domestic wastewater management*. Standards Australia.



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FIGURES



Larry Cook Consulting PO Box 8146 Tumbi Umbi NSW 2261 Phone 02 4340 0193	Wastewater Management Plan	Scale: As shown
	Lot 89 in DP755221 Glenworth Valley Glenworth Valley Outdoor Adventures Additional Potential land Application Area	FIGURE 1



Possible Additional LAA



Larry Cook Consulting
 PO Box 8146
 Tumbi Umbi NSW 2261
 Phone 02 4340 0193

Wastewater Management Plan
 Lot 89 in DP755221 Glenworth Valley
 Glenworth Valley Outdoor Adventures
 Additional Potential Land Application Area

Scale: As shown

FIGURE 2