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Appendix A NOTICE TO CARRY OUT ENVIRONMENT AUDIT



16 Dec 2015

NOTICE TO CARRY OUT ENVIRONMENTAL AUDIT PROGRAM

Issued pursuant to section 48 of the *Waste Management and Pollution Control Act*

Issued to:

Northern Australia Beef Limited
ACN 150 153 192
'Tower A' Level 1
76 Skyring Terrace
NEWSTEAD QLD 4006

Relating to the premises at:

The Northern Australia Beef Limited Livingstone beef processing facility located at Lot 4, Hundred of Cavanagh and Section 5410 Hundred of Strangways otherwise known as 270 Blyth Road and 2660 Stuart Highway Livingstone Northern Territory 0822.

TAKE NOTICE THAT I, William John Freeland, Chairperson and authorised delegate of the Northern Territory Environment Protection Authority (NT EPA) for the purposes of section 48 of the *Waste Management and Pollution Control Act* (the Act), have reason to believe that:

1. Northern Australia Beef Limited (NABL) is the licensee for the Livingstone beef processing facility (EPL131) located at Lot 4, Hundred of Cavanagh and Section 5410 Hundred of Strangways otherwise known as 270 Blyth Road and 2660 Stuart Highway in the Northern Territory (the premises);
2. The NT EPA has received numerous pollution reports of off-site environmental impacts related to odours emanating from the premises from:
 - (a) members of the public on the Stuart Highway; and
 - (b) residential properties to the North West, East, South and South West of the premises;
3. Authorised officers of the NT EPA have attended the premises and surrounding areas during June and July 2015 and:
 - (a) detected an offensive odour on the evening of 17 June 2015, from the Stuart Highway to the East of the premises;
 - (b) detected offensive odour from within the car park of the premises on the evening of 17 June 2015; and
 - (c) detected offensive odour from within the residential properties of several neighbouring residents on the evening of 30 June 2015;
4. NABL have provided complaint logs to the NT EPA demonstrating NABL has received frequent odour pollution complaint reports from affected residents since 7 January 2015;
5. The NTEPA received a total of 44 pollution complaints of offensive odour in the Livingstone area between 23 February 2015 and 17 August 2015 (in addition to the complaints received by NABL, Attachment 1);

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6. The NTEPA is satisfied that the premises are the likely cause of these pollution complaints; and
7. The NTEPA is of the view that this continual non-compliance with the Act and EPL131 or likely non-compliance must be addressed as a matter of urgency.

AND I HEREBY REQUIRE, for the reasons specified an environmental odour audit program to determine:

- (a) the ability of the management systems employed at the premises to manage waste or prevent, reduce, control, rectify or clean up pollution or environmental harm resulting from pollution;
- (b) the extent to which actions are required to be taken, or results required to be achieved, for waste management at the premises;
- (c) the extent, nature and sources of wastes generated at the premises;
- (d) the likelihood of waste management problems or pollution resulting in environmental harm occurring and the adequacy of safeguards in place to prevent their occurrence or limit their impact on the surrounding environment; and
- (e) the extent to which compliance with this Act has been achieved.

Notice Conditions

Site Specific Environmental Odour Audit

1. By 30 November 2015 you must carry out and submit to the NTEPA a Site Specific Environmental Odour Audit of the operations at premises;
2. The Site Specific Environmental Odour Audit submitted as a requirement of condition 1 must be submitted as a report and contain written endorsement by a qualified person pursuant to section 67 of the Act that it meets the requirements notice;
3. The Site Specific Environmental Odour Audit referred to in condition 1 must:
 - a. Contain provision for NABL to consult with the NTEPA and the qualified person prior to conducting the Site Specific Environmental Odour Audit;
 - b. Contain provision for NABL to consult with the affected community;
 - c. Audit the effectiveness of the odour controls at the premises in regard to protecting receivers against offensive odour;
 - d. Audit the effectiveness of all cleaning, maintenance and housekeeping practices from all operations at the premises;
 - e. Review of the licensee's production data that are relevant to the odour audit and complaint records;
 - f. Review of the relevant odour sections of the NABL Air Quality Impact Assessment and other air quality impact information held by the licensee for the operations at the premises and assess the effectiveness of odour controls and procedures;
 - g. Measure all key odour sources at the premises and collect all emissions data (emissions inventory) including:
 - i. consideration of weather conditions providing all raw data used in this analysis;
 - ii. consideration of emissions (but not limited to all);
 - (a) lairage;
 - (b) slaughter and processing;
 - (c) waste product handling and processing;
 - (d) wastewater handling and treatment;
 - (e) disposal of wastewater by irrigation;
 - (f) pollution control equipment;
 - (g) liquid waste storage areas;
 - (h) paunch bins;

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- (i) tallow tanks;
- (j) hides building;
- (k) green waste holding tank(s);
- (l) first flush dam;

- iii. a comparison of the results of these measurements against the predictions in the NABL Air Quality Impact Assessment dated 26 March 2015;

- g. Determine whether the operations at the premises are complying with the requirements contained in EPL 131 to protect receptors against offensive odour;
- h. Outline all reasonable and feasible measures (including cost/benefit analysis, if required) that may be required to improve odour control at the premises; and
- i. Recommend and prioritise recommendations for their implementation including dates of implementation;

Site Specific Odour Management Plan

- 4. By 30 November 2015 you must utilise the outcomes of the Site Specific Environmental Odour Audit referred to in condition 1 and develop a site specific Odour Management Plan (OMP) for the premises' operations;
- 5. In preparing the OMP, you must consult with the NTEPA and a qualified person pursuant to section 67 of the Act;
- 6. The OMP must contain written endorsement by the qualified person referred to in condition 5 upon submission to the NTEPA;
- 7. The OMP referred to in condition 4 must include but not be limited to the following requirements:

Essential Premises Details Requirements

- a. A detailed process description, particularly describing odorous, or potentially odorous, activities/processes or materials used (inventory);
- b. Identification of all the release points for each of the activities including plans and maps;
- c. Identification of the sensitive receptors within the area of influence which is to be no smaller than 7 kilometres radius from the location of the bio filter at the premises that could be impacted including maps and plans;
- d. A description of the meteorological conditions prevailing at the premises, especially wind direction;

Routine Controls Under Normal Conditions Requirements

- e. Installation of an automated weather station (AWS) at the premises to record and understand the dispersion of odour from the premises under various meteorological conditions;
- f. A routine ambient odour monitoring program;
- g. A description of the routine mitigation/control measures that would be used day-to-day under normal operating conditions in the absence of any unusual risk factors. Examples of routine control measures include receipt, inspection, acceptance/rejection of materials, storage, containment, handling, treatment and timing of activities;
- h. Routine maintenance of plant processes and equipment;
- i. Cleaning and good housekeeping practices at the premises;
- j. Management of the wastewater treatment plant within its design criteria;
- k. A list of the actions in detail and who is responsible for carrying out the routine maintenance/cleaning/housekeeping/mitigation/control measures;

Abnormal Conditions and Additional Control Requirements

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- l. Identification of possible risk factors (e.g. adverse weather conditions) and anticipation of reasonably foreseeable odour-related incidents and accidents (e.g. bio filter acclimatisation period, abnormal situations, spillages, power failure, breakdown of doors, equipment or abatement) and a listing of the consequences for odours of these risk factors;
- m. List all contingency plans for upsets, maintenance and in the event of exceedances;
- n. A description of the additional measures (e.g. additional control measures and modifications to site operations, such as diverting odorous waste loads to facilities with less sensitive surroundings during adverse weather conditions) that will be applied during these periods to deal with these risks and any reasonably foreseeable incidents and accidents. If the measures are not sufficient, they need to be tightened further or else possibly ceasing/reducing odorous operations;
- o. A list of the actions in detail during abnormal conditions and who is responsible for carrying them out;

Triggers for Additional Controls and Checks on Effectiveness Requirements

- p. A description of what would trigger further actions/additional measures, such as:
 - i. the results of planned routine checks/inspections/surveys at the premises;
 - ii. compliance with odour criteria and trigger mechanisms for remedial actions;
 - iii. the results of on-site measurements of process parameters and surrogate measurements for odour (e.g. pH, temperature, oxygen, etc.) exceeding defined trigger levels;
 - iv. other metrics, such as particular meteorological conditions (e.g. temperature above a certain value, wind blowing in a particular direction, or calms);
 - v. odour monitoring on and off-site, including:
 - (a) odour complaints monitoring;
 - (b) monitoring carried out on-site, showing non-compliance with any licence requirement for controlled point source releases; and
 - (c) monitoring carried out off-site (e.g. by sniff testing, odour diary surveys, etc.), showing non-compliance with any action levels for ambient odour levels;

Management Good Practice Requirements

- q. A description of:
 - i. the roles and responsibilities of personnel on site (e.g. organisational chart);
 - ii. the training and competence of staff in odour-critical roles;
- r. Details of how the following will be carried out, and who has been assigned managerial and operational responsibilities for them:
 - i. implementing and maintaining the OMP;
 - ii. responding and recording odour-related incidents and any elevated odour levels from the aforementioned checks/inspections/surveys, monitoring, or on receipt of community complaints of odour nuisance; including carrying out investigations and taking appropriate remedial action to prevent recurrence;
 - iii. planned maintenance and repair and the keeping of essential odour-critical spares;
 - iv. regular review (at least once per year) of the effectiveness of odour controls - including the OMP itself - taking account of complaints, monitoring results, inspections, surveys and other information and feedback received. This interval may be shorter if there have been complaints or relevant changes to your operations or infrastructure;
 - v. engaging with your neighbours and communicating with relevant interested parties (e.g. local community and local authority) to provide necessary information and minimise their concerns and complaints, including methods used, content and frequency of communication;
 - vi. keeping records of all activities and actions relating to odour and the OMP;

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- vii. verification of operational and compliance performance;
- viii. standard operating procedures for odour related matters;
- ix. submission of a site specific odour modelling assessment utilising the information obtained during the site specific environmental odour audit which must include but not be limited to including all sources of odour and the sum total of all maximum ground-level concentrations/odour assessment criteria for the 99.9th percentile; and
- x. an annual odour audit requirement including a timetable for this;

Website

8. The Site Specific Environmental Odour Audit produced as described in Condition 1 and the OMP described in Condition 4 must be made available on the NABL publicly accessible website within 10 business days after being submitted to the NT EPA; and

Submissions

9. All submissions to the NT EPA required by this notice are to be provided in both electronic and hardcopy form, all other submissions required are to be provided in electronic form only to the following addresses:

Northern Territory Environment Protection Authority**Street address:** The Avenue, Suite 201 (level 2), 12 Salonika Street, Parap, NT 0820**Postal address:** GPO Box 3675, Darwin NT 0801**Email:** waste@nt.gov.au**END OF CONDITIONS**
William John Freeland15/10/15
Date**Chairperson of the NT EPA**
Delegate of the Northern Territory Environment Protection Authority**NORTHERN TERRITORY ENVIRONMENT PROTECTION AUTHORITY**

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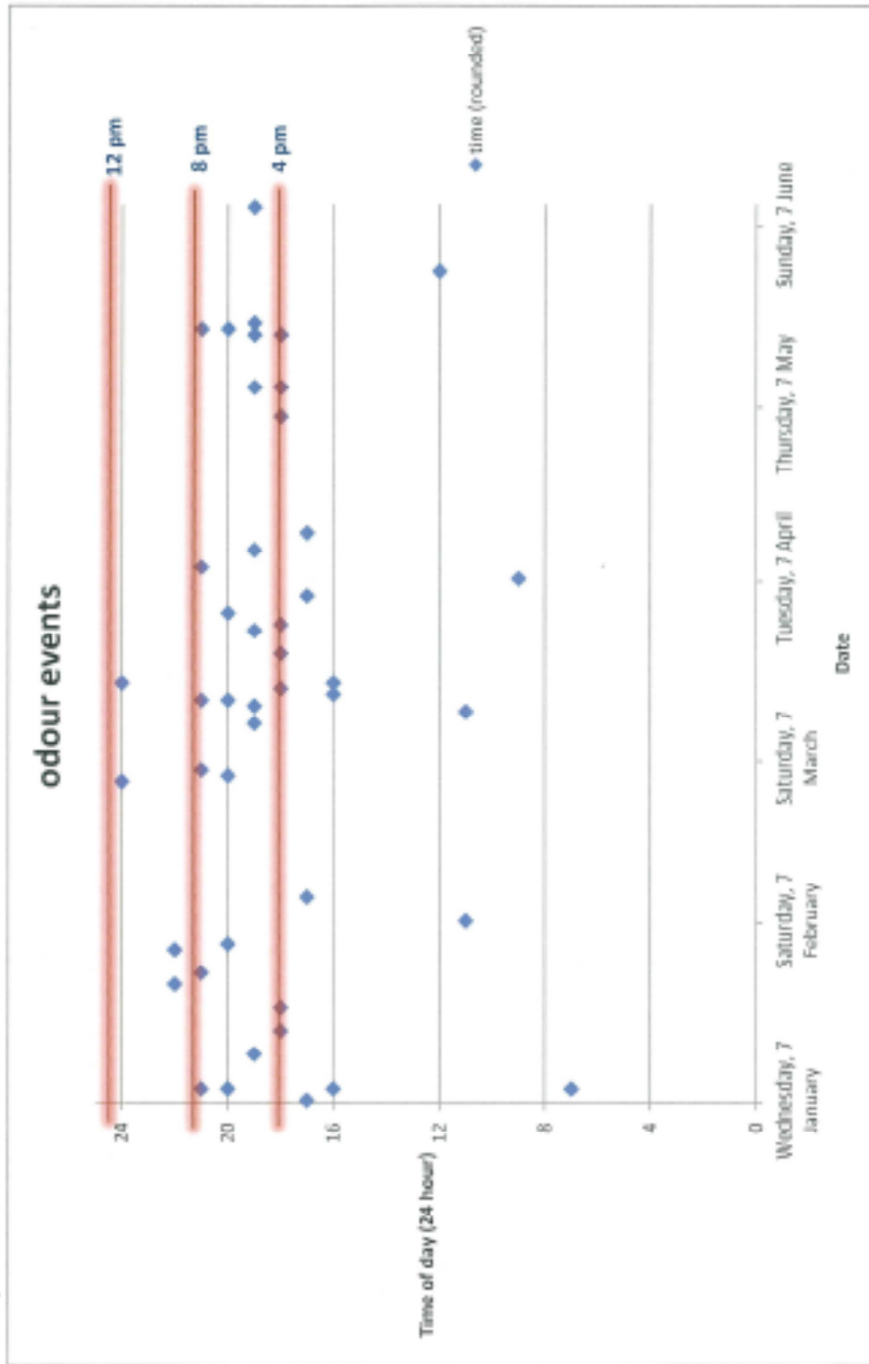
Important Notice

1. Failure to comply with a notice to conduct an environmental audit is an offence under section 51(1) of the Act and may incur significant penalties and/or other statutory action.
2. You will not be taken to have submitted the results of the environmental audit program required by this Notice until the requirements of section 51(2) of the Act have been satisfied.
3. Additional offences specific to the conduct of an environmental audit are established under section 52 of the Act.
4. Pursuant to section 67 of the Act, a person must not perform an environmental audit for the purposes of an environmental audit program unless the person is registered in a register established under section 68 of the Act or is specifically exempted from that requirement by Regulation. A current register of qualified persons is available from:
http://www.ntepa.nt.gov.au/waste-pollution/compliance/audits/qualified_persons or by contacting the NT EPA on telephone (08) 8924 4218.
5. The NT EPA is as defined in the Act or it's authorised Delegate.
6. This notice takes effect on the date on which it is served upon you.

NORTHERN TERRITORY ENVIRONMENT PROTECTION AUTHORITY

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ATTACHMENT 1 : TIME PATTERN OF ODOUR COMPLAINTS OVER 6 MONTHS FROM JANUARY UNTIL JUNE 2015 (REPORTED TO AACO)



NTEPA2014/0140

Appendix B NABL – DETAILED DESCRIPTION

NABL is a typical beef slaughter operation which comprises receiving cattle in holding pens, stunning the animals and draining their blood at the kill floor, removing their hides, and evisceration (removal of internal organs) and trimming. Each animal's carcass is separated into edible parts for human consumption and inedible by-products, which are processed in the rendering plant. Choice fatty parts from the cutting operations are processed into edible fats by a rendering process.

Manure is collected from the holding pens and paunch manure is separated from the viscera (internal organs within the abdominal and thoracic cavities) and inedible materials removed from the rendering processes. The dressed beef are refrigerated within 24-hours for human consumption. A simplified process chart is presented in Figure B-16-1. Detailed process flow charts are presented in Appendix C.

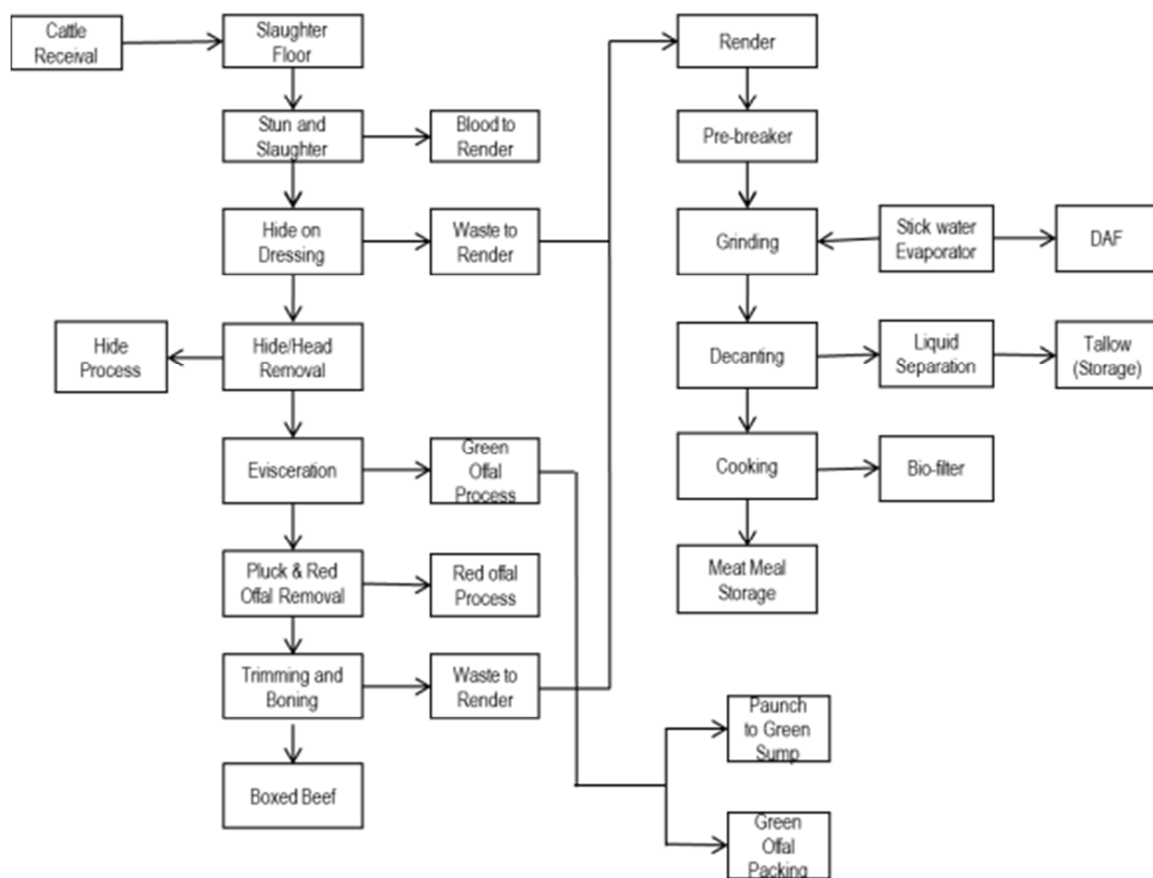


Figure B-16-1: Summary of Main Cattle Processes (Excluding Wastewater)

Operations within the Facility that cause odour are:

- Animal receival and holding (lairage);
- Rendering;
- By-product storage and handling;
- Wastewater treatment; and
- Waste material disposal and handling.

B.1 Lairage

The Facility has a maximum capacity of 1,400 head in the storage yards (1,000 head in the holding yard and 400 head in the AQIS yard). The yards are located on the western side of the Facility. Currently the cattle are unloaded from the trucks held in the yards for no more than 24-hours before being transferred to the slaughter floor.

Whilst placed in the yards, the main odour emission is the manure and urine which is cleaned out and washed down every day to meet department of agriculture food safety standards. The used water from the holding yard cleaning is drained into the green wastewater stream. Manure and urine are typically very strong odours and this green waste can be dominant odour during the irrigation spraying, depending on bacteria load.

B.2 Rendering Processes, Storage and Handling

All material is processed fresh on the same day as slaughter (subject to plant breakdowns), and no other material for rendering is imported to the site. This coupled with the large separation distance (up to 950 m sensitive receptors south of the Facility who have made complaints) means that the rendering plant does not need to be fully sealed. The building is open to atmosphere at the junction of the walls and roof, and via doors on two sides that allow passive ventilation by wind.

The two main sources of odour within the rendering system are considered to be fugitive emissions from passive ventilation of the rendering building space, and the bio-filter. The bio-filter is discussed separately in the following section.

The odour controls used at the Facility's rendering plant are as follows:

- Raw material (except blood) is received into a large bin (the "red bin") which is outside the rendering plant building. This bin is open to atmosphere and any odours are allowed to disperse passively. Odour from this bin was not found to be severe during the site visit.
- Blood for rendering is kept in a tank until processed. Any fugitive odour emission from this tank is considered to be relatively minor.
- Raw material ready for rendering is conveyed into the rendering building in covered chutes and conveyors. Odour from these chutes and conveyors escapes into the building air space at various open points, as presented in Figure 10-4. Similarly, odours emitted during grinding and conveyance to the cooker escape into the building air space. Odour in the building was found to be quite strong during the site visit.
- Odours emitted during cooking, decanting, and liquid phase separation processes are vented in a closed system to the meal dryer. Odour from these sources is negligible.
- Blood is processed by steam coagulation then decanted. The odour inside the rendering building was very strong with a dominant ammonia tone during blood processing.
- The meal dryer is housed in a separate building which is open to atmosphere at the junction of the walls and roof, and the walls and floor slab. Doors were observed to be open during dryer operation. The dryer room becomes hazy due to smoke with a strong smell during operation, indicating leakage of fumes from the dryer. However the smell in this room was not considered to be as bad as the odour in the rendering building during the site visit; this practice has recently changed.
- The dryer is a direct-fired, co-current process. Exhaust gases contain water vapour from the meal, combustion products from the burning of natural gas (carbon dioxide, water vapour, and nitrogen oxides), and any excess air blown into the dryer from the burner fan (containing water vapour, nitrogen, and oxygen). Odorous air extracted from the rendering cooking and separation processes is added to the dryer exhaust gases prior to the condenser and dropout box. A portion of the total

exhaust stream is ultimately diverted to the bio-filter for odour treatment, and the rest is recycled into the inlet end of the dryer.

- Odour from the stick-water evaporation system is extracted separately with a dedicated fan, and is added to the exhaust stream destined for the bio-filter.
- By-products of the slaughter process include hides, meat meal and tallow:
 - The hides are preserved through brining, salting and drying and these are stored in the hides shed (maximum capacity of 2,400). Odour is negligible within the hide shed; and
 - Tallow, meat and bone meal is stored in enclosed tanks, whilst dry blood is stored in 1 tonne bags, which are kept undercover prior to being pumped out and transported off-site.;

B.3 Bio-filter

A bio-filter operates by converting the air pollutants to CO₂ and water when the pollutants interact with the active microbes, oxygen and water within the media. For this reason they must be treated as a dynamic living process requiring regular attention to maintain a healthy environment. The process is cost effective, requiring no fuel or chemicals as the microbial enzymes continually regenerate themselves. It is a process that produces no secondary pollutants, making it ecologically sound and safe to operate

The bio-filter has been constructed adjacent to the rendering plant where the main odour stream is discharged from the Knock-Out Drum 509. The odour stream is a proportion of the air flow through the Flo-Dryer with the majority being recycled back to the Flo-Dryer Combustion Chamber. Vapour and odour is also extracted from the Reactor, Decanters and LP Screen via the Dryer. There is also an extraction from the Flo-Dry Evaporator Plant which is handled separately within the bio-filter.

The odour delivery from the FPSS Plant is discharge underground to a manhole which connects into the Bio-Filter manifold within the Bio-Filter media. A drain is located underneath the distribution manifold to collect drainage water. The drain discharges to the inlet manhole and liquid is discharge through a submersible pump into the feed to the wastewater sump.

Rock metal is used to support the biologically active bark media. Coarse rock metal is located at the bottom to support the media distributors and to allow full drainage of the bio-filter media. A medium rock metal grade is placed on top to provide distribution into the bark layers. An additional fine metal layer is used to separate the bark layer from the distribution metal. The odour from the bio-filter can be described as earthy. The bio-filter parameters are listed in Table B-16-1.

Table B-16-1: Bio-filter Parameters [Haarslev, 2015]

Parameter	Unit	Value
Design Air Flow	m ³ /s	2.8
Mean Odour Discharge	OU/m ³	30,000
Bio-Filter Length	m	27.6
Bio-Filter Width	m	15.6
Bio-Filter Area	m ²	430
Area Velocity	mm/s	7.8
Residence Time	sec	180
Fine Media	-	Pea Metal
Filtration Media	-	12/38 Graded
Media Moisture System	-	Top Irrigation

Parameter	Unit	Value
Dryer Fan Duty Volume	m ³ /s	6.1
Dryer Fan Duty Pressure	kPa	8
Evaporator Fan Duty Volume	l/s	325
Evaporator Fan Duty Pressure	kPa	4.2

B.4 Wastewater Treatment and Disposal

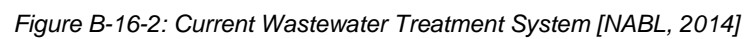
The Water Quality Management Plan (EcOz, 2015b) provides a detailed description of the wastewater treatment system at the Facility. Current wastewater flows at the Facility are in the order of 0.8 - 1 ML per day, for processing cattle. The design and operation of the facility incorporates the following industry best-practice features designed to minimise wastewater generation and pollution:

The currently operating wastewater treatment system comprises the following key elements:

- Primary treatment and ancillary equipment;
 - FAN screw press to remove gross solids from the “green” streams;
 - FAN screw press to remove gross solids from the render wastewater streams;
 - Large, mixed “common sump” which collects all flows discharged from the green and render FAN presses and the “red” stream off the processing floor;
 - Twin 25 kL equalisation storage tanks prior to Dissolved Air Flotation (DAF) processing. These tanks are mixed. The DAF utilises the property of micro-bubble adherence to suspended solids, increasing the tendency of the particles to float. After the suspended solids have floated to the surface, mechanical scrapers skim the solids from the surface into a sludge storage bin, which is not enclosed;
 - Chemically-dosed DAF unit (Photo 6) to remove a large fraction of BOD, suspended solids and oils & greases from the fully combined wastewater stream. Sulphuric acid is added to reduce the pH to about pH 4.8 to improve the removal. Coagulant and polymer are dosed to assist separation of the flocculated organic matter;
 - Decanter to dewater the DAF float solids; and
 - Caustic dosing to recover the pH to neutral.
- Tertiary treatment consisting of:
 - Alum dosing into a lamella clarifier for phosphorus removal;
 - In-line ultraviolet disinfection to reduce pathogen levels; and
 - 200 kL storage tank to hold treated effluent prior to disposal by irrigation.

The current wastewater treatment system also includes a number of buffer storage vessels, with the total volume being about 300 kL, which corresponds to about 40 % of the daily throughput.

A flow chart showing the sources and current wastewater treatment is presented in Figure B-16-2 and a summary of the wastewater treatment streams is presented in Table B-16-2.



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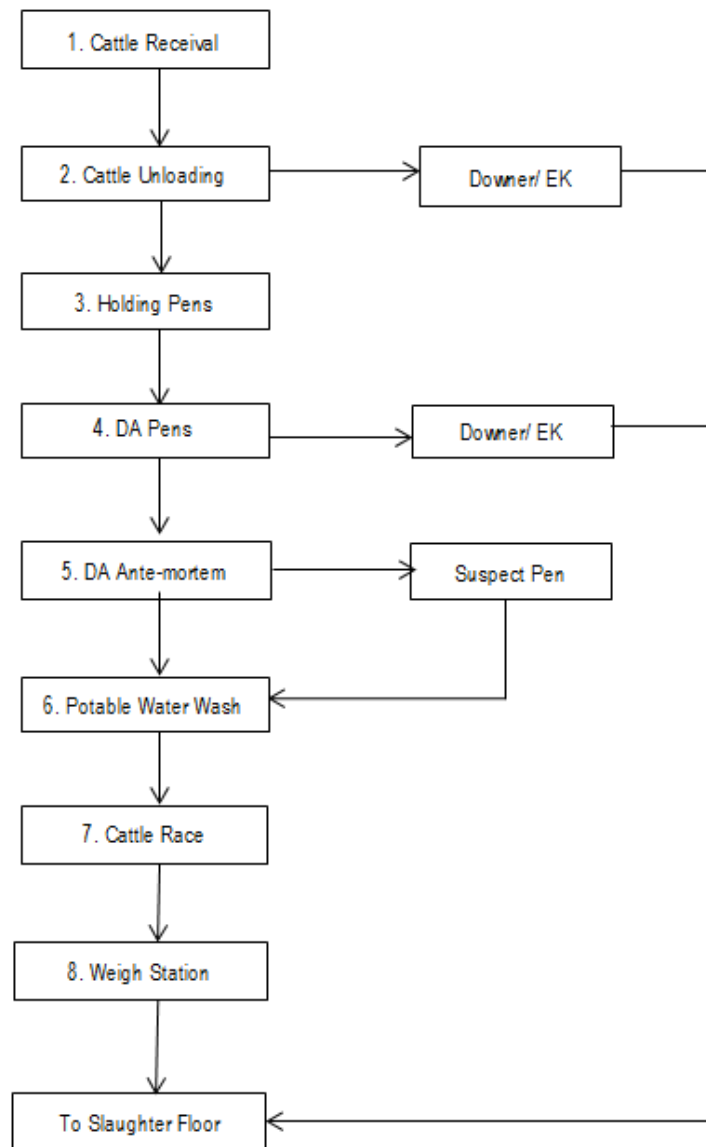
Table B-16-2: Wastewater Treatment Streams [EcOz, 2015b]

Water Use	Treatment 1	Treatment 2	Treatment 3	Comments
Stock and stockyard wash-down water	<p>Specially designed sediment holding system where solids are separated from liquid portion by settling</p> <p>The settled sludge is pumped to the green fan press to separate solids and liquids</p> <p>Covered yard wash down goes straight to and through green fan press and DAF</p>	<p>DAF plant for removal of solids, fats, protein and other organic waste, includes lamella for P removal and UV sterilisation for pathogen removal</p> <p>Additionally, a sand filtration unit installed between the lamella and UV system will ensure TSS levels are low enough for effective UV treatment. This filter will also remove a proportion of oil & grease, BOD and other contaminants</p>	<p>Irrigation onto land for hay making and removal of nutrients through soil and plant uptake</p>	<p>Manure and other organic matter from stockyards will be regularly scraped, removed daily and taken to an offsite facility licensed to dispose of animal effluent and residue wastes</p> <p>Stormwater will be diverted around the stockyards to minimise wastewater volume</p> <p>Solids collected in initial settling system sent to an offsite facility licensed to dispose of animal effluent and residue wastes</p> <p>Note the open stockyards will not be used during the wet season months (Dec – Mar) as only one shift per day and stock will go straight to covered holding yards (reticulated drainage through the DAF)</p> <p>First flush dam will capture all run-off from open cattle-holding yards during dry season and first flush of wet season. This water will go to DAF system for treatment. Stormwater from open cattle- holding yards will be diverted to DAF until water quality meets Assessment Criteria as outlined in WQMP. Following this, stormwater will go to Dam 1; see SWMP.</p>
Wash water from slaughter areas, paunch and carcass washing, sterilisers and plant cleaning	<p>Solids screening</p> <p>Green solids sent to composting</p> <p>Red solids sent to rendering plant</p>	<p>As above for DAF plant, lamella, sand filtration and UV sterilisation</p>	<p>Irrigation onto land for hay making and removal of nutrients through soil and plant uptake</p>	<p>Water use and consequently wastewater volumes will be minimised through water efficiency measures as outlined in the OEMP</p> <p>Additionally, operating procedures and specialised equipment will minimise concentration of contaminants in wastewater as outlined in the OEMP</p> <p>A proportion of the DAF treated wastewater will be reused where possible for non-sensitive purposes, such as stockyard washing, paunch washing and garden irrigation</p> <p>Solid wastes from meat processing (including blood) sent to rendering plant</p> <p>Green solid waste sent to an offsite facility licensed to dispose of animal effluent and residue wastes</p> <p>Red solid waste from initial screening sent to rendering plant</p> <p>Sludge from DAF sent to rendering plant</p> <p>Sludge from lamella and sand filtration sent to an offsite facility licensed to dispose of animal effluent and residue wastes</p>
Rendering plant	<p>Solids screening</p>	<p>As above for DAF plant, lamella, sand filtration unit UV sterilisation</p>	<p>Irrigation onto land for hay making and removal of nutrients through soil and plant uptake</p>	<p>Solids from initial screening sent back through rendering plant</p>
Hides processing	<p>Saltwater evaporator system</p>	-	-	<p>Recovered salt reused in hide curing process</p>
Staff amenities / human sewage	<p>Maceration and primary settling to remove floatables</p> <p>Aeration chamber - 24hr detention of liquids and solids; microbiological culture growth in form of floc stimulated by</p>	<p>Separation and chlorination of liquids, further stabilisation of solids through biological stabilisation</p>	<p>Effluent absorption trench system</p> <p>Removal of nutrients through soil and plant uptake</p>	<p>Sludge from aeration tank regularly removed by licensed contractor</p> <p>Sedimentation chambers covered to prevent insect and odour problems</p>

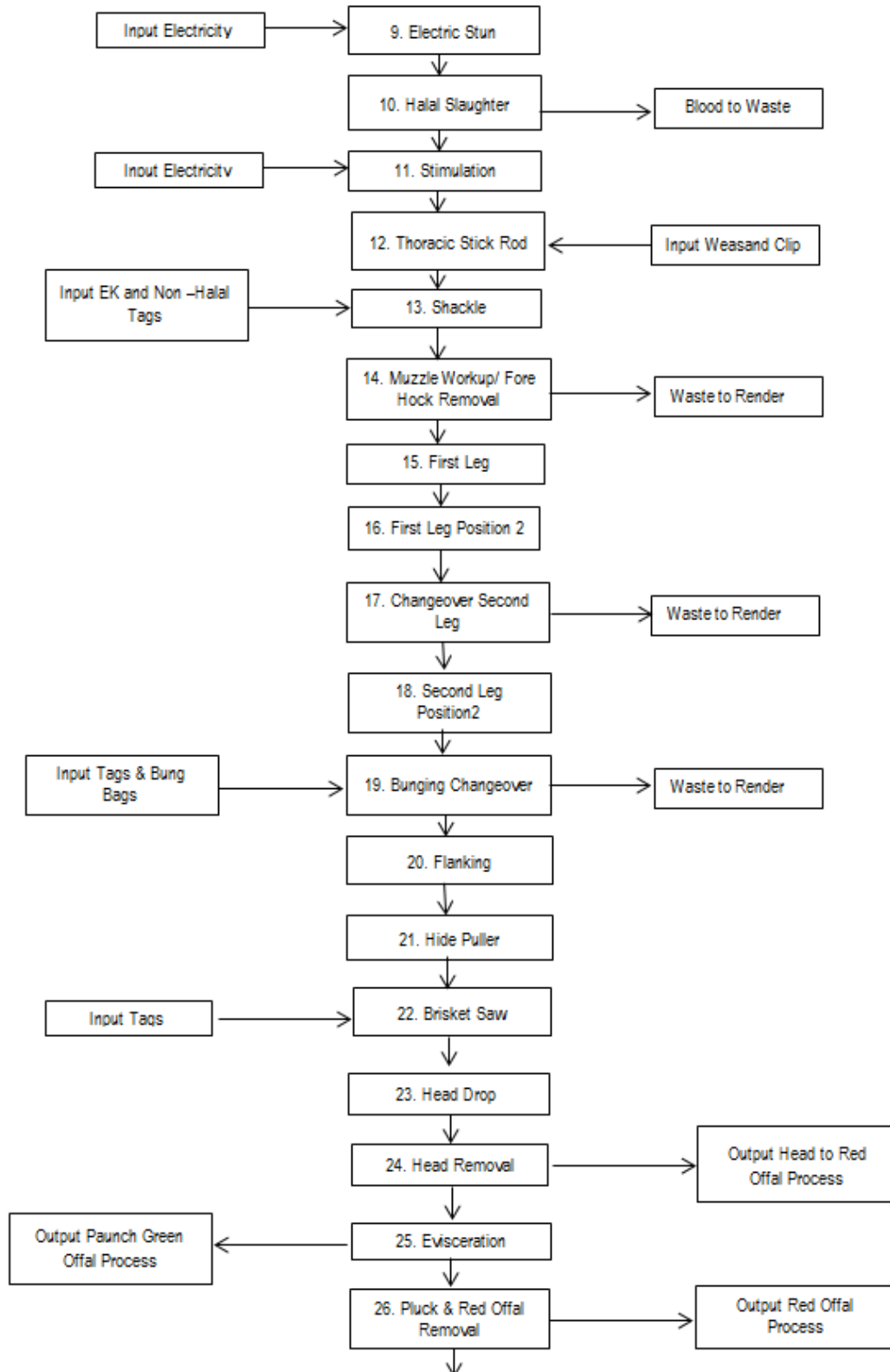
Appendix C NABL – DETAILED PROCESS FLOW DIAGRAMS

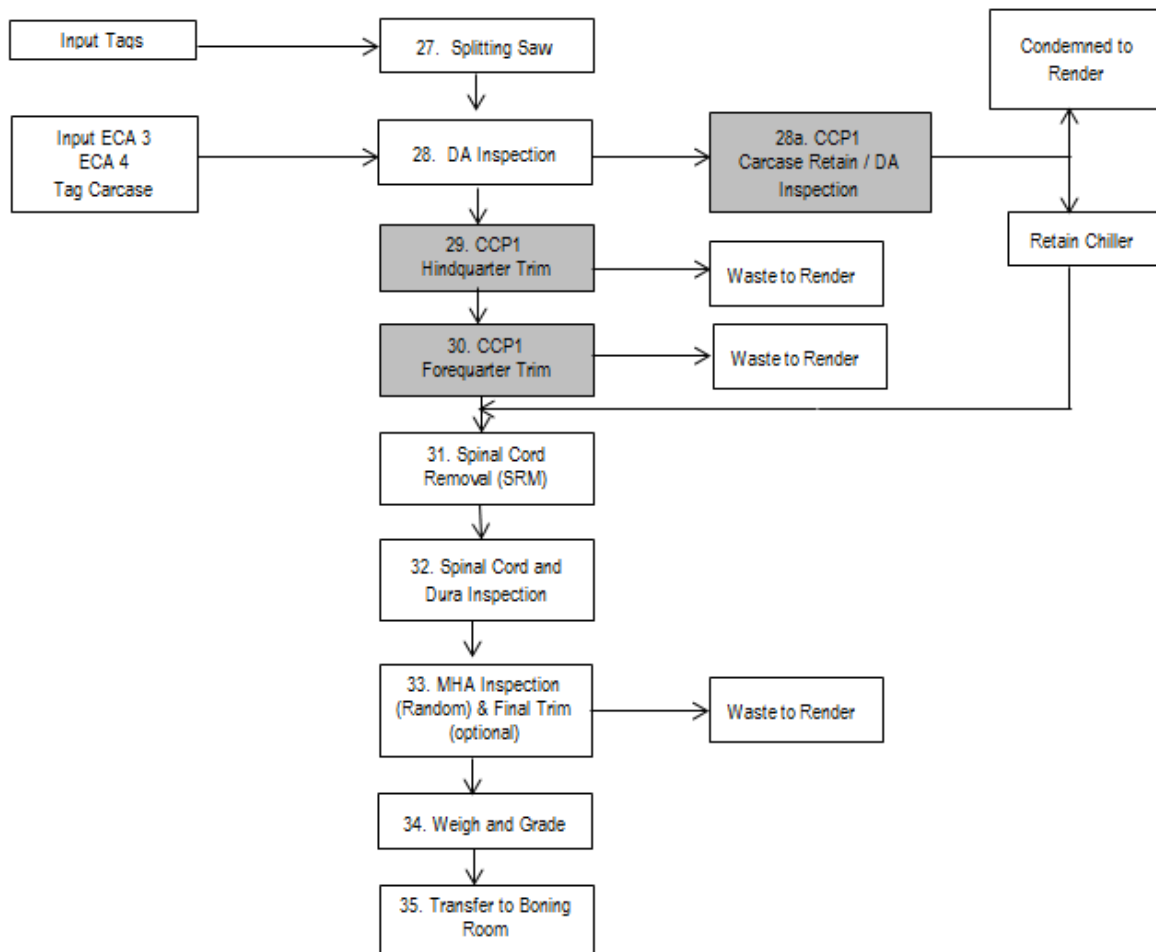
This Appendix provides the detailed process flow charts for the stockyard, slaughter floor, red offal, boning room and cold storage.

C.1 Stockyard

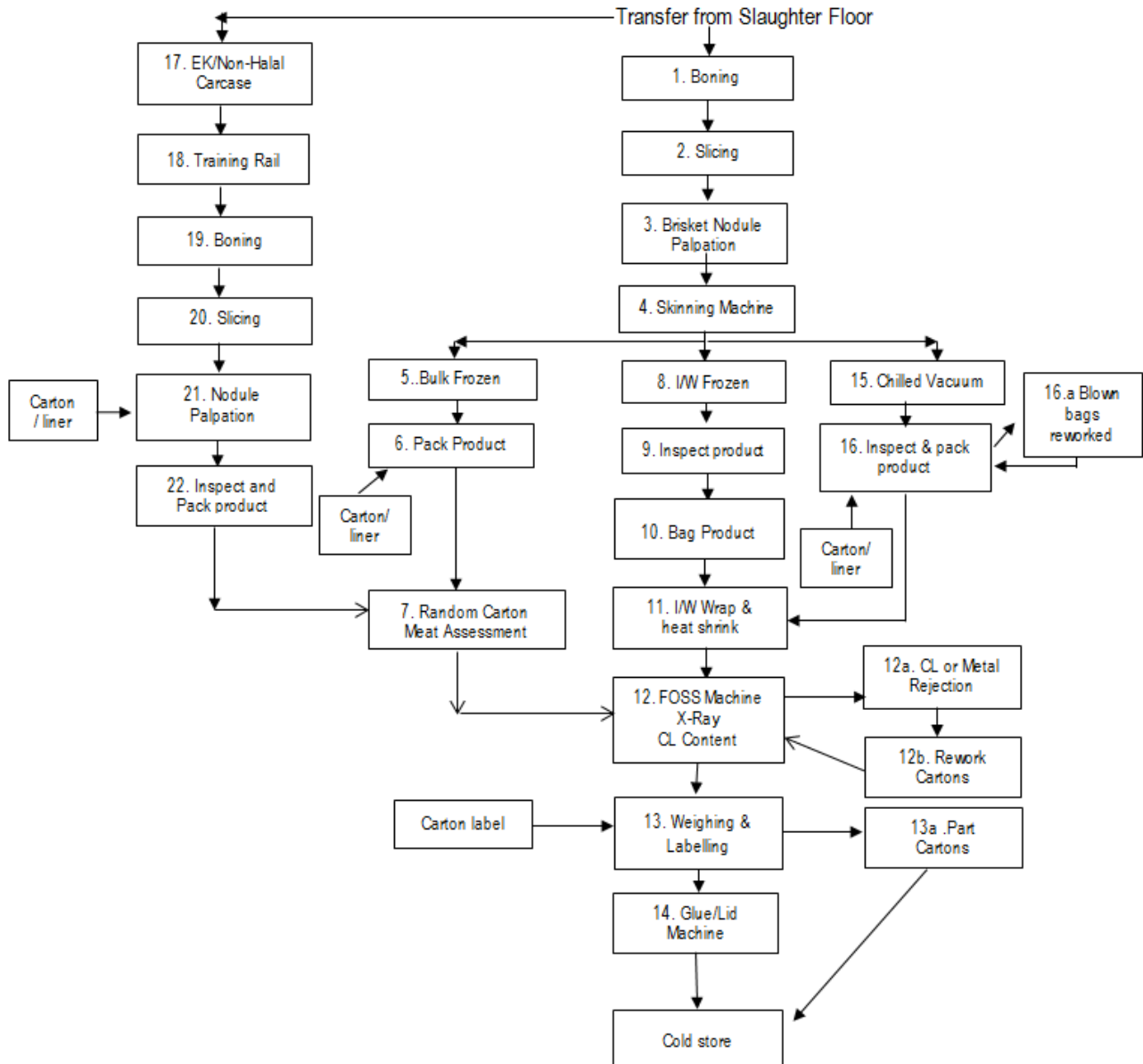


C.2 Slaughter Floor

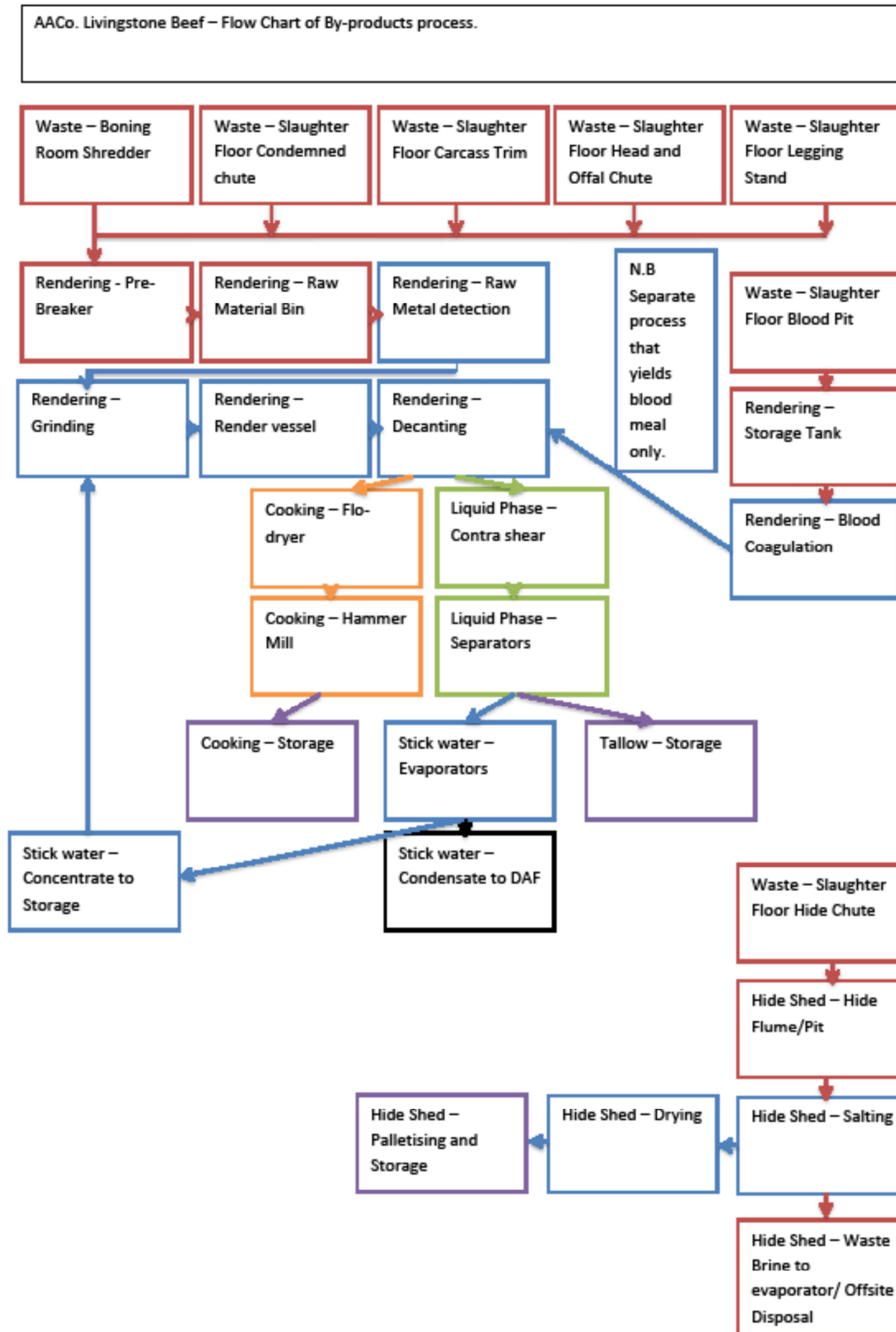




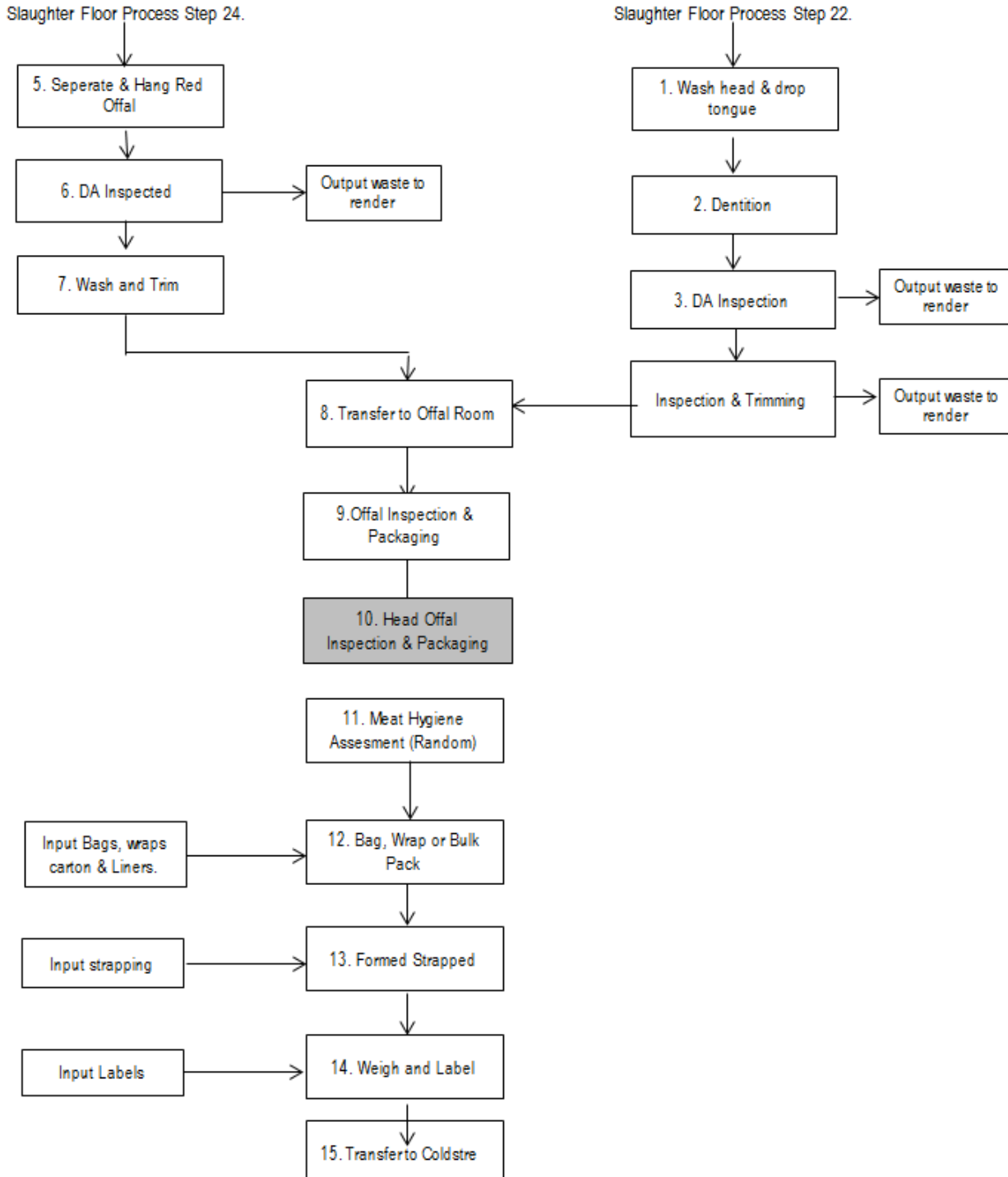
C.3 Boning Room



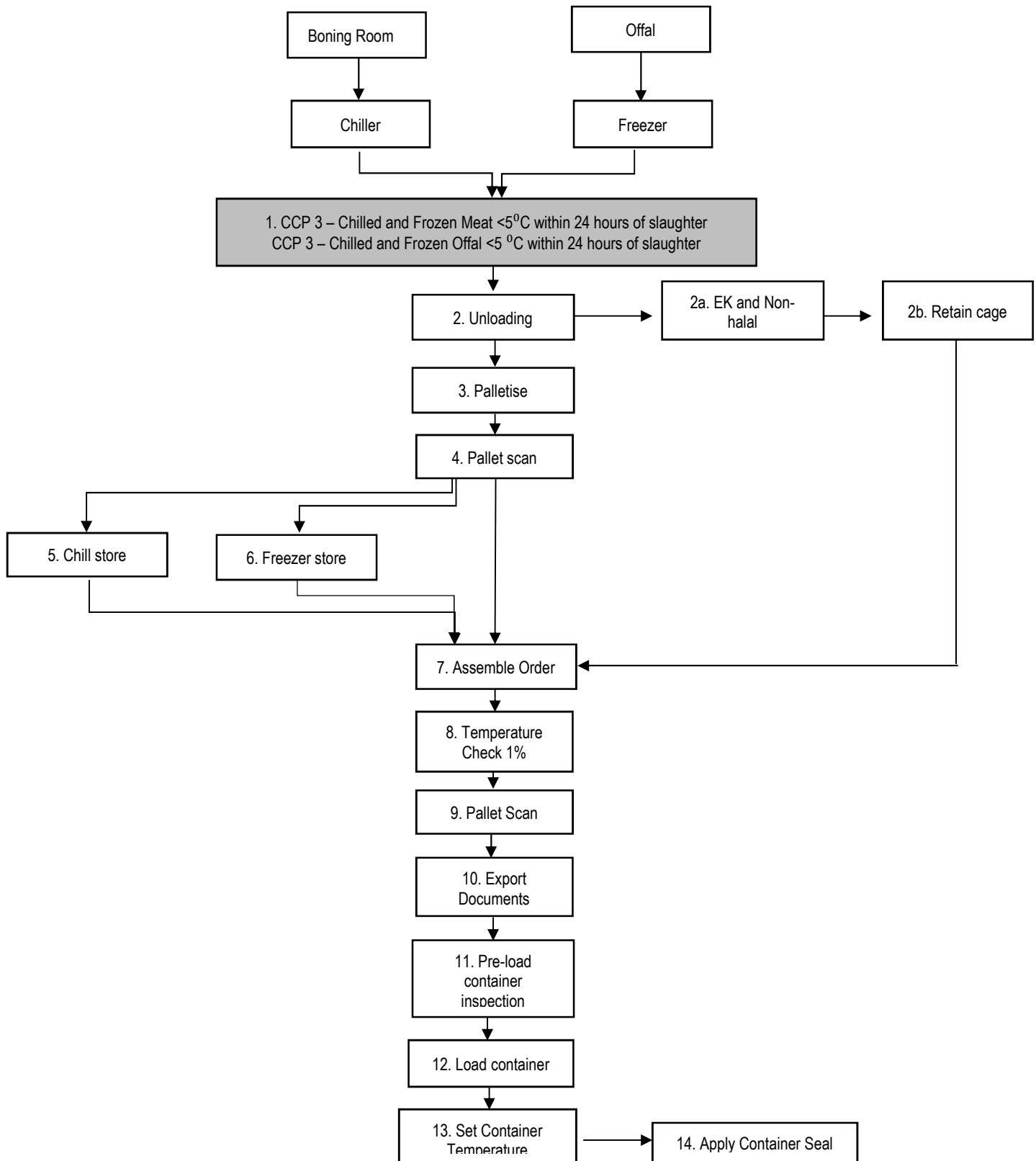
C.4 Rendering & By-Products



C.5 Red Offal



C.6 Cold Storage



Appendix D AUSTRALIAN WASTEWATER DISCHARGE LIMITS & LICENCE CONDITIONS FOR SIMILAR PROJECTS

As discussed in Section 1.1, the issued EPL 131 licence conditions are very stringent. This Appendix provides context information on typical wastewater pollutant limits for sewage and surface water disposal, as presented in Table D-16-3 to Table D-16-5.

Table D-16-3: Sewer Disposal Pollutant Limits (Australian Meat Processor Corporation, 2013)

Parameter	Unit	National (ANZECC)	New South Wales	Queensland	South Australia	Victoria	Western Australia
BOD	mg/L	site specific	300 ^(a)	Limits set by individual Councils, generally based on ANZECC criteria.	site specific	Limits set by individual Water Authorities, generally based on ANZECC criteria.	< 3000
COD	mg/L	site specific	< (3 x BOD)		site specific		< 6000
Suspended solids	mg/L	site specific	NS		< 1000		< 1500
Temperature	C	< 38	< 38		< 38		< 38
pH	-	8.0 - 10.0	7.0 - 9.0		8.0 - 10.0		8.0 - 10.0
Oil and grease	mg/L	< 200	< 50 ^(b)		< 100		NS
Ammonia as nitrogen	mg/L	< 100	< 50		< 50		< 200
Kjeldahl nitrogen	mg/L	< 150	< 100		NS		NS
Total phosphorus	mg/L	< 50	< 20		NS		NS
Sulfate	mg/L	< 2000	< 100		< 1500		NS
Chlorine	mg/L	< 10	< 10		< 5		< 10
TDS	mg/L	NS	< 4000		NS		NS

Notes:

(a) Higher values (< 600 mg/L) may be acceptable if sufficient capacity at treatment plant and dilution in sewer is available

(b) Higher values (< 100 mg/L) may be acceptable if volume of the discharge is less than 10% of the capacity of the treatment plant

NS = Not specified

Table D-16-4: Surface Water Disposal Pollutant Limits (Australian Meat Processor Corporation, 2013)

Parameter	Unit	National (ANZECC)	New South Wales ^(b)	Queensland	South Australia ^(d)	Victoria		Western Australia ^(c)
		Secondary Contact	90% ile	Refer to ANZECC criteria ^(c)		median	90 %ile	Secondary Contact
BOD	mg/L	NGR	10		<6	5	10	NGR
Suspended solids	mg/L	< 10% change ^(a)	15		< 10% change	10	15	< 10% change ^(a)
pH	-	5.0 - 9.0 ^(a)	6.5-8.5		6.5 - 8.5	6 - 9		5.0 - 9.0 ^(a)
Ammonia as nitrogen	mg/L	0.02 - 0.03 ^(a)	2		Refer to National Guidelines	2.0	5.0	0.02 - 0.03 ^(a)
Total nitrogen	mg/L	0.1 - 0.75 ^(a)	10			10	15	0.1 - 0.75 ^(a)
Total phosphorus	mg/L	0.01 - 0.1 ^(a)	0.3			0.5	1.0	0.01 - 0.1 ^(a)
E.coli	org/100 mL	< 1000	200		150 (primary contact)	200	1000	< 1000
Oil & Grease	mg/L	(e)	2		15 maximum 8 average	non visible		(e)
TDS	mg/L	500 ^(f)	NS	NS	NS		NS	

(a) Criteria relates to receiving water, ie after mixing

(b) Source: NSW EPA Submission to Public Inquiry into Management of sewage and sewage by-products in the coastal zone (Table 1, Appendix 3)

(c) Site specific (dependent on environmental value of receiving water body and characteristics of effluent)

(d) Environment Protection (Marine) Policy 1994 - South Australia

(e) Oil should not be noticeable as a visible film on the water nor should be detectable by odour

(f) Based on limits required for good quality drinking water

NGR = No Guideline Recommended

NS = Not Stated

Table D-16-5: A Comparison of Abattoir Wastewater Disposal Quality [Matheyarasu, Seshadri, Bolan, & Naidu, 2015]

Parameter	Irrigation	Sewer large city	Sewer small town	Coastal surface water	Inland surface water	Reuse non potable (a)
BOD (mg L ⁻¹)	Site specific	4000	600	10	10	100
pH	6.5-8.5	6.0-10.0	7.0-9.0	5.0-9.0	6.5-8.5	5.5-8.0
TDS (mg L ⁻¹)	1000	NA	NA	NA	500	1000
Coliforms (Org 100 mL ⁻¹)	1000	No limit	No limit	1000	200	1000
TN (mg L ⁻¹)	Site specific	500	100	15	10	150

(Source: MLA-RPDA-1998); a) Typical for non-potable reuse.

A review of the licence conditions for abattoirs with rendering facilities was undertaken in each state. A summary is shown below:

Queensland

A full list of the licences could not be retrieved from the Department of Environment, Heritage and Protection. However a review of the requirements of the Environmental Relevant Activities for Abattoirs including rendering activities (ERA 25) and Application requirements for activities with impacts to water (EM963) has determined that there are no pre-defined criteria for wastewater releases.

New South Wales

A number of licences for abattoirs were downloaded from the EPA website; however none of these licences includes criteria for individual pollutants. The only requirement appeared to be complying with 'Section 120 of the Protection of the Environment Operations Act 1997'. This Act does not prescribe pollutant levels.

South Australia

Two licences for abattoirs were reviewed (EPA 38082 and EPA 1823), neither of these licences contained prescribed wastewater pollutant limits. The only requirement is to comply with the *Wastewater Irrigation Management Plan (WIMP)* (South Australian EPA, 2009). This guideline states that BOD is site specific based on the soil type. The EPA recommends using a spreadsheet model for determining the BOD application rate.

Victoria

Several abattoir licences were reviewed and none of the contained prescribed wastewater limits.

Tasmania

Licence conditions were not able to be reviewed on the EPA website, however an application for an abattoir upgrade (King's Island Abattoir dated 2011) was reviewed. This application proposed criteria for the effluent limits: BOD - 40 mg/L, TSS – 100 mg/L, TN – 400 mg/L, TP – 40 mg/L, Oil and grease – 10 mg/L and coliforms – 1900 cfu/100 ml. The plant was closed in 2012.

Western Australia

A number of abattoir licences which included land irrigation were obtained from the Department of Environment Regulation. The licences included maximum nutrient loadings, monitoring locations and frequency and reporting requirements.

Some licences issued 2011 – 2015 are based on kg/ha. The nutrient loading ranges for the licences are:

- Total Nitrogen – 250 – 300 kg/ha (annual limit);
- Total Phosphorus – 20 – 50 kg/ha (annual limit); and
- BOD – 30 kg/ha (daily limit).

One licence for a sheep abattoir issued in 2012 (L8670) provided lower discharge limits for irrigation:

- Total Nitrogen – 140 kg/ha (annual limit) and 9 mg/L;
- Total Phosphorus – 10 kg/ha (annual limit) and 5 mg/L;
- BOD – 30 kg/ha (daily limit) and 120 mg/L; and
- Total Suspended Solids – 120 mg/L.