



REPORT

Odour Impact Assessment - Blood Processing Plant
AFFCO New Zealand Limited, Imlay

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1.0 INTRODUCTION

AFFCO New Zealand Limited (AFFCO) currently holds a discharge permit (APP-200501198.01) for the discharge of contaminants into air from its meat processing plant at Imlay Place, Whanganui (*the site*), which will expire on 1 July 2025.

This report provides an assessment of the change in potential odour effects that may result from the installation of a proposed 4.5 Tonnes/hr (T/hr) blood processing plant at the site's existing rendering plant (the proposal).

This assessment includes a review of the performance of the rendering plant's existing odour control system (OCS), which includes onsite measurements, off-site odour observations and a review of recent odour complaint records.

Having assessed the extent of existing odour effects arising the site's rendering plant, then modifications to the OCS are recommended. These recommendations aim to achieve a less than minor increase to the existing potential for odour effects due to the site's rendering plant operation, as result of the proposal.

The assessment has therefore included a review of the rendering plant's extraction and treatment system, for controlling odour emissions and including the system installed in 2018 to target fugitive odour emissions from the external raw material receivable bin.

2.0 DESCRIPTION OF ACTIVITIES

2.1 Existing Plant

2.1.1 Overview

The air discharge consent requires AFFCO to undertake activities in general accordance with the original resource consent application and AEE (Golder, 2017). A copy of the air discharge consent is provided in Appendix A. These include stockyards, animal slaughter, processing, by-product rendering, natural gas fired steam boiler operation, wastewater treatment and other ancillary activities. A summary of the rendering related activities is provided here.

2.1.2 Rendering

The site operates a low temperature rendering plant (LTRP) that processes animal by-products (i.e., offal) which are produced from the site's meat processing plant, as well as from other central North Island meat processors. The LTRP produces a dried meal product (sheep and beef offal) as well as tallow. It also coagulates raw blood (via live steam injection) and dewateres the resultant solids using a decanter centrifuge. The resultant wet coagulated solids are currently transported for processing off-site.

The nominal processing rate of the LTRP is 10 Tonnes/hr of raw by-products, whereas the 2 Tonnes/hr of raw blood are coagulated and dewatered. For soft offal processing a higher processing rate of about 14 tonnes/hr can be achieved. In the past, this has included the co-drying of coagulated blood and by-products to produce meal product.

The LTRP operates two TST-60 indirect steam dryers at a capacity of 10 to 14 T/hr of bovine/ovine meal. Some of the latent energy within the hot and humid exhaust air streams (ex the TST indirect steam dryers) is recovered within a waste heat evaporator (WHE), which uses this recovered energy to concentrate stick-water and enable the concentrate to be processed into meal product.

2.1.3 Existing blood processing

The coagulation of blood and decanting of blood solids currently occurs at the site at 2 T/hr. The resultant dewatered coagulated material is then trucked off site for further drying and processing into meal product.

Currently the maximum amount of raw blood processed at the site (under normal circumstances) is 42 Tonnes/day (T/day) (21 hours of processing per day). This is made up of 25 T/day of blood from Manawatu Beef Packers, 5 T/day from Land Meats, and 12 T/day from blood production at the AFFCO Imlay site.

AFFCO advise that their existing 2 T/hr rated blood decanter at Imlay is wearing out and needs replacement. Consequently, a larger 4.5 T/hr unit is proposed, which could process the normal daily loading of blood (42 T/day) in less than half the time currently required.

2.2 Proposed Blood Plant

2.2.1 General

Details of the proposed new 4.5 Tonne/hr blood plant were provided by Rendertech Ltd¹ and a basic process flow diagram is provided in Figure 1. The main processing stages involve existing processes (albeit at a higher rate) including:

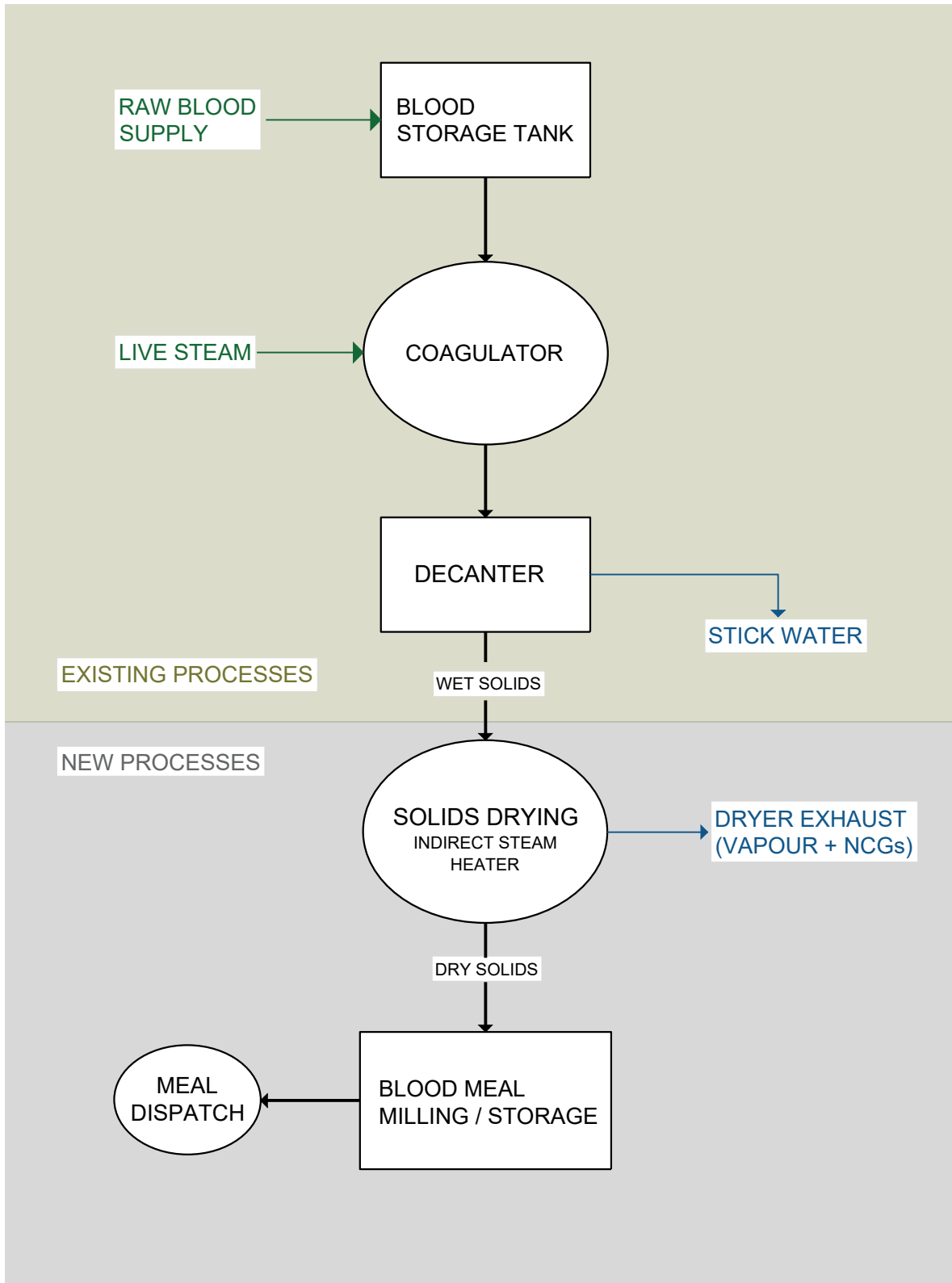
- Blood storage
- Raw blood coagulation (via live steam injection)
- Decanting/dewatering of coagulated solids

And additional processing stages including:

- Wet solids drying (via a new indirect steam heated dryer) and
- Meal milling/storage and dispatch.

A more detailed process diagram of the overall blood processing stages and equipment is provided in Appendix B.

¹ Email from Rendertech to AFFCO, *Proposed Bloodmeal Plant Steam, Vapour, NCG & Odour Loadings - Ref Q5270-B-001*, dated 23 March 2021.



LEGEND

- PROCESSING SYSTEM
- INPUT
- WASTE STREAMS

NOTES

PROCESS DIAGRAM ONLY, NOT TO BE INTERPRETED AS AN ENGINEERING DESIGN OR CONSTRUCTION DRAWING

Figure 1: Process flow diagram for the proposed blood plant.

2.2.2 Hourly processing rates

Hourly blood processing rates would increase from 2 T/hr to 4.5 T/hr. A mass balance for the higher rate is provided in Table 1.

Table 1: Water & solids mass balance for blood plant (kg/hr)*.

Stage	Solids	Water	Live Steam	Solids Content	Evaporated Water
Raw Blood	675	3825	0	15.0 wt. %	0
Coagulator/Steam injection	675	3825	675	13.0 wt. %	0
Decanter Stick-Water	54	3569	0	1.5 wt. %	0
Decanted Wet Solids	621	931	0	40.0 wt. %	0
Dried Solids	621	33	0	95.0 wt. %	900

Information provided by Rendertech, email ref: Q5270-B-001, dated 23 March 2021.

The hourly processing rate of blood is proportional to the rate of process air extraction required from the decanter, transfer conveyors, blood drying and meal processing plant.

With reference to the detailed process flow diagram in Appendix B, the design air extraction flow rates and minimum extraction duct diameters for blood processing equipment items, are recommended as follows:

- Existing blood tank (design extraction, 100 m³/hr, Ø75 mm duct)
- Blood decanter bin (design extraction, 800 m³/hr, Ø200 mm duct)
- Decanter bin discharge conveyor (design extraction, 300 m³/hr, Ø150 mm duct)
- Meal processing/storage: (design extraction, 1,500 m³/hr, Ø250 mm duct)
- Blood drier non-condensable gases (NCGs): (design extraction, 300 m³/hr, Ø150 mm duct)

2.2.3 Daily processing rates

AFFCO also propose to use the new blood plant to process coagulated blood and some raw blood from other plants in response to breakdowns at their Horotiu blood plant. The Horotiu blood processing plant is used as a central hub for processing blood generated at other north island sites – it is a central blood processing site for AFFCO processing sites in the North Island.

The larger capacity blood plant proposed for AFFCO Imlay would provide a backup central blood processing facility to Horotiu. AFFCO have advised, that in the worst-case breakdown scenario, an extra 40 T/day of material could be directed to their Imlay site. All this increased load would usually consist of coagulated blood from other North Island sites, and so requiring no additional decanting and subsequent increase in loading of stick liquor to the site's wastewater treatment plant (WTP).

However, in a worst possible case situation, AFFCO advise that the additional 40 T/day blood load (in response to a plant failure at their Horotiu site), could consist as much as 50 % raw blood.

2.2.4 Increased organic loading to the wastewater treatment plant

Stick liquor flows

For an unlikely worst-case scenario an additional 20 T/day of blood would be coagulated and dewatered via the blood decanter. Based on mass balances for blood processing shown in Table 1, this would increase the stick liquor flow to the WTP by 16 m³/day and increase the soluble COD² loading by 300 kg/day.

At the current maximum blood processing rate of 42 T/day (assuming all blood from MBP and Lands Meat is not in a coagulated state), then the current maximum stick liquor flow and soluble COD loading to the WTP would be respectively 34 m³/day and 640 kg/day.

The weekly monitoring records of total site wastewater flow and soluble COD loadings to the WTP (which includes stockyards, washdown operations, and rendering), shows the average total daily values to be 2320 m³/day and 12,000 kg/day. Therefore, the increased daily load of soluble COD to the WTP as a result of processing an extra 20 T/day of raw blood is around 3 %.

Evaporator condensate flows

The exhaust air from the drying of coagulated blood will have the majority of its evaporated water load condensed and discharged to the site's WTP. When processing raw blood at existing rates of 42 T/day, this condensed vapour load will be approximately 8400 L/day. Assuming a similar COD concentration to the blood stick liquor, then this estimates the existing maximum organic load to the WTP of 160 kg/day (soluble COD). For emergency break down scenarios at AFFCO Horotiu site, this load could double to 320 kg/day (soluble COD). These are small increases against the nominal organic loading to the WTP of 12,000 kg/day (soluble COD).

3.0 ODOUR CONTROL SYSTEM

3.1 Existing System

3.1.1 Drawings

The layout of the existing odour control system and design extraction flows for concentrated sources were detailed by Golder (2017). These are shown as a schematic diagram in Figure 2 and Figure 3. These figures have been updated to include the additional flows from new sources as detailed in Section 2.2.2.

Figure 3 provides a schematic diagram of the odour control system (OCS), including extraction, cooling and biofiltration for two TST-60 meal dryers and includes the additional flow of NCG flow from the 4.5 T/hr blood dryer.

Note that the flow for the existing blood decanter of 800 m³/hr would be dedicated to the new blood decanter, which would replace the existing unit.

² An average soluble COD of 18,900 g/m³ for stick liquor (average of two results) was provided by RenderTech (*Email from James Richardson, dated 16 December 2021*).

3.1.2 System performance

To assess the current performance, Golder air quality staff visited the site on 25 and 26 November 2021 to undertake flow, vacuum measurements and ambient odour assessments downwind of the operational rendering plant.

Point Source Extraction System (PSES)

The wet site extraction system for process stages was assessed visually and via measurement of vacuums on the 25 November 2021 using Golder's calibrated differential pressure meter. Vacuum measurement points covered those specified in Condition 18(a) of the air discharge consent.

Most process items (except for the existing blood decanter and solids press) had no visible process leaks and had positive vacuums. Some positive vacuums were measured on the discharges from the pre-cooker duct, blood decanter and the solids press inlet conveyor.

The pre-cooker results seemed to be related to the installed sampling lines and use of push-lock fittings. The lines appeared to have condensed vapour, but the cooker itself had no obvious steamy leaks when operating. However, the solids-press and existing blood decanter were losing some visible process emissions into the wet-side of the rendering building and were found to be operating with a low positive pressure.

The dry-side of the rendering plant (includes meal dryers and meal processing) had no visual fugitive emissions from the steam heated dryers or downstream meal processing equipment.

Given the above findings, the following is recommended:

- Checking the connecting duct legs to the pre-cooker and solids press for any blockages; and
- Clearing the sampling lines (e.g., with a handheld can of compressed air) prior to vacuum measurements – suggest removing all compression (push type) fittings on these lines as well and plug lines with something else.
- Connecting the new blood decanter and covered discharge conveyor to the dry-side extraction system (as shown in Figure 2).
- Removal and replacement of the existing blood decanter would allow the blanking of its connection to the wet-side PSES.
- The larger new decanter and its product bin is located such that these sources could be efficiently connected to the dry-side PSES manifold, which is in the meal processing/dryer room. This will free up around 800 m³/hr of the wet-side extraction duct's air flow capacity.
- While the blood tanks are a very minor source of odour, we recommend these are extracted at 100 m³/hr to the wet-side PSES manifold (shown in Figure 2).

Ambient Odour Assessments

The ambient levels of odour at 100 m downwind of the rendering process building (open grassed area onsite to the northeast of the building) were assessed during light winds during the afternoon periods of 25 and 26 November 2021. The assessments were carried out by Golder and WSP air quality staff following the Ministry for the Environment (MfE) good practice odour assessment guide (MfE, 2016)³.

³ MfE (2016): Ministry for the Environment. 2016. Good Practice Guide for Assessing and Managing Odour. Wellington: Ministry for the Environment. Publication number: ME 1278.

Odour was absent for most of the assessment periods, and when present momentarily, it was very weak (Odour Intensity = 1) and difficult to discern the character, although it was judged to be from meal and tallow storage.

Observations on the morning of 26 November 2021, when downwind of the WTP and from the adjacent river walkway, indicated a distinct intensity (Intensity = 3) anaerobic “rotten egg” type odour when within 30 m of the WTP, this dissipated rapidly with distance.

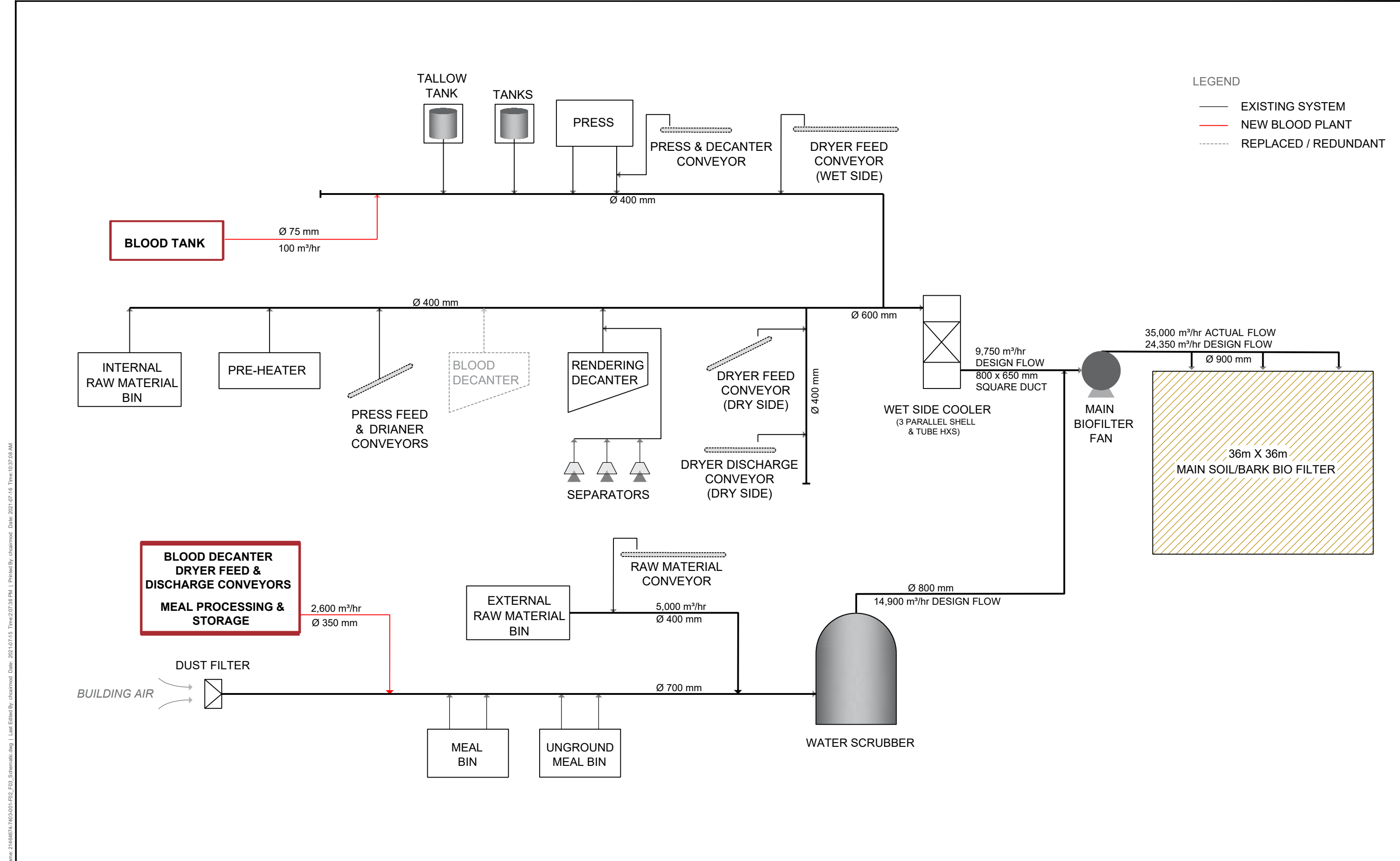
Over the two days onsite, it was clear that stockyard odour was the most noticeable type of odour character that was noticeable 250 m downwind of the stockyards during a moderate westerly wind. This finding and the outcome of assessment downwind of the rendering plant indicates that rendering odour emissions are well contained and treated at the site.

Because stockyard type odour is generally tolerated by most people, we anticipate that existing odour from the WTP is more significant than other sources of odour discharge from the AFFCO Imlay site.

3.1.3 Ventilation of building air from the rendering building

When onsite, it was noted that all roof vents from the wet and dry-side of the rendering building were blocked off and therefore no forced air ventilation of building air to atmosphere is occurring from rooflines of the rendering building. Apart from making the working environment unnecessarily hot and humid, this current arrangement is likely to increase the potential for rendering process odour to be noticed off site. Odour cannot be held in a building by closing doors and shutting off roof ventilation – this can only exacerbate odour levels at ground level due to fugitive emissions into the rendering building.

Ventilation of building air via roof fans discharges the same odour load in a more diluted form and with much better ambient dispersion. Therefore, we recommended that the roofline fans on both the dry and wet-side of the rendering building are recommissioned and operated as soon as practical, as allowed for by air discharge consents granted by Horizons in 1997.



- LEGEND**
- EXISTING SYSTEM
 - NEW BLOOD PLANT
 - - - REPLACED / REDUNDANT

Path: G:\2021\145674 AFFCO CAD drawing\1 File Name: 21464674-203-001-F02_F03_Schematic.dwg | Last Edited By: chaimod Date: 2021-07-16 Time: 10:37:09 AM
 25 mm IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ISO A3

NOTES

Schematic only, not to be interpreted as an engineering design or construction drawing.

01	2021-12-23	RC	IX	RC	RC	
REV.	YYYY-MM-DD	DESCRIPTION	DESIGNED	PREPARED	REVIEWED	APPROVED

CLIENT
AFFCO NEW ZEALAND LIMITED

PROJECT
BLOOD DRYING PLANT

CONSULTANT

GOLDER
MEMBER OF WSP

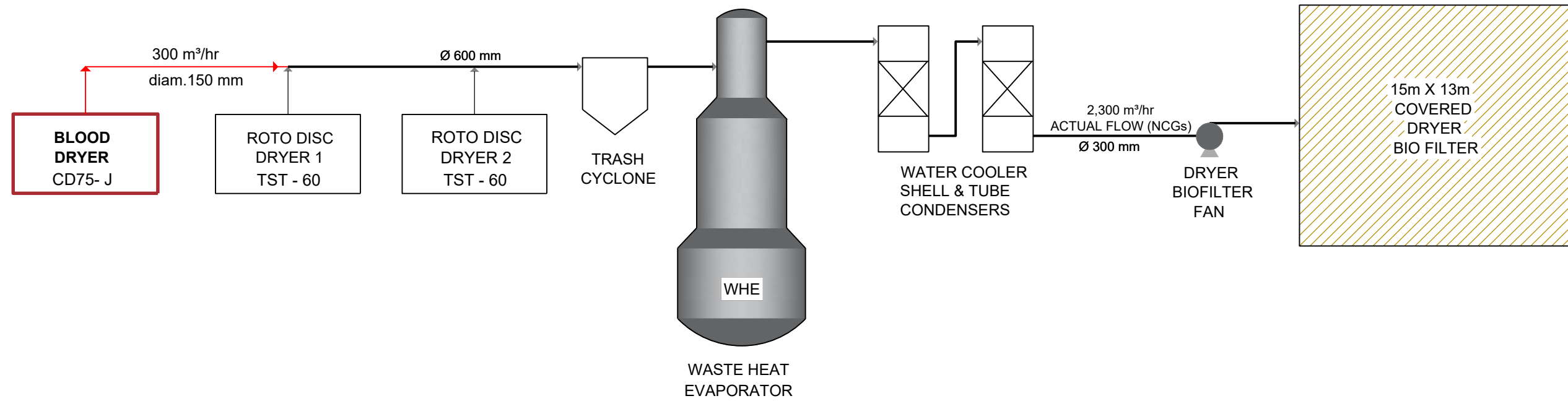
Golder Associated (NZ) Limited
 Level 1, 214 Durham Street
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 www.golder.com

TITLE
CONCENTRATED ODOUR SOURCE MANAGEMENT SYSTEM

PROJECT NO.
21464674

REV. 1 **of** 1 **FIGURE** 02

LEGEND
 — EXISTING SYSTEM
 — NEW BLOOD PLANT
 NCG: NON-CONDENSABLE GASES



NOTES					
Schematic only, not to be interpreted as an engineering design or construction drawing.					
01	2021-12-23	RC	IX	RC	RC
REV.	YYYY-MM-DD	DESCRIPTION	DESIGNED	PREPARED	REVIEWED APPROVED

CLIENT
 AFFCO NEW ZEALAND LIMITED

PROJECT
 BLOOD DRYING PLANT

CONSULTANT



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TITLE
 MEAL DRYER EXHAUST MANAGEMENT SYSTEM

PROJECT NO.
 21464674

REV. of
 1

FIGURE
 03

3.2 Raw Material Receivables Bin

3.2.1 Consent requirements

Condition 18 of the air consent states the following:

The Permit Holder shall operate and maintain a point source emission extraction system to extract all gaseous and vapour emissions from point sources of odour to the odour control system, i.e., condensers, heat exchangers and biofilters as detailed in the Resource Consent Application and AEE dated 10 March 2017 as follows:

- a. *On the wet-side of the rendering process, sources shall include the internal raw bin, pre-cooker, transfer conveyors, decanters, decanter tank, separator tank, wastewater drains and separators.*
- b. *The external raw material bin, its enclosed discharge sump chamber and discharge conveyor shall be connected and air extracted to a small biofilter by 30 April 2018 and remain covered at all times apart from when open for deliveries.*
- c. *On the dry-side of the LTRP the sources shall include the meal dryer exhausts, meal storage bins and the filtered building ventilation air.*

3.2.2 Installed system

The system installed by AFFCO for extracting and treating fugitive odour emissions from the external raw material bin (as shown in Figure 2) differs from the requirements of condition 18(b). Capacity within the existing main biofilter and associated air extraction system has been utilized instead of a separate stand-alone extraction system and biofilter. The effectiveness of this alternative arrangement (in terms of odour control) can be assessed as part of the blood meal plant consenting process, and then consideration can be given to an appropriate change to existing condition 18(b) to accommodate the system as installed (on the basis this can be supported).

3.3 Recommended Modifications

3.3.1 New ducting and design flows

As discussed, Figure 2 shows the blood plant's process stages and conveyors connecting to the dry PSES manifold. The individual duct sizes connecting blood plant equipment items to the PSES manifold and design flows are specified in Section 2.2.2.

The blood meal drying exhaust would enter the existing meal dryer exhaust air extraction, cooling and biofilter system as shown in Figure 3. The detailed design of sub-manifolds for extracting air from the blood meal processing plant and storage (a total design flow of 1500 m³/hr) is best completed once the layout of the new blood plant is finalised, which normally occurs once consent is granted.

3.3.2 Design flows for the point source extraction system

Table 2 provides an update of all sources which are targeted by the rendering OCS, as previously summarised in Table 3 of Golder (2017) for the existing rendering plant. This also includes the additional flows, and removal of the existing blood decanter design flow as specified in Section 2.2.2.

Table 2: Concentrated odour source extraction – recommended design flows.

Source	Duct Diameter (mm)	Velocity (m/s)	Design flow (m ³ /hr)
Wet-side Rendering (Pre-cooking, solids dewatering, tallow recovery)			
Tallow tank	100	5.3	150
Heated centrifuge liquor feed tank	200	2.7	300
Press liquor feed tank	200	2.7	300
2 x 200 mm connection to solids press & 1 x 100 mm to entry hopper	200	8.8	1,000
Rendering decanter discharge conveyor	200	7.1	800
Dryer feed conveyor	200	3.5	400
Sub-manifold to dry-sidedry-sider (picks up dryer feed and discharge conveyors)	400	3.3	1,500
Dry-sideconnection to open air	100	3.5	100
Sub-manifold to decanter and separators (200 mm to 300 mm)	300	5.1	1,300
Connections to 3 x tallow separator discharge chambers	100	10.6	300
Top of press feed conveyor	150	4.7	300
Discharge from drainer conveyor into the press feed conveyor	250	3.4	600
Top of drainer conveyor	150	3.1	200
Blood decanter (removed)	-	-	-
Blood tank	75	6.5	100
Pre-heater discharge	150	6.3	400
Pre-heater	100	35	1,000
Raw material bin (internal)	250	5.7	1,000
Proposed blood meal processing/storage [#]	300	6	0
Total Design Flow – Wet-side Manifold	600	9.6	9,750
Dry-sideRendering (Dryers and Meal Processing)			
Unground meal bin	2 x 200	4.4	1,000
Ground meal bin	2 x 200	4.4	1,000
Building air via dust filter	600	5	5,000
External raw material receivable bin [#]	400	11	5,000

Source	Duct Diameter (mm)	Velocity (m/s)	Design flow (m ³ /hr)
Blood Plant (<i>decanter, conveyors, filtered storage bin discharge, but not including the blood dryer exhaust</i>) [#]	300	6	2,600
Design Flow – Dry-side Manifold	800	8.2	14,600
Total Design Flow - Main Biofilter	900	10.6	24,350

[#] Sources to be targeted by the OCS, which are additional to those specified in Table 3 of Golder (2017).

3.3.3 Cooling systems

The preliminary advice from Rendertech, is that the existing wet and dry-side concentrated source cooling systems have sufficient spare capacity to accommodate heat loads from the additional concentrated source flows anticipated for the new blood plant. This includes the water-cooled shell & tube condenser and the water spray tower, which are respectively used to cool and clean the extracted wet and dry-side concentrated source flows (shown in Figure 2).

Rendertech has also advised that the existing WHE and associated shell & tube condensers have sufficient spare capacity to accommodate heat loads associated with the 900 kg/hr of evaporated water from the proposed blood meal in-direct steam heat dryer. This includes the water-cooled shell & tube condenser and the water spray tower, which are respectively used to cool and clean the extracted wet and dry-side concentrated source flows (shown in Figure 3).

From our own measurements, the existing WHE and downstream cooling systems currently result in NCG flows with relatively low temperature (in the order of 20 °C). This further indicates that the existing WHE and cooling systems have sufficient spare capacity to receive an additional loading of 900 kg/hr of evaporative load and the associated flow of 300 m³/hr of NCGs due to the operation of a 4.5 T/hr blood meal dryer.

The concentrated source cooling system has historically achieved biofilter inlet air temperatures that readily comply with the target of ≤35 °C for 95 % of time and a maximum of 40 °C. The new concentrated sources flow from the blood plant decanter, conveyors and meal plant will add heat loading to the dry-side spray tower, although the dry-side air stream is dominated by ambient sources including the external raw material and filtered air from the dry-side building air. There will therefore be an increase in the inlet air temperature to the main concentrated source biofilter, which would require an additional cooling water demand should this cause biofilter temperature limits to be breached. It is considered that the existing dry-side water spray tower can have inlet water flows readily adjusted as necessary to off-set the increased cooling duty from the blood plant concentrated sources.

3.3.4 Main biofilter

The total air flow to the main biofilter, measured by Golder on 25 November 2021, was found to be operating at 34,000 m³/hr at 34 °C (9.4 m³/s). This flow is consistent with (i.e., 6 % higher) the flow measured back in June 2021 of 32,000 m³/hr.

For the 36 m x 36 m main biofilter, the total additional graded bark media recommended for this bed is 250 m³ (which is an increased bark media depth of 190 mm). This would enable treatment of the existing concentrated source flow of 32,000 m³/hr and additional flow associated with the proposed blood plant. The 250 m³ total results from following:

- 90 m³ of bark required to treat extra concentrated source flow from the proposed blood plant (2,700 m³/hr); and
- 155 m³ of additional graded bark to top up the existing bed to achieve its maximum design loading when treating the existing concentrated source flows.

The existing timber wall's available freeboard can readily accommodate this height increase.

3.3.5 Dryer exhaust (NCG) biofilter

The total air flow to the smaller dryer biofilter, measured by Golder on 25 November 2021, was found to be operating at 2,000 m³/hr at 25.5 °C (0.56 m³/s). This flow is the nominal flow expected when both existing meal dryers are operating at capacity and is 43 % higher than the flow of 1400 m³/hr measured in June 2021.

For the 13 m x 15 m dryer NCG biofilter, the additional bark media required to treat extra NCG flow would be 15 m³ (i.e., an increased depth of 80 mm). However, the actual depth of media within this bed needs to be confirmed and compared to the original design depth. This would enable the required additional bark volume (if any) to be confirmed.

The original design media depth was 600 mm. This would be sufficient for treating the existing nominal NCG flows of 2,000 m³/hr (from the rendering plant dryers) and the additional NCG flow of 300 m³/hr from the proposed blood plant. While our spot check found a depth of 700 mm, it is recommended that further investigation of the bed's depth of media are undertaken to confirm there is a minimum of 600 mm of graded bark media throughout the whole bed.

4.0 ENVIRONMENTAL SETTING

4.1 The Site and Surrounding Activities

The AFFCO site is located in the suburb of Imlay, Whanganui on the west coast of the central North Island of New Zealand. The site is situated approximately 2 km from the mouth of the Whanganui River (where it meets the Tasman Sea) and is situated along the river's northern bank (see Figure 4).

The site is located in a General Industrial Zone under the Whanganui District Plan and the surrounding areas contain a mixture of General Industrial, General Residential and Open Space zones.

As indicated in Figure 4, built up residential areas are located directly opposite the eastern site boundary (Balgownie Avenue) and also 180 metres away from the northern site boundary (off Heads Road). There are also several residential properties directly opposite the western site boundary (off Beach Road, which borders the AFFCO's western boundary). The residential dwellings to the west are within the industrial zone and are the closest in proximity to the AFFCO rendering plant (190 m), stockyards (200 m), primary wastewater treatment plant (WTP) site (100 m).

The largest industrial neighbour is the Open Country Dairy (OCD) site, immediately to the north of AFFCO's site boundary. The OCD site has two milk powder dryers, and each have their own gas-fired energy plant. There is little potential for OCD's milk powder dryer discharges to air to cause cumulative odour effects in combination with odour discharges from the AFFCO site, and particularly their rendering and wastewater treatment plants. Likewise, the other light industries surrounding the site are not considered to be significant background sources of odour.

There are other waste management related activities including the Whanganui District Council's (WDC) upgraded wastewater treatment plant situated on the southern side of the Whanganui River. There is also the WDC's wastewater screening plant located directly to the west of AFFCO's own WTP. A composting facility now operates on land (shown as vacant in Figure 4) that is immediately adjacent and to the west of the WDC's wastewater screening plant.



LEGEND

- Parcel Boundary
- Building Outline
- Building Location

NOTES

1. Aerial: Provided by Whanganui District Council
2. Parcel Boundary information provided by LINZs
3. Schematic only, not to be interpreted as an engineering design or construction drawing.

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CLIENT
AFFCO

PROJECT
AFFCO WHANGANUI

TITLE
SITE DIAGRAM AFFCO IMLAY, WHANGANUI

CONSULTANT



YYYY-MM-DD	2021-12-23
PREPARED	RC
REVIEW	RC
APPROVED	RC

PROJECT NO. 21464674	REPORT 004	REV. 1	FIGURE 4
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IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: A3

4.2 Wind Patterns

Wind data from Whanganui airport for 1999 and 2000 has been summarised as a wind-rose in Figure 5. The airport is situated approximately 1 km due south of the AFFCO site on flat terrain and is expected to have the same wind patterns as those experienced at the site. The wind rose in Figure 5 shows a prevalent northeast wind, which becomes more dominant at night and is associated with light wind speeds. Stronger winds are also prevalent from the west to northwest and also from the south. These wind patterns are discussed in more detail below.

4.2.1 Large scale westerly wind flow

Whanganui experiences winds from the west to northwest for approximately 25 % to 30 % of the time and these winds are associated with moderate to high wind speeds (>5 m/s). Winds from this quadrant are expected to be associated with westerly synoptic weather systems. These winds provide a relatively high degree of odour dispersion with distance and therefore rapidly dilute odour discharges from the rendering plant with distance. This helps mitigate the potential for odour effects at residential dwellings to the east of the site (i.e., dwellings off Balgownie Avenue, Wordsworth Street).

4.2.2 Local wind drainage

The local wind drainage down the Whanganui River valley (from the northeast) is expected to occur between 15 % and 20 % of the time. These conditions would provide a relatively low degree of odour dispersion with distance and therefore slowly dilute odour discharges from the rendering plant with distance. However, the sensitivity of receiving environment to the southwest of the site has no residential dwellings and therefore likely to be less sensitive to odour exposures. People impacted during these conditions are likely to be involved in recreational activities such as cycling along the river cycle way, or fishing.

4.2.3 Southerly winds

Southerly winds that blow over the AFFCO plant towards Heads Road and Bignell Street occur for approximately 10 % of the time and are also associated with moderate to high wind speeds (>5 m/s).

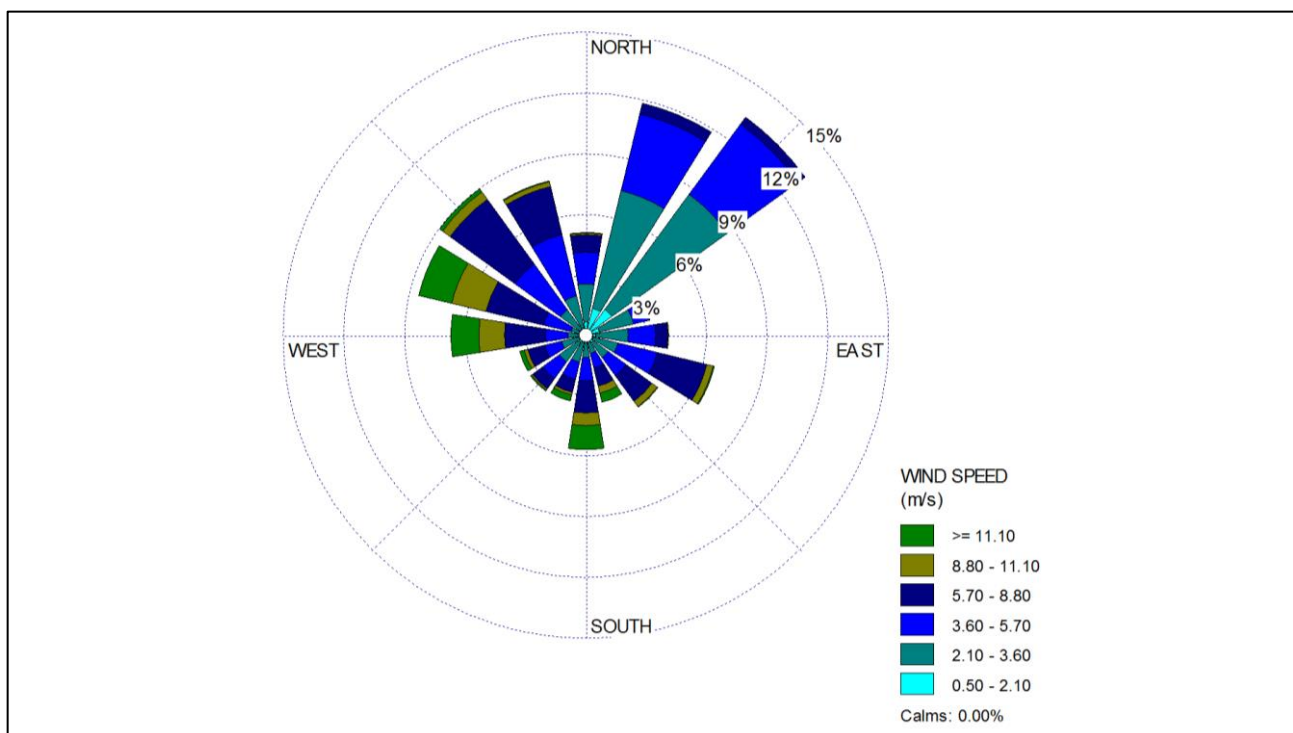


Figure 5: Wind rose for Whanganui for the period of January 1999 to December 2000.

4.3 Odour Complaint Records

Golder has examined the record of odour complaints from the Whanganui District Council. A total of 46 complaints were logged between 1 January 2018 and 14 June 2021, which were attributed to AFFCO by the callers. Callers who gave their address were mostly located on Balgownie Avenue, Wordsworth Street (these locations are downwind during westerlies) and Heads Road and Bignell Street (these locations are downwind during southerlies).

The complaint dates and time of day are plotted in Figure 6. The complaints tended to occur during the day in warmer months of the year, with occasional calls in the evening. Note that no complaints were made during the winter months (around July of each year).

Odour complaint frequency has reduced in the last 2 years, with only one odour complaint being lodged in 2020, and four in the first half of 2021. This is a relatively low level of odour complaint for a large meat processing site, which is likely to produce occasional odour that is recognisable offsite due to stockyards, wastewater treatment and the rendering plant operation.

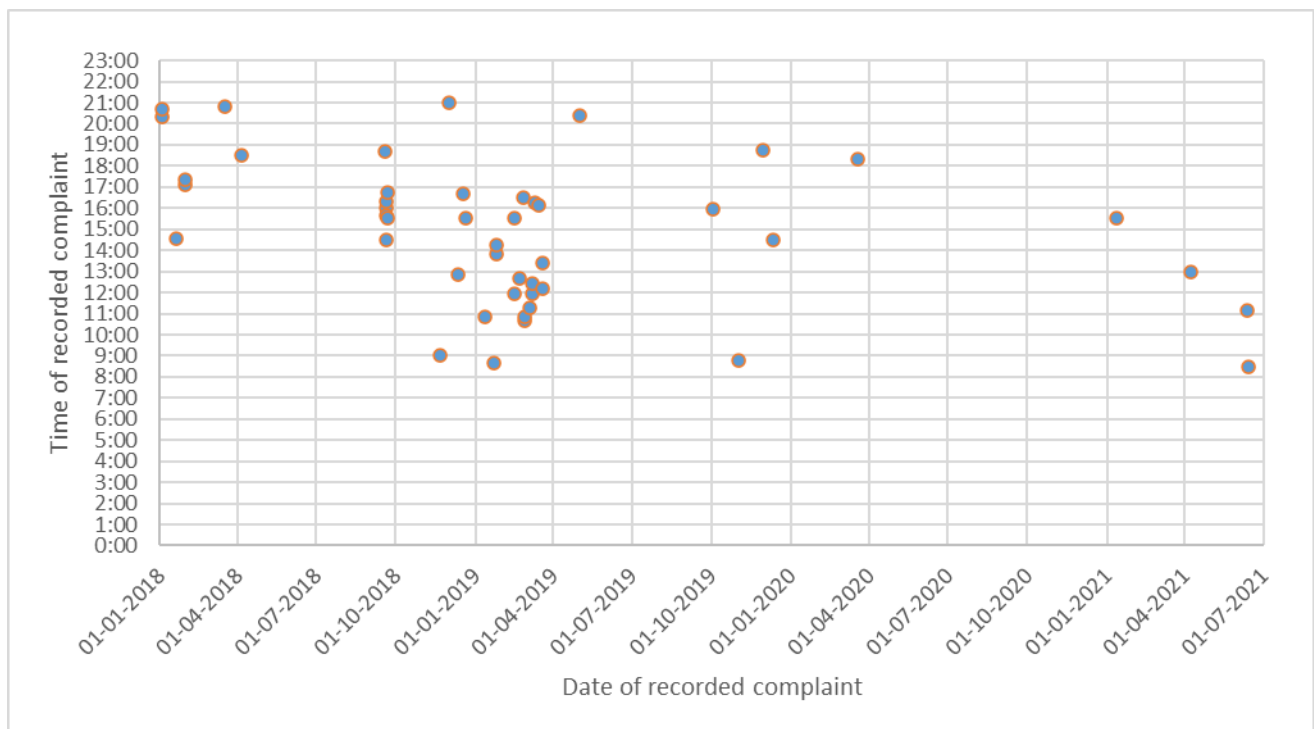


Figure 6: Date and time of recorded odour complaints to Whanganui District Council.

5.0 ASSESSMENT OF ODOUR EFFECTS

5.1 Approach

The assessment of the change in potential odour effects associated with a new blood process being installed and operated requires a consideration of the scale of the change and of the ability of the existing odour control systems to contain and treat the additional odour discharges to the same standard required by the existing air consent. The approach assesses the potential for the proposed blood plant to cause cumulative odour discharges from rendering to objectionable or offensive odour occurring beyond the site boundary.

Given the above, the assessment approach for this proposal has been to review the existing odour control infrastructure and its performance and, assess what practical modifications to the existing OCS could be made to ensure effective containment and treatment of existing and additional odour discharges from the expanded blood plant.

5.2 Existing Odour Control System

The review of odour complaint records (Section 4.3) indicates a reduction in compliant frequency from 2020 onwards. The current level of odour complaint (tracking to be less than 10 per year) is low for this scale of meat processing site and associated rendering and wastewater treatment facilities. However only low levels of ambient odour downwind of the rendering plant were confirmed during 25 and 26 November 2021.

Furthermore, the site investigations undertaken during November 2021 confirmed that odour extraction and cooling systems at the rendering plant were effectively removing high loads of odour from the rendering and drier processes. This is especially evident when measuring airflows into the biofilters downstream of their respective inlet fans.

The existing PSES is working effectively for key concentrated sources of odour, except with respect to the existing blood decanter (to be decommissioned and replaced) and the solids press.

In summary, it is concluded that the existing rendering odour control system (OCS) is operating close to its design specifications and is likely to be avoiding objectionable or offensive odour occurring beyond the site boundary.

5.3 Required Modifications

5.3.1 Increased extraction flows

To avoid an increase in odour discharge due to the proposed blood plant, an additional 2,700 m³/hr of concentrated source and 300 m³/hr of dry exhaust NCGs would need to be extracted, cooled and treated via the existing OCS. These flows are more than adequate to contain odorous process emissions from the proposed blood plant.

5.3.2 Fan and cooling system capacity

The extraction and cooling of the additional concentrated source and dryer NCG flows would be undertaken via the existing biofilter fans and cooling systems at the rendering plant (discussed in Section 3.3.3). We partly rely on Rendertech's expert opinion that these existing systems are able assimilate the increased air flow rate and associated cooling duties, prior to biofiltration. However, the flow increases are only in the order of 10 % - 15 % and existing fans and cooling systems can always be upgraded as necessary, to meet the existing consent requirements for pre-cooling inlet air streams to the biofilters and maintain vacuums on equipment targeted by the PSES.

5.3.3 Increased biofilter capacity

The existing main and dryer NCG biofilters both require moderate increases in bark media volumes to accommodate the 8 % to 15 % respective increase in air flow loading. Sections 3.3.4 and 3.3.5 provide our assessment of additional bark requirements and it is clear these beds can readily accommodate the additional material.

5.4 Conclusion

It is concluded that the rendering plant's OCS can practically extract and treat the incremental concentrated source and dryer NCG flows extracted from the 4.5 T/hr blood processing plant.

With recommended expansion to the site biofilters and installation of extraction ducting (in accordance with good engineering practice) the proposed blood plant can be operated while only causing a very minor increase (if any) to existing odour discharges from the AFFCO Imlay rendering plant.

Increased organic loadings to the site's WTP, as a result of blood plant operation, would not make a material difference to the potential release of odour from this activity.

Given the above, allowing the blood plant proposal to proceed – subject to the existing consent with some varied conditions (Section 6.0) – is likely to achieve a less than minor impact on existing odour discharges and potential odour effects beyond the site boundary.

6.0 CONSENT CONDITIONS

To enable the proposed blood plant and installed odour control system for the external raw material bin, to be authorised via a variation to APP-200501198.0 (Appendix A), there is a number of existing conditions and one definition that would require changes to be made. These proposed changes are highlighted as red italic text where new wording is recommended, and strike outs of wording where this would be replaced.

6.1 Changes to Conditions

Conditions, including associated clauses and sub-clauses which have no required changes are not listed below. Those listed have either main body, clause or sub-clause changes as shown by word strike outs and red italic text.

6.1.1 Specific changes and deletions

Condition 2

The Permit Holder must undertake the activity in general accordance with the Resource Consent Application and AEEs *prepared by Golder dated March 2017 and prepared by WSP XXX 2022*, including all accompanying plans and documents first lodged with the MWRC on 10 March 2017 and subsequent further information supplied on 4 October 2017 by email responding to the further information request dated 12 September 2017 together with any subsequent information or updates presented at the hearing 31 October 2017, *and accompanying documents lodged with MWRC on XXX 2022*.

Where there may be inconsistencies between information provided by the applicant and conditions of the resource consent, the conditions of the resource consent will apply.

Condition 5

The Permit Holder must develop an Odour Management Plan (OMP) to identify all systems and procedures that the Consent Holder has in place to reduce the risk of odours that could result in adverse effects beyond the site boundary. As a minimum, the OMP shall include chapters on the following, which must address but not be limited to the subsequent items:

- a. Odour control system which includes:
 - i. *No change proposed.*
 - ii. *No change proposed.*
 - iii. A list of key compliance limits & guidelines for design and operational parameters associated with the extraction, cooling and biofilter systems including but not limited to the following:
 1. Recommended odour extraction, flows, vacuums as set out in Table 23: Concentrated odour source extraction – Recommended design flows as detailed in the Resource Consent Application and AEE dated ~~10 March 2017~~ **XX 2022**.
 2. *No change proposed.*
 3. *No change proposed.*
 - iv. v. vii. viii. ix. and x. *No changes proposed.*
- b. *No change proposed.*
- c. *No change proposed.*

Condition 18.

The Permit Holder shall operate and maintain a point source emission extraction system to extract all gaseous and vapour emissions from point sources of odour to the odour control system, i.e., condensers, heat exchangers and biofilters as detailed in the Resource Consent Application and AEEs dated 10 March 2017 **and XXX 2022** as follows:

- a. *No change proposed.*
- b. The external raw material bin, its enclosed discharge sump chamber and discharge conveyor shall be connected, and air extracted to **the main 36 m x 36 m soil-bark biofilter** by 30 April 2018 and remain covered at all times apart from when open for deliveries.
- c. *No change proposed.*

Extraction rates from all enclosed point sources shall be sufficient to ensure a vacuum is maintained within the enclosure system, with a minimum vacuum of 100 Pascal gauge **being achieved within the extraction duct which connects to the enclosure system.**

6.1.2 Discussion of changes

Overall, the extent of changes to the existing conditions for accommodating the operation of the proposed blood plant are relatively minor. Only four of the thirty-seven existing conditions in the air discharge consent require some minor text changes. Further comments on these changes for specific conditions involved are provided as follows:

Condition 2

The term AEEs will include the original AEE for all activities which was prepared by Golder (2017) and updated AEE for the blood plant operation prepared by WSP 2022. This change to Condition 2 ensures all relevant historical and most recent information on rendering processes would be captured.

Condition 5 (a) (iii) (1)

This condition is modified so that it refers to an updated table of concentrated odour sources and extraction design flows which would be updated to reference the updated 2022 AEE regarding the blood plant upgrade.

Condition 18

The change to 18(b) allows for the alternative use of the main biofilter at the site for treating odorous air that is extracted from the external raw material bin, instead of this source having a dedicated biofilter.

The final statement in Condition 18 requires enclosed point sources to be maintained at 100 Pascal gauge pressure. This is considered an error that was previously identified. The expert air quality evidence at the 2017 consent hearing recommended this vacuum to apply to the ducting which connects to the enclosed point source. However, having a high level of vacuum within the enclosed point source (e.g., within the enclosed head space of a pre-cooker) risks the removal of excessive quantity of steam and fatty/volatile materials into the OCS, which could be expected to cause rapid blockage of the system as well as excessive energy usage at the site.

Reference to the 2022 AEE regarding the blood plant upgrade is also made.

7.0 CONCLUSION

It is concluded that the proposal would result in a moderate increase (in the order of 10 -15 %) of odorous air streams that require capture and treatment. Further, this outcome would be practical to achieve and ensure a less than minor change to the existing levels of odour effect beyond the site boundary. It is also concluded that the existing OCS is being operated as required by the existing air discharge consent and achieving an acceptable level of odour effects – i.e., no objectionable or offensive odour effects.

Given the above, and the recommended changes to the existing OCS being implemented, the cumulative odour effects from the site's rendering plant are not likely to be objectionable or offensive.

8.0 LIMITATIONS

Your attention is drawn to the document, "Report Limitations", as attached in Appendix C. The statements presented in that document are intended to advise you of what your realistic expectations of this report should be, and to present you with recommendations on how to minimise the risks to which this report relates which are associated with this project. The document is not intended to exclude or otherwise limit the obligations necessarily imposed by law on WSP New Zealand Limited, but rather to ensure that all parties who may rely on this report are aware of the responsibilities each assumes in so doing.

9.0 REFERENCES

Golder 2017. *Resource Consent Application and Assessment of Effects on The Environment - Air Discharge AFFCO, Whanganui*. Report No. 1667577_7403-001-R-Rev1, March 2017.

Signature Page

WSP New Zealand Limited



Roger Cudmore
Technical Director Environment



Neil Gimson
Principal Air Quality Scientist

RC/NG/mt

APPENDIX A

Application Decision 2017

ATH-2007010926.01 - Discharge Permit to discharge odour to air: The discharge of odour to air associated with activities occurring at the AFFCO site, Imlay Place – Whanganui.

ATH-2017201595.00 - Discharge Permit to discharge contaminants to air: The discharge of contaminants to air associated with the operation of gas fired boilers located at the AFFCO site, Imlay Place – Whanganui.

Site: The term 'site' refers to the AFFCO - Imlay plant on land legally described as Lot 1 DP 500721 at approximate map reference NZTopo50: BL32:729-757 and as shown on Map LOC - 0000063717 (attached to these Conditions)

CLG – Community Liaison Group

EMP – Environmental Management Plan

OMP – Odour Management Plan

MWRC – Manawatu-Wanganui Regional Council

AEE – Assessment of Environmental Effects prepared by Golders dated March 2017

LTRP – Low Temperature Rendering Plant

SCADA – Supervisory control and data acquisition

Advice Notes relating to all conditions of this consent:

ADVICE NOTE: Any reports required by this permit can be sent to the MWRC via email compliance.shared@horizons.govt.nz –OR- by mail, addressed to: C/- The Regulatory Manager, MWRC, Private Bag 11025, Manawatu Mail Centre, Palmerston North 4442.

ADVICE NOTE: The Consents Monitoring Team can be contacted 24 hours 7 days a week by free phone 0508 800 800.

ADVICE NOTE: For the purpose of this consent the definition of 'working day' is the same as recorded in section 2 of the Resource Management Act 1991.

ADVICE NOTE: Where written feedback is required it can either be provided in the form of an email or a written letter.

ADVICE NOTE: Any variance from the location, design concepts and parameters, implementation and / or operation may require a new resource consent or a change of consent conditions pursuant to section 127 of the Resource Management Act 1991.

1. The activities authorised by this Air Discharge Permit shall be restricted to the discharge of contaminants to air, including odour, from the site. The discharges to air covered by this Air Discharge Permit are those associated with the following processes:
 - a. Animal slaughter;
 - b. By-product rendering;
 - c. Truck washing;
 - d. The primary wastewater treatment plant;
 - e. The holding of livestock in yards;
 - f. Other emission producing activities such as ventilation; and
 - g. The combustion of natural gas by three module steam boilers with a combined net heat output of 10.5 mw producing carbon monoxide, oxides of nitrogen and trace levels of particulate matter

2. The Permit Holder must undertake the activity in general accordance with the Resource Consent Application and AEE, including all accompanying plans and documents first lodged with the MWRC on **10 March 2017** and subsequent further information supplied **on 4 October 2017** by Email responding to the further information request dated **12 September 2017** together with any subsequent information or updates presented at the hearing **31 October 2017**.

Where there may be inconsistencies between information provided by the applicant and conditions of the resource consent, the conditions of the resource consent will apply.

3. The Permit Holder must undertake and complete the schedule of works as detailed in the titled **AFFCO Imlay Mitigation Table** provided to MWRC on the 16 November 2017 and attached to these conditions as **Schedule 1**. A written update on the progress of these works shall be provided to MWRC within six months of the commencement of this consent and thereafter an update to the schedule shall be included in the Annual Report required under **Condition 35**.

In the updates the Permit Holder shall:

- a. Indicate which works have been completed;
- b. Indicate why particular works have not been completed in the stated time periods;
- c. Provide new timeframes for implementation of works.

ADVICE NOTE: Unnecessary, avoidable or protracted delays in the implementation of any of the works may be considered a trigger for the initiation of enforcement action.

4. The Permit Holder must develop an Environmental Management Plan (**EMP**) that sets out a framework for the plans and processes for ensuring compliance with conditions of this permit, particularly **Condition 6**, regarding odour.

The EMP must include:

- a. Specific information, procedures and practices relating to the overall operation of the site;
 - b. Methods to facilitate achieving compliance with the conditions of this permit;
 - c. Methods to minimise the potential for offsite odour effects; and
 - d. Procedures to deal with complaints to ensure compliance with conditions 24-27.
5. The Permit Holder must develop an Odour Management Plan (OMP) to identify all systems and procedures that the Consent Holder has in place to reduce the risk of odours that could result in adverse effects beyond the site boundary. As a minimum, the OMP shall include chapters on the following, which must address but not be limited to the subsequent items:
 - a. Odour control system which includes:
 - i. A summary of all on-site odour sources.
 - ii. Details of the odour extraction, cooling and biofilter systems that target the main odour sources including their layout, their key design and operation parameters.
 - iii. A list of key compliance limits & guidelines for design and operational parameters associated with the extraction, cooling and biofilter systems including but not limited to the following:
 1. Recommended odour extraction, flows, vacuums as set out in Table 3: Concentrated odour source extraction – Recommended design flows as detailed in the Resource Consent Application and AEE dated 10 March 2017.
 2. The normal operating ranges for the Waste Heat Evaporator vacuum pump draught (kPa), stickwater level within the evaporator (% of maximum), final stickwater concentration (% of solids); non-condensable gas temperature; and waste heat evaporator vapour temperature.
 3. Airflow rate, temperature and pressures of airstreams within the inlet ducts to site biofilters.

- iv. Specific monitoring methods, work procedures/practices and maintenance that aim to ensure effective operation of the odour extraction, cooling and biofilter systems including but not limited to:
 - 1. Visual monitoring for fugitive odours (steam) associated with the rendering building in accordance with **Condition 20**
 - 2. Annual monitoring of biofilter flow rates and vacuums at extraction points in accordance with **Conditions 17** and **31** respectively.
- v. Specific procedures and frequencies for the collation, archiving and reporting of odour control system monitoring data (continuous and manually recorded) including but not limited to inlet air to biofilters, condensate temperature, biofilter temperature, bed back-pressure, pH and moisture content to ensure the system meets the standards set in **Conditions 15, 16 and 20**.
- vi. Procedures for responding to and recording odour complaints, reporting maintenance of associated complaint records and reporting information back to MWRC on complaints, investigations, actions and any relevant developments at the site that can impact on odour emissions, as required by **Conditions 26, 27** and **28**
- vii. A log recording any maintenance undertaken, any periods of malfunction, the reasons for malfunction and the remedial action taken to ensure the malfunction does not reoccur. The log must also note any notifications made to the Regulatory Manager of the MWRC under **Condition 21**. The log shall be made available to the Consents Monitoring staff of the MWRC on request and as part of the Annual reporting requirements in **Condition 35**. The log shall be maintained for the term of these Air Discharge Permits.
- viii. Procedures for annual review of the odour control systems and the OMP itself including updates to the OMP recommended from the review or as a result of process changes at the site.
- ix. A procedure to ensure the stockyards are cleaned, at a minimum, daily on those days on which animals are held for processing, and recorded in order to meet **Condition 12**.
- x. Details of the methods to be used for ambient odour monitoring as per **Condition 29**.

- b. Odour contingency measures which identify:
 - i. How to deal with raw material received by the LTRP which does not meet the requirements of **Condition 13**.
 - ii. How to deal with any mechanical breakdowns including the removal of all material trapped within the LTRP when breakdowns are longer than eight hours.
 - iii. The process for notifying the MWRC Consents Monitoring Team in order to meet **Condition 21**.
 - iv. Any other measures that will minimise adverse effects on the environment likely as a result of incidents that may breach this consent
- c. Rendering procedures which include:
 - i. Specific management controls on raw material quality and raw material preservation, including (but not limited to) a procedure for recording raw material quality and compliance with the requirements of **Condition 13**.
 - ii. Implementing the odour contingency procedures within the OMP in instances where the material is not of acceptable quality.
 - iii. A process to ensure compliance with **Condition 12** regarding the cleaning of rendering facilities including a daily log confirming cleaning has taken place.
 - iv. A monitoring programme of key process criteria, including provision for a daily log to record the matters set out in **Conditions 16 and 19**.
 - v. Provision to record the process operating temperatures for the rendering and drying equipment as per **Condition 20**.

The EMP and the OMP shall be provided to the Regulatory Manager of the MWRC by **1 February 2018** for technical certification and thereafter within **five (5) working days** of any content within the EMP changing.

The Permit Holder must comply with the certified EMP and OMP at all times.

- 6. The Permit Holder shall ensure there is no discharge to air of odour, or particulate matter (including meal dust from any vent) that is objectionable to the extent that it causes an adverse effect at or beyond the boundary of the AFFCO Imlay site.

ADVICE NOTE: When assessing compliance with this condition, an MWRC officer will consider the Frequency, Intensity, Duration, Offensiveness and Location of the odour (i.e. the FIDOL factors) in determining the adverse effect of objectionable odours.

7. The Permit Holder shall engage an independent person who shall be available, as far as practicable, within 30 minutes of receiving notification from either the Permit Holder or MWRC, to investigate odour complaints, and within 24 hours, to provide a written report to the Permit Holder and MWRC on whether the complaint is a confirmed odour complaint and whether that odour was considered to have an offensive or objectionable effect beyond the site boundary by the independent person. The Permit Holder shall be responsible for paying all costs associated with the independent person's investigation and report.

The Permit Holder shall ensure that the independent person meets the AS/NZS 4323.3:2001, and its successors, requirement for an odour panelist and provide evidence of this to MWRC.

ADVICE NOTE: When assessing compliance with this condition, the independent person will consider the Frequency, Intensity, Duration, Offensiveness and Location of the odour (i.e. the FIDOL factors) in determining the adverse effect of objectionable odours.

8. If MWRC confirms that validated offensive or objectionable odours have occurred, then the Permit Holder must as soon as practicable investigate the potential source and provide a report to MWRC (within 24 hours of its investigation) of what caused the odour and what remedial action has been undertaken to stop the odour and prevent it from reoccurring. Where a permanent remedial action cannot be implemented immediately, the report shall provide a timeframe for implementation, and detail what measures will be implemented in the interim to minimise the potential for offensive or objectionable odours to occur.

This action will be added to the schedule of works required by **Condition 3** and any updated schedule provided in the annual reporting.

9. If validated offensive or objectionable odour effects attributed to any part of the LTRP operation persist continuously or are present intermittently for more than twenty four (24) hours, then MWRC may issue a written notice to the Permit Holder requiring the LTRP to cease operating. The LTRP plant shall not resume operating until MWRC is satisfied that appropriate mitigation measures have been implemented to ensure that off-site offensive or objectionable odours will not occur if the plant resumes operating, and MWRC advises the consent holder in writing of that.

10. If directed in writing by MWRC following one or more validated offensive or objectionable odour complaints, the Permit Holder must commission a report by an appropriately qualified independent person, to review the efficacy of odour management at the Site, including but not limited to:
 - a. The point source extraction;
 - b. The biofilter system;
 - c. The need to fully enclose the raw materials receipt area;
 - d. The need to operate the ltrp building under negative pressure;
 - e. The need to place covers on the slaughterhouse offal bins; and
 - f. The need to have a cover on the skip collecting solids removed by the kontrashear.

The Permit Holder must provide that report to MWRC within twenty (20) working days of receipt of the written direction from MWRC.

The Permit Holder must implement any recommendations contained within the report as soon as practicable but no later than three months after receiving the report.

In the event that it is not practicable to implement a particular recommendation within three months, the Permit Holder may seek an extension from MWRC to the three month timeframe for that particular recommendation. These recommended actions will be added to the schedule of works required by **Condition 3** and any updated schedule provided in the annual reporting.

11. The Permit Holder shall ensure that the stockyards are thoroughly cleaned of animal waste as follows:
 - a. As a minimum at the end of each day that the stockyards have been used; and
 - b. Whenever the stockyards have been used and there is more than an hour until they are used again.
12. All equipment processing areas used for the receipt and processing of animal matter in the rendering operations shall be cleaned thoroughly (by way of water blasting or pressure hose) as follows:
 - a. At least one occasion every day on which processing occurs; and
 - b. At the cessation of the daily processing operation.

These areas shall be kept free of accumulated or deposited material.

13. All raw material to be processed on site must meet the following criteria:
- a. All soft offal shall be processed within six hours of kill, unless it has been stabilised by one of the following methods:
 - i. Stored material is cooled to a temperature of 20 degrees celsius or lower as soon as practicable but no later than six hours after the kill of the animal from which it is derived; or
 - ii. Stored material is treated with acid to ensure a ph of 4.5 or less; or
 - iii. any equivalent stabilisation method to (a) and (b) above which has been given technical approval by the Regulatory Manager of MWRC in which case stabilised soft offal shall be processed within **twenty-four (24) hours** of receipt; and
 - b. hard offal shall be processed within **forty-eight (48) hours** of receipt.
 - c. Where hard and soft offal have been mixed the material must be processed with 24 hours of receipt.

If raw material does not meet the above requirements, it must not be processed on site and contingency measures set out in the EMP must be implemented by the Permit Holder to dispose of this material in an approved off-site facility.

14. The Permit Holder shall ensure that the pre-cooled inlet air to all biofilters (except for the external raw material bin biofilter) shall be maintained at a temperature not exceeding 35 degrees Celsius (35°C) for 95% of the time as recorded via Supervisory control and data acquisition (SCADA), with a maximum temperature not exceeding 40°C. Furthermore, all condensate from the condensers shall be discharged via a covered drain and maintained at a temperature not exceeding 40 degrees Celsius (40°C). Measurements shall be kept in accordance with **Condition 30**.

15. The biofilters shall be maintained to the following standards:
- a. Media moisture content shall be maintained at 50 to 65% dry weight basis throughout its depth;
 - b. The ph shall be greater than or equal to 5 in the top 2/3rd layer of the biofilter media;
 - c. The static pressure (back pressure) of the biofilters determined in the inlet duct, shall not, under normal moisture conditions, exceed 150 mm/wg;
 - d. A maximum biofilter loading rate of 35 cubic metres of gas per hour per cubic meter of bed media;
 - e. A minimum bed depth of 0.7m and 0.6m for the main and dryer biofilters respectively;
 - f. A maximum back-pressure across the bed media of 50mm water gauge pressure; and
 - g. The biofilters must remain weed free.
16. The Permit Holder shall undertake monitoring and inspection for all biofilters as follows:
- a. The back-pressure within the inlet duct to each bio-filter shall be continuously recorded;
 - b. Daily manual back-pressure checks, visual inspection for moisture content, leakage and odour discharge;
 - c. Moisture content and ph shall be monitored and recorded at least once a month from the commencement of this consent;
 - d. Monthly inspection and recording of biofilter condition i.e. Weeds, compaction, pugging or fissures, commencing from the date of commencement of this permit; and
 - e. Annual measurements of the biofilter inlet flows combined with vacuum monitoring results for duct connections to equipment.

All findings shall be recorded and detailed in a log.

17. The biofilter operation and maintenance logs shall be made available to the Regulatory Manager of MWRC or MWRC officers on request at any time. The operation and maintenance logs must also be supplied as part of the annual report required by **Condition 35**.

18. The Permit Holder shall operate and maintain a point source emission extraction system to extract all gaseous and vapour emissions from point sources of odour to the odour control system i.e. condensers, heat exchangers and biofilters as detailed in the Resource Consent Application and AEE dated 10 March 2017 as follows:
- a. On the wet-side of the rendering process, sources shall include the internal raw bin, pre-cooker, transfer conveyors, decanters, decanter tank, separator tank, wastewater drains and separators.
 - b. The external raw material bin, its enclosed discharge sump chamber and discharge conveyor shall be connected and air extracted to a small biofilter by **30 April 2018** and remain covered at all times apart from when open for deliveries.
 - c. On the dry side of the LTRP the sources shall include the meal dryer exhausts, meal storage bins and the filtered building ventilation air.

Extraction rates from all enclosed point sources shall be sufficient to ensure a vacuum is maintained within the enclosure system, with a minimum vacuum of 100 Pascal gauge.

19. The Permit Holder must:
- a. visually check for any leaks of steamy odorous vapours from all enclosed process equipment and conveyors in rendering on a daily basis on days when the plant operates; and
 - b. Advise the MWRC Consents Monitoring Team of any maintenance work which may result in odour release to the atmosphere at least **twelve (12) hours prior** to the works commencing; and
 - c. Keep a log of the above checks details in (a) and (b).

Any remedial actions are to be undertaken in accordance with the procedures set out in the OMP required by **Condition 5**. Results of these checks and remedial actions shall be logged daily. Logs shall be made available to the Regulatory Manager of MWRC or MWRC officers on request at any time. The log must also be supplied as part of the annual report required by **Condition 35**.

20. The process operating temperatures for the rendering and drying equipment shall meet the following standards:
- a. The rendering vessels shall be operated at the lowest temperature practicable, and in any event shall not be operated above 100°C; and
 - b. The meat and bone meal dryers shall be operated at the lowest temperature practicable, which is consistent with MAF (or any future replacement regulatory body with relevant functions) sterilisation requirements, and to prevent burning of meal.

The temperature of the rendering vessels and dryers shall be continuously monitored and recorded. These records shall show the correct time and date. The records shall be made available to the Regulatory Manager of MWRC or of MWRC officers on request at any time. The records must also be supplied as part of the annual report required by **Condition 35**.

21. In the event of any incident at the Site or complaint received by the Permit Holder that has or could have resulted in a condition or conditions of this consent being breached, the Permit Holder shall:
- a. Notify the Regulatory Manager or consent monitoring staff at MWRC **within two (2) hours** of the Permit Holder becoming aware of the incident mechanical breakdown or complaint and advise what action is being taken to respond to the situation; and
 - b. Forward a report to the Regulatory Manager of MWRC. The report must detail the cause, if known, of the mechanical breakdown or complaint and what actions the Permit Holder has undertaken in response. The report must be received within **five (5) Working Days** of MWRC being notified under (a).
22. The Permit Holder shall provide co-ordination and administrative support for the Community Liaison Group (CLG) including a dedicated contact point at the site, provision of a meeting point and overseeing any administration associated with the group. The general purpose of the CLG shall be for the Consent Holder to inform the CLG of:
- a. The odour generating activities being undertaken within the Imlay site;
 - b. The current odour management processes and procedures being used for those activities; and
 - c. Any proposed alterations to those activities, processes or procedures.

23. The Permit Holder shall invite all persons who submitted on the notified air discharge applications in 2017, an iwi representative from each of Tupoho, Ngā Tāngata Tiaki o Whanganui and Tama Ūpoko, and one representative from each of MWRC and Whanganui District Council to join the CLG. The CLG must also be open to any other person who wishes to join.

The information provided to the CLG shall include a copy of the Complaints Register for the period since the last meeting.

Meetings of the CLG shall be held **annually in March** and upon receiving a written request for a meeting from the MWRC or by request of a CLG member. A CLG meeting shall be convened by the consent holder within **four (4) weeks** of any such request being received from the MWRC or CLG member.

24. The permit holder must provide a 24 hour contact name and number for receipt of complaints. This contact must be provided to:
- a. All members of the CLG; and
 - b. Published in the White Pages of the Whanganui Telephone Book; and
 - c. Published in newspapers circulating in Whanganui every three months following the commencement of this Air Discharge Permit; and
 - d. Must be clearly posted at the site entrance which faces a publicly accessible road together with details of the Permit Holder's website established pursuant to **Condition 25**.

The telephone number shall be attended on a 24 hour basis by a person when the site is operating and additionally a suitably qualified and experienced person shall be available to respond to and investigate all complaints received on a 24 hour basis.

25. The Permit Holder, shall establish and make available a webpage, be it on its own website or externally hosted, which provides the following information:
- a. A 24 hour contact name and phone number for receipt of complaints;
 - b. An email address for lodging complaints with the permit holder;
 - c. A copy of this consent and approved management plans and links to any external documents or references in these consents (except where restricted by copyright);
 - d. A copy of any consents related to other operational activities on the site;
 - e. A copy of the latest annual report required by this permit; and
 - f. A copy of a plan showing the location of all consented operational activities on the site.

26. The Permit Holder shall maintain a Complaints Register for any complaints received including any complaints either received or directly referred to the Permit Holder by Whanganui District Council or MWRC. For each complaint received the Consent Holder shall record:
- a. The name and address of the complainant (if given);
 - b. The location where the complaint occurred;
 - c. The date and time that the odour was encountered or if that information is not given, the date and time that the complaint was received;
 - d. The wind speed and direction at the affco lmlay site when the odour was encountered; and
 - e. A description (if given) of any odour character, strength and persistence; and copies of any feedback given as per **Condition 27**.
27. For each complaint received the Permit Holder shall:
- a. Investigate the odour complaint as quickly as possible and no later than 30 minutes of receiving the complaint;
 - b. If the source of the odour is identified as being within the site undertake remediation or mitigation measures designed to stop the odour, and prevent or minimise the risk of the odour reoccurring as soon as practicable;
 - c. Provide an initial response to the complainant within 24 hours of any complaint being received.
 - d. Provide written feedback, within five working days of receiving a complaint, to the complainant regarding whether or not the source of the odour was identified and what actions were undertaken by the permit holder in order to ensure the incident does not reoccur. Copies of the written feedback provided to the complainant shall be included in the complaints register. Copies of the complaint record and response shall be provided to the regulatory manager of mwrc within **five (5) working days** of the complaint being received.

ADVICE NOTE: For the purposes of this condition the person investigating the complaint shall be the independent person identified in **Condition 7** except where that person is not available in which case it shall be investigated by an employee of AFFCO who does not normally work in operational areas of the lmlay plant, and who has been assessed as having a normal sense of smell.

28. A copy of the Complaints Register shall be provided to MWRC upon request. The Complaints Register for the year ending 30 April shall be provided to the Regulatory Manager of MWRC as part of the annual reporting required by **Condition 35**.

29. The Permit Holder shall carry out monthly odour surveys around the boundary of the site, and shall record whether any odour attributable to AFFCO is discernible or not at each location. Monitoring shall occur when the rendering plant is fully operational. These boundary surveys shall be undertaken by the independent person identified in **Condition 7**. The methods and reporting shall be set out in the environmental management plan required by **Condition 4** that is certified by MWRC.

The outcome of each monthly odour survey shall be recorded. The Permit Holder shall investigate the cause of any significant odour (intensity greater than two on the VDI 3940 intensity scale) detected during each survey, and implement any necessary remedial action within 48 hours of its detection.

A record of each monthly odour survey and any remediation carried out shall be reported in the annual report required by **Condition 35**.

30. The Permit Holder shall measure and record temperatures as specified in **Condition 15** including from the condensers associated with odour control systems and log via the rendering plant SCADA system. Electronic records of temperature versus time and data shall be made available to the Regulatory Manager of MWRC or MWRC Officers on request.
31. The Permit Holder shall, annually **prior to 30 March**, undertake an annual audit of the rendering plant's odour control systems that considers the effectiveness of the extraction, cooling and biofilter system and its overall performance in regards to controlling odour emissions. The audit should utilise all monitoring data (manual and continuous, complaint records, any independent odour assessments) as well as include downwind odour assessments of the operational rendering plant and ancillary activities. The audit should assess the state of the odour extraction, cooling and biofilter system and taken appropriate measurements and sample for analysis required to confirm the status these systems against their design and required operating parameters. Any analysis of samples shall be undertaken by an appropriately qualified testing laboratory and sampling undertaken as specified in the OMP. Accepted methods shall be used for measurement of media properties that are certified by the Regulatory Manager of MWRC.

The audit shall be undertaken by person(s) who is independent, appropriately qualified and experienced in the operation and maintenance of air extraction, cooling and biofilter systems.

The results of the assessment, including a summary of the findings, details of any action(s) to be taken to improve the efficiency of the overall odour control system, and a timetable for those actions to be undertaken; must be submitted to the Regulatory Manager of MWRC as part of the annual report in **Condition 35**. Any remedial actions must be implemented in a timeframe of 6 weeks or less, where practicable, and the Permit Holder must demonstrate the works have been completed within these timeframe in the annual report.

In the event that it is not practicable to implement a particular recommendation within 6 weeks, the Permit Holder may seek an extension from MWRC to the 6 week timeframe for that particular recommendation.

32. The Permit Holder shall, annually **prior to 30 March**, measure and record the vacuum (pressure) at all enclosed equipment items that are extracted by the odour control systems as follows:
- a. Pressure shall be measured in the head space of the equipment items that are targeted by the extraction systems. The measurements shall be undertaken by an independent appropriately qualified and experienced person following industry best practice for measurements of this type.
 - b. The Permit Holder shall prepare a report on the findings and critically analyse the results (including a comparison with historical data) and if required, make recommendations as to the adequacy of the extraction rates, whether pressures are sufficiently negative and whether additional sealing/enclosing of any rendering plant process area is needed to ensure adequate extraction and compliance with conditions of this consent.

This report must be submitted Regulatory Manager of MWRC as part of the annual reporting required by **Condition 35**.

33. The gas combustion units on the boiler shall be tuned and tested, **prior to 30 April annually**, to maintain efficient combustion of fuel. A report summarising boiler test results shall be supplied to the Regulatory Manager of MWRC as part of the annual report in **Condition 35**.
34. The Permit Holder shall monitor the quality of raw material that is processed in the rendering plant to ensure compliance with **Condition 13**. The following parameters for all raw materials received at the rendering plant shall be logged.
- a. Type, quantity and source of raw materials received in each load;
 - b. Temperature, ph, visual appearance and odour of soft offal held in receiving bins;
 - c. Approximate age of raw materials upon receipt and the expected time before processing;
 - d. Details of any stabilisation, where required; and
 - e. Acceptance or rejection of material and if rejected where and when its disposal occurs.

The log shall be made available to the Regulatory Manager of MWRC or MWRC officers on request at any time. The log must also be supplied as part of the annual report required by **Condition 35**.

35. The Permit Holder shall prepare an Annual Report summarising performance in relation to the discharges allowed under this resource consent. The Annual Report shall be provided to the Regulatory Manager of MWRC by **1 June** each year from the commencement of this consent. The report shall cover the period **1 May – 30 April**. The purpose of this report is to provide an overview of the monitoring and all reporting work undertaken, compliance performance, and any environmental issues that have arisen from air discharges authorised by this consent.

The Annual Report shall include but not be limited to:

- a. An update of any actions undertaken in accordance with **Condition 3**;
- b. A summary of all biofilter performance, maintenance and monitoring as collated in the log required by **Condition 16** and the annual assessment required by **Condition 31**;
- c. A copy of the log required by **Condition 19** regarding daily site checks;
- d. A copy of the process operating temperatures for the rendering and drying equipment log as required in **Condition 20**;
- e. A summary of any notifications made to MWRC in accordance with **Condition 28**;
- f. A copy of any notes recorded during the annual meeting of the CLG under **Condition 22**;
- g. A summary of monthly odour surveys received and the outcome of any investigations and responses required by **Condition 29**;
- h. Reporting undertaken as part of **Condition 32** regarding the vacuum (pressure) at all enclosed equipment items;
- i. Records all instrument calibrations carried out on the rendering plant cooling and odour control equipment;
- j. Any other relevant information; and
- k. From **1 June 2019** onwards, a summary of the breaches identified in the previous year's annual report along with evidence of undertaking the remedial work proposed within the timeline stated.

The Permit Holder shall finalise the report with a summary of breaches and a clear timeline in how these will be addressed. All timelines should be a term of 9 months or less in order, where practicable, for the remedies to be addressed in the following years annual report (as per (k) above).

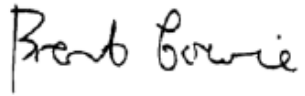
In the event that it is not practicable to implement a particular recommendation within 9 months, the Permit Holder may seek an extension from the MWRC to the 9 month timeframe for that particular recommendation

36. The MWRC, under section 128 of the Act, may initiate a review of all conditions of these Air Discharge Permits Annually in the month of July for the term of these Air Discharge Permits.


- a. The review shall be for the purpose of:
 - i. Reviewing the effectiveness of these conditions in avoiding or mitigating any adverse effects on the environment;
 - ii. Reviewing the adequacy of the monitoring and reporting required by these air discharge permits;
 - iii. Reviewing the frequency of the clg meetings;
 - iv. Reviewing the findings of audit reports required under **Condition 31**;
 - v. To review the effectiveness of the conditions of resource consents relating to odour control, in the event of validated offensive or objectionable odour;
 - i. Reviewing the effectiveness of odour extraction, cooling and biofilter treatment systems at controlling odour discharges to levels that cause less than minor effects beyond the site boundary;
 - vi. Reviewing the requirement to operate the rendering plant building under negative pressure by extracting the process air within that building and treating it in a biofilter;
- b. The review of conditions shall allow for:
 - i. The deletion or amendment to any conditions of these Air Discharge Permits; and
 - ii. The addition of new conditions as necessary to avoid, remedy or mitigate any adverse effects on the environment; and
 - iii. The implementing of any recommendations of the annual report required under **Condition 35**.
 - iv. If necessary and appropriate, the adoption of best practicable options to avoid, remedy or mitigate any adverse effects on the environment.

In the case of repeated non-compliances or breaches of consent limits, to review the conditions, with the aim of introducing new or revised conditions that will effectively and efficiently seek to manage environmental effects.

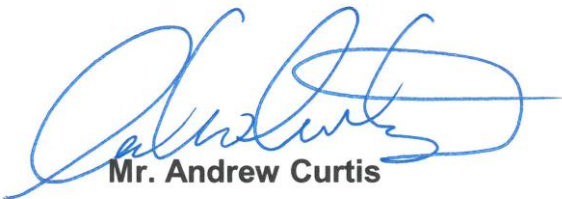
37. The resource consent will expire on **1 July 2025**.

A handwritten signature in black ink that reads "Brent Bowie".

Dr. Brent Cowie
Chair

A handwritten signature in blue ink that reads "Rachel Keedwell".

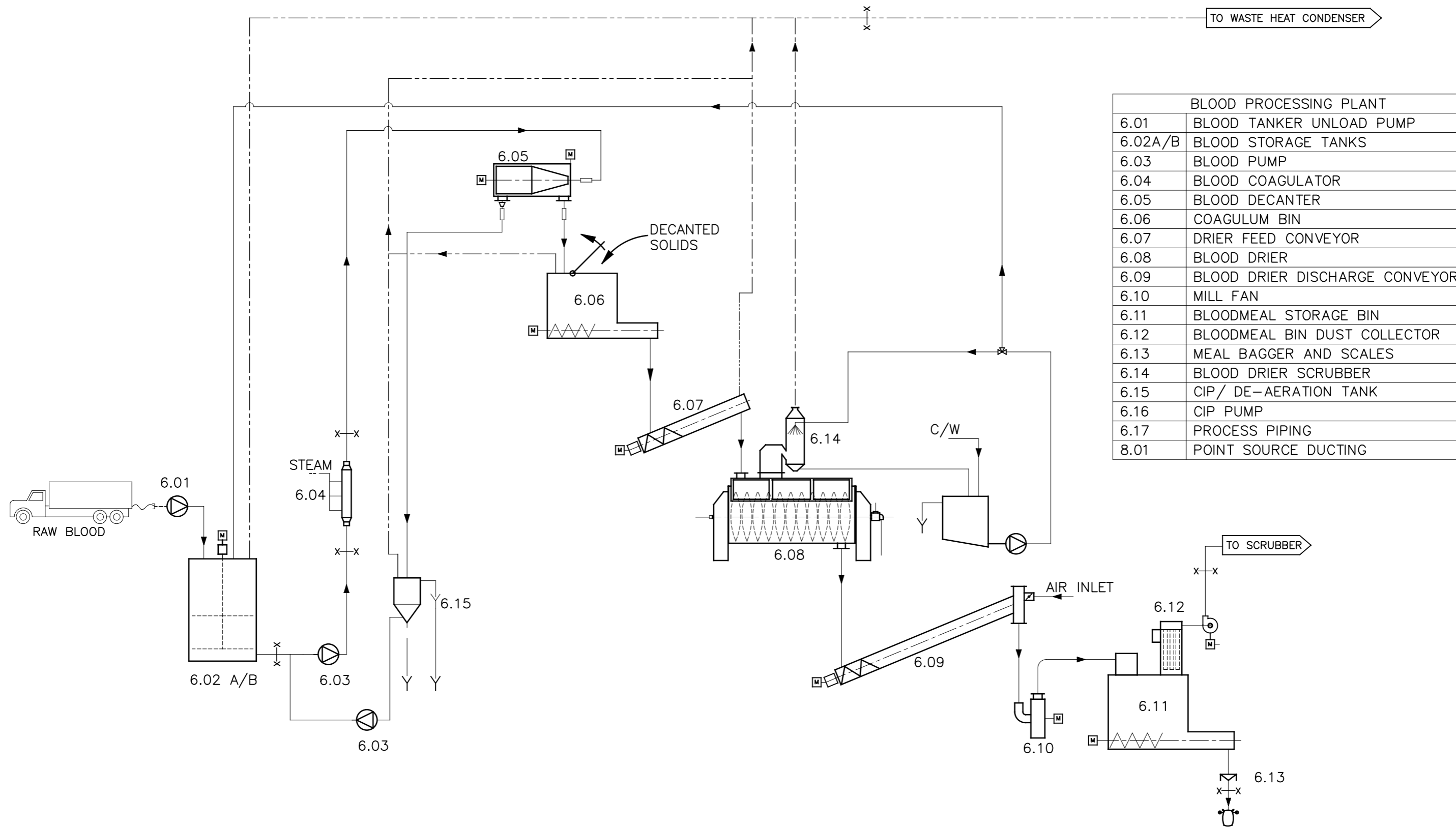
Cr. Rachel Keedwell
Hearing Commissioner

A handwritten signature in blue ink that reads "Andrew Curtis".

Mr. Andrew Curtis
Hearing Commissioner

APPENDIX B

Blood Plant Process Diagram



BLOOD PROCESSING PLANT	
6.01	BLOOD TANKER UNLOAD PUMP
6.02A/B	BLOOD STORAGE TANKS
6.03	BLOOD PUMP
6.04	BLOOD COAGULATOR
6.05	BLOOD DECANTER
6.06	COAGULUM BIN
6.07	DRIER FEED CONVEYOR
6.08	BLOOD DRIER
6.09	BLOOD DRIER DISCHARGE CONVEYOR
6.10	MILL FAN
6.11	BLOODMEAL STORAGE BIN
6.12	BLOODMEAL BIN DUST COLLECTOR
6.13	MEAL BAGGER AND SCALES
6.14	BLOOD DRIER SCRUBBER
6.15	CIP/ DE-AERATION TANK
6.16	CIP PUMP
6.17	PROCESS PIPING
8.01	POINT SOURCE DUCTING

LEDGEND	
RENDETECH	
X-----X	
CLIENT CARE	

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REV	DATE	AMENDMENT	CHKD	APP'D	REV	DATE	AMENDMENT	CHKD	APP'D	REV	DATE	AMENDMENT	CHKD	APP'D	REV	DATE	AMENDMENT	CHKD	APP'D	DRAWN	MC	DATE	SCALE	SIZE
D					H					M														
C	8/7/21	CIP PUMPED ADDED			G					L												26/01/21	NTS	A1
B	19/02/21	DESIGN CHANGES			F					K														
A	26/01/21	ORIGINAL ISSUE			E					J														

AFFCO IMLAY
 PROPOSED BLOODMEAL PLANT
 PROCESS SCHEMATIC
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APPENDIX C

Report Limitations

This report (**'Report'**) has been prepared by WSP New Zealand Limited exclusively for AFFCO New Zealand Limited (**'Client'**) in relation to Odour Impact Assessment - Blood Processing Plant (**'Purpose'**). The findings in this Report are based on and are subject to the assumptions specified in the Report. WSP accepts no liability whatsoever for any reliance on or use of this Report, in whole or in part, for any use or purpose other than the Purpose or any use or reliance on the Report by any third party.

In preparing the Report, WSP has relied upon data, surveys, analyses, designs, plans and other information (**'Client Data'**) provided by or on behalf of the Client. Except as otherwise stated in the Report, WSP has not verified the accuracy or completeness of the Client Data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in this Report are based in whole or part on the Client Data, those conclusions are contingent upon the accuracy and completeness of the Client Data. WSP will not be liable in relation to incorrect conclusions or findings in the Report should any Client Data be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to WSP.

The following Clarification of the Golder company status is provided:

In April 2021 Golder Associates Inc. and its subsidiaries and affiliated companies, including Golder Associates (NZ) Limited and Golder Construction (NZ) Limited (**'the Company'**) was acquired by Canadian listed company, WSP Global Inc. As part of that acquisition, in January 2022 the Company amalgamated with WSP New Zealand Limited (ultimately owned by WSP Global Inc.) under Part XIII of the Companies Act 1993. On 1 January 2022 the Company changed its legal name to "WSP New Zealand Limited".

wsp **GOLDER**

golder.com