FINAL REPORT

WWT Pond desludging using Geo Bags

PROJECT CODE:	2020-1046
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DATE SUBMITTED:	**1/12/2020**
DATE PUBLISHED:	**17/03/2022**
PUBLISHED BY:	**Australian Meat Processor Corporation**

The Australian Meat Processor Corporation acknowledges the matching funds provided by the Australian Government to support the research and development detailed in this publication.

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1.0 EXECUTIVE SUMMARY

DBC is an SME in the Australian processing industry, processing 380 head beef & venison, 3,200 sheep/lamb and 1,650 pigs per week on two slaughter chains. DBC are situated within the Swan Coastal Plane sand belt (hence cannot allow waste to 'hit' the ground), and currently uses staff on 'floating pumps' (with lifejackets on) to undertake hand desludging of the final pond. DBC believe they have identified a Municipal WWT approach, that might be able to be de-scaled to suit DBCs operational needs.

The intent of this project is to evaluate the potential of pumping all pond 1 discharge through GEO bags (dosed with FeCl) and have the GEO bags undertake inline automated sludge collection and dewatering. Once a GEO bag is full, it can then be disconnected from the system and allowed to dry further (i. e. further dewatering) and then the contents (dried sludge) can be sent to composing.

The aim is to remove the need to de-sludge Pond 2 by undertaking desludging in GEO bags. The first stage enabled a trial run of the configuration with suitable water and sludge analysis to enable an understanding if it is feasible for this concept to work at scale and inline at DBC.

At the end of our initial testing, we were happy with the results that the GEO bags we are providing, but what this highlighted for us was that we needed to have more bags and a bigger hardstand to allow us to be able to drain and dry the products in the bags through the winter period. By not being able to take the bag off flow, didn’t allow us to clean the bag adequately to get maximum benefit from the process.

After consultation and review, it was agreed that we now needed to set up a hardstand that allowed us to run two GEO Bag systems. This would allow us to take one offline to drain and dry and remove solids while the second system continued the filtering process.

2.0 INTRODUCTION

DBC is an SME in the Australian processing industry, processing 380 head beef & venison, 3,200 sheep/lamb and 1,650 pigs per week on two slaughter chains. DBC are situated within the Swan Coastal Plane sand belt (hence cannot allow waste to 'hit' the ground), and currently uses staff on 'floating pumps' (with lifejackets on) to undertake hand desludging of the final pond. DBC believe they have identified a Municipal WWT approach, that might be able to be de-scaled to suit DBCs operational needs.

This project will enable DBC to evaluate the potential benefit and realistic de-scaling opportunity to take current large scale municipal WWT desludging concepts and configure it for the needs to a SME processing facility. Currently DBC removes sludge from its second settling pond (anerobic), using a staff member on a floating pontoon sludge pump (figure 1) to both stir up and collect the sludge from the bottom of Pond 2, pump it to a trial GEO Bag to further dewater the sludge (figure 2).

Figure 1

Figure 2

The intent of this project is to evaluate the potential of pumping all pond I discharge through GEO Bags (dosed with FeCl) and have the GEO Bags undertake inline automated sludge collection and dewatering. Once a GEO Bag is full, it can then be disconnected from the system and allowed to dry further (i. e. further dewatering) and then the contents (dried sludge) can be sent to composing.

3.0 PROJECT OBJECTIVES

DBC's current WWT process is depicted in the attached schematic. Other processors who have a similar available footprint, utilise clarifiers for desludging of secondary water discharge.

The aim is to remove the need to de-sludge Pond 2 by undertaking desludging in GEO bags.

This first stage will enable a trial run of the configuration with suitable water and sludge analysis to enable an understanding if it is feasible for this concept to work at scale and inline at DBC.

3.1 Current and Proposed WWT Process

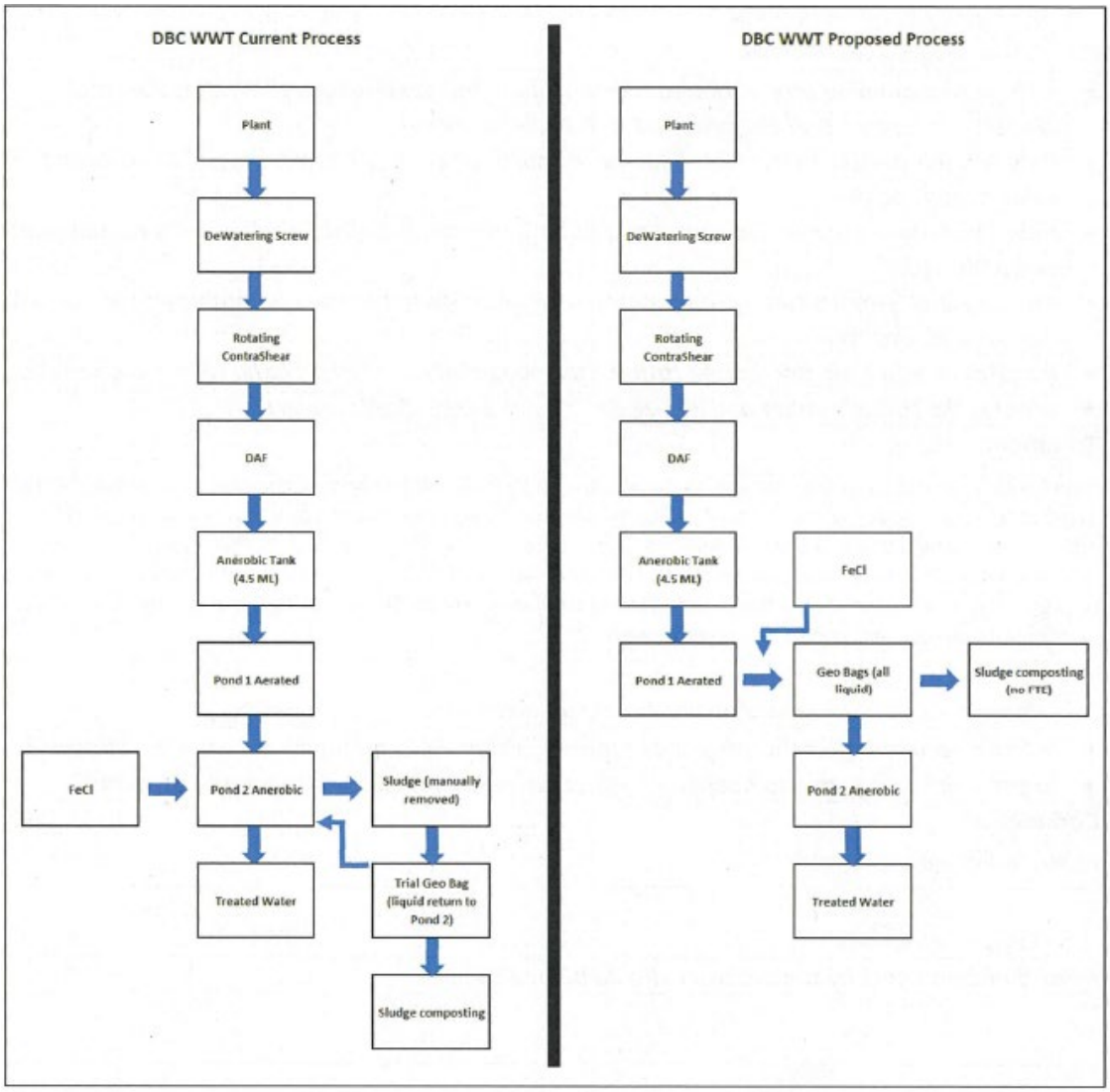

Figure a: Current and Proposed WWT process

3.1.1 Objective

At the conclusion of this Stage I, DBC will have ascertained if it is possible to configure their WWT system as depicted in the right-hand side of Figure A.

4.0 METHODOLOGY

- Purchase GEO Bags and required pumps and pipes.
- Configure system for trial purposes.
- Operate process to acquire sufficient liquid and solid samples for analysis.
- Evaluate results, develop, design & cost Stage 2 project for full scale implementation (if applicable).

5.0 PROJECT OUTCOMES

At the end of our initial testing, we were happy with the results that the GEO bags we providing, but before we complete the hardstand, we wanted to trial some different sized Geo Bags to see if we could generate similar results.

What this highlighted for us was that we needed to have more bags, and a bigger hardstand to allow us to be able to drain and dry the products in the bags through the winter period. By not being able to take the bag off flow, didn't allow us to clean the bag adequately to get maximum benefit from the process.

6.0 DISCUSSION

After consultation and review, it was agreed that we now needed to set up a hardstand that allowed us to run two GEO Bag systems. This would allow us to take one offline to drain and dry and remove solids while the second system continued the filtering process.

7.0 CONCLUSIONS/RECOMMENDATIONS

Conclusion

Our conclusion for this project is to go ahead with the process, but to set up two hardstand areas to accommodate two identical GEO Bag filtering systems. As per attached drawing Reference Drawing No PBP IRR-Bio-015.

The new design allows for full 16.6lp/sec treated water flow from Pond 1 clean water area and through to new Amiad Dual fully automated filtration system then through to Pond 2 as per drawings. Backwash cycles run for approximately 30 to 60 seconds and discharge backwash directly to the Geo-Bag every 5 to 10 minutes of filtration operation.

This design allows for only backwash water with a high solid content to enter GEO Bags, approximately 70 to 80% less water entering bags, thus allowing more solids capture and less expensive bags required per annum.

This will dramatically reduce the carryover of suspended solids for Pond 1 and Pond 2 within the irrigation pond, help reduce and stabilise total nitrogen, phosphorous and BOD levels, allowing more irrigation to be carried out, with compliant discharge to the Water Corporation Sewerage network.

Recommendation

Our recommendation for this would be to complete this PIP project as a trial project only, then go to a much larger version of this trial installed to generate required results.

Scope of Works now Proposed

Bio-Bag bunded concrete hard stand and Amiad Automatic Filtration System Project
Reference Drawing No PBP IRR-Bio-015

- Currently DBC's effluent system separates and clarifies out suspended solids using Pump 7 suction located in the clean water area of pond 1 and the system doses Ferric acid into the effluent on route to 3 x Bio-bags located in an experimental limestone bund area, water filtered through the bags is pumped via a submersible pump station located within the limestone bund area and back to pond 2, their irrigation pond.

  This experimental process has limitation due to all pump 7 flow forced into Gio-Gags at 16.6lp/sec, the Gio-bags fill with water, pressurise, and slow effluent transfer rates to less than halve original flows slowing the filtration process and causing high levels of back pressure on Pump 7 (4" Gorman Rupp T Series Pump).
- This project is part of a review of this experimental process and has been engineered on the experience of the existing system's failures.
- Refer to Drawings PBP Bio 015 for all Locations of specified equipment, Civil works, and Design parameters.
- The new design allows for full 16.6lp/sec treated water flow from Pond 1 clean water area and through to new Amiad Dual fully automated filtration system then through to Pond 2 as per drawing., Backwash cycles run for approximately 30 to 60 seconds and discharge backwash directly to Bio-Bag every 5 to 10 minutes of filtration operation.

  This design allows for only backwash water with a high solid content to enter Bio-bags, approximately 70 to 80% less water entering bags, thus allowing more solids capture and less expensive bags required per annum.
- This project will dramatically reduce the carryover of suspended solids for Pond 1 and Pond 2 within the irrigation pond, help reduce and stabilise total nitrogen, phosphorous and BOD levels, allowing more irrigation to be carried out, delivering compliant discharge to the Water Corporation Sewerage network.

8.0 BIBLIOGRAPHY

Civil and Structural Engineers. *Design and Certification of Hardstand.*
Environmental and Agricultural testing Services. *Nutrient Analysis Services.*
Kurup, R . *Wastewater Treatment and Nutrient Removal Management.*
MCR Electrical Contractors. *Design and Certification of Electrical Requirements.*
Phil Best Plumbing. Assessment of *Bio-Bag bunded concrete hard stand and Amiad Automatic Filtration System Project and providing of all required drawings.*
Survlon Surveyors. *Surveying of Hardstand Areas.*

9.0 APPENDICES

9.1 Water Quality Images

Above is a picture of the water quality that these bags are producing since instillation.

9.2 Reference Drawing No PBP IRR-Bio-015.