final report

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CRF Colac Effluent Improvement Plan

Trade Waste and Green Waste Projects

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Executive summary

This report finalises the Plant Initiated Project Application Form prepared and submitted by CRF Colac Otway directly relating to the understanding of current practises and the investigation improving the overall Trade Waste and Green Waste results and handling

Integra have been partnering CRF Colac Otway for a number of years in regards to waste water treatment management and improvement. During that time we have seen that the regulations regarding pollutant limits for discharge to sewer via the trade waste connection have become tighter and overall processing numbers have increased.

Integra have offered a number of long term plant upgrades and solutions that were industry standard and sure to deliver good reliable waste water treatment results and sustainable sludge handling. These include budget pricing for a complete DAF plant, Sludge dewatering unit and Balance/Equalisation tank.

The pricing for such equipment ranged from $500K for a large Balance tank through to $2.2 Million to build a complete DAF plant including associated equipment.

CRF were faced with much tighter regulations coinciding with an increase in production along with a new licence to discharge waste water to Barwon Water municipal water treatment plant that put a limit on the total water volume discharged. Couple this with the ballooning cost of the Green Waste Transportation and disposal it became clear that if the business was to continue processing as the market dictated we needed to provide an immediate solution to improve the quality of the Trade Waste final discharge and also the way CRF handled and disposed of their Green Liquid Waste.

First we met with Barwon water to discuss the total mass discharge element of the trade waste agreement and it was agreed that if we could reduce the kilograms of pollutant being released per litre that they would review the maximum daily volume limit to cover the water required to keep up with processing demands. We investigated the possibility of using a polymer to reduce the Suspended Solids and insoluble pollutants in the waste stream and conducted a bench scale trial and laboratory testing. It was shown that if we could successfully remove the solids separated by our preferred chemistry, the water remaining would fall below the targeted compliance line set out by Barwon Water.

Integra designed, built and implemented an automatic polymer activation, make-up and dosage system in one – Integra Model Number Actiflox 1200 - and applied our chemistry proportion to flow and pollutants inline prior to the main wastewater discharge, utilising the existing Rotary Screen onsite as the solids removal stage. The screen feeds into a gravity drainage bin and the solids are classified as solid waste. The results were consistently below the limits outlined by Barwon Water therefore they agreed that the maximum daily flow be lifted. The polymer equipment is leased by CRF and the polymer cost is minimal compared to a breach of the Trade Waste Agreement.

Following our successful Trade Waste application we then evaluated a number of options to dewater the Green Waste generated from the paunch processing room. It was thought that using similar principles demonstrated on the main trade waste discharge we could achieve favourable results combining the treated green waste stream back into the final discharge without impacting negatively on the water quality discharging to Barwon Water. Bench scale testwork confirmed the possibility of chemically treating the water with a carefully selected polymer would theoretically be able to go out via trade waste and solids bins. The paunch material proved very hard to pump

and we carried out a number of pilot trials onsite but they failed primarily due to the gross solid made up of semi-digested material held in the stomachs of the animals and foreign objects that caused blockages in the equipment, pipes and pumps.
It was decided in order to demonstrate effective separation and dewatering of the green waste we needed to conduct a full scale trial. GEA supplied a primary rotating screen to remove and dewater the gross solids made up of grass, grain and other feed material and separate the foreign bodies. Once the GEA screen delivered a waste stream that was fluid in appearance we could then chemically treat the water inline and proportional to flow and pollutants prior to the contra-shear screen and use this as the solids removal step in this process. The solids from the GEA primary screen and the contra-shear were combined in a bin and classed safe for composting.

The capital cost is yet to be finalised however we believe the green waste project payback on investment would be achieved in no more than 12 weeks.

Contents

1 Background

1.1 Overview

CRF Colac have indicated that they would like to improve the quality of waste water currently discharged to the Barwon Municipal Water Treatment Facility with the aim of reducing the solids loading and pollutants in line with the new waste water discharge agreement that commenced in August, 2012.
Integra have been commissioned to investigate an overall cost effective solution to achieve compliance with the discharge regulations and allow CRF to continue to operate their production facility within the boundaries outlined by Barwon Water.
Following initial success of applying a polymer inline prior to the Contra Shear and final discharge, we applied the same principle in handling the green waste and successfully implemented a multiple screen trial with polymer addition with the purpose to eliminate the need to remove the green waste in tanks as a liquid waste from site.

2 Project objectives

2.1 Trade Waste Effluent Improvement

2.1.1 Waste Water Compliance discharge to Barwon Water

On behalf of CRF, integra established that the daily flow limit reflected the total mass of pollutants allowed in kilograms per day in a 24hr period. In order to allow the business to continue to process livestock as required the quality of water needed to improve considerably.

2.2 Green Waste Handling

CRF are currently separating the green waste from the paunch room and transporting it from site in liquid waste bins.
Integra proposed a plan to screen the gross solids from the waste stream with a rotary screen and then with the addition of a polymer prior to a second screen physically separate the majority of the insoluble pollutants from the waste stream. The aim was to direct the screened and treated green waste water back into the main waste water stream prior to final discharge without affecting compliance to discharge and removing the need to transport the Green Waste as a liquid from site.

3 (Methodology) - Section

3.1 Waste Water Treatment and Waste Handling

3.1.1 Main Stream Waste Water Treatment

Integra carried out comprehensive bench scale testwork to select the best chemistry for the application. We then set up an automatic polymer makeup system onsite designed to achieve the desired dose rate proportional to the trade waste average flow. We dosed the made polymer solution prior to the final discharge contra-shear and were able to bind remove a portion of the solid pollutants present in the waste water. The solids were separated into a bin for disposal as dry waste.

3.1.2 Green Waste Handling and Water Treatment

Integra carried out comprehensive bench scale testwork to select the best chemistry for the application. The paunch stream waste water has a high gross solid content and we utilised a rotary screen combined with a dewatering attachment supplied by GEA Farm Technologies. The dewatering unit was sourced from DTS West (Dairy Technology Services West) who is a dairy service provider located in Warrnambool, Victoria. The GEA de-watering unit had traditionally been used to dewater cow manure and this was the first time the unit had been used to treat tripe effluent. The unit successfully removed the partially digested feed and grass and any other foreign object leaving the heavily loaded green waste water. The combined waste stream (tripe and runner waste) was chemically treated in line with a polymer prior to the contra-shear. The chemical treated colloidal solids could then be removed with the screen and combined with the primary waste from the GEA screen and sent off site for composting.

4 (Results and discussion) - Section

4.1 Cost of Treatment Savings to CRF

4.1.1 Main Stream Waste Water Treatment

Following the successful application of polymer prior to the main stream contra-shear allowed CRF to renegotiate their trade water agreement to discharge.

We have included a summary table of results. See Appendix 1 for water testing results for the main limiting factors – COD and TSS.

4.1.2 Green Steam Waste Water Treatment and Handling

Following a successful trial which included screening of the gross solids present in the green waste/paunch stream with the GEA rotating screen we were able to apply a polymer and build the size of the solids remaining in the green stream waste water and remove them as a solid. The waste produced is suitable for composting. The GEA screened produced approximately 15 cubic metres in a typical working day and we estimate that the solids produced by the contra-shear following polymer addition was a further 2 cubic metres. As the waste produced from this process is acceptable for composting there is no disposal cost required. CRF have been offered to enter into a partnership agreement with the owner of the farm to further reduce the transport cost associated with disposal. See Appendix 3 for laboratory results.

5 (Conclusions and recommendations) - Section

5.1 Trade Waste Water Treatment Upgrade and Green Waste Handling

5.1.1 Trade Waste Effluent Improvement

The dosage system used on the trade waste main stream has been operating successfully since November 2012. By adding a polymer continuously during working hours has delivered a >30% improvement on the key analytes as stipulated in the Barwon Water agreement to discharge and has achieved Total Daily Mass compliance without disrupting the operation of the processing plant.

As the water quality falls within the Barwon Water Agreement to discharge and also within operational budget set aside for Waste Water Treatment at CRF, polymer addition will continue as an essential part of daily operations.

5.1.2 Green Waste Handling and Disposal

Once the materials handling aspect of pumping the paunch material was successfully completed we found that a combination of screens along with chemical selection offered best results. As the cost of liquid waste removal and disposal continues to rise so too does the cost of waste handling and disposal at CRF.
We were able to achieve an acceptable quality of filtrate following screening that would not have a negative impact on the main trade waste results. Aside from the obvious operational cost advantage we produced a waste product that is essential to the local composting business and then applied back onto the land to improve soil conditions.

6 Reference list

Nil.

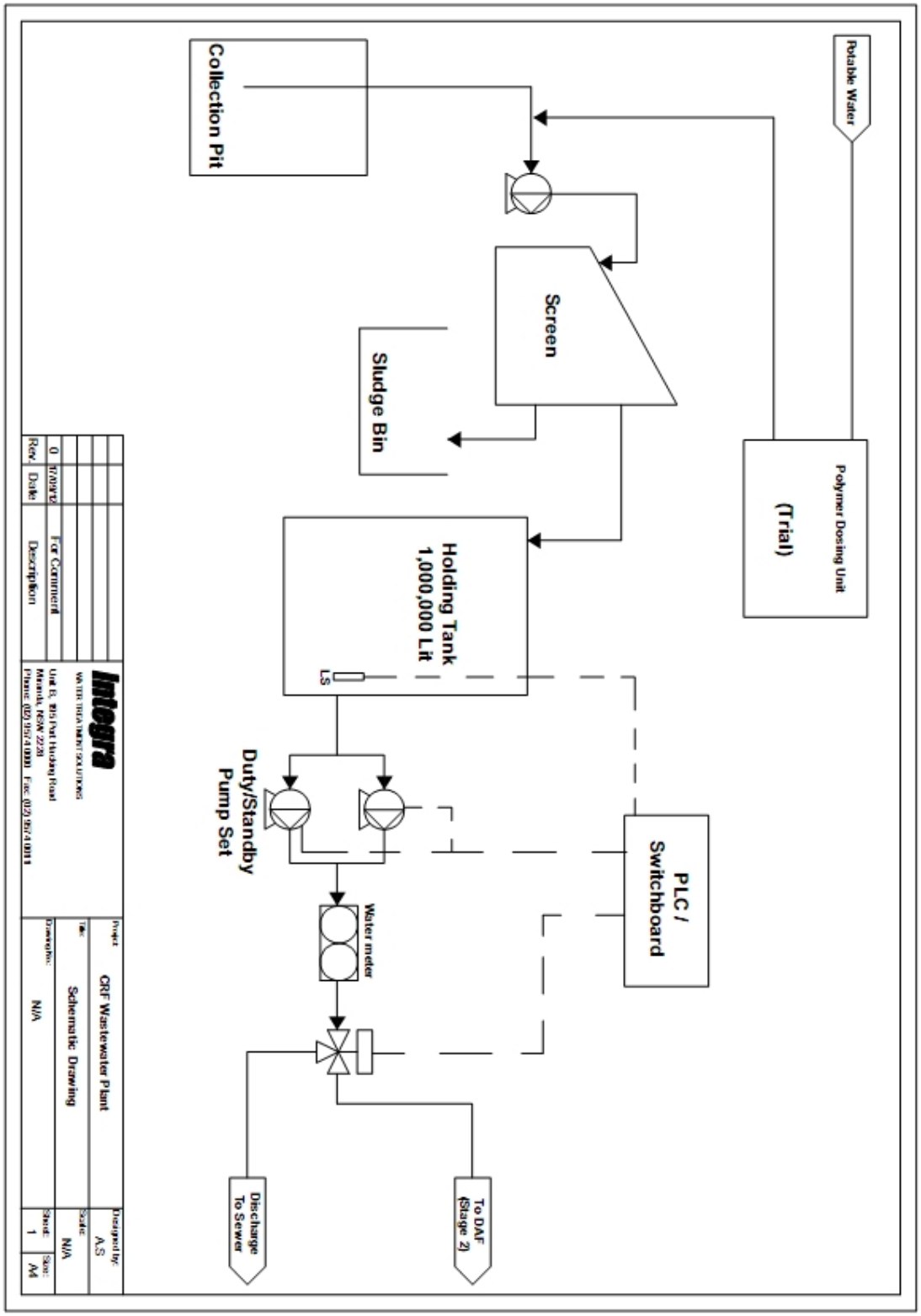
7 Appendices

7.1 Appendix1

NATA Accredited Sampling

					UNITS - Mg/L			
SAMPLE No	BATCH_NO	SAMPLE_NO	SAMPLE DATE	SAMPLE TIME	COD	TSS	TKN	P
1		358550	8-Nov-12	10.45	1900	340	170	9.8
2	12-49776	3248302	9-Nov-12	10:00	2000	400	120	
3	12-50596	3254207	14-Nov-12	0:00	1900	540	94	
4	12-50874	3256264	15-Nov-12	0:00	1800	490	91	
5	12-51016	3257463	16-Nov-12	15:14	1800	420	100	
6	12-51607	3262447	20-Nov-12	10:00	1700	420	90	
7	12-51607	3265990	22-Nov-12	10:00	2100	620	110	
8	12-51607	3267598	23-Nov-12	10:00	2300	480	120	
9	12-52784	3271841	27-Nov-12	12:00	1600	470	96	
10	12-52784	3273673	28-Nov-12	10:00	1900	500	100	
AVERAGE					**1900**	**468**	**109.1**	

7.2 Appendix 2



7.3 Appendix 3

mgt LabMark ENVIRONMENTAL LABORATORIES

Certificate of Analysis

NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Clinical Laboratories P/L
1868 Dandenong Road
Clayton
VIC 3168

Attention: **Dianne Gray**

Report **371386-W**
Client Reference INTEGRA WATER 31082 CRF COLAC
Received Date Mar 07, 2013

Client Sample ID			CRF COLAC GREEN RAW	CRF COLAC GREEN TREATED
Sample Matrix			Trade Waste	Trade Waste
mgt-LabMark Sample No.			M13-Ma05592	M13-Ma05593
Date Sampled			Mar 06, 2013	Mar 06, 2013
Test/Reference	LOR	Unit		
Chemical Oxygen Demand (COD)	20	mg/L	32000	3700
pH	0.1	units	7.0	7.4
Suspended Solids	1	mg/L	14000	420
Total Dissolved Solids	10	mg/L	10000	5100
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	1300	300