

OUR REF: Z:\21380_LETTER.docx

YOUR REF:

26th February, 2021

The Buttery
346 Lismore Road, Binna Burra

Attention: Ari Miller

Re: Preliminary investigation into on-site sewage management for The Buttery, Lot 1 DP 124647, 346 Lismore Road, Binna Burra.

Dear Ari,

Thank you for engaging us to provide this preliminary investigation into On-site Sewage Management (OSM) for The Buttery. Based on discussions with yourself and documentation you provided we understand that OSM for The Buttery has been a long-term issue requiring constant investment of time and resources to ensure the existing On-site Sewage System (OSMS) is functioning adequately. A brief description of the OSM history for The Buttery is understood to consist of the following events:

- 2000 – An OSMS report was prepared to manage 4000 L/day & included a disposal area of 2850m².
- 2001 – OSMS failure. Flow meter recorded 6500 L/day of water entering the OSMS.
- 2005 – OSMS upgrade report prepared by Trine Solutions Pty Ltd. The upgraded design included an OSMS to manage 10,000 L/day, with disposal via a 300m² 'Trine Mound'.
- 2009 – Modifications to buildings but no increased loading on OSMS.
- 2012 – Defect notice issued by Council regarding a complaint of water contamination to the existing bore from the OSMS.
- 2012 – Trine Solutions Pty Ltd respond to Council regarding the servicing undertaken on the OSMS. Water contamination issues relating to the bore were not addressed.
- 2012 to present – Ongoing, intensive management of the existing OSMS evidenced by the contracting of a third party plumber to manage the OSMS on a weekly basis.

Under ideal circumstances a development like The Buttery would have an OSMS that functions adequately and would require servicing quarterly. As requested, we have undertaken a preliminary assessment into the type and scale of upgraded OSMS The Buttery would require to meet its current operations. This assessment is based on the principles and policies from a local, state and national level that apply to this development including the Byron Shire Council's *Design Guidelines for On-site Sewage Management for Single Households* (2004), the State Government's *Environment & Health Protection Guidelines – On-site Sewage Management for Single Households* (1998), the Water NSW *Designing & Installing On-site Wastewater Systems* (2019) and the national AS/NZS 1547: 2012.

Based on an assumed hydraulic loading of 10,000 L/day generated from The Buttery (design capacity of existing OSMS), our calculations show that a suitably upgraded OSMS would require the following components:

1. A treatment system capable of reducing Total Nitrogen (TN) by 50%.
2. A wastewater disposal field being a minimum 7000 m² in area.

Those figures are based on using a modified version of Council's *On-site Sewage Management System Design Model*, with a copy attached for reference. Please note, a treatment system with lower TN removal would require a larger disposal area, while a treatment system with higher TN reduction would require a smaller disposal area. The 50% TN reduction modelled is a relatively standard TN reduction rate for a high performing commercial Aerated Wastewater Treatment System (AWTS).

To consider the suitability of the subject property to accommodate such an upgraded OSMS, vacant area was measured using Byron Shire Council aerial mapping program. According to our measurements the subject site contains approximately 1300m² of available space, of which much is marginal due to following constraints:

- <100m setback to a permanent creek,
- <100m to a ground water bore,
- <40m to an intermittent water course,
- Reduced buffers to buildings,
- The presence of large trees within this area.

In addition to the above, no reserve area is available for future upgrades to the OSMS.

From the above assessment we conclude that the subject site is not able to suitably accommodate an upgraded OSMS. Understanding that the services provided by The Buttery are critical to our community, we would recommend you explore the following options to obtain a long-term solution to OSM:

1. Investigate the connection to the reticulated sewer system servicing Bangalow. A connection to sewer would remove the requirement to manage wastewater on-site.
2. Investigate the option of a boundary adjustment with a neighbouring rural property on order to acquire more land. Our preliminary investigation suggests that an area of up to 1 hectare of suitable land would need to be acquired for this to be a suitable option (this area does not consider future expansion of services and capacity of The Buttery).

These two options are detailed further in the following sections. A third option, not considered a long-term solution, is also discussed, being the Installation of a high performance OSMS to allow water reuse through toilets and laundry. This option would relieve some pressure on the existing OSMS by reducing the wastewater entering the Trine mound.

1. CONNECTION TO SEWER

The following outline of works is subject to council approval and collaboration with the rail corridor asset management authority which is believed to be John Holland. It is also noted that the Bangalow sewer treatment plant may require upgrades if already at capacity, Council would be able to provide guidance on this.

- 1.65km of trenching / laying DN65 PN16 Sewer pressure pipe (to WSA states 1200mm depth of cover for future road/rail/train payments)
- To follow the existing un-used train line easement (as per figure 1 below)
- 1x under boring under train line & road to tie into existing sewer treatment plant (See figure 2 below)

Figure 1 below outlines a possible route for the connection of The Buttery to the reticulated sewer system at Bangalow. Figure 2 shows an indicative location for under boring the rail track and connecting to the sewerage treatment system.

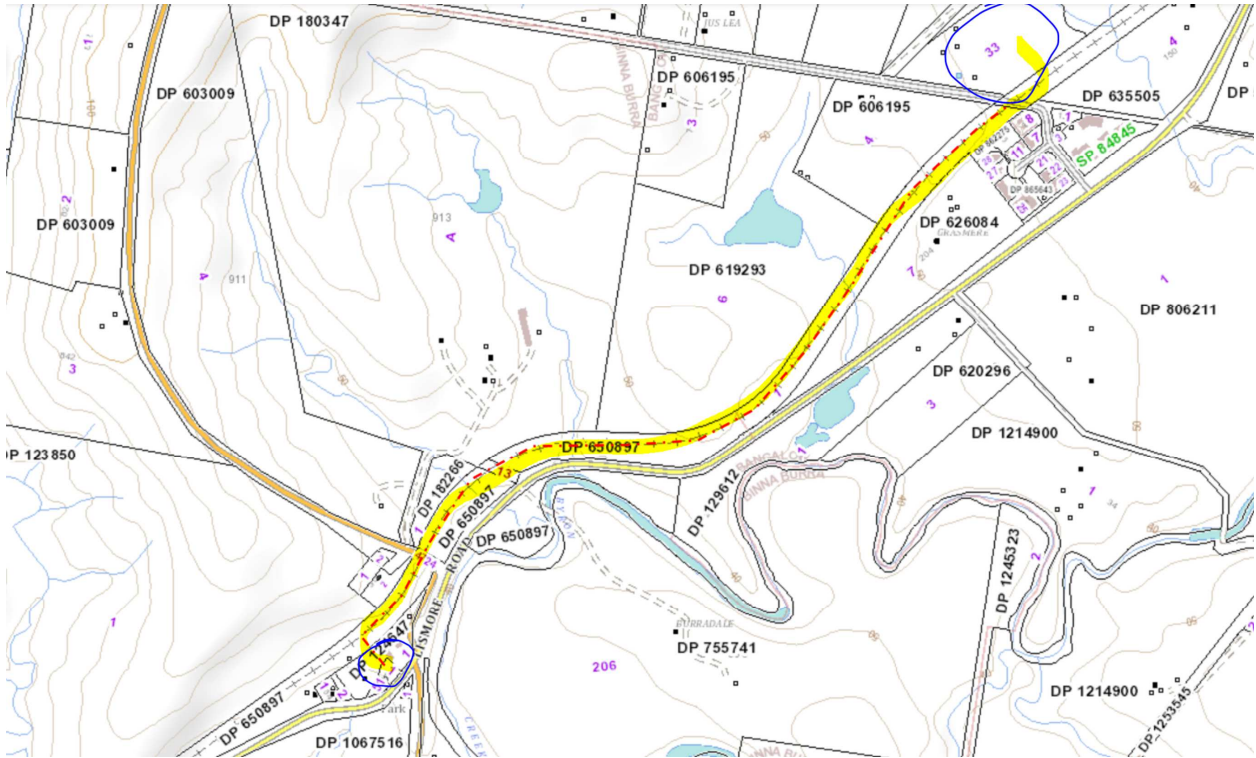


Figure 1. Possible connection path to sewer.

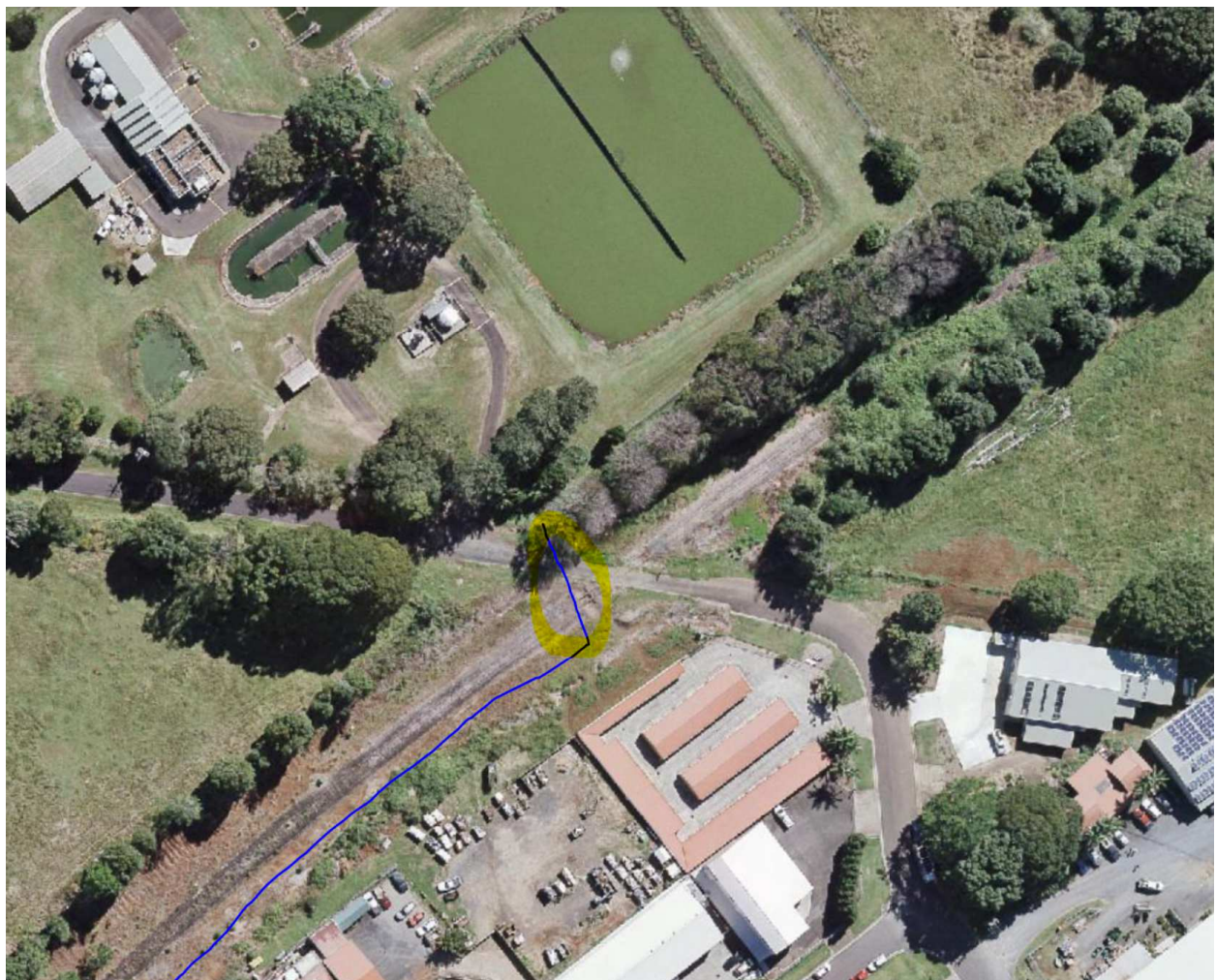


Figure 2. Indicative under boring location of rail line.

We have contacted a local civil construction firm to provide a preliminary understanding of the cost for civil works required to connect to the reticulated sewer. The indicative figure they have provided for pipe laying is \$550,000.

There would be numerous other expenses incurred. A non-exhaustive list of other costs would include:

- Planning/administration/Council fees
- Sewer pump station installation (similar projects have cost around \$20,000)
- Costs associated with surveying and establishing a new easement

The main foreseeable constraints to this option being viable will be the capacity of the sewerage system to treat the additional load placed on it by The Buttery and Council allowing the connection to be made.

2. ACQUIRING SUITABLE LAND

A boundary adjustment with a neighbouring rural property could allow for the acquisition of suitable land to accommodate an upgraded OSMS. Costs associated with this option would include:

- Planning/Council DA fees
- Consultants design fees
- Land purchase
- New OSMS infrastructure
- Under boring of either rail easement to the north or Lismore Road to the south and east.

Our recommendation is to engage with Council to discuss the feasibility of this option. Significant hurdles to this option include getting approval to pipe wastewater under the rail line or road, and finding a willing landholder to purchase suitable land from.

In the short-term there are actions The Buttery could undertake to assist in actioning this option. These actions include conducting an audit on the fixtures & amenities within the buildings to look to reducing water usage and installing a meter on the OSMS and conduct meter readings to determine the hydraulic load being managed by the existing OSMS.

It must be noted that the above assessment does not factor in the possible future expansion of The Buttery's services. Increases to patient and staff numbers will increase the capacity and size required for an upgraded OSMS. Our recommendation would be that prior to any upgrades being conducted for OSM, The Buttery should factor in possible future growth.

3. WATER REUSE THROUGH TOILETS & LAUNDRY

Installing a high treatment capacity OSMS could be a way of reducing the hydraulic loading entering the Trine Mound. This option would involve using treated greywater for toilet flushing and laundry use. Often these types of OSMS's cost \$50,000 - \$300,000 and would include substantial replumbing across all amenities and buildings, which would be an additional cost.

The advantage of this option is it may improve the performance of the existing Trine mound disposal area. The disadvantage is it does not provide any capacity for future expansion and is dependant on the functional life left in the Trine mound. All disposal areas fail in time and require replacement. It would be generally expected that a Trine mound would last 20-30 years, which means it is only a 15 year solution in the very best case.

CONCLUSION

A preliminary assessment into upgrading the existing On-site Sewage Management (OSM) servicing The Buttery has been undertaken. We conclude that the subject property cannot accommodate a suitable upgrade to OSM due to a lack of suitable vacant land. It is our recommendation that The Buttery engage with Council to discuss the following long-term solutions to OSM:

1. Connect to the reticulated sewer system servicing Bangalow,
2. Perform a boundary adjustment with a neighbouring rural property to acquire suitable land to accommodate an upgraded OSMS.

And also a lesser preferred option, being the reuse of treated wastewater through toilet and laundry amenities.

We trust that the information provided is of assistance to your decision making, however, if you have any questions, please contact our office.

Yours faithfully,
Greg Alderson and Associates



Dylan Brooks
Environmental Consultant

Attachments: Council design model

Byron OSMS Design Model Version: On-site Sewage Management System Design Model.xls

STEP 1 bedrooms: 1 persons (Grp 1) **STEP 2** persons (Grp 2): 0

STEP 3 Buffer to permanent water: 10000 L/day
Buffer to intermittent water: 10000 L/day

STEP 4 Block size (m2): 9690
Daily Effluent Flow per person (L/day): 115

STEP 5 Daily effluent flow accord. water supply type: 180L/p/d
Reticulated supply (bore, spring, creek): 145L/p/d
Reticulated + s/d. water saving devices: 140L/p/d
Roof water harvesting: 115L/p/d

STEP 6 Toilet: Toilet Bathroom Laundry
Kitchen: Kitchen

STEP 7 Wastewater stream: kitchen Laundry Bathroom Toilet

STEP 8 Treatment system: Septic + recirculating sandfilter Septic + recirculating sandfilter Septic + recirculating sandfilter

STEP 9 P soil sorption accord. soil type: 40%
P soil sorption: 91.25 kg/ha/yr

STEP 10 Water Table/ Bedrock Depth (m): 3.00

STEP 11 % Effective Rainfall: 65%

STEP 12 Soil texture in root zone: ANLUMI

STEP 13 Effective porosity of root zone: 0.30

STEP 14 Land Application Type: French under root zone

STEP 15 Calculate (or Cont. q): 2.00

STEP 16 SSI laterals pipe separation (m): 583

STEP 17 Minimum effluent application (mm/day/m²): 1.43

STEP 18 Permissible percentile exceedence: 5.00%

STEP 19 Soil Moisture Holding Capacity: saturation & AWC (mm): 45.00

STEP 20 Avg depth bluemetal (etc) in trench below root zone (m): 0.00

STEP 21 Avg depth of root zone (m): 0.37

STEP 22 Avail. Water Capacity (AWC) of root zone: 0.15

STEP 23 Default AWC of bluemetal in trench below root zone: 0.00

STEP 24 Nitrogen Report: Total N-load: 146.00 kg/yr

STEP 25 Soil texture & structure beneath system: ANLUMI

STEP 26 % Effective Rainfall: 65%

STEP 27 Soil texture in root zone: ANLUMI

STEP 28 Soil texture & structure beneath system: ANLUMI

STEP 29 Soil texture & structure beneath system: ANLUMI

STEP 30 Soil texture & structure beneath system: ANLUMI

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