Operational Management Plan

Stantec

DEVELOPMENT PERMIT APPLICATION – PLANNING RATIONALE AND STUDIES

Sofina New Poultry Facility, Calgary AB

September 28, 2018

Prepared for:

Stephanie Loria, File Manager, Community Planning - South

Prepared by:

Stantec

CITY OF CALGARY
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Distribution - Administration
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Operational Management Plan

Revision	Description	Author		Quality Check		Independent Review	
1	for DP	C.Redel		M.Paryniuk		T.Hartley	
2	For DTR resp.	C.Redel		M.Paryniuk		T.Hartley	

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1.0 BACKGROUND AND INTRODUCTION

1.1 BACKGROUND

Sofina Foods Inc. (Sofina - owners of Lilydale) is relocating their Poultry Processing Facility (facility) from its current location at 2126 Hurst Rd. SE, to a new site located in the Dufferin II Industrial area. A poultry processing facility has been located at Sofina's existing site since the 1960's. The facility is classified as Legally Non-Conforming and therefore cannot be expanded or modified to meet the current animal welfare or processing guidelines. A portion of the existing site is also required by the new Green line LRT project for trackage and route right of way, which requires the plant to be relocated.

Sofina has secured land in the Dufferin II (North) Industrial Sub Division for a new poultry processing plant. The proposed land has been re-zoned to a DC district (LOC2017-0266/CPC2018-0295) to allow for the construction of a Slaughter house.

Locating the new plant in the Dufferin II Sub division is a good fit as the area is designed for large truck traffic, has very good access to Glenmore Trail and Stoney Trail and is approximately 3.5 km from the nearest residential community. Access to the plant via Stoney Trail has been reviewed by the plant staff and will represent an improvement for most of the 475+ employees.

The new facility will process live chicken into various meat cuts for institutional, commercial and retail customers. The facility will be a primary processor and will not produce further processed or cooked products. The facility will not render or further process any by-products of the process.

The facility will be designed to process 13,500 birds per hour and will operate over two eight-hour shifts, Monday to Friday, with a third shift for cleaning and sanitation of the plant. There are no formal operations scheduled for weekends except shipping. Any other weekend work will be associated with facility maintenance, not production.

The plant has been designed to the guidelines established by the Canadian Food Inspection Agency for food plant construction and operation. In addition, the design reflects the highest standards for both animal welfare and people health and safety.

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Planning Analysis

1.2 INTRODUCTION

Stantec Architecture Ltd. Has been retained as the Prime Consultant for the design of the Sofina Foods Inc. New Poultry Facility in Calgary. Sofina has completed the Land Use Amendment with the City of Calgary, and the parcel is now zoned as a Direct Control District (DC) with a discretionary use - Slaughter House. The rules for an application for a Development Permit for this use requires:

a) an operational management plan, completed by a qualified professional, that includes details on:

   i) the management, mitigation and discharge of airborne emissions, including smell;

   ii) public response and communications;

   iii) waste management;

   iv) noise, vibration and dust control; and

   v) traffic and transportation management; and

b) any other information that is deemed appropriate by the Development Authority.

The purpose of this document is to outline how the project relates to the rules of the Calgary Land Use Bylaw 1P2007, and the subsequent DC rules for this use. Sections of this document will cover the basic planning analysis, operational management plan and supporting studies.

2.0 PLANNING ANALYSIS

2.1 PROJECT OVERVIEW AND CONTEXT

The proposed Sofina Foods Inc. New Poultry Facility is located on an 11.836-hectare parcel at 6202, 106th Avenue SE, (Lot 4, Block 5, Plan 171 0868) in the Dufferin II (North) industrial area. The Dufferin II development is part of the East Shepard Industrial community and is bounded by the Western Headworks Canal to the north and north-west, 68th Street SE to the east, and the CP Rail intermodal yards to the south. The development is comprised of large parcel (19+acre) industrial uses with smaller scale industrial uses to the east of 68th Street, and north west of the irrigation canal. The East Shepard Industrial community is mainly composed of industrial uses, such as manufacturing, logistics, landfill and wastewater treatment. The Dufferin II development was designed as a logistics and distribution park. Registered architectural guidelines are in place to ensure quality, sustainable building and site designs.

Activities at the proposed Poultry Facility will be comprised of the receiving and processing of live poultry (chickens), packaging and shipping of final product, treatment of associated wastewater, and shipping of waste and byproducts for disposal elsewhere. The proposed building at the site will contain all these processes within and is designed to mitigate impacts to surrounding parcels through best practice engineering design, operational management and visual and auditory screening. Ancillary uses within the building will consist of administration, staff amenities (lunch rooms, locker rooms, etc.), light maintenance, and building and process support service spaces.

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Planning Analysis

2.2 LAND USE BYLAW ANALYSIS

2.2.1 Site Analysis

LAND USE BYLAW 1P2007

Municipal Address: 6202, 106th Avenue SE, Calgary, AB

Legal Address: Lot 4, Block 5, Plan 171 0868

POLITICAL DESIGNATIONS

Ward 12 Councilor: Shane Keating

Community of: East Sheppard Industrial

LAND USE DESIGNATION

DC-157D2018 (Direct Control) based on I-G (Industrial - General), with additional rules (see section 1.2, above)

PROPOSED DEVELOPMENT

Principal use: Slaughter house (based on General Industrial – Medium) – Poultry (Chicken) Processing and Distribution

Secondary use: Office

Site Area: 11.836 Hectares

Proposed Gross Floor Area (GFA): 25,020m^2

Permitted F.A.R.: 1.0

Proposed F.A.R: 0.211

OFFICE AND ADMIN AREA

Maximum GFA of office: 50% of GFA of building

Proposed GFA of office: 15% of GFA of building

BUILDING HEIGHT

Maximum height: 16.0 m

Proposed height: 11.5 m (15.3 m including mechanical penthouse)

SETBACK AREAS

Required front setback: (106 AVENUE SE): 6.0m

Proposed front: 35.0 m

Required rear setback (east, adjacent to I-G parcel): 1.2 m

Proposed rear: 22.2 m

Required south side setback (adjacent to I-G parcel): 1.2 m

Proposed south: 170.0 m+

Required north side setback (Western Irrigation District): 7.5 m

Proposed north: 7.5 m+

BUILDING SETBACK

Required north side building setback (Western Irrigation District): 15.0 m

Proposed building setback from canal: 51.5 m

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Planning Analysis

2.2.2 Parking Requirements

GROSS USABLE FLOOR AREA FOR CALCULATING PARKING REQUIREMENTS

Slaughter house Gross Useable Floor Area (GUFA): 21,561 m^2

Office GUFA: 3,286 m^2

LOADING REQUIREMENTS

Required loading stalls: 1 stalls per 9300 m^2. OF GFA = 3 stalls

Proposed loading stalls: 18+

MOTOR VEHICLE STALLS FOR SLAUGHTER HOUSE

1 spaces per 100 m^2 of GUFA for the first 2,000 m^2, and then 1 stalls for each subsequent 500 m^2.

Required for slaughter house: 60

MOTOR VEHICLE STALLS FOR OFFICE

2 spaces per 100 m^2 of GUFA

Required for office: 66

TOTAL MOTOR VEHICLE STALLS REQUIRED: 93

TOTAL MOTOR VEHICLE STALLS PROPOSED: 344 (based on owner's requirements)

CLASS 1 BICYCLE PARKING STALLS FOR SLAUGHTER HOUSE

No requirement

Required for slaughter house: 0

CLASS 1 BICYCLE PARKING STALLS FOR OFFICE

1 stall per 1,000 m^2 GUFA

Required for office: 4

TOTAL CLASS 1 BICYCLE STALLS REQUIRED: 4

TOTAL CLASS 1 BICYCLE STALLS PROPOSED: 4

CLASS 2 BICYCLE PARKING STALLS FOR SLAUGHTER HOUSE

1 stall per 2,000 m^2 GUFA

Required for slaughter house: 11

CLASS 2 BICYCLE PARKING STALLS FOR OFFICE

1 stall per 1,000 m^2 GUFA

Required for office: 4

TOTAL CLASS 2 BICYCLE STALLS REQUIRED: 15

TOTAL CLASS 2 BICYCLE STALLS PROPOSED: 15

2.2.3 Landscape Requirements

SETBACKS ADJACENT TO STREETS OR INDUSTRIAL PARCELS

Soft Surface

1.0 trees and 2.0 shrubs per 50.0 m^2 (low water irrigation)

NORTH SETBACK (INDUSTRIAL PARCEL):

267.5m^2 - 6 trees and 11 shrubs req.

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Planning Analysis

EAST SETBACK (INDUSTRIAL PARCEL):

839.8m^2 - 17 trees and 36 shrubs req.

SOUTH SETBACK (INDUSTRIAL PARCEL):

274.3m^2 - 6 trees and 11 shrubs req.

WEST SETBACK (STREET 106 AVE NE):

560.7m^2 - 12 trees and 23 shrubs req.

SIDEWALKS

FRONT:

2.0m min. wide along the length of building raised above parking area

From public entrance to street

EMPLOYEE AREA:

Min. 10.0m

2.2.4 Other Regulations, Policies, And Considerations

Dufferin North Industrial Park Architectural Control Guidelines (April 30, 2014)

Municipal Development Plan

Calgary Transportation Plan

Southeast ASP

Southeast Industrial ASP

Southeast 68 Street Industrial ASP

City of Calgary LID (Low-Impact Development)

Municipal Development Plan, City of Calgary

Controlled Streets Bylaw (20m88)

Canada Food Inspection Agency (CFIA) Act

Canada Agricultural Products Act

National Energy Code of Canada For Buildings (NECB)

Alberta Building Code (ABC)

Solar Collector

Wind Energy Conversion System

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3.0 OPERATIONAL MANAGEMENT PLAN

3.1 OPERATIONS OVERVIEW

The following describes the typical operation for the new plant, based on a normal five day per week cycle.

3.1.1 Live Poultry Receiving and Processing

Poultry will start to arrive at the plant shortly after midnight in tarped trailers. Depending on daily production requirements, all poultry trailers will be on-site by mid-afternoon. All trailers will be staged inside an enclosed Live Shed that is light, temperature and humidity controlled to ensure that the birds are calm and not stressed. The birds are staged in the Live Shed for a minimum of two hours to ensure that they can relax from their transport from the farms. There will be no trailers of live birds staged in the yard. The controlled atmosphere of the Live Shed allows for the treatment of all exhausted ventilation air for odour control.

The trailers of birds will be moved from the Live Shed to the Live Receiving portion of the building according to the operation schedule. Trailers will not move unless they can be placed directly into the process.

Once the birds are moved into Live Receiving, they will be processed, chilled and packaged into various retail and wholesale packages for distribution world-wide.

3.1.2 Sanitation and Support Operations

Cleaning and sanitation of the plant will start sequentially with the finish of the second production shift. Again, through the process design, operational and cleaning shifts will be offset to ensure a smooth flow of traffic through the site and within the facility. Support operations for the plant will continue through the entire day. This can include visitors, maintenance contractors and waste removal.

3.1.3 Shipping and Receiving

The movement of finished goods from the plant will be via refrigerated trailer to customers; there will be no public retail operation on site. The majority of shipping will occur between 6 and 9 AM and after 8 PM. More products will be shipped later in the week than early, and the average number of shipments per day will be approximately 20 trailers. Shipping will be a seven day per week operation.

3.1.4 Waste Management

See section 7.0 Waste Management.

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3.1.5 Plant Population and Circulation

The plant population will vary through-out the day depending on the process schedule. From midnight to around 4 AM, the plant will only be minimally staffed for the receiving of birds. At approximately 5 AM until approximately 8 AM, the operating, shipping and office staff will arrive. At approximately 2 PM, the day shift will finish, and the afternoon shift will start to arrive. The two shifts will be slightly offset (facilitated by the process design) to ensure that the end of one shift does not coincide directly with the start of the second shift which reduces congestion in the parking area as well as traffic in and out of the site.

The plant will be configured with two separate entrances / exits to separate car traffic from truck traffic. This will reduce congestion at the access points for the plant and is safer for all personnel. The established sub division traffic flow requirements (entrance via right turn off 106 Ave. and exit via right turn onto 106 Ave.) will assist in the flow to and from the site and help reduce any potential congestion in the area. Further information on traffic movement is detailed in section 6.0 – Traffic Study.

3.2 NOISE, VIBRATION, ODOUR AND DUST CONTROL

Noise, vibration, odour and dust control will be achieved through a combination of operational protocols and engineering design. Odour and noise studies have been completed, to better assess the sources of noise and odour at the current facility and will serve as a basis for mitigation measures that will be incorporated during the detailed engineering design of the new facility. These studies are included in **Appendix B.**

Noise, vibration odour and dust will be largely controlled through basic design and operations methods: sources of noise and odours will be mitigated by the design of the facility and all poultry operations will occur indoors. Table 3-1 lists potential sources of noise/vibration, dust and odour, and mitigating control methods planned for the new facility.

Table 3-1 - Noise, Odour and Dust Control - Poultry Operations

Location	Activity	Noise, Odour and Dust Control
Site	Live Trailer Arrival	• Trailers go directly into Live Shed (noise and odour control) • Asphalt paved internal roads (noise and dust control)
Live Shed	Live staging	• Controlled conditioned enclosed holding space (noise, dust and odour control) • Modular live shed design (noise and odour control) • odour control on ventilation exhaust (odour control)
Poultry Plant	Poultry Processing	• odour control on ventilation exhaust (odour control)
Inedible	Inedible Loading	• Controlled enclosed holding space (noise, dust and odour control) • Odour control on ventilation exhaust (odour control)
Process Wastewater Treatment Plant (PWWTP)	Treatment of Wastewater and Loading of solid waste screenings and dewatered sludge	• Controlled enclosed holding space (noise and odour control) • Odour control on ventilation exhaust (Odour control)

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3.3 AMMONIA DETECTION SYSTEM

An ammonia detection system will be installed in Calgary plant to support the safety procedures and improve the emergency response. The sequence of actions has been built based on Sofina's emergency response plan, BC Safety Authority recommendations and previous experience and events.

3.3.1 Plant Zones

The plant has been broken down into zones, based on the environment, occupancy and risk of exposure. Each zone has different requirements and limits to appropriately address a potential release. The concept is designed to make the work environment and neighborhood safe and to allow for an efficient response in case of a release.

Table 3-2 - Zone Descriptions

		Zone 1	Zone 2	Zone 3	Zone 4	Zone 5
Location	Environment	Normal	Harsh (cold temperature and/or daily sanitation)	Harsh (cold temperature and/or daily sanitation)	Normal	Relief stacks
	Occupancy	Low	Low	High	High	
	Risk	High	Moderate	Moderate	Low	
	I.e.	Compressor room	Freezer	Refrigerated production room	Employee hallway	
Required hardware	Sensors	EC-FX-NH3 or equivalent 0-500ppm	EC-FX-NH3 or equivalent 0-500ppm	EC-FX-NH3 or equivalent 0-500ppm	EC-FX-NH3 or equivalent 0-500ppm	VL-F7-NH3-N4-LPA-MK 0-10,000ppm
	Exhaust fans	Yes	No	Yes (future)	No	
	Strobe lights	Yes (set = 1 orange and 1 red)	Yes (set = 1 orange and 1 red)	Yes (blue with horn)	Yes (blue with horn)	
	Controller	DDC controller to perform the sequence detailed below (with display of NH3 levels per room and remote display for outside the building)				

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Table 3-3 - Ammonia Sensor Locations

Location	Sensor #	Sensor Type	Zone	Strobes / sensor
Compressor Room	1	Normal	1	Orange Red
	2	Normal	1	Orange Red
	3	Normal	1	Orange Red
Freezer	4	Harsh	2	Orange Red
	5	Harsh	2	Orange Red
Penthouse 1	6	Harsh	2	Orange Red
Penthouse 2	7	Harsh	2	Orange Red
Blast Freezer	8	Harsh	2	Orange Red
Cooler	9	Harsh	2	Orange Red
	10	Harsh	2	Orange Red
Penthouse 3	11	Harsh	2	Orange Red
Penthouse 4	12	Harsh	2	Orange Red
FP Cooler	13	Harsh	2	Blue w/ horn
Shipping	14	Harsh	3	Blue w/ horn
	15	Harsh	3	Blue w/ horn
WIP Cooler	16	Harsh	3	Blue w/ horn
	17	Harsh	3	Blue w/ horn
Packaging	18	Harsh	3	Blue w/ horn
	19	Harsh	3	Blue w/ horn
FM Room	20	Harsh	3	Blue w/ horn
Bulk Rm 1	21	Harsh	3	Blue w/ horn
Bulk Rm 2	22	Harsh	3	Blue w/ horn
Cut-Up	23	Harsh	3	Blue w/ horn
	24	Harsh	3	Blue w/ horn
	25	Harsh	3	Blue w/ horn
Air Chill	26	Harsh	3	Orange Red
	27	Harsh	3	Orange Red
	28	Harsh	3	Orange Red
South Hallway	29	Normal	4	Blue w/ horn
	30	Normal	4	Blue w/ horn
East Hallway	31	Normal	4	Blue w/ horn
	32	Normal	4	Blue w/ horn
West Hallway	33	Normal	4	Blue w/ horn
	34	Normal	4	Blue w/ horn
Box Storage Mezzanine	35	Normal	4	Blue w/ horn
Relief Stack 1	36		5	
Relief Stack 2	37		5	
Relief Stack 4	38		5	
Relief Stack 5	39		5	

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Table 3-4 - Ammonia Detection Sequence

Location		Zone 1	Zone 2	Zone 3	Zone 4	Zone 5
		Compressor Room	Freezer	Production Rooms	Hallways	Relief Stacks
			Blast Freezer	Shipping	Box Mezzanine	
			Penthouses			
Actions when low limit reached	Low Limit	25 ppm	25 ppm	15 ppm	15 ppm	5000 ppm
	Exhaust Fans	On	NA	On	NA	NA
	Strobe Light	Orange ON	Orange On	Off	Off	NA
	Email	Send	Send	Send	Send	Send
Actions when high limit reached	High Limit	35 ppm	35 ppm	25 ppm	25 ppm	
	Exhaust Fans	On	NA	On	NA	
	Strobe Light	Red On	Red On	On	On	
	Email	Send	Send	Send	Send	

3.3.2 Exposure Limits

American Conference of Governmental Industrial Hygienists (ACGIH®) recommended exposure limit for ammonia:

- ACGIH® TLV® - TWA: 25 ppm
- ACGIH® TLV® - STEL: 35 ppm

Exposure Guideline:

- TLV® = Threshold Limit Value.
- TWA = Time-Weighted Average.
- STEL = Short-term Exposure Limit.
    - STEL = 15 minutes

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3.4 COMMUNICATIONS STRATEGY

3.4.1 Emergency Response Plan

A draft copy of Sofina's Emergency Response Plan has been attached in **Appendix A**. The Plan will be updated during detailed design, and again at completion, prior to occupancy.

3.4.2 Non-emergency Communications

Non-emergency communications with neighbors will be accomplished through a neighbor mass mailer e-mail. The communication method will be used to let surrounding neighbors know when non-typical events will be carried out on the site. This would be done for events such as yard sweeping where dust could be generated or special events.

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Odour Study

4.0 ODOUR STUDY

The preliminary Odour Study is presented in **Appendix B.2**

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Noise Study

5.0 NOISE STUDY

The preliminary noise study is provided in **Appendix B.3**

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Traffic Study

6.0 TRAFFIC STUDY

A traffic study is attached in **Appendix B.1**

7.0 WASTE MANAGEMENT

7.1 PROCESS WASTE

7.1.1 Process Waste Solids

Process waste solids will be stored indoors in trucks or bins and removed for further processing and disposal off-site by a third-party contractor in sealed, water tight trucks. The frequency of removal of solid wastes will depend on production but is anticipated to be five times per 24-hour period.

7.1.2 Process Wastewater

Process wastewater streams will be processed in the on-site waste water treatment facility prior to being discharged to the City sanitary system. The process includes one (1) mm rotating drum screens to remove finer solids, followed by flow equalization and dissolved air flotation (DAF). The DAF process will remove additional solids, fats oils and grease (FOG) and particulate 5-day biochemical oxygen demand (BOD5). The effluent from the DAF process will be further polished in a downstream biological treatment process to reduce additional BOD5, total-phosphorus and total kjeldahl nitrogen (TKN) before final discharge to the City sewer. Solids generated by the DAF and biological processes will be dewatered and sent off-site for additional processing. See section 8.0 Effluent Report

for further details.

7.2 PACKAGING WASTE AND RECYCLING

Packaging Waste and Recycling disposal will be contracted to a third-party and will be managed via two compactors (40 cu yd. Recycling, 30 cu. Yd. Waste) with a 4:1 compaction ratio, located to the south of the main process building, accessible via overhead doors at loading dock height (see drawings appendix). Waste and recycling will be collected from the ancillary spaces by sanitation staff daily and disposed in these waste and recycling compactors. Pickup will occur weekly.

7.3 FOOD AND YARD WASTE (COMPOSTING)

Food Waste disposal will be contracted to a third-party and will be removed via carts located in the lunch rooms throughout the facility. It is anticipated that this will be picked up twice per week as a minimum. This will be the same waste contractor that will remove the packaging waste.

Yard waste will be collected and removed by the site maintenance contractor when generated by yard maintenance activities.

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Waste Management

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Effluent Report

8.0 EFFLUENT REPORT

The effluent report is attached in Appendix B.4

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Sanitary Servicing Study

9.0 SANITARY SERVICING STUDY

The Sanitary Servicing Study is attached in **Appendix B.5**

APPENDIX A - ATTACHMENTS

Appendix A

A.1 SOFINA FOODS INC. EMERGENCY RESPONSE PLAN

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SOFINA	New Calgary Facility Occupational Health & Safety Management System	Issue Date:	April 16, 2018	Revision 2
		Last Review	August 31, 2018	Page 1 of 44
		Issued by:	Gerry Beadle, Plant Manager Harb Kamo, Health & Safety Manager	

Proposed Emergency Response Program New Calgary

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1.2 Instructions for all Employees & Visitors

IF YOU DISCOVER A FIRE OR AMMONIA RELEASE:

- Leave fire / release area immediately
- Close doors
- Call supervisor
- Leave the building by the nearest EXIT
- If you encounter smoke or ammonia in a stairway or corridor, use a different exit

WHEN YOU HEAR THE FIRE ALARM OR ARE TOLD TO EVACUATE

- Calmly leave the building by the nearest exit
- Close doors behind you
- Report to the muster station
- Do not return to the building until it is declared safe to do so by the fire department

CAUTION

- If smoke is heavy or the ammonia odor is strong in the exit route, it may be safer to stay in your area
- Close the door and place a wet towel or other object (i.e jacket, etc.) at the base of the door
- Remain calm
- Wait for the fire department

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Proposed Emergency Response Program New Calgary

1.3 Emergency Classification System – Crisis Management

LEVEL 3 – Crisis	Level 2 – Emergency	Level 1 - Incident
• Multiple serious injuries or a fatality to company personnel or others • Evacuation of the plant or neighbouring facilities due to a Sofina incident • Significant damage to property (>$50,000) • Regional or national media attention • Potential for or actual significant damage to public or neighbour's property • Potential for or actual government agency involvement that may result in charges or fines • Requires 3rd party emergency responders to mobilize and take action on site	• Serious /critical injury to company personnel or others • Evacuation of part of the plant • Damage to company property ($10 - $50,000) • Danger to a large area or more than one area or room of the plant • Minor local media attention • Potential for or actual damage to public or neighbour's property • Potential for or actual government agency involvement that may result in orders • Requires Sofina response team to mobilize	• Injury to company personnel or others on-site (minor, first aid, medical-aid, time loss injuries) • Damage to company property (<$10,000) • Damage contained to Sofina property • No involvement of government regulatory agencies • No media attention or not likely to receive medical attention
Immediate Actions		
• Take whatever action necessary, which can be performed safely, to protect the safety of persons, property and environment • Secure area and establish Incident Command Post	• Take whatever action necessary, which can be performed safely, to protect the safety of persons, property and environment • Secure area, Plant Manager to determine if Incident Command Post needs to be established	• Take whatever action necessary, which can be performed safely, to protect the safety of persons, property and environment • Implement Sofina Health & Safety Procedures
IMMEDIATE INTERNAL NOTICATION / REPORTING		**Immediate Notification**
• Health & Safety – Specialist & Manager, Director • Plant Manager • Vice President • Executive Vice President • Director – Communications & PR • Senior Manager – Risk & Environ	• Health & Safety – Specialist & Manager, Director • Plant Manager • Vice President • Director – Communications & PR • Senior Manager – Risk & Environ	• Supervisor • Health & Safety Specialist • Plant Manager

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1.4 Emergency Contact Information Lists

INTERNAL EMERGENCY CONTACTS			
NAME	TITLE	PHONE #	CELL #
Gerry Beadle	Plant Manager	403-718-0047 X-3344	604-308-7413
Abdul Rauf	Maintenance Supervisor	403-718-0047 X-3351	403-510-7303
Sukhdeep Dhillon	Maintenance Supervisor - Night	403-718-0047 X-3357	403-470-1640
Harb Kamo	Health & Safety Manager	403-718-0047 X-3358	604-557-6525
Chris Clark-Turcotte	Human Resources Manager	403-718-0047 X-3342	403-919-3836
Kristen Temple	Human Resources Generalist	403-718-0047 X-3336	587-437-0520
Sandy Adams	Quality Assurance Manager	403-718-0047 X-8328	403-605-4406
Ken Grant	Plant Superintendent	403-718-0047 X-3334	403-606-9908
Hector Gonzalez	Plant Superintendent - Night	403-718-0047 X-3334	403-831-2017
Daniele Dufour	Director, Corporate Communications & Public Relations	905-747-3322 X2118	416-435-4574
Paul Corbin	VP, Health & Safety & Environment	905-747-3322 ext 2132	416-707-4209
Robert Chrysanthou	Director of Engineering		587-341-5742
Les Cowley	Vp, Operation & Supply Chain		1-416-557-0783
Fabio Pozzobon	Executive Vice-President Legal and Counsel	1-905-747-3322 X-2104	
Bill Baker	Senior Manager, Risk & Environmental Management	780-472-4873	1-780-902-4029

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Proposed Emergency Response Program New Calgary

EXTERNAL EMERGENCY CONTACTS		
SERVICE / AGENCY	SERVICE / AREA OF INTEREST / JURISDICTION	CONTACT #
Police / Fire / Ambulance / Paramedic	Local emergency services	911
Fire Non-Emergency	Fire Department	403-264-1022
City of Calgary Waterworks	Floods, Stormwater Drainage and Drinking Water Services	311
Ministry of Labour – Occupational Health and Safety	OHS	1-866-415-8690
CANUTEC	Canadian Transport Emergency Centre	1-613-996-6666
Alberta Workers Compensation Board	WCB	403-517-6000
Ministry Of Environment – Alberta	Environmental Emergencies	1-800-222-6514
Mayken Hazmat Solutions	Spill Response/Clean Up	403-272-1995
TYCO – Security Alarms (ACC#N272232844)	Security Alarm Company	1-800-289-2647
CIMCO – Refrigeration	Third Party Refrigeration Centre	403-250-5501
ATCO	Power Related Issues	403-292-7500
Enmax	Electricity	403-514-6100
Home Depot	Neighbouring Facility (notify of release)	Pending
Rocky View County	Emergency Duty Manager	403-585-3718
TBD	Neighbouring Facility (notify of release)	

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1.5 Training

- All personnel, contractors and visitors will be trained in the basics of evacuation.
- All personnel will receive training in the dangers of ammonia, the detection triggers and how to respond.
- The Emergency Response Team will be trained in all possible emergency scenarios utilizing table top exercises.
- Maintenance will be trained in the use of full-face respirators and responses to ammonia releases. Only those maintenance workers who are authorized and trained in refrigeration emergency repairs will be fit tested.
- Annual drills will be conducted for all shifts.
- Drills will be planned by the Emergency Response Team and held randomly to ensure a true evaluation of the response system.

Emergency Response Team Training

At a minimum, the following individuals will receive annual training in their responsibilities as outlined in the Emergency Response Program

- Incident Commander (Lead) –Plant Manager
- Production Supervisors
- Maintenance Supervisors
- Health & Safety Manager
- Human Resources Manager
- Quality & Food Safety Manager

Additional training in emergency response responsibilities will be assigned at the discretion of the Plant Manager in consultation with the Health and Safety Manager.

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Supervisor Training

Supervisors will receive training in their emergency response plan responsibilities on a minimum annual basis. Their training will include all aspects of their emergency response program responsibilities including, but not limited to:

- Primary and secondary evacuation routes for work areas under their responsibility,
- Locations of emergency response equipment such as horns, vests, communication devices and fire extinguishers,
- Responsibilities for emergency response in other emergency scenarios including, but not limited to, Fire, earthquake, extreme weather, power outages, flammable gas leaks, intentional human threats, medical emergency response, spills, shelter in place and External notification protocols.

Annual Drills

Fire drills will be conducted on a minimum annual basis and involve a full facility evacuation. The primary purpose and objectives of the fire evacuation drill include:

- Identification of any weaknesses in the evacuation strategy,
- Test the procedure following any recent alterations or changes to work practices,
- Familiarize new personnel with procedures,
- Test arrangements made for people with disabilities,
- Identify weaknesses in emergency communication procedures and systems,
- Identify positive and negative reactions of staff with emergency response plan responsibilities.

Additional emergency response drills based on alternate emergency scenarios will be conducted on an as needed basis. Additional drills will be scheduled by the Plant Manager in consultation with the Health and Safety Manager.

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Emergency Evacuation Evaluations

An evacuation drill evaluation form will be completed for all emergency response drills conducted utilizing the Evacuation/ Drill Report Form (Appendix 7).

The Plant Manager will be responsible for assigning responsibility for addressing corrective actions required post drill and tracking closure of actions taken.

Records for all drills and corrective actions taken will be maintained by the Health and Safety Specialist and maintained on file for two years.

Responsibilities

Incident Commander

Assumes command on scene, oversees and leads aspects of the response, including developing incident objectives and directing activities. *NOTE: First responder on scene becomes Incident Commander until Plant Manager or designate arrives.*

Responsibilities:

- Assume overall authority for emergency or crisis unless higher command arrives (e.g. Fire Dept);
- Direct response operations from Incident Command Post,
- Establish immediate priorities especially the safety of all involved,
- Determine objectives and approve implementation of action plan,
- Monitor incident organization and responder activities,
- Authorize/summon resources, as needed,
- Notifying, if needed, Police, Fire, Ambulance and any other organizations,
- Declares the emergency response termination and initiates recovery plan,
- Acts on behalf of Sofina Foods, as instructed.

Maintenance Supervisor and Department

Support emergency operations by providing technical/engineering services, facilities management, equipment and manpower.

Responsibility:

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- Coordinate with Incident Command and arriving emergency services
- Provide Fire Department with keys, plans and access codes to all areas of the building
- Identify all hazardous areas, situations and materials in the facility for emergency responders
- Be available to assist the emergency responders

Health & Safety Manager

Support emergency operations with the goal of protecting life and health of all people

Responsibility:

- Identifies potential hazards and risks involved in a response,
- Recommend measures to Incident Commander for assuring health and safety,
- Assess and/or anticipate hazardous and unsafe situations,
- Ensure responders are properly prepared and have PPE,

Live Operations Admin. & Payroll Clerk / Production Supervisor(s)

Support emergency operations with the goal of protecting life and health of all people

Responsibility:

- Assist the Incident Command with organization of personnel, visitors and contractors
- Initiate notification phone calls to impacted businesses

First Responders

On-site response activities under the leadership of the Incident Commander and Health & Safety Manager.

Responsibility:

- Assess the situation and determine which additional resources will be required
- Cut off and restore utilities as needed
- Assist emergency responders as directed

Director, Corporate Communications & Public Relations

Directing communication with the larger organization and public.

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Responsibility:

- Notifying ELT members as necessary,
- Develop crisis communications strategy
- Informing other parts of Sofina of the situation
- Communicating with the media and public

EXTERNAL PARTIES

Municipal Fire Department

Firefighting and ensuring life-safety for employees and the public.

Responsibility:

- fights fires,
- rescues trapped or injured people from buildings,
- assists other services such as cutting off or restoring utilities

Municipal Medical Emergency Response

Emergency medical treatment and transport

Responsibility:

- Assessing injured people and providing emergency medical treatment
- Coordinating aid and treatment for multiple casualties
- transport casualties to treatment facilities (hospital)

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Operational Management Plan

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		Last Review	August 31, 2018		Page 12 of 44
		Issued by:	Gerry Beadle, Plant Manager Harb Kamo, Health & Safety Manager		

Proposed Emergency Response Program New Calgary

Emergency Response & Evacuation Plans

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2.1 Evacuation Procedure

ALARM & WARNING SIGNAL ACTIVATION

Any employee or visitor may activate the alarm for evacuation by notifying a supervisor or any pull station throughout the plant.

The alarm/warning signal for an evacuation is a siren.

If a siren is heard or instructions given over the radio to evacuate, the Supervisors will direct the evacuation of their departments.

INCIDENT COMMAND SYSTEM

The Emergency Response Team will work under the direction of the Incident Command and will make all decisions concerning the response, facility and operations during a level 2 Emergency or Level 3 Crisis, in which an Emergency Response Plan (ERP) is implemented.

The Emergency Management Team includes:

- Incident Command (Lead)
- Maintenance Manager
- Health & Safety Manager
- Human Resources Manager
- Quality & Food Safety Manager

The Plant Manager is Incident Command. Following are designates in the Plant Manager's absence for the purpose of this procedure:

- Day Shift – Superintendent Days
- Afternoon Shift – Superintendent Afternoons
- Sanitation Shift – Sanitation Supervisor

The primary Incident Command Post is located on the school field in front of the property outside the office & employees' entrance.

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Proposed Emergency Response Program New Calgary

ALARM RESPONSE

When the alarm sounds:

1. Health & Safety Manager and Incident Command (or designate) will immediately go to the fire panel at the main office entrance and radio the area where the alarm is coming from.
2. Management, maintenance or supervisors in that area of the plant will perform a check to determine if there is an emergency or if it is a false alarm.
3. Management, maintenance or supervisors will radio back to confirm the nature of the alarm (i.e. real emergency or false alarm/controlled situation and type of emergency – fire, ammonia release, medical).
4. If the emergency is an ammonia release, the Health & Safety Specialist will exit the building to view the wind sock to determine appropriate muster station or shelter-in-place.
5. When evacuating due to fire:
   a. If evacuation is necessary, Incident Command (or designate) will confirm evacuation on the radio and request confirmation of order from each supervisor (check-in).
6. When evacuating due to ammonia release:
   a. View the wind sock, use radio to communicate up-wind direction and advise assembly location.
   b. Follow the Ammonia Leak Initial Response flowchart.
7. Non-evacuation emergencies:
   a. Some types of emergencies (i.e. ammonia release) may not require immediate or full evacuation of the building or area.
   b. Incident Command (or designate) will ascertain the nature of the emergency and determine appropriate actions including Shelter-in-Place (2.2).
8. False Alarms (including sprinkler malfunctions):
   a. Incident Command will verify that it is a false alarm and there is no evidence of fire or hazardous material release.
   b. Incident Command or Maintenance Supervisor will call the security alarm company to advise the sprinkler alarm is false.

The alarm may only be silenced by the Fire Department or on their authorization

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Proposed Emergency Response Program New Calgary

EMERGENCY ORGANIZATION

1. Incident Command (or designate) will collect the emergency kit from the construction box located beside the Atco trailer.
2. Health & Safety Manager (or designate) will monitor the radio in the event first aid assistance is needed in some other area of the plant.
3. Incident Command, Health & Safety Manager and Maintenance Manager will move to the designated Incident Command Post, which is located on the school field in front of the property outside the office & employees' entrance.
4. The Live Operations Admin. Clerk, Payroll Clerk (or designate) will obtain the Visitors / Contractor Log Book located in the front entrance and report to the Incident Command Post. The Maintenance Supervisor will obtain the Visitors / Contractor Log Book for the afternoon shift. The Shipping Supervisor (or designate) will obtain the Visitors / Contractor Log Book located in the shipping office and report to the Incident Command Post.
5. The Payroll Clerk (or designate) will obtain the 'evacuation report' located in the payroll office and report to the Incident Command Post (these reports are printed every day at 8:00 am after all shifts starts and 3:30 pm for afternoon shift).
6. Supervisors/Lead hands will evacuate all personnel in their area, regardless whether they are from another department or are visitors.
7. For evacuations during the weekend, the Maintenance Manager (or designate) will take the Contractor sign-in log book from the Shipping Office and report to the Incident Command Post.

EVACUATING OCCUPANTS

1. If a continuous alarm bell is heard employees will follow the evacuation instructions provided on signage in plant and direction from supervisory staff (Appendix 3)
2. Once advised to evacuate, all personnel (employees, contractors, visitors, etc.) will:
   a. Turn off any running equipment, put down any equipment or tool being used.
   b. Leave work area immediately.
   c. Close doors.
   d. Leave the building by the nearest exit.
   e. If encountering smoke or ammonia in a stairway or corridor, use an alternate exit.

f. Follow evacuation routes as posted.
g. All personnel including contractors and visitors are to report to the designated Muster station (TBD).
h. If evacuating due to ammonia release, supervisors will direct evacuees based on directive from Health & Safety Manager or designate.
i. Keep clear of building, driveways and road to permit emergency vehicle access
j. Await further instruction.

3. All personnel at evacuation point will stand by for the ALL CLEAR signal given by Incident Command, through supervisors to either return to the building or leave the property.

EVACUATING PERSONS WITH DISABILITIES

1. Persons with physical disabilities should be immediately evacuated out of the building, to the assembly point or to a rescue area with an accompanying staff member.
2. Supervisors will advise Incident Command and/or Emergency Services of this situation so that further evacuation can be arranged, if required.
3. Incident Command will notify the first responding agency of any disabled, trapped or injured persons.
4. If evacuation is not possible or advisable, then the staff member should initiate Shelter-in-Place (2.2) with the individual.
5. Shelter-in-Place should be considered if the staff member is not physically capable of assisting the disabled person out of the building.

SECURING THE EVACUATED AREA

1. Supervisors or designates will:
   a. Complete a final sweep of their area to verify it is evacuated; and
   b. Radio Incident Command to report that their area was evacuated and is secure.
2. Health & Safety Manager (or designate) will ensure any hazard areas (i.e. moving traffic) where evacuees muster is secured with caution tape to keep the area secure, and contact local traffic control company to assist where necessary.

ACCOUNTING FOR EVACUEES

1. Supervisors will account for all employees after the evacuation; each department will conduct a head count at the assembly point.

For Day Shift – the Supervisors or designate will do the head count for their department.

For Afternoon Shift – the Supervisors or designate will do the head count for their department.

For Graveyard / Sanitation Shift - the Sanitation Supervisor (or designate) will do the head count for the shift.

2. Supervisors will communicate to Human Resources (or designate) the head count results identifying any missing persons and any additional pertinent information.
3. If the Supervisor has employees from other departments or visitors in their group they will give the names to Human Resources (or designate).
4. Live Operations Admin Clerk/Payroll Clerk will advise Human Resources (or designate) of names of any visitors or contractors signed in to the plant that day.
5. In the event any person is unaccounted for, the Supervisor or designate will radio in the names to the Incident Command who will determine whether a search and rescue will take place and if so, notify emergency services (Fire Department).
6. Veterinarians will conduct CFIA head counts and ensure all Inspectors/CFIA employees are clear of the building. After confirming this, the Veterinarian will report to Human Resources (or designate).
7. If the evacuation is related to an ammonia release, the Health & Safety Manager (or designate) will monitor the wind sock and communicate to the Incident Command if conditions change and relocation of evacuees is required.

ALL CLEAR SIGNAL ACTIVATION

1. The Incident Command will allow personnel to return to the facility once the Fire Department has provided an ALL CLEAR.
2. Once Supervisors and Managers have received instructions from Incident Command that the emergency response has been cancelled, they will verbally communicate the all clear to employees, contractors and visitors.

2.2 Shelter in Place

Definitions

Shelter in Place – to seek immediate shelter and remain there during an emergency rather than evacuate the facility. The decision to Shelter-in-Place will be made by the Incident Command in consultation with the Health and Safety Specialist.

Severe Weather - refers to any dangerous meteorological phenomena with the potential to cause damage, serious social disruption, or loss of human life.

Potential Violence –Situations external to the facility that are known or ought reasonably to be known to pose the potential for injury to employees or guests within the facility. Situations may include but are not limited to violent protesters, civil unrest, verbal threats made against a person or groups of persons within the facility.

External Environmental Conditions – External environmental conditions could include but are not limited to chemical spills or environmental pollution (including chemical, biological or radiological).

SHELTER IN PLACE (HAZARDOUS RELEASE)

1. Move to a room with no windows – lunchroom, hallways, coolers, production floor.
2. Rooms that have little or no ventilation are preferred.
3. Close any open windows and doors.
4. Only come out when you are told that it is safe by the Incident Command.

SHELTER-IN-PLACE (VIOLENCE)

1. Stay in your departments, offices or production areas.
2. Notify those around you, and encourage others to remain in your area rather that to try to leave the building.
3. Lock the doors, cover the door window, pull down the blinds, turn off the lights and stay calm.
4. Stay away from the windows. Stay on floor out of view of windows.
5. Report any suspicious activity, sounds or smells to the Incident Command if safe to do so.
6. Only come out when you recognize the authority directing you to do so.

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Proposed Emergency Response Program New Calgary

SHELTER-IN-PLACE (WEATHER – Earthquake, Storms)

1. Move to lower levels of the building as they usually provide the best protection
2. Move to an interior room with no windows – Lunchroom, hallways, coolers.
3. In the event of an earthquake - crawl under furniture. Stay away from door frames.
4. Cover your head.
5. Stay in the centre of the room away from doors and windows.
6. Stay in place until the danger has passed.

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2.3 Ammonia Release Response

Definitions

Major Release – 25 ppm or greater. Evacuation initiated.

Minor Release – less than 25 ppm. No evacuation required while being assessed.

Production Alarm Limit –25 ppm of ammonia detected by either the fixed detectors or personal handheld detectors.

Non-production Alarm Limit – *35 ppm of ammonia detected by personal handheld detectors.*

Response Triggers –

Smell/Respiratory (generally detected around 2 ppm)

a. Pungent odour
b. Nasal irritation
c. Upper respiratory tract irritation

Sight

d. Eye irritation
e. Visual ammonia cloud
f. Ammonia Detection Monitor Reading
g. Employee in distress

Audible

h. Hissing noise from potential line break
i. Audible alarm from detector

INITIAL DETECTION PROTOCOL

1. Immediately notify Supervisor.
2. Supervisor to contact Maintenance and inform them of detection of ammonia.
3. Maintenance is to contact Plant Manager (or designate) and Health & Safety Manager (or designate) immediately and report location of ammonia detection.
4. Maintenance to follow the NH3 Exposure Control Plan – Emergency Procedures.

LEAK DETECTED (Production or Non-Production Areas) – No Alarm

1. Supervisors to notify any personnel in the immediate or adjacent area of the detection that Maintenance has been informed.
2. If supervisors feel there is an immediate risk to health or safety evacuate the work area immediately.

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3. If alarms start
    a. Health & Safety Manager to view wind sock and advise Incident Command which muster point to evacuate workers to.
    b. Incident Command to radio supervisors with muster point location.
    c. Incident Command to initiate the NH3 Exposure Control Plan – Emergency Procedures.
4. Only the authorized maintenance workers can remain or re-enter the building once they have:
    a. Referred to the external ammonia sensor monitoring panel
    b. Determined that the ammonia levels do not exceed 250 ppm
    c. Their fitted / personal respirators donned
    d. Two authorized workers to enter together
    e. The appropriate tools to resolve the issue
    f. Communication equipment - radios

RELEASE TRIGGERS ALARM

1. When alarms starts:
    a. Supervisors to monitor radios for instructions while getting workers organized to evacuate.
    b. Health & Safety Manager to view wind sock and advise Incident Command which muster point to evacuate workers to.
    c. Incident Command to radio supervisors with muster point location.
2. Incident Command to initiate the NH3 Exposure Control Plan – Emergency Procedures.
3. All workers to evacuate the building and proceed to the Muster Station.
4. Only the authorized maintenance workers can remain or re-enter the building once they have:
    a. Referred to the external ammonia sensor monitoring panel
    b. Determined that the ammonia levels do not exceed 250 ppm
    c. Their fitted / personal respirators donned
    d. Their personal gas detection monitors that are calibrated and bump tested
    e. Two authorized workers to enter together
    f. The appropriate tools to resolve the issue
    g. Communication equipment – radios

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2.4 Spill Response

Definitions

Major Spill - Any hazardous material spill that involves highly toxic, highly reactive or explosive chemical, or represents a credible risk of fire or immediate risk to an individual's health or safety.

Minor Spill –Spills manageable by trained employees who, when wearing proper Personal Protective Equipment (PPE), can be cleaned up without risk to any individual's health or safety.

Note: For ammonia releases refer to the NH3 Exposure Control Plan – Emergency Procedures.

INITIAL DISCOVERY PROTOCOL

1. Notify any personnel in the immediate area of the spill
2. If immediate risk to health or safety evacuate the work area
3. Look for labels and other marking on container and identify the material released, if possible.
4. Isolate the area of the spill
5. Extinguish any sources of ignition, if safe to do so.
6. Notify plant maintenance and/or trained spill responder
7. Call 911 if situation is immediately life threatening

NOTIFICATION AND ASSESSMENT

1. Supervisor will notify the Health & Safety Manager and plant spill responders when a spill discovery has been reported.
2. Health & Safety Manager will contact the Plant Manager (or designate) to advise of the spill and continue to keep updated on assessment.
3. Health & Safety Manager will contact regulatory agencies to report the incident.
4. Trained spill responder conducts an initial assessment and determines if the incident is a major spill or a minor spill.
5. Secure the affected area from entry by unauthorized personnel.
6. Trained spill responder gathers information on spill details.
7. If an off-site chemical release occurs that may impact the facility, the Incident Command will assess the situation and decide if a Shelter-in-Place procedure is required

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Only trained responders may attempt to control a spill

MINOR SPILL RESPONSE

The trained spill responders will:

1. Evaluate the situation and hazards.
2. Review Material Safety Data Sheets (MSDS) to:
   - Identify and understand hazards
   - Identify appropriate PPE
   - Determine proper and safe control measures
3. Assess situation and internal capabilities.
4. Don the appropriate PPE.
5. Cordon off the affected area (hot zone) with caution tape to prevent others from entering and further contamination of other areas.
6. If vapors are in the area of a ventilation intake immediately shut down the ventilation system following the 2.5. Ventilation System Shutdown Procedures.
7. Notify external response agencies (Fire Department), if necessary.
8. Clear adjacent area (warm zone), if necessary.
8. Lockout any energy sources.
9. Stop the spill, release or discharge by shutting down the equipment, closing valves and pumps or plugging hoses.
10. Remove or disable potential sources of ignition.
11. Contain the spill by means of absorbent pads, dykes or other means to prevent the spill from entering drains or exiting the building/area.
12. Recover pooled liquids and placing in drums for temporary storage and collect residual liquids with absorbent pads.
13. Skim and soak up of any spill in standing water.
14. Taking photographs of contaminated and affected area(s).
15. Place any absorbent materials, contaminated soils or materials in temporary storage to await disposal.

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MAJOR SPILL RESPONSE

1. Incident Command will determine whether to request third party spill responders assistance:

   Third Party Spill Responders

   - Contracted Third Party Spill Responders will perform spill clean-up and containment, transport and dispose of the waste material.

RECOVERY ACTIONS FOR "MINOR SPILLS"

1. Refer to MSDS.
2. Don PPE.
3. Bring spill kit to site of spill.
4. Recover or clean up the material spilled. Collect liquids absorbed by solid materials and placed into open top containers such as a pail or bag, or if size warrants, into a drum.
5. Close and label containers. When containers are filled after a cleanup, lids must be secured and the container appropriately labeled identifying the contents, the date of the spill/cleanup, the site name and location and the words "hazardous waste."
6. Material that cannot be reused must be discarded as hazardous waste. Cleanup water must be minimized, contained and properly disposed of.
7. Clean-up the spill area.
8. Surfaces that are contaminated by the spill or release should be cleaned using an appropriate cleaning substance or water – refer to MSDS.
9. Decontaminate equipment and tools used in cleanup.
10. Arrange for proper disposal of any waste material. Waste material from the cleanup must be characterized by a qualified hazardous waste vendor or Health and Safety Specialist. Sampling and analysis may be necessary to determine proper disposal method.
11. The Health and Safety Manager will make the necessary notifications to government agencies, if necessary. In all cases where verbal notification is given, a confirming written report shall be sent to the same entity.

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2.6 Emergency Medical Response

OUTSIDE AGENCY COORDINATION

In the event emergency service assistance from local Fire & Emergency Services has been requested, Supervisor will ask someone to meet and arrange for an escort from the main entrance to the location of the medical emergency.

EMERGENCY MEDICAL RESPONSE

1. Ensure the safety of the area BEFORE approaching injured party.
2. Supervisor and First Aid must be informed immediately.
3. Injured worker not to be left alone. Assign someone to go for First Aid and report back.
4. WALK CALMLY.
5. First Aid Attendant to assess the injured party.

SERIOUS INJURY OR ILLNESS

1. Ensure the safety of the area BEFORE approaching injured party.
2. Supervisor and First Aid must be informed immediately.
3. Injured worker not to be left alone. Assign someone to go for First Aid and report back.
4. WALK CALMLY.
5. First Aid Attendant to assess the injured party.
6. If required, call 911
    a. Describe type of injury
    b. Give contact phone number
    c. Specify location where the help will be directed
7. If a serious injury, call WCB (worker is being transported by ambulance).
8. Secure the scene of the accident for the Incident Investigation. Scenes can only be disturbed in the moving of an injured party. If possible, take photos before anyone or thing is moved.
9. Keep the casualty still and comfortable. Ask them "Are you okay?" and "What is wrong?"

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10. Do NOT administer food or drink to an injured person (unless patient is diabetic).
11. Continue to assist the casualty until help arrives.
12. While waiting for appropriate emergency personnel to respond obtain and record as much information as possible pertaining to the casualty and/or circumstances.

NON-LIFE THREATENING MEDICAL CONDITIONS

1. Provide the necessary First Aid.
2. DO NOT administer any medication, food or drink (unless patient is diabetic).
3. If worker requires further medical care, call a taxi and have another employee escort the injured party to seek medical attention.
4. Complete reporting to WCB within 72 hours.

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2.7 Earthquake

When shaking begins:

- Remain where you are
- DROP – get down to the ground and stay where you are. Stay in a crawling position and cover your head and neck with your hands/arms.
- COVER – get under a table, desk, if there's nothing there an inside corner wall.
- HOLD ON - to whatever you're under or next to.
- Protect yourself from windows or tall shelving and unsecured racking.
- Wait for the shaking to subside.
- Wait for instructions on whether to remain in the building or to evacuate.
- If remaining in building – move slowly and away from areas that have been damaged.
- If evacuating the building go to the Muster Point.

NOTIFICATION & IMMEDIATE ACTIONS

1. Incident Command (or designate) and ERP Team will assess the situation and make a decision on the safest location to hold people.
2. ERP team to set up Command Centre with equipment from the emergency equipment box outside of the main entrance.
3. First Aid will set up a triage centre next to the Command Centre.
4. Health & Safety Specialist (or designate) will monitor the radio in the event first aid assistance is needed in some other area of the plant.
5. Contact Supervisors to account for missing individuals and appoint search teams.

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RE-ENTRY AND ACCESS TO FACILITY

Incident Command, Health & Safety Specialist and Maintenance Manager will assess damage and determine if it is safe to re-enter the buildings.

Maintenance Manager

If safe to do so, Maintenance will re-enter to:

- Check for fire or fire damage.
- Check for potential natural gas or ammonia leaks.
- Check for hazards (i.e. object which may still fall, exposed electrical wiring, etc.)
- Check for flooding or water damage.
- Survey hazardous materials storage areas to check for chemical spills/releases.
- Secure utilities (natural gas, water, electricity).
- Inspect heating, ventilation and refrigeration systems.
- Evaluate condition of utilities, shut-down or restore as able (gas, electric, ammonia, water, sewer, etc.).
- Identify usable structures to house evacuated employees in order to provide shelter from weather.
- Identify, survey, secure and make an inventory of valuable equipment on site

FURTHER ACTIVITIES AND OPERATIONS

Incident Command

- Organize relocation of personnel to provide shelter. Consider as high priority if weather warrants.
- Authorize relocation or cancellation of activities and/or operations, if necessary.
- Authorize closing of facilities, if necessary.
- Establish security watches to protect property from criminal activity.
- Coordinate and communicate administrative decisions regarding the short-range and long-range response to the emergency.

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Health & Safety Specialist

- Identify and seal off condemned areas (tape, barriers, etc.)
- Contact Director, Health & Safety and advise of support needs.
- Contact EAP provider to establish support for employees to cope with the crisis.

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2.8 Extreme Weather

- In the event of an imminent weather condition, notify the Supervisor or management representative
- Take cover indoors in a room with no windows to the outside
- Share notification with others
- Beware of flying debris;
- Call 911 only if you require immediate emergency assistance

The decision to suspend operations and close the plant due to extreme weather will be made by the Plant Manager in consultation with the Vice-President of Poultry Operations.

SEVERE THUNDER OR WINDSTORM WARNING

1. Keep people indoors and away from windows until the severe storm passes.
2. Continue normal activities but monitor the situation.
3. If you are outside, seek shelter immediately.
4. Keep employees away from natural lightning rods like tall trees in an open area, isolated sheds or other small structures in open areas and metal objects
5. If thunder is heard less than 30 seconds after seeing a flash of lightning, ensure all employees seek safe shelter indoors immediately.
6. Listen to radio, TV or check for updates on internet.
7. If a severe windstorm strikes a without advance warning, the Incident Command will order immediate relocation to safe areas within the facilities.

SEVERE WINTER WEATHER

1. Monitor local weather broadcasts and weather conditions
2. Keep employees indoors and minimize outdoor work and travel.

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3. When freezing rain is forecasted, avoid work outside and driving if possible. If travel is necessary, encourage drivers to drive slowly and increase distance require for stopping.
4. Ice from freezing rain accumulates on branches, power lines and buildings.
5. If employees must go outside when ice has accumulated, instruct them to pay attention to branches or wires that could break due to the weight of the ice and fall. Ice, branches or power lines can continue to break and fall for several hours after the end of the precipitation.
6. Monitor the property for and avoid for downed trees and power lines. Never approach power lines. A hanging power line could be charged (live) and you could be electrocuted. Stay back at least 10 meters (33 feet) from wires or anything in contact with them.
7. If Power lines are downed call ATCO (see section 1.4 Emergency Contact Information List)

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2.9 Power Outage

- Everyone is to STOP and STAY where they are.
- Wait for the emergency lighting to come on or for Supervisors to come with emergency lighting.
- Put knives in scabbards.
- Proceed slowly and cautiously to secure area.
- ERP Team and Supervisors to get flashlights and assist workers in getting to safe location away from equipment e.g. hallways or lunchroom.
- Maintenance is to initiate equipment shutdown immediately. Lockout must be done on all equipment that workers will be required to remove product from.
- Plant Manager and Supervisors will review the immediate situation and make a plan on how to minimize disruption and destruction of production.
- Production teams may be assigned to recover product from lines. Ensure lockout has been initiated before proceeding.
- Check media using cell phones to determine if power outage is plant or area affected.
- When power is re-established, all equipment must be checked before restart.

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Operational Management Plan

2.10 Flammable Gas Leak

- In the event of a gas leak, notify the Supervisor or management representative
- Warn others in the immediate area
- Evacuate the building
- Call 911

Gas leak detected (smell of gas, hissing sound, visible broken pipe)

1. Cease all operations. Leave equipment and lights on and running
2. Notify the Incident Command and report the location of odor
3. Incident Command to call 911
4. Warn others in the immediate area
5. Leave doors open and any windows that may already be open,
6. Evacuate and secure area or if outside, isolate the area
7. Prevent source of ignition (no cutting, torches, cigarettes , etc.)
8. Incident Command will gather team at Incident Command Post,
9. Maintenance Manager will assign employee to turn off gas at the meter (turn the shut-off valve ¼ turn, gas is off when the valve is perpendicular to the pipe)
10. Maintenance Manager will meet and assist Fire Department,
11. Do not re-enter building or outside area until cleared by Fire Department.

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2.11 Intentional Human Threats

1. In a violent incident the first priority is personal safety.
2. Wherever possible, individuals at risk should go to a safe location, warning others who are in the vicinity as appropriate.
3. If possible, call
   a. 911
   b. Plant Manager phone 403-718-0047, ext. 3344
   c. Health & Safety Manager phone 403-718-0047, ext. 3355
   d. Superintendent days/afternoon phone 403-718-0047 ext. 3333
4. Request assistance, giving the location and as many other details of the situation as possible.
5. Management will contact local police as required and direct them to the necessary location.
6. Stay safe by being quiet. Hide. Do not confront.

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2.12 External Notification and Release Reporting Requirements

WCB 24 Hours 1-403-517-6000

Call immediately whenever there is a major release of ammonia (more than 10 lbs)
Call immediately if a person has been seriously or fatally injured.
Call immediately if there was the potential for serious injury or major property damages.
Call within 72 hours if an injured person has had to seek medical attention.
Provide Preliminary investigation within 48 hours.

Ministry of Environment 24 Hours 1-800-222-6514

Call immediately whenever there is a major spill (more than 10 gallons).
Call and report all spills that enter drains or storm sewers.
Provide Preliminary investigation within 48 hours.

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APPENDICES

Definitions

Facility Description (TBD)

Facility Fire Plan

Incident Command Checklist

Emergency Equipment Checklist

Emergency Personnel PPE Checklist

Emergency Drills Evaluation

Evacuation Diagrams (TBD)

Inventory of Hazardous Materials Storage (TBD)

Risk Assessment

Site Location Map (TBD)

Site Plan Showing Storm and Sanitary Sewers (TBD)

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Definitions

Assembly_Point – designated location intended to provide a safe area for individuals to congregate while either waiting for emergency personnel to respond or to receive transport to reception centre / facility.

Biological Agents – living organisms that cause disease, sickness and mortality in humans.

Emergency – a present or imminent incident requiring the prompt coordination of actions, persons or property in order to protect the health, safety or welfare of people, or to limit damage to property or to the environment.

Emergency Organization- group or organization with staff trained in emergency response that are prepared and may be called upon to respond as part of the coordinated response to an emergency situation.

Emergency Response Plan – a risk-based plan developed and maintained to respond in the event of an emergency.

Exercise – a simulated drill or sequence of events to evaluate plans and procedures. An exercise is a focused practice activity that places participants in a simulated situation requiring them to function in the capacity that would be expected of them in a real event.

Incident Command – the management representative on site who is in charge of coordinating resources and developing actions to resolve the emergency situation.

Incident Command Post (ICP) – the location from which the Incident Command in charge oversees all emergency response operations. An ICP is only established when an incident occurs. There is only one ICP for each incident or event. However, the ICP may change locations during the Incident depending on conditions. The ICP will be positioned outside of the present and potential hazard zone but close enough to the incident to maintain command. The ICP may be located in a vehicle, trailer, tent or within a building.

Hazard – a situation with a potential for human injury, damage to property, damage to the environment or some combination of these (CAN/CSA-Z731-02).

Hazardous Material- a substance (gas, liquid or solid) capable of creating harm to people, property and the environment e.g. materials which are flammable, toxic, etc.

Mitigation – actions taken to reduce the risks and impacts posted by hazards.

Mutual Aid / Mutual Assistance Agreement - a pre-arranged agreement entered into by two or more entities whereby the parties to the agreement undertake to render assistance to each other.

Preparedness – measures taken in advance of an emergency to ensure an effective response and recovery.

Prevention – measures taken to avoid an incident or stop an emergency from occurring.

Recovery – activities and programs designed to return conditions to a level that is acceptable to the entity following an emergency or other event.

Reception Centre / Facility – located outside the impact zone of the emergency, the place where evacuees go to register, receive information and shelter.

Response - actions taken during or immediately after an emergency to manage its consequences.

Stakeholder – any individual, group or organization that might affect, be affected by, or perceive itself to be affected by an emergency.

Threat – any event that has the potential to disrupt or destroy critical infrastructure, or any element thereof. Threat includes accidents, natural hazards as well as deliberate attacks.

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Emergency Response Communication Plan

An important component of the emergency response program is the emergency communications plan. Sofina Calgary plant must be able to respond promptly, accurately and confidently during an emergency in the hours and days that follow. Many different audiences must be reached with information specific to their interests and needs. The image of the business can be positively or negatively impacted by public perceptions of the handling of the incident.

This step provides direction for the communications plan. Understanding potential audiences is key, as each audience wants to know: "How does it affect me?" The Plant will need to use existing resources to gather and disseminate information during and following an incident.

Audiences

There are many potential audiences that will want information during and following an incident and each has its own needs for information. The Plant will identify potential audiences, determine their need for information and then identify who within the facility and the company is best able to communicate with that audience.

The following is a list of potential audiences: Customers, Survivors impacted by the incident and their families, Employees and their families, News media, Community—especially neighbors living near the facility, Company Senior management, Government elected officials, regulators and other authorities and Suppliers.

Contact Information

Contact information for each audience will be compiled and immediately accessible as part of the Emergency Response Program document during an incident. The following information for each contact will be included: organization name, contact name, business telephone number,

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cell number and email address. Lists will be updated regularly, secured to protect confidential information and available to authorized users at the facility. Hard copies of lists should also be available at the alternate location.

Customers

Customers are the life of our business, so contact with customers is a top priority. Customers may become aware of a problem as soon as their phone calls are not answered or their electronic orders are not processed. The business continuity plan will include action to redirect incoming telephone calls to proper communication channel. The business continuity plan should also ensure that customers are properly informed about the status of orders in process at the time of the incident. Customer service or sales staff normally assigned to work with customers will be assigned to communicate with customers if there is an incident.

Suppliers

The ER communication plan will also include notification of suppliers as needed. Our Supply Chain team will identify when and how they should be notified.

Management

The process to notify management should be clearly understood and documented as part of the emergency response program. Incidents and events that occur on a holiday weekend or in the middle of the night must be included. It must also be clear to staff what situations require immediate notification of management regardless of the time of day. Management does not want to learn about a problem from the news media.

Government Officials & Regulators

Communications with government officials depends upon the nature and severity of the incident and regulatory requirements. Businesses that fail to notify a regulator within the prescribed time risk incurring a fine. Health & Safety regulations require notification depending on the seriousness of an incident. Environmental regulations require notification if there is

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chemical spill or ammonia release that exceeds threshold quantities. CFIA may need to be notified if there is an incident involving product tampering, contamination or quality. Notification requirements specified in the Alberta and Canadian regulations must be documented in the ER communications plan.

A major incident in the community will capture the attention of elected officials. The plant manager should communicate with elected officials and public safety officials as needed.

Employees, Victims and Their Families

HR management will assume the role of communicating with employees in case of an emergency. HR will coordinate communications with management, supervisors, employees and families. HR will also coordinate communications with those involved with the care of employees and the provision of benefits to employees and their families. Close coordination between management, company spokesperson, public agencies and HR will be required when managing the sensitive nature of communications related to an incident involving death or serious injury.

Community & Neighbours

If there are hazards at the facility that could impact the surrounding community and our neighbours, then community and neighbours outreach must part of the ER communications plan. The plan includes coordination with public safety officials to develop protocols and procedures for advising the public of any hazards and the most appropriate protective action that should be taken if warned.

News Media

If the incident is serious, then the news media will be on scene or calling to obtain details. The information we choose to disclose must be timely, accurate, comprehensive, authoritative and relevant to all aspects of our business. We maintain professional and courteous relationships with members of the media at all times.

Process

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Proposed Emergency Response Program New Calgary

Any media inquiry should immediately be transferred to Sofina's Communications team.

- Media inquiries should be addressed to communications@sofinafoods.com.
- The employee who received the inquiry should also immediately alert Daniele Dufour (ddufour@sofinafoods.com – 905.747.3322 ext. 2118 or Aishah Ahmed (aahmed@sofinafoods.com), ext. 2184.
- Upon receiving the media inquiry, the Communications team reviews it and works with the impacted team to determine the appropriate response. Input from various internal teams or experts might be required to ensure accuracy.
- In some cases, any response to a media inquiry must be coordinated with the proper authorities before it is shared with the media. This ensures the response takes all facts into account.
- The Communications team (or the proper authority) then provides the coordinated response to the reporter and addresses any follow up inquiries.
- The Communications team monitors the media to capture any publication of the Company's response or name, and address any inaccuracies.
- The Communications team must also be kept informed of how the situation evolves in order to update Sofina's messaging as needed.

If a reporter shows up unannounced

No one should be given access to a Sofina facility for a photo or filming without approval from the facility Manager and from Communications.

The following guidelines should be used if a television camera crew or print photographer shows up unannounced at a facility.

- Filming or photographing of public areas outside of our facilities (e.g. public parking lots, courtyards and walk ways) cannot be prevented. Please report any such activity immediately to the Communications team (ddufour@sofinafoods.com – 905.747.3322 ext. 2118).
- The media must not be allowed to enter our facility to photograph or film.

Questions about this process should be addressed to: Daniele Dufour (ddufour@sofinafoods.com – 905.747.3322 ext. 2118

Messages

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Proposed Emergency Response Program New Calgary

An important element of the crisis communications plan is the need to coordinate the release of information. When there is an emergency or a major impact on the business, there may be limited information about the incident or its potential impacts. The "story" may change many times as new information becomes available.

One of the aims of the crisis communication plan is to ensure consistency of message. If you tell one audience one story and another audience a different story, it will raise questions of competency and credibility. Protocols need to be established to ensure that the core of each message is consistent while addressing the specific questions from each audience.

Another important goal of the ER communications plan is to move from reacting to the incident, to managing a strategy, to overcome the incident. Management needs to develop the strategy and the communications team needs to implement that strategy by allaying the concerns of each audience and positioning the organization to emerge from the incident with its reputation intact.

Contacts & Information

Communications before, during and following an emergency is bi-directional. Stakeholders or audiences will ask questions and request information. The plant representatives will answer questions and provide information. This flow of information should be managed through a communications hub as outlined below:

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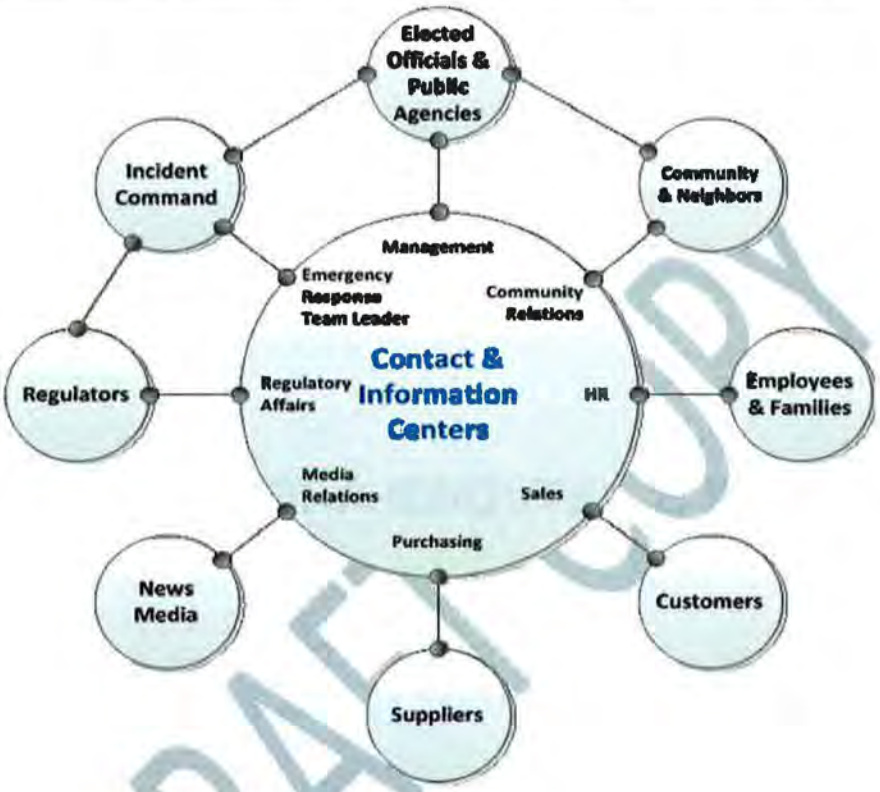
Proposed Emergency Response Program New Calgary



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APPENDIX B – STUDIES AND REPORTS

A.I.1

Appendix B

Operational Management Plan

Appendix B

B.1 TRAFFIC STUDY

Operational Management Plan

Appendix B

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Operational Management Plan

Stantec

Stantec Consulting Ltd.
200-325 25 Street SE,
Calgary AB T2A 7H8

September 28, 2018
File: 144211190
Reference: Existing Sofina Poultry Plant Traffic Study

TRAFFIC STUDY

The proposed development will have two accesses off 106 Avenue SE. The north access will service employee vehicles and the south access will service trucks as shown in Figure 1-1.

Scope of Transportation Assessment

The scope of this transportation assessment was established with the City of Calgary Transportation Development Services (TDS) are as follows:

- Estimate the trip generation for the proposed development based on the site operations schedule provided by Sofina Foods.
- Estimate the number of trucks entering/exiting the site.
- Review the site circulation which will include anticipated vehicle types with turn templates.
- Review of site access provisions.
- Provide a parking stall requirements comparison based on the City of Calgary Land Use Bylaw requirement and based on the site operations.

Our correspondence with TDS regarding the scope of this study is included in Appendix A.

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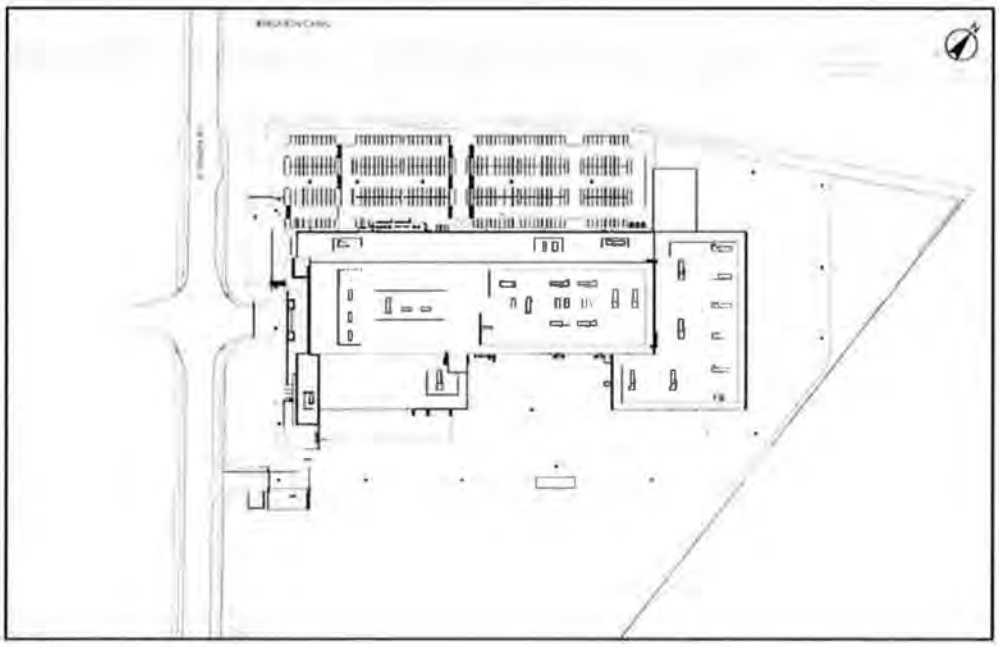
Figure 1-1: Proposed Development



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PROJECTED USAGE OF THE DEVELOPMENT

Sofina provided the projected incoming and outgoing cars and trucks by time of day for a typical day. These projections are included in **Appendix B**. The following provides a summary of the employee travel characteristics and the anticipated travel characteristics of the trucks.

Employee Trip Generation

Table 1-1 summarizes the information provided by Sofina regarding the employee cars entering and exiting the site.

Table 1-1: Employee Vehicle Trips

Time of Day	Inbound Trips	Outbound Trips	Total Trips
4:00 AM	45	0	45
7:00 AM	216	0	216
8:00 AM	40	0	40
12:30 PM	45	45	90
3:00 PM	209	209	418
5:00 PM	0	47	47
10:30 PM	30	45	75
12:30 AM	0	209	209

As shown in Table 1-1, the peak times for the proposed development are 7:00 AM, 3:00 PM - 3:30 PM and 12:30 AM. Sofina Foods have indicated that the arrival and departure times for the employees are not anticipated to overlap. The schedule has been set which includes a 30-minute gap between the departure and arrival of employees between 3:00 – 3:30 PM; however, during periods of high kills or extreme weather, some employees may require overtime resulting in a delay of outbound trips for approximately 45 vehicles.

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Truck Trip Generation

Table 1-2 summarizes the truck schedule and anticipated number of trucks arriving/departing the site.

Table 1-2: Anticipated Truck Volumes

Vendor	Daily	Weekly	Monthly	Scheduled Day
Progressive	-	4	-	Monday & Wednesday
Westcoast Reduction	2	-		Monday – Friday
Wildrose	-	-	2	Sunday & Saturday
Highway Fuel	1	-	-	Monday - Friday
Propane Truck	-	1	-	Monday - Friday
Pace Chemical	-	1	-	Monday - Friday
CO2	-	1	1	Monday - Friday
Unisource	2	-	-	Monday - Friday
Ecolab	-	2	-	Monday - Friday
Precision Label	-	1	-	Monday - Friday
X-treme Pakaging	-	2	-	Monday - Friday
Cintas		2-	-	Monday - Friday
Canadian Linen	1	-	-	Monday - Friday
Purolator Courier	3	-	-	Monday - Friday
Fedex Courier	1	-	-	Monday - Friday
Monarch Courier	2-3	-	-	Monday - Friday
UPS Courier	-	1	-	Monday - Friday
Shipping 53' Loads	38	-	-	Monday - Saturday
Shipping 5 ton Loads	6	-	-	Monday - Friday
Live Haul - 53' & B-trains	30	-		Sunday – Friday
TOTAL	**82**	**13**	**3**	

Sofina Foods indicated that the truck activity for the live-hauls occur approximately from 3:00 AM – 10:00 AM; truck activity for trailers containing the final product occur approximately from 6:00 PM – 6:00 AM. Given the timing and the number of trucks noted above for the live-haul and shipping trucks, which account for much of the anticipated truck traffic, a higher truck activity period from 3:00 AM – 10:00 AM may be expected with about 7 trucks entering and 7 trucks exiting per hour during that period.

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SITE ACCESS

There are two site access locations for the proposed site primarily to separate passenger car activity from truck activity. The north access mainly serves passenger vehicles utilizing the parking lot and the south driveway is utilized for large trucks in the shipping and receiving of goods. The proposed access spacing is approximately 100m which is comparable to existing intersection/driveway spacing on 94 Avenue SE (continuation of 106 Avenue SE north of the canal) which are in the range of 60m to 120m. The south truck driveway access flares were modified from the City of Calgary Road Construction 2015 Standard Specifications to accommodate the movement of B-train trucks.

PARKING DEMAND

Figure 1-2 shows the employee parking accumulation over the course of a typical work day. As shown on Figure 1-2, the peak parking demand is 301 vehicles. The site has been designed to accommodate 340 parking stalls. This will be sufficient to accommodate the peak parking demand. It is of note, however, that during periods of high kills or extreme weather, some employees may require overtime resulting in a delay of outbound trips for approximately 45 vehicles; the additional 39 stalls on site may assist in accommodating these extraordinary occurrences. Below is a summary of the anticipated vehicles in/out and the based-on timings for shifts; employee shifts are expected to be timed so shifts do not overlap:

- 4:00 AM – 45 vehicles arrive, and 30 vehicles depart
- 7:00 AM – 216 vehicles arrive
- 8:00 AM – 40 vehicles arrive
- 12:30 PM – 45 vehicles arrive, and 45 vehicles depart
- 3:30 PM – 209 vehicles arrive, and 209 vehicles depart
- 5:00 PM – 47 vehicles depart
- 10:30 PM – 30 vehicles arrive, and 45 vehicles depart
- 12:30 AM – 209 vehicles depart

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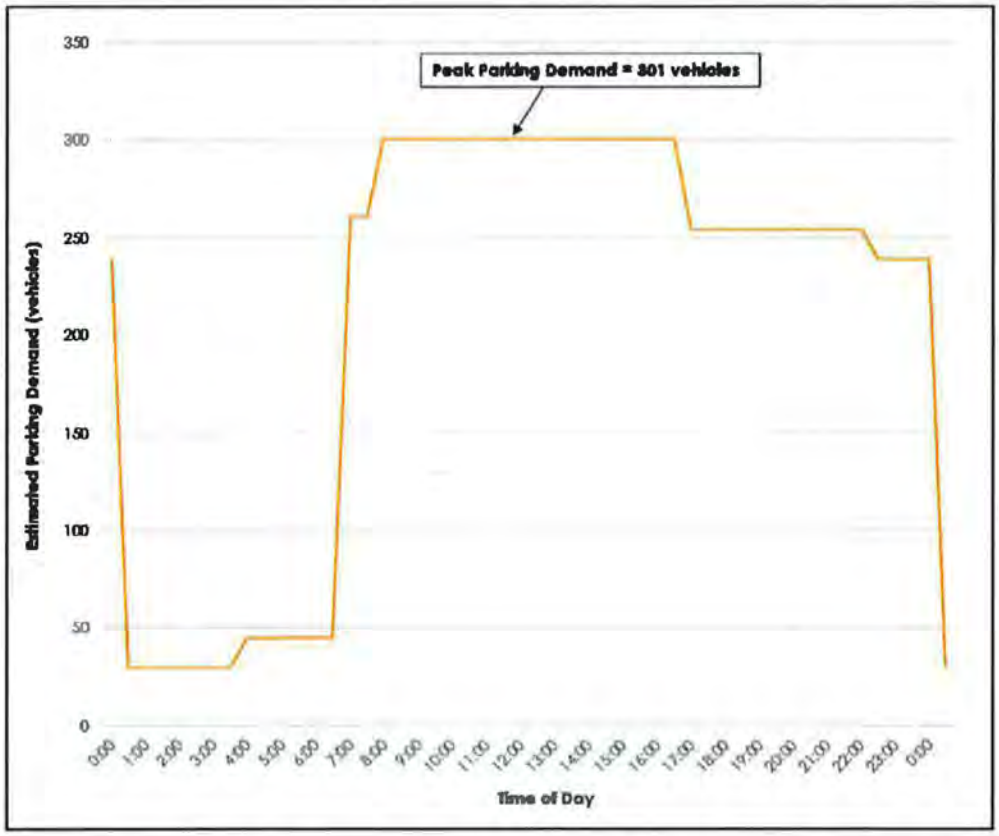
Figure 1-2: Parking Accumulation Profile



As directed by the City, Stantec also reviewed the City of Calgary Land Use Bylaw to determine the parking requirements for the site which includes a Slaughter House component as a principal use and an Office component as the secondary use.

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Reference: Existing Sofina Poultry Plant Traffic Study

The proposed development will have a gross usable floor area of approximately 21,561 square metres for the Slaughter House component and 3,286 square metres for the Office component and a total gross floor area of 24,877 square metres.

A summary of the required motor vehicle parking stalls and class 1/2 bicycle parking stalls per the City of Calgary Land Use Bylaw 1P2007 is summarized in Table 1-3.

Table 1-3: Land Use Bylaw 1P2007 Required Parking Stalls

Use	Proposed Gross Usable Floor Area	Parking Rates			Required Stalls	
					Neat	Rounded
Motor Vehicle						
Office	3,286 m²	2 stalls	per 100 m²		65.72	66
Slaughter House	21,561 m²	1 stalls	per 100 m²	first 2000 m²	20.00	20
		1 stalls	per 500 m²	subsequent 500 m²	39.12	40
		Total				60
Total Required Motor Vehicle Parking Stalls						126
Class 1 Bicycle Parking						
Office	3,286 m²	1 stalls	per 1000 m²		3.286	4
Slaughter House	21,561 m²	0 stalls	per 1000 m²		0	0
Total Required Class 1 Bicycle Parking Stalls						4
Class 2 Bicycle Parking						
Office	3,286 m²	1 stalls	per 1000 m²	for offices greater than 1000 m²	3.29	4
Slaughter House	21,561 m²	1 stalls	per 2000 m²		10.78	11
Total Required Class 2 Bicycle Parking Stalls						15
Loading Stalls						
Gross Floor Area	25,020 m²	1 stalls	per 9300 m²	for gross floor area greater than 1000 m²	3.29	4
Total Required Loading Stalls						4

With a total proposed number of 344 motor vehicle parking stalls, 4 class 1 bicycle parking stalls and 15 class 2 bicycle parking stalls, and 32 loading stalls the bylaw parking stall requirements are met.

age with community context

Operational Management Plan

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Reference: Existing Sofina Poultry Plant Traffic Study

TURN TEMPLATES

The below turn templates are shown as **Appendix C** in drawing TRAN-A.0 to TRAN-A.7. Through discussions with the City of Calgary, the driveway was modified based on typical driveway layouts for separate sidewalks; with this modification, it is noted that oversteering to opposing lanes or right turns from the inside lane will be required for some vehicles. Turn templates have been developed for the site and includes the following with commentary for clarification on the process for the live holding:

- Truck access at the site driveway
- Shipping
- Waste/recycling
- Live holding
  1. Custom 53' trailers are brought onto the site with a standard cab.
  2. The Custom 53' trailers are then brought to the Live Holding area where the standard cab then departs the site.
  3. The Custom 53' trailer is then taken from the Live Holding area with a custom Ottawa 4x2 cab and brought around the building where the Custom 53' trailer is cleaned as it drives through the building.
  4. The Custom 53' trailer is then placed at the Trailer Storage area until it is brought off-site.
- Trailer storage
- Fire lane/
- Deliveries

Stantec Consulting Ltd.

Kennith Lin

Kennith Lin P.Eng.
Transportation Engineer

Phone: (403) 750-2334
Kennith.Lin@stantec.com

Attachment: Appendix A; Appendix B; Appendix C

ATTACHMENT A
CORRESPONDENCE WITH CITY OF CALGARY

Operational Management Plan

From: Lin, Kennith
To: "Cheung, Idi L."
Subject: RE: Sofina Foods Poultry Plant - Transportation Assessment for DP Submission - Scoping
Date: Friday, June 08, 2018 10:25:00 AM

Thanks you for you input below Idi. We'll revise our scope with the highlighted and include the bylaw parking comparison and the site driveway distances review.

Kind Regards,

Kennith Lin P.Eng.
Transportation Engineer

Direct: 403 750-2334
Kennith.Lin@stantec.com

Stantec
200-325 25 Street SE
Calgary AB T2A 7H8 CA

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From: Cheung, Idi L. <Idi.Cheung@calgary.ca>
Sent: Thursday, June 07, 2018 1:07 PM
To: Lin, Kennith <Kennith.Lin@stantec.com>
Subject: RE: Sofina Foods Poultry Plant - Transportation Assessment for DP Submission - Scoping

Kennith

Sorry about taking a bit to get back to you, but I'm still catching up from my short vacation.

This scope is more than I was looking for.
I've highlighted the bits that would be enough to submit – the ask wasn't a TIA and we don't need analysis. The ask is to get trip gen as this is an abnormal use. I'm interested in shift change and trucks.
For parking can you also do a comparison with the bylaw requirement?
Also for site design please check the driveway distances proposed on site, 106 ave is an arterial so rationale will be required to support the additional access.

Idi

From: Lin, Kennith [mailto:Kennith.Lin@stantec.com]
Sent: Friday, June 01, 2018 11:35 AM
To: Cheung, Idi L. <Idi.Cheung@calgary.ca>
Subject: [EXT] Sofina Foods Poultry Plant - Transportation Assessment for DP Submission - Scoping

Hi Idi,

Operational Management Plan

I left a voicemail with you yesterday regarding a study we are expecting to commence early next week for Sofina Foods' proposed poultry plant, located at 6302 106 Avenue SE. In preparation for this project, I would like to discuss with you the proposed scope for the transportation assessment in support of their upcoming DP application outlined below:

- Traffic analysis at site driveways and intersections for the AM and PM peak periods will be conducted.
  - The north site access will serve all passenger vehicle traffic and the south site access will have primarily heavy vehicle traffic assigned (see attached for the preliminary site plan).
  - Trip generation estimates for the site will be based on the site operations schedule provided by the Client and other information which may be available from them. The Client has outlined their proposed shift change times including the number of employees which will inform the trip generation – this will primarily impact the north driveway. A general outline of their loading/unloading schedule has been indicated to us, however, we will confirm their expected number of trucks per hour which is likely limited to the number of loading bays on site – this will primarily impact the south driveway.
  - Stantec will conduct traffic analysis at the two site driveways and the two intersections noted below, if required:
    - North Site driveway (proposed count location aligned with existing driveway at 6309 106 Avenue SE)
    - South Site driveway
    - 94 Avenue SE and 52 Street SE (proposed count location)
    - 106 Avenue SE and 68 Street SE (proposed count location)
  - We will analyze the opening day conditions in Synchro with existing counts utilized as background traffic. A TIA has been completed for the overall area and is anticipated to account for future horizons of the surrounding roadway network.
- Site circulation review will be undertaken indicating anticipated vehicle types with turn templates.
- Confirmation of parking stall requirements will be performed based on the noted vehicles in/out of the site by the Client.
- We will summarize the results in a memorandum.

I was aiming to finalize the proposed scope with you by Monday as the study is on a tighter schedule. Please let me know at your earliest convenience if you have any comments on the above or will like to discuss further.

Thank you,

Kennith Lin P.Eng.
Transportation Engineer

Direct: 403 750-2334
Kennith.Lin@stantec.com

Stantec
200-325 25 Street SE
Calgary AB T2A 7H8 CA

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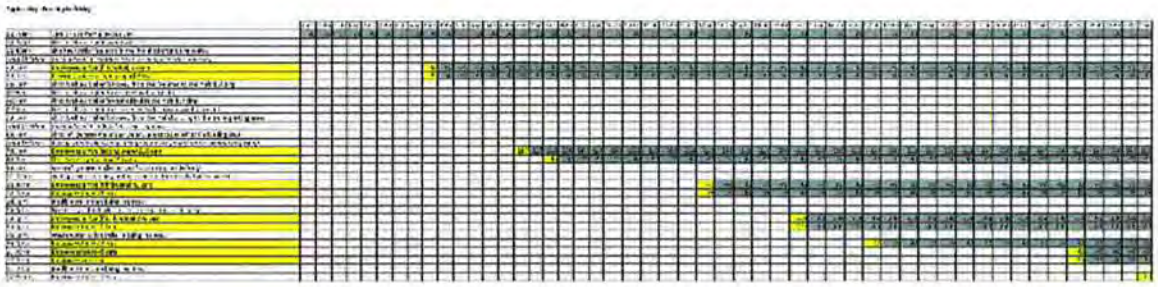
ATTACHMENT B
SOFINA FOODS SITE OPERATIONS INFORMATION

Operational Management Plan

Ref		Start	Finish	Daily frequency	Description
1	Live haul trailer	12:30am	12:00pm	31	Trailers containing live birds arrive to the site. They enter through the double gate. They do not wait on the road.
2	Live haul trailer	12:30am	11:00pm	31	Trailers containing live birds are stored in the live shed building as soon as they are weighed. They do not wait outside. The live shed is an atmosphere controlled building, enclosed, and is designed with an odor control system.
3	Live haul trailer	4:00am	11:00pm	31	Trailers containing live birds are transferred from the live shed to the main building for processing.
4	Live haul trailer	4:00am	11:00pm	31	Trailers are offloaded, washed, then reloaded with clean crates within the main building, which is enclosed and designed with an odor control system.
5	Live haul trailer	4:00am	11:00pm	31	Clean and empty live haul trailers are transferred from the main building to the trailer parking area.
6	Live haul trailer	12:00am	12:00am	31	Clean and empty live haul trailers are parked before being picked-up by live haul drivers and leave the facility.
7	Inedible trailer	1:00pm 11:00pm		3 3	2 Trailers containing inedible organic material and 1 tanker trailer containing inedible liquid are replaced twice a day. These trailers are enclosed and sealed. They are washed before leaving the building. The inedible room is enclosed and designed
9	Processing facility	4:00am	12:30am		Chickens are processed through the main building. The main building is enclosed. Odor control systems are in place where odors are generated. All activities are supervised by CFIA.
9	Refrigerated trailer	12:00am	12:00am	38	Refrigerated trailers of different sizes are dropped off at the loading dock to be unloaded (minimum) or loaded with packaged fresh or frozen chicken product. They enter and leave the site through the double gate.
10	Refrigerated trailer	12:00am	12:00am		Some refrigerated trailers are parked before being picked-up or loaded.
11	Non-refrigerated trailer	6:00am	4:00pm	2	Non-refrigerated trailers are delivering dry supplies, wood pallets, maintenance supplies and chemicals. They are backed up and unloaded or loaded in the loading dock area. They enter and leave the site through the double gate.
12	Bins	6:00am	4:00pm	0.5	Garbage bins containing non-organic waste and cardboard are being replaced twice a week. The bins are enclosed during operations. The bins are sealed for transportation. There is no odor emaning of this activity. The trucks enter and leave the site through the double gate.
13	Employee cars	4:00am	12:30am		Employees cars are entering and leaving the facility through the car entrance of the property.
14	Employee cars	4:00am	12:30am		Employees are using the car parking. They are coming and leaving at different times. The most traffic will happen at 4am, 6:30am, 12:30pm, 3pm, 12:30am.
15	Waste water solids trailer	4pm		1	Trailer containing solids from the waste water treatment plant is replaced once a day. This trailer is enclosed and sealed. It is washed before leaving the building. The waste water treatment plant is enclosed and designed with an odor control system.

Operational Management Plan



Operational Management Plan

ATTACHMENT C
TURN TEMPLATES

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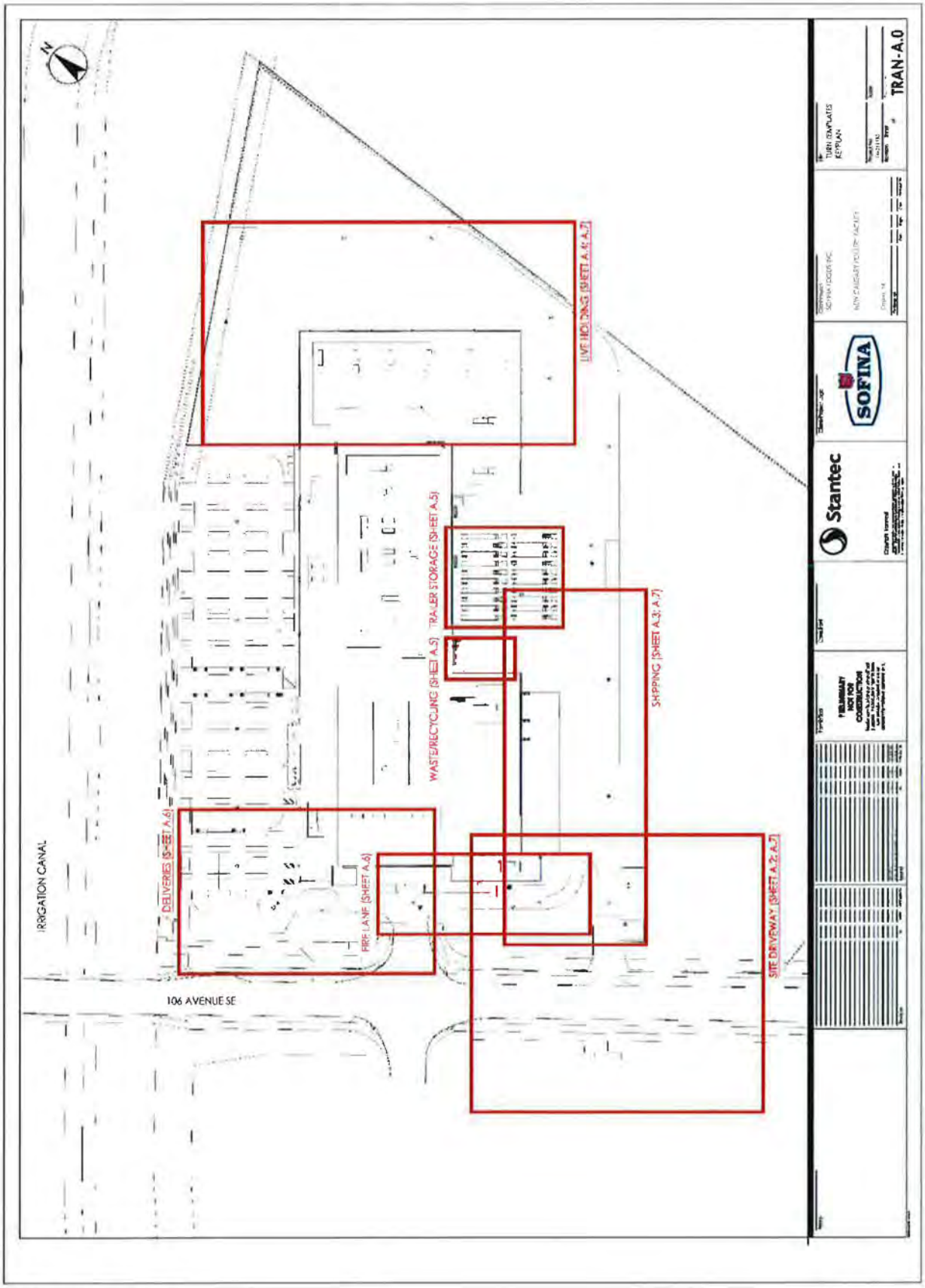

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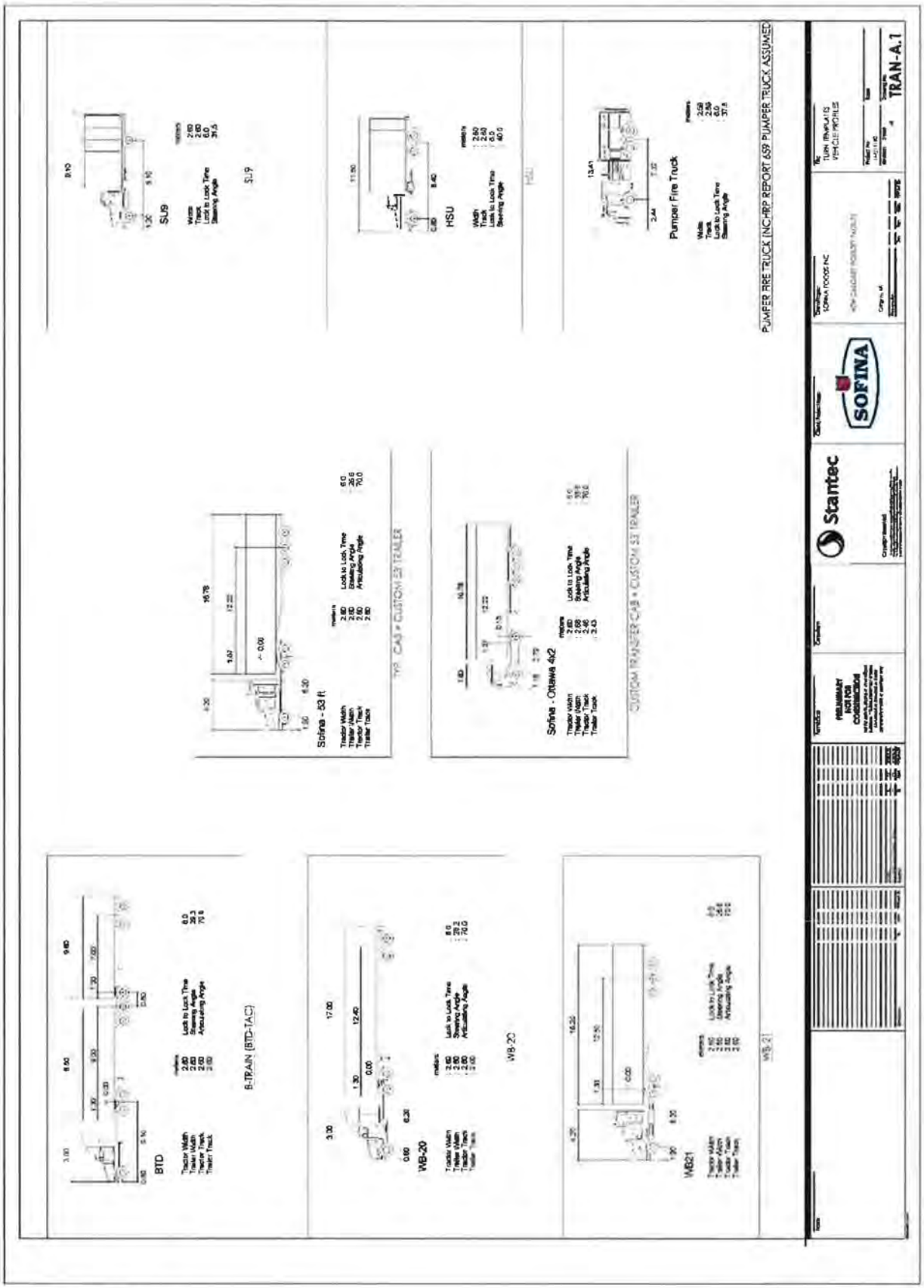

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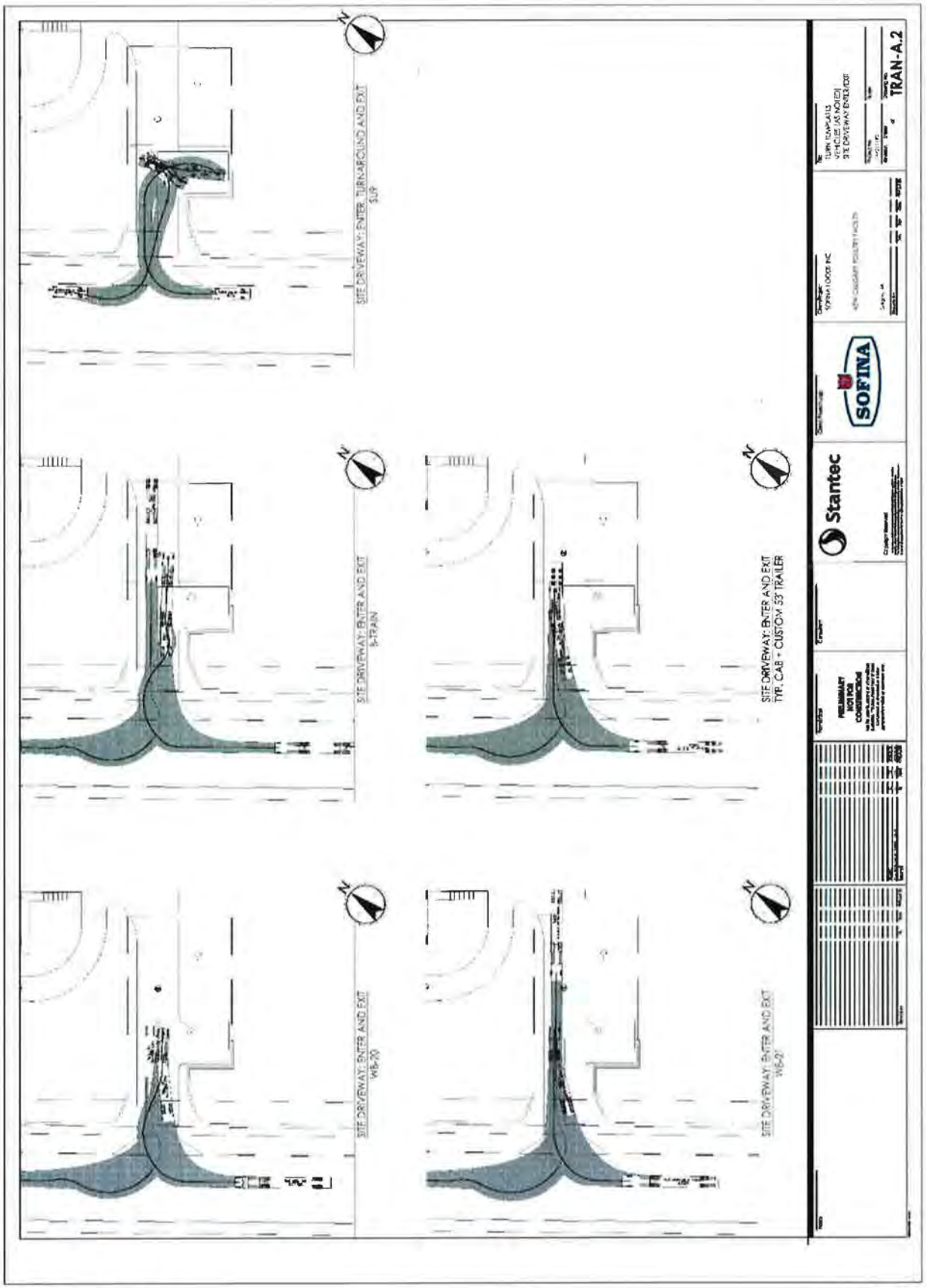

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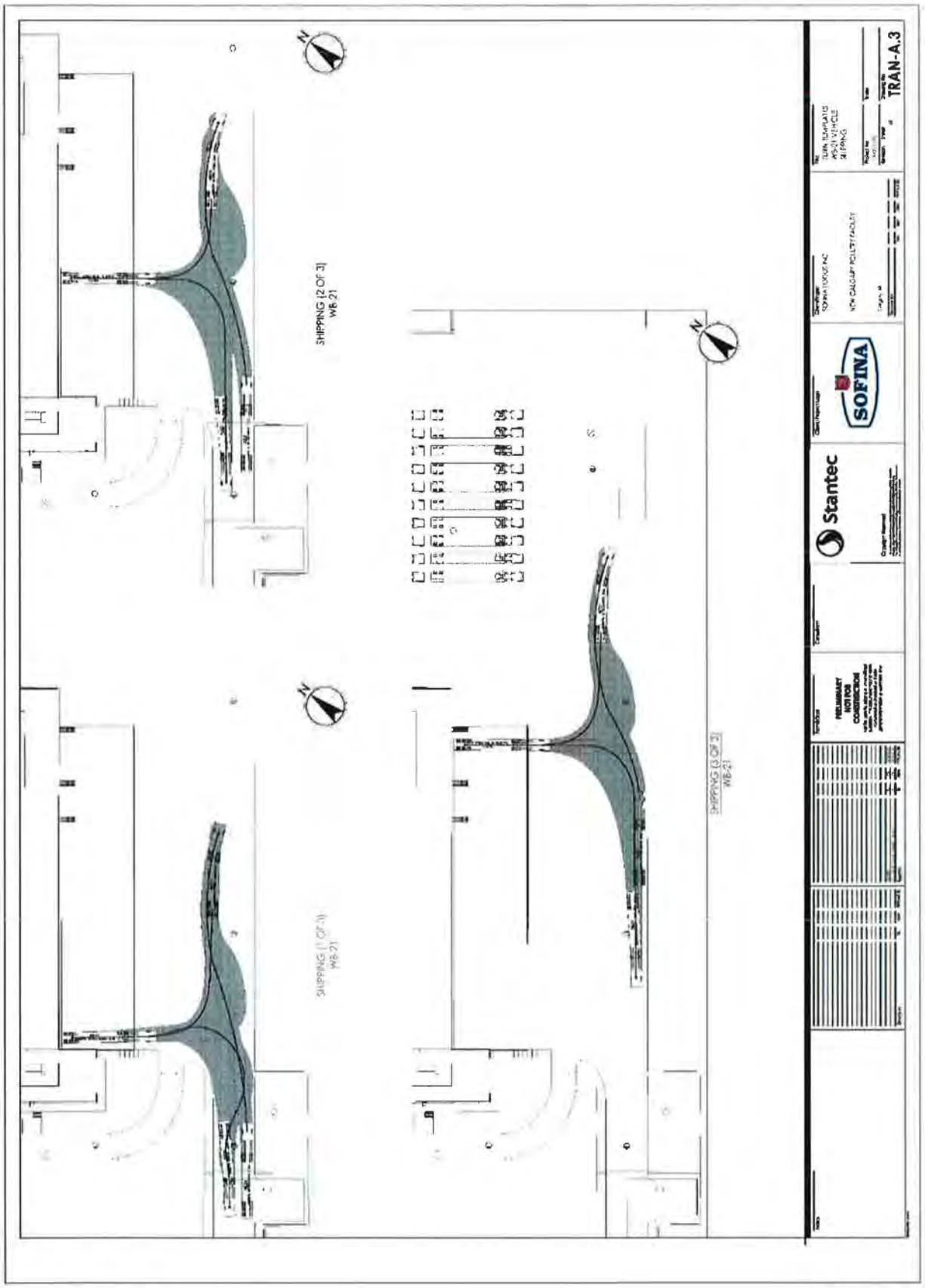

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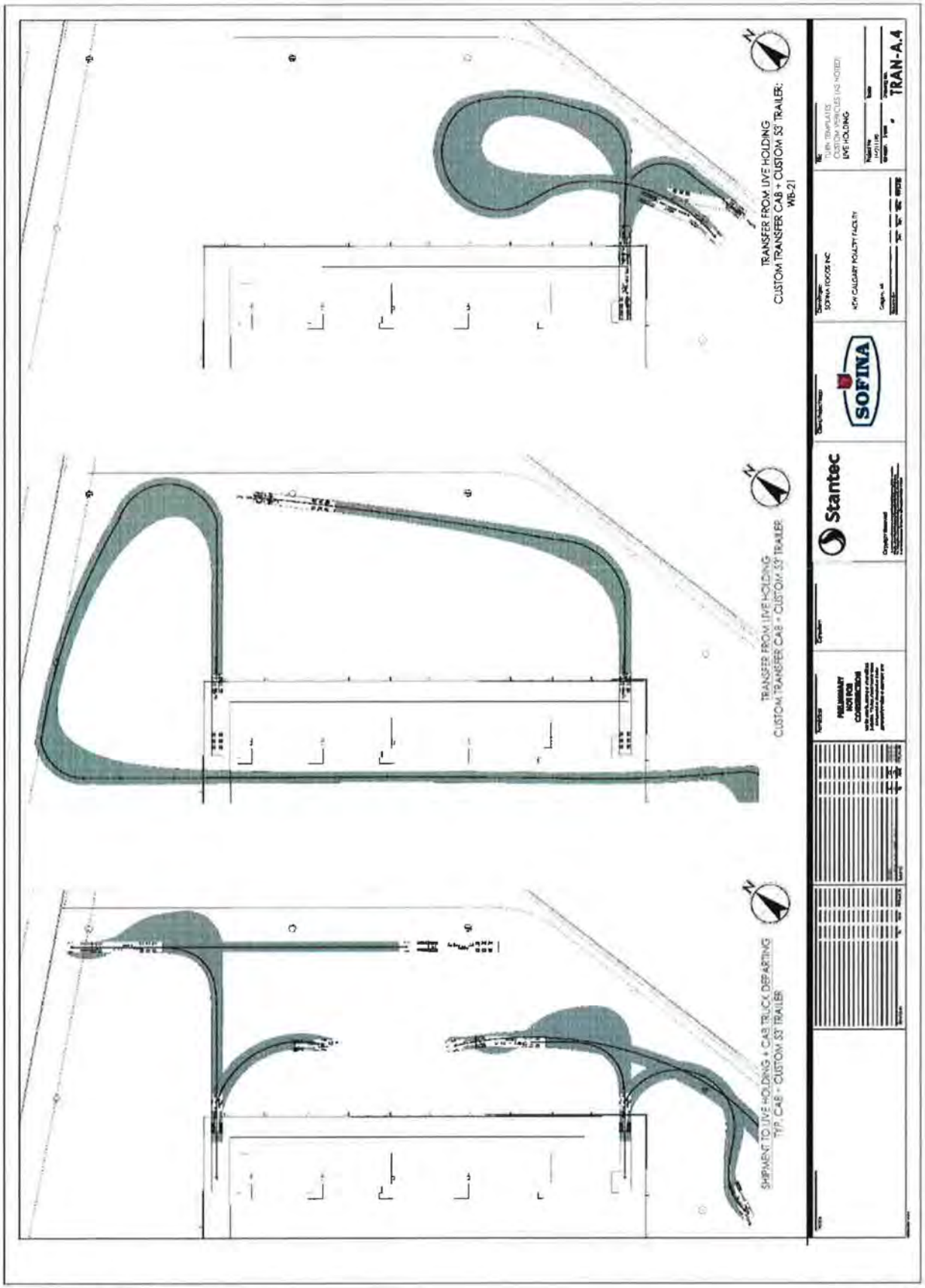

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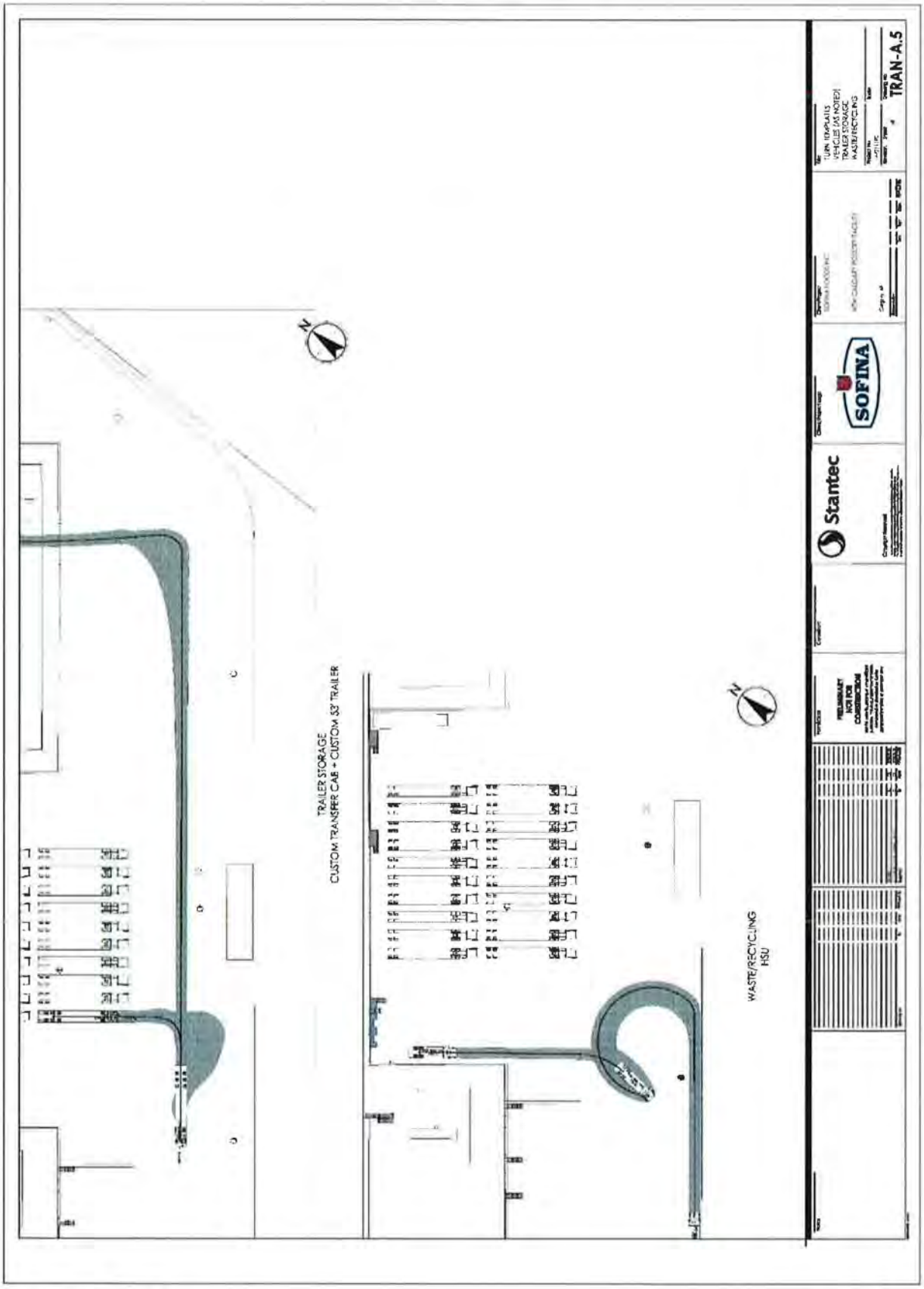

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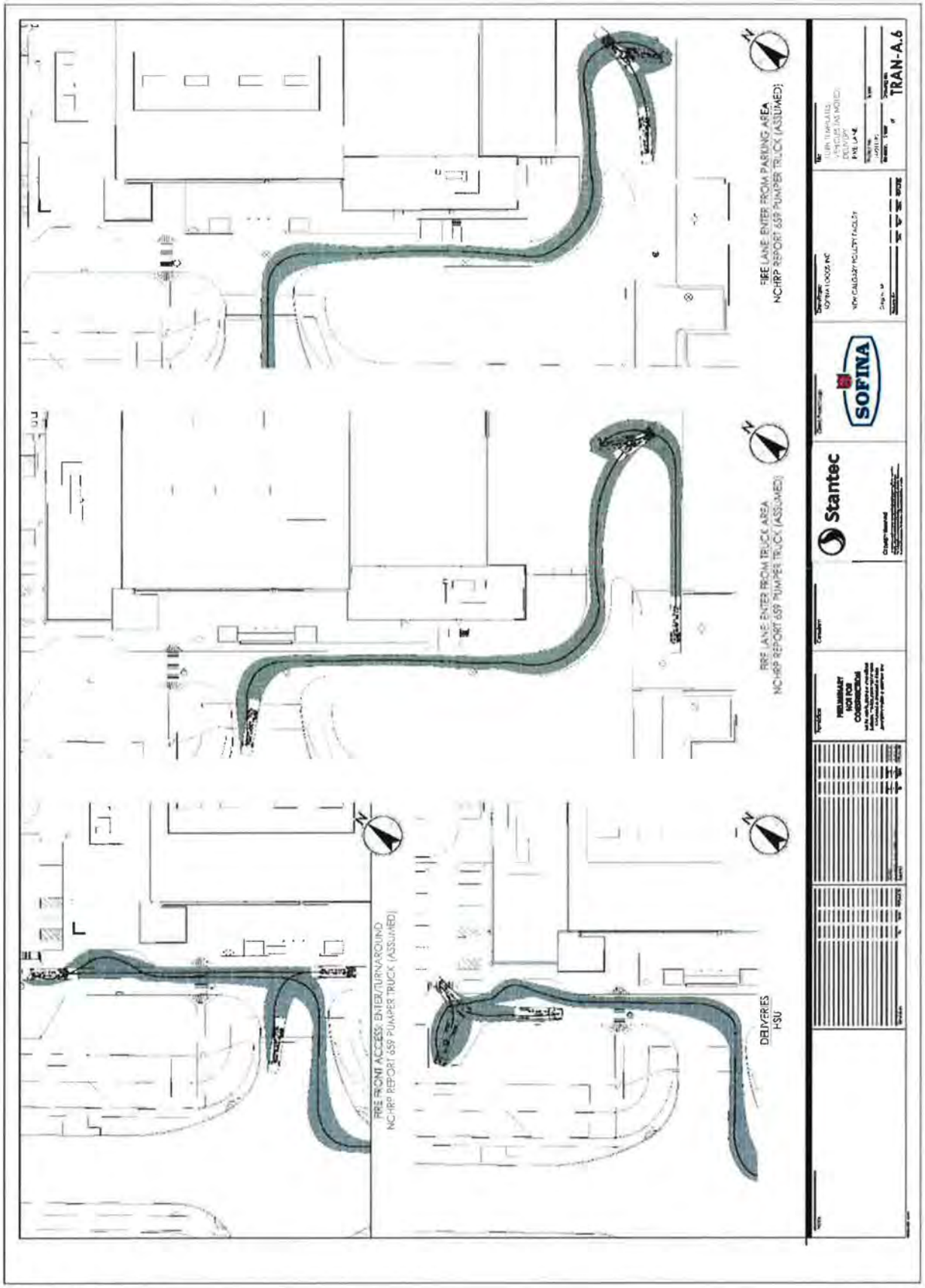

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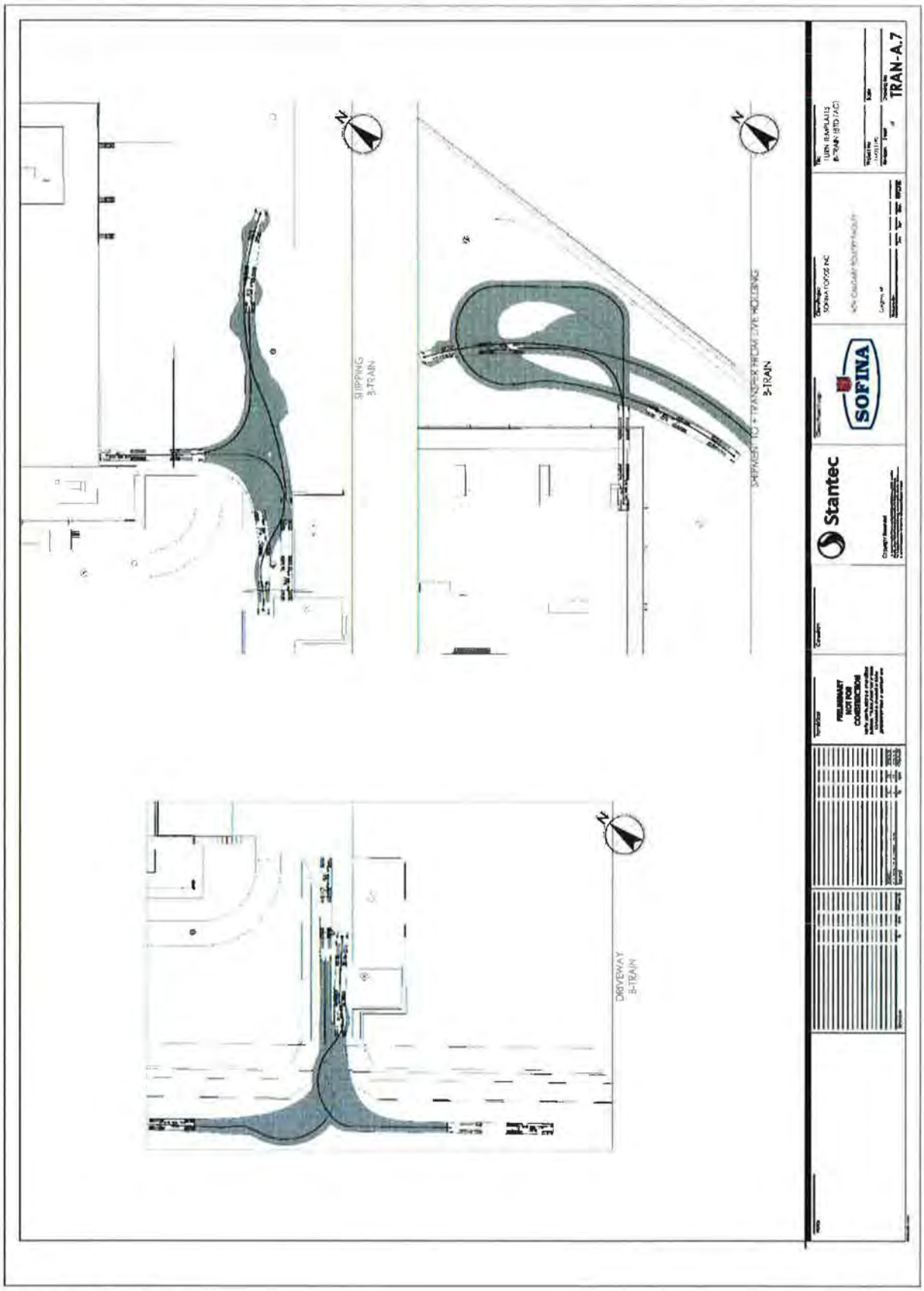

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Appendix B

B.2 ODOUR STUDY

Operational Management Plan

Stantec

Odour Assessment
Sofina Foods Inc.
6202, 106th Ave. SE, Calgary, AB
For Development Permit

October 3, 2018

Prepared for:

Sofina Foods Inc.

Prepared by:

Stantec Consulting Ltd.

Operational Management Plan

Sign-off Sheet

This document entitled Odour Assessment was prepared by Stantec Consulting Ltd. ("Stantec") for the account of Sofina Foods Inc. (the "Client"). Any reliance on this document by any third party is strictly prohibited. The material in it reflects Stantec's professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

Prepared by _____

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Maryam Mirzajani, M.Sc., P.Eng.

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Reviewed by _____ Wade B. Gieni 2018.10.03 10:52:57 -06'00'

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Approved by _____

(signature)

Charlie Alix, B.Sc., PE

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Abbreviations

AQMG	Alberta Air Quality Modelling Guidelines
AEP	Alberta Environment and Parks
CAS	Controlled Atmosphere Stunning
DAF	Dissolved Air Flotation
ODTV	Odour Detection Threshold Value
OU	Odour Units
PBL	Planetary Boundary Layer
U.S EPA	United States Environmental Protection Agency
WWTP	Wastewater Treatment Plant

Operational Management Plan

ODOUR ASSESSMENT

Introduction
October 3, 2018

1.0 INTRODUCTION

Stantec is designing a new poultry processing plant for Sofina Foods Inc. (Sofina) on a 12-hectare parcel at 6202, 106th Avenue SE, (Lot 4, Block 5, Plan 171 0868) in the Dufferin II (North) Industrial area of Calgary, Alberta. To obtain a development permit for the new plant Sofina is required to provide an assessment to the City of Calgary demonstrating mitigation of the anticipated odours. While there are no specific odour guidelines pertinent to the plant location, the general methodology followed for the assessment aligns with the Good Practices Guide for Odour Management in Alberta (CASA, 2015) and the criteria used for the assessment are consistent with other recent odour assessments in the Calgary area. The odours will be modeled as emissions from the various processes at the new plant using the United States Environmental Protection Agency (U.S. EPA) steady state AERMOD air quality dispersion model.

1.1 BACKGROUND INFORMATION

Sofina's poultry processing plant has been in operation at 2126 Hurst Road SE in Calgary since the 1960s. The current plant is surrounded by a variety of residential and industrial neighbors as well as an adjacent rail line. Odours from the plant are an ongoing and long-term issue with the neighbors in the area. Due to the planned construction of the Green Line by the City of Calgary, Sofina plans to relocate the existing operations to a new processing plant to be constructed at 6202, 106th Avenue SE, (Lot 4, Block 5, Plan 171 0868).

1.2 SCOPE OF ODOUR ASSESSMENT

To determine the necessary level of odour control at the proposed Sofina Poultry Processing Plant (the New Plant), an odour dispersion modelling study was completed. The existing plant was used as a representative source of odour emissions data for the dispersion modelling. The work for the project included the following tasks:

1. **Sampling and Testing**: Air samples from odourous areas of the existing plant, considered representative of corresponding processes at the new plant, were collected and submitted to a certified laboratory for odour analysis. Samples were analyzed to quantify the strength of each odour sample in accordance with procedures approved by Ontario Ministry of the Environment and Climate Change. (Ontario Source Testing Code ON-6) (OME, 2017).
2. **Estimate Emission Rates for the New Plant**: The laboratory results were normalized for process throughput and room size for each of the plant processes at the existing facility. The normalized results were then factored to match the processing rate and room sizes for the corresponding processes at the new plant for use as emission data in the dispersion model.
3. **Dispersion Modelling**: The U.S. EPA AERMOD dispersion modelling system was used to model the down-wind concentrations of the odour emissions from the new plant to determine predicted fence line and off-site odour concentrations. Dispersion modelling was completed following the guidance of the Alberta Air Quality Modelling Guidelines (AQMG) (Idriss & Spurrell, 2009).
4. **Mitigation Measures**: Based on the predicted odour concentrations, mitigation measures were incorporated into the model to determine the degree of treatment required to demonstrate the feasibility of achieving the fence line objective of 5 OU/m^3 for the predicted odour (1-hour average of 99.5th percentile data).

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ODOUR ASSESSMENT

Introduction
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1.3 GENERAL LIMITATIONS AND ASSUMPTIONS

Overall, the purpose of this odour assessment is to determine the predicted extent of odours from the proposed plant and if these odours could be treated to mitigate fence line and off site odour concentrations. This assessment is based on preliminary building designs and assumed locations for the emission control equipment (close to the proposed stack locations for the venting of the various process areas). As such there are a number of potential limitations and assumptions of the odour dispersion modelling study which include:

- The sampling and testing program was a one-time sampling event conducted to characterize the odours at the existing plant site from select processes during the poultry processing. It is assumed that these are representative of the processes that would occur at the new plant site without alterations that may change the odour emissions. The only change to the emissions that was accounted for was the increase in the number of birds processed and the change in the size of the rooms for each of the processes. These changes are assumed to be related linearly to the current production rates and room sizes.
- For samples that were collected directly from exhaust points at the existing plant it was assumed that the location sampled was representative of all exhaust points for the process.
- Odour is represented by the Odour Dilution to Threshold Values (ODTV) obtained via laboratory olfactometery testing. There was no attempt to gauge the relative acceptability of one odour source vs another amongst the processes sampled.
- The odours from the processes are assumed to be evenly distributed within the air volume of the room and it was assumed that the complete volume of air is removed during each air change event. While the exhaust rates for the New Plant were generally determined based on the volume of the room, the number of air changes, and an assumed size and number of exhaust points, the assumption was made that the ceiling heights in each process area of the existing plant would be consistent with the ceiling heights in the New Plant process areas to which the existing plant results were applied.
- The initial evaluation of the emissions assumed that the air from the processes was discharged without any treatments.
- The location, size, and flow information for the stacks were based on initial building design parameters. The resulting dispersion would be affected by changes to the location, size, exit velocity, and emission rates at the stacks that would occur in the final building design.
- Changes to the exterior building structures, or changes to the interior process area sizes or air handling would also change the assumptions made in this assessment.
- Local buildings, structures, trees, or complex terrain may affect odour dispersion. Simplifications in building and site topography and reduced ventilation effects around buildings and trees have the potential to lead to under-predictions by the model. Model results do not necessarily represent site specific conditions at off-site locations and do not take into account changes to topography or land cover from the publically available datasets.
- The modeling is based on the assumption that the proposed building is kept closed (doors are not left open and ventilation is as per design) and that housekeeping practices minimize potential odour emissions from sources outside of the buildings on the site.
- Fugitive emission sources were not characterized or modelled.
- The odour model does not account for odours from other sources, and the results of this study only represent the modeled emissions from the proposed plant. Other odour emissions or emissions that may combine with emissions from the proposed plant are not considered.
- No attempts were made to correlate odour emissions from the existing plant with odour intensity at surrounding locations. No in-field odour intensity measurements were collected as part of the study.
- Odour control technology incorporated into the model is non-specific but expected to represent the capabilities of a range of potential technologies that could be considered for implementation in the plant design. This assessment is mainly to determine the level of control necessary to mitigate odour concentrations at the fence

1.2

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ODOUR ASSESSMENT

Introduction
October 3, 2018

line and off-site. An evaluation of the performance of the control technologies that will be used at the New Plant is beyond the scope of this assessment.

- It is important to note that an odour complaint can be generated when an intense odour is perceived over a short period of time such as several minutes. Perceived odours may be transient in nature and may disappear when the wind changes direction.
- General limitations and assumptions inherent within the dispersion model algorithms apply.

Stantec has prepared this report in accordance with the usual care and thoroughness of the consulting profession for the use of Sofina. This report was prepared in September 2018 and is based on the conditions encountered and information reviewed at the time of preparation. No liability is accepted by this company or any employee or sub-consultant of this company with respect to its use by any other person.

This disclaimer shall apply notwithstanding that the report may be made available to the City of Calgary and other persons for an application for permission or approval to fulfil a legal requirement. This report should be read in full. No responsibility is accepted for use of any part of this report in any other context or for any other purpose or by third parties.

Operational Management Plan

ODOUR ASSESSMENT

Project Description
October 3, 2018

2.0 PROJECT DESCRIPTION

The processes planned for the new plant will be similar to those at the existing plant; however, the new plant design will involve increasing the existing plant's daily processing rate from 130,500 birds/day to approximately 195,800 birds/day at the new plant. Generally, the processes and resulting odour sources will be similar in nature to the existing plant, with the exception that the new plant will include wastewater pretreatment to reduce the strength of the wastewater discharged to the City of Calgary wastewater system. It is assumed that the odour generated would be scaled in proportion to the increased processing rates.

The specific methods of odour treatment can vary depending on the characteristics of the exhaust stream such as volume, temperature, humidity, location, and cost. This odour assessment will identify the treatment levels required to reduce the predicted emissions to the point where the odour criteria are achieved for the site. The specific treatment technology employed for the design will be determined as part of the detailed design work for the plant.

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ODOUR ASSESSMENT

Alberta Odour Thresholds
October 3, 2018

3.0 ALBERTA ODOUR THRESHOLDS

Alberta has minimal regulations regarding odours. The Environmental Protection and Enhancement Act (2014), Section 116 includes some basic requirements as follows:

Section 116 - Environmental protection orders re odour

(1) Where the Director is of the opinion that a substance or thing is causing or has caused an offensive odour, the Director may issue an environmental protection order to the person responsible for the substance or thing.(2) Subsection (1) does not apply in respect of an offensive odour that results from an agricultural operation that is carried out in accordance with generally accepted practices for such an operation or in respect of which recommendations under Part 1 of the Agricultural Operation Practices Act indicate that the agricultural operation follows a generally accepted agricultural practice. (3) An environmental protection order under this section may order the person to whom it is directed to take any or all of the following measures:

(a) investigate the situation;

(b) take any action specified by the Director to prevent the offensive odour;

(c) minimize or remedy the effects of the offensive odour;

(d) monitor, measure, contain, remove, store, destroy or otherwise dispose of the substance or thing causing the offensive odour or lessen or prevent the offensive odour;

(e) install, replace or alter any equipment or thing in order to control or eliminate the offensive odour;

(f) construct, improve, extend or enlarge a plant, structure or thing if that is necessary to control or eliminate the offensive odour;

(g) take any other action the Director considers to be necessary;

(h) report on any matter ordered to be done in accordance with directions set out in the order.

Currently, there are no regulations or acts that define an 'offensive odour'. Accordingly, the designer must determine, in consultation with the Owner, Alberta Environment and Parks (AEP) and other stakeholders (i.e., municipalities and neighbours), the appropriate odour limits and how they should be applied to the facility. Often 'fence line' odour limits are applied, which determines the magnitude of the odours acceptable at the boundary of the facility. This odour limit depends on the proximity of residential and commercial developments, and other site-specific factors such as the proximity of parks, trails, or roads and the sensitivity to perceived odours.

For the purposes of this assessment, odour is dealt with as a concentration (OU/m^3). Odour concentration refers to the number of dilutions required for an odourant sample to reach the odour detection threshold value (ODTV). Therefore, an odour unit (OU) is defined as the number of times that an odour sample must be diluted with odour-free air so that 50% of a trained odour panel can just detect the presence of the odour (CASA, 2015).

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ODOUR ASSESSMENT

Alberta Odour Thresholds
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The odour control industry's experience indicates that controlling the ground level odour concentrations at or less than 5 to 10 OU/m^3 is typically sufficient to prevent nuisance-level odour impacts in residential areas and this objective is commonly used where other criteria or standards have not been assigned. A previous odour assessment conducted in Calgary for a waste water treatment facility targeted a goal of 10 OU/m^3 at the nearest receptor and 25 OU/m^3 at the fence line based on a 15-minute averaging period (a 15-minute averaging period is sometimes used for odour limits to account for shorter term tolerance for odour perception).

A 1-hour average objective of 5 OU/m^3 at the fence line is proposed as the objective for the dispersion modelling assessment for the New Plant. To account for extreme, rare, and transient meteorological conditions (i.e., outlier concentration predictions) the 99.5th percentile of predicted 1-hour average concentrations over a one-year period is used to determine compliance with the fence line objective.

For this assessment odour intensity evaluation using trained odour sniffers was not conducted. This type of assessment would typically be used to quantify the effectiveness of the odour controls at a facility or to evaluate complaints from an operating facility.

3.2

Operational Management Plan

ODOUR ASSESSMENT

Source Identification
October 3, 2018

4.0 SOURCE IDENTIFICATION

The operations of the existing plant were reviewed to identify potential odour generating processes that could be present at the new facility. Based on examination of drawings for the existing plant and an on-site discussion with the Director of Engineering at the existing plant, several locations were selected for sampling based on the relative perceived odour encountered at the site, including:

- Live shed
- Scalding
- Kill Floor
- Live Receiving
- Gut room

In addition to the odour sources identified at the existing site, the undeveloped new site was also identified for sample collection to provide an indication of background conditions prior to development.

4.1 SAMPLE COLLECTION AND RESULTS

Samples were collected at the exhaust from the Live Shed, Scalding area, and Kill Floor, and ambient room samples were collected from the Live Receiving area and Gut Room of the existing plant process areas. An ambient sample was also collected at the new site. The samples were collected under the conditions, and using the methods outlined in Appendix A. Sample collection locations and the results of the laboratory analyses are summarized in Table 4-1.

Table 4-1 Odour Sample Laboratory Results

Sample Location	Sample ID	Description of Environment Sampled	Mean ODTV
LIVE SHED	001	At louvred exhaust near ground level	126.3
SCALDING	002	Roof exhaust	291.6
KILL FLOOR	003	Roof exhaust	98.8
LIVE RECEIVING	004	Interior sample collection	133.2
GUT ROOM	005	Interior sample collection	1315.6
NEW SITE	006	At the new site	49.0

NOTES:
ODTV – Odour Detection Threshold Value, the dilution point where 50% of odour panelists will just detect odour presence. Expressed as Odour Units

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ODOUR ASSESSMENT

Source Odour Concentrations
October 3, 2018

5.0 SOURCE ODOUR CONCENTRATIONS

5.1 EXISTING PLANT

The odour emission rates for new facility were developed using production factors determined based on the differences between the new facility and the existing facility. The odour concentrations for the existing plant were normalized to the size of process area. In the case of the Gut Room sample, the odour concentration was also normalized to the relative exposed area of the disposal bin to the size of the room. The normalized existing plant odour concentrations are summarized in Table 5-1.

Table 5-1 Normalized Existing Plant Odour Concentrations

Odour Sample ID	Base Case at Existing Plant at Time of Odour Sample Collection	Estimated Area of Process Room (m^2)	Mean ODTV from Lab Test (OU/m^3)[A]	Normalized Odour Concentration $OU/m^3/m^2$	Normalized Odour Concentration $OU/m^3/\%$ [B]
Live Shed	52,800 birds in the live shed at the time of air sampling	725	126.3	0.174	
Scalder	9000 birds per hour	100	291.6	2.906	
Kill Floor	9000 birds per hour	95	98.8	1.038	
Live Rec.	9000 birds per hour	377	133.2	0.353	
Gut Room	Area of feathers = 5.94 m^2 Area of guts 5.94 m^2	139	1315.6	9.441	154.322
New Site	Open field with some earthworks occurring		49.0		

NOTES:
[A] Results from Ortech laboratories report R26470 of September 7, 2018, see Appendix A
[B] Gut Room only, 8.5% of Gut Room occupied by bin

5.2 NEW PLANT

The new plant process areas were examined to determine how to best apply the odour data from the existing plant to the exhaust sources for each process area at the New Plant as described below:

- The background odour concentration from the new site was used to represent the odour from the Evisceration process general exhaust as this was not considered to be a source of noticeable odour at the existing plant location.
- The Kill Floor and Live Shed exhaust odour concentrations were apportioned based on the room size using the corresponding Kill Floor and Live Shed source data from the existing plant.
- The odour concentrations in the Live Receiving areas of the plant were apportioned based on room size across the General Exhaust, Controlled Atmosphere Stunning (CAS) Tunnel, the Tray Wash, and the Truck Wash; this

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ODOUR ASSESSMENT

Source Odour Concentrations
October 3, 2018

was considered to provide a conservatively high estimate of the odours as the Tray Wash and Truck Wash areas of the plant are not expected to produce odours as strong as the general exhaust from the Live Receiving area.

- The Inedible Screening area odour concentration was factored directly (based on room size) from the Gut Room sample at the existing plant. The Gut Room in the existing plant included screening as well as an open gut and feather storage bin; adopting the ambient room odour concentration and factoring for the room size was considered to provide a conservatively high estimate of potential odours for the Inedible Screening area in the New Plant.
- The Inedibles Loading area odour concentration was factored based on the relative size of the room occupied by open bins of feathers and guts in the new plant vs the percent of the room occupied by the bin in the existing plant Gut Room.
- As there was no Wastewater Pretreatment process at the existing plant to sample for odours, literature values (McGinley & McGinley 2008) were used to estimate the odour emissions representative of the main wastewater pretreatment processes planned for the new plant. The process classifications chosen from the literature to represent the odours from the Pretreatment area were: Screening (geometric mean of 720 OU/m^3); DAF thickening (geometric mean of 760 OU/m^3); and, dewatered sludge storage (geometric mean of 1,638 OU/m^3).

The estimated odour emissions for each process are summarized in Table 5-2, a description of the factor calculation process is provided in Appendix B.

Table 5-2 Normalized and Production-Factored Emissions for New Plant

Sample Location	Mean ODTV from Lab Test (OU/m^3)	Base Case at Existing Plant at Time of Odour Sample Collection	Proposed Case for New Plant	Production factor	Normalized and Production Factored OU/m^3 / m^2
Live Shed	126.3	52,800 birds in the live shed at the time of air sampling	32,000 for each of 5 compartments	0.61	0.106
Scalder	291.6	9,000 birds per hour	15,000 birds per hour	1.67	4.844
Kill Floor	98.8	9,000 birds per hour	15,000 birds per hour	1.67	1.729
Live Rec.	133.2	9,000 birds per hour	15,000 birds per hour	1.67	0.588
Gut Room	1315.6	Area of feathers = 64 ft^2 or 5.94 m^2 Area of guts 64 ft^2 or 5.94 m^2	71 m^2 for two feather bins/trailers, 35 m^2 for offal bin/trailer, 35 m^2 for blood trailer (closed tanker). Inedible screening same as gut room.	n/a	9.441
		8.5% of room occupied by bin odour sources	Inedible loading factored by percent of room occupied by bin odour sources.	n/a	21.20^
WWTP (Wastewater treatment plant)	n/a	No WWTP at existing plant	WWTP including Primary DAF (dissolved air flotation) and	n/a	n/a

5.2

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ODOUR ASSESSMENT

Source Odour Concentrations
October 3, 2018

Table 5-2 Normalized and Production-Factored Emissions for New Plant

Sample Location	Mean ODTV from Lab Test (OU/m^3)	Base Case at Existing Plant at Time of Odour Sample Collection	Proposed Case for New Plant	Production factor	Normalized and Production Factored $OU/m^3 / m^2$
			Screenings, Dewatered Sludge Storage		
New Site	49.0	Open field with some earthworks occurring		n/a	n/a
NOTES: [A] Percent of Room Occupied by Open Bins					

Once the process-factored odour concentration was determined for each process exhaust location, exhaust parameters (room size, exhaust volume, temperature, velocity, and stack height/diameter) were determined by the mechanical design team for the new plant, and an emission summary table was developed (Table 5-3) to represent the base case inputs (no odour mitigation incorporated) for the dispersion model.

Table 5-3 New Plant Emission Summary Table – Base Case, No Odour Control

Fan #	Area/Equipment Served	Estimated Area of Process Room (m^2)	Source Concentration (OU/m^3)[C]	Volume Flow Rate (m^3/s)	Stack Height (m)	Exhaust Velocity (m/s)	Assumed Stack Diameter (m)	Temperature (Summer/Winter)	Estimated Emission Rate From Proposed Plant (OU/s)
1	Evisceration - General Exhaust [D]	826	49	4.72	3.05	17.27	0.59	24°C/20°C	231
2	Kill - Scalder	55	267	2.83	3.05	17.27	0.46	Ambient when above 20°C/20°C	757
3	Kill – General Exhaust	744	1287	8.97	3.05	17.27	0.81	Ambient when above 20°C/20°C	11,536
4	Live Receiving – General Exhaust	843	496	13.92	3.05	17.27	1.01	Ambient/18°C	6,905
5	Live Receiving - CAS Tunnel	843	496	1.42	2.59	11.68	0.39	Ambient/18°C	702
6	Live Receiving – Tray Wash	843	496	1.42	2.59	11.68	0.39	Ambient/18°C	702
7	Live Receiving – Truck Wash	170	100	2.12	2.59	17.27	0.40	Ambient/18°C	212
8	Live Shed x 5 [B]	2625	277	22.65	3.51	17.78	1.27	15°C/15°C	6,275
9	Inedible Screening	272	2566	4.25	3.05	17.27	0.56	Ambient when above 18°C/18°C	10,899
10	Inedible Loading	500	3272	9.34	3.05	17.27	0.83	Ambient when above 18°C/18°C	30,572
11	WWTP [A]	697	3118	17.18	3.05	17.27	1.13	Ambient when above 18°C/18°C	53,564

NOTES:
[A] Sum of geo mean used for primary DAF, Screen Room, Dewatered Sludge Storage
[B] Values for live shed determined based on 5 live shed sections with 1 fan #8 each
[C] Normalized for size of room at existing plant vs new plant as well as production and odour source factor
[D] Assumed essentially equivalent to background OU conc.

Operational Management Plan

ODOUR ASSESSMENT

Dispersion Modelling
October 3, 2018

6.0 DISPERSION MODELLING

The U.S. EPA air dispersion model AERMOD (Version 16216) was used to predict the ground level concentrations of odour emissions from the New Plant. AERMOD is a steady-state plume model that is applicable to rural and urban areas, flat and complex terrain, surface and elevated releases, and multiple sources (including, point, area and volume sources). In the Stable Boundary Layer, the concentration distribution is assumed to be Gaussian both vertically and horizontally. Vertical profiles of wind speed wind direction, turbulence temperature, and temperature gradient are estimated using available meteorological observations. AERMOD accounts for the vertical heterogeneity of the Planetary Boundary Layer (PBL). This is accomplished by "averaging" the parameters of the actual Stable Boundary Layer into "effective" parameters of an equivalent homogeneous PBL. AERMOD is recognized by AEP as a refined model to be used for the assessment of off-property impacts of air emissions from a facility, including odour emissions.

Parameters that directly influence the dispersion of pollutants include; wind speed and direction, atmospheric stability, and mixing layer depths. High concentrations from low elevated sources, elevated sources with building or topography effects, or virtual sources are typically due to stable atmospheric conditions with light winds.

6.1 METEOROLOGICAL DATA

The local meteorology of the region must be characterized to evaluate the short-term atmospheric dispersion and transport of emissions released from the New Plant. The data required for predicting dispersion and transport includes: wind speed and direction, temperature, atmospheric stability, and mixing layer depth. Wind and temperature data are readily available from meteorological stations, but atmospheric stability and mixing layer depth are calculated from additional raw meteorological data including; cloud cover and opaque sky cover.

The 2000 Land Cover data available from NRCan (NRCAN, 2009) was obtained for the New Pant site for the 10 km by 10 km assessment domain centered on the Facility. The data was obtained and processed by the AERflare-incin Spreadsheet (ZeltPsi, 2014; 2018a; 2018b) to determine the appropriate site characteristics following the same methods as used by the AERSURFACE (U.S. EPA, 2013) land use pre-processor for AERMET (U.S. EPA, 2018b).

AEP provides 12 km prognostic meteorological data created using the Pennsylvania State University (PSU) and National Center for Atmospheric Research (NCAR) mesoscale model (known as MM5, (UCAR, 2008)) for the 2002 to 2006 five-year period for use in dispersion modelling assessments in Alberta (AEP, 2017). The AEP provides the Multi-Model Extraction Utility (MMEU; (AENV, 2009)) to extract site-specific meteorological information for use in various dispersion models.

The MMEU was used to extract the site-specific meteorological data from the MM5 data for use in the AERMET meteorological model for the Facility for the full 5-year period. The MMEU provides a formatted standardized Solar and Meteorological Surface Observation Network (SAMSON) surface station file and a Radiosonde Observation (RAOBS) upper air station file that are readable by AERMET. As part of the processing, wind speeds less than 1 m/s are rounded up to 1 m/s unless they were predicted to be 0 m/s by the mesoscale modelling.

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The frequency distribution of wind speeds (from AERMET) at the site is shown in Figure 6-1. High wind speeds greater than 11 m/s occur infrequently, while wind speeds between 2-3 m/s occur the most frequently. A wind rose plot is presented in Figure 6-2. Wind roses are an efficient and convenient means of presenting wind data. The length of the radial barbs gives the total percent frequency of winds from the indicated direction, while portions of the barbs of different widths indicate the frequency associated with each wind speed category. The predominant winds at the New Plant site blow from the west to east direction.

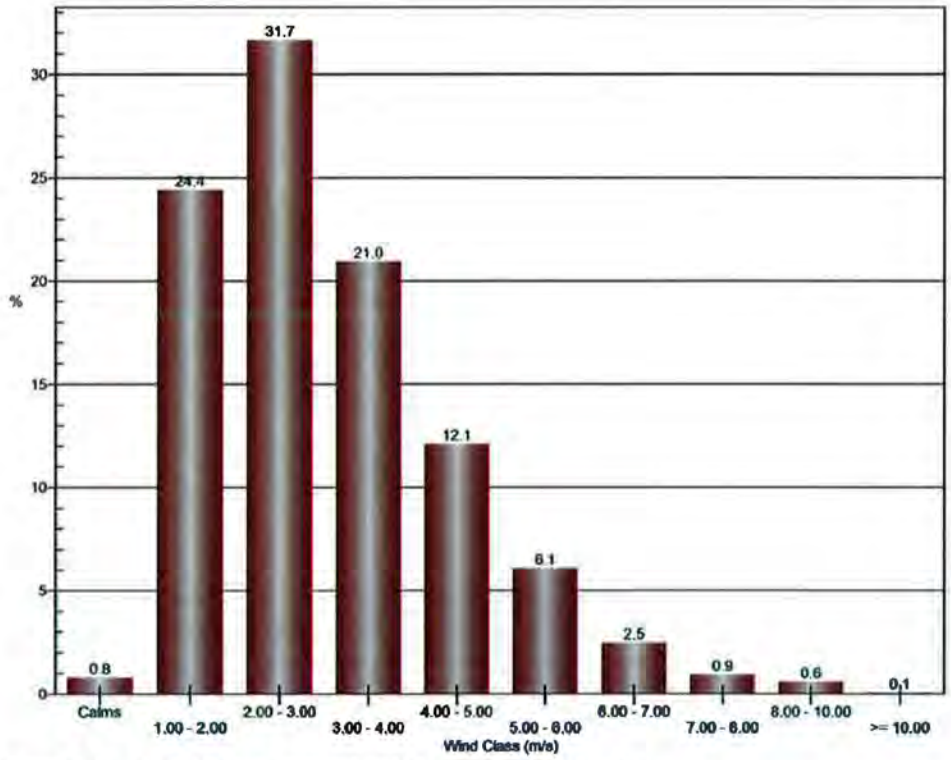

Figure 6-1 Wind Class Frequency Distribution (2002-2006)

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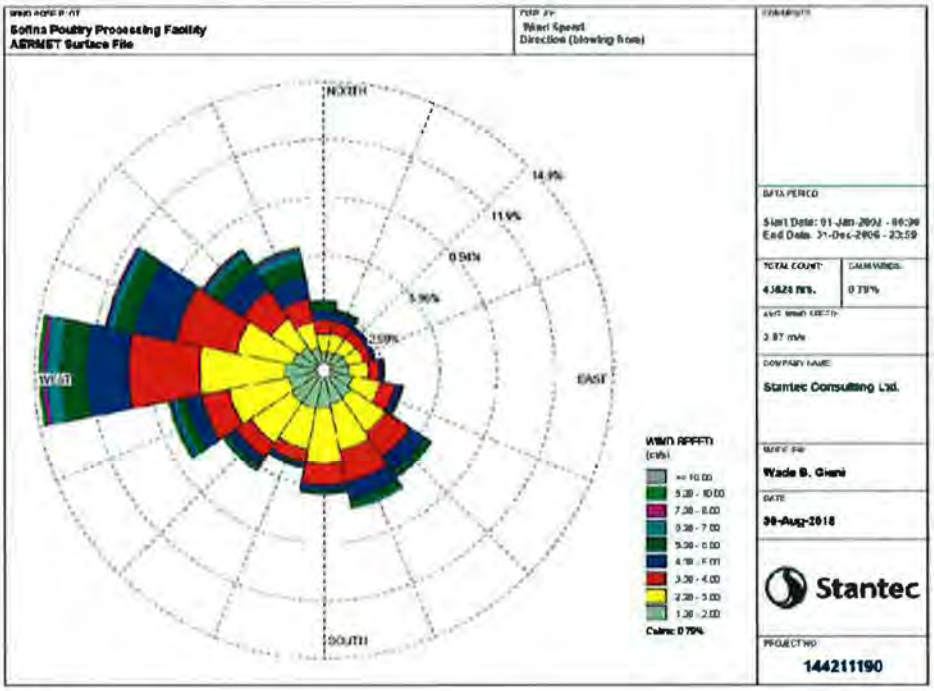

Figure 6-2 Wind Rose Plot (2002-2006)

6.2 RECEPTOR GRID

A 10 km by 10 km computational domain of gridded receptors was used in the modelling assessment to generate odour concentration contour plots. Gridded receptors were placed at the following spacing from a bounding box that encompassed the New Plant's odour emission sources, with spacing in accordance with the AQMG (ESRD, 2013):

- 20-m receptor spacing in the general area of maximum impact and the property boundary
- 50-m spacing within the property boundary
- 50-m receptor spacing within 0.5 km from the source
- 250-m receptor spacing within 2 km from the source of interest
- 500-m receptor spacing within 5 km from the sources of interest
- 1000-m spacing beyond 5 km

The receptor grid relative to the New Plant property boundary is shown in Figure 6-3. Terrain elevations and hill height scales are extracted from Canadian Digital Elevation Model (CDEM; NRCan 2016) and applied to all receptor points using the terrain pre processor AERMAP (U.S. EPA, 2018c). The hill height scale for the receptors is determined based on the regional terrain features up to 20 km radius from the New Plant.

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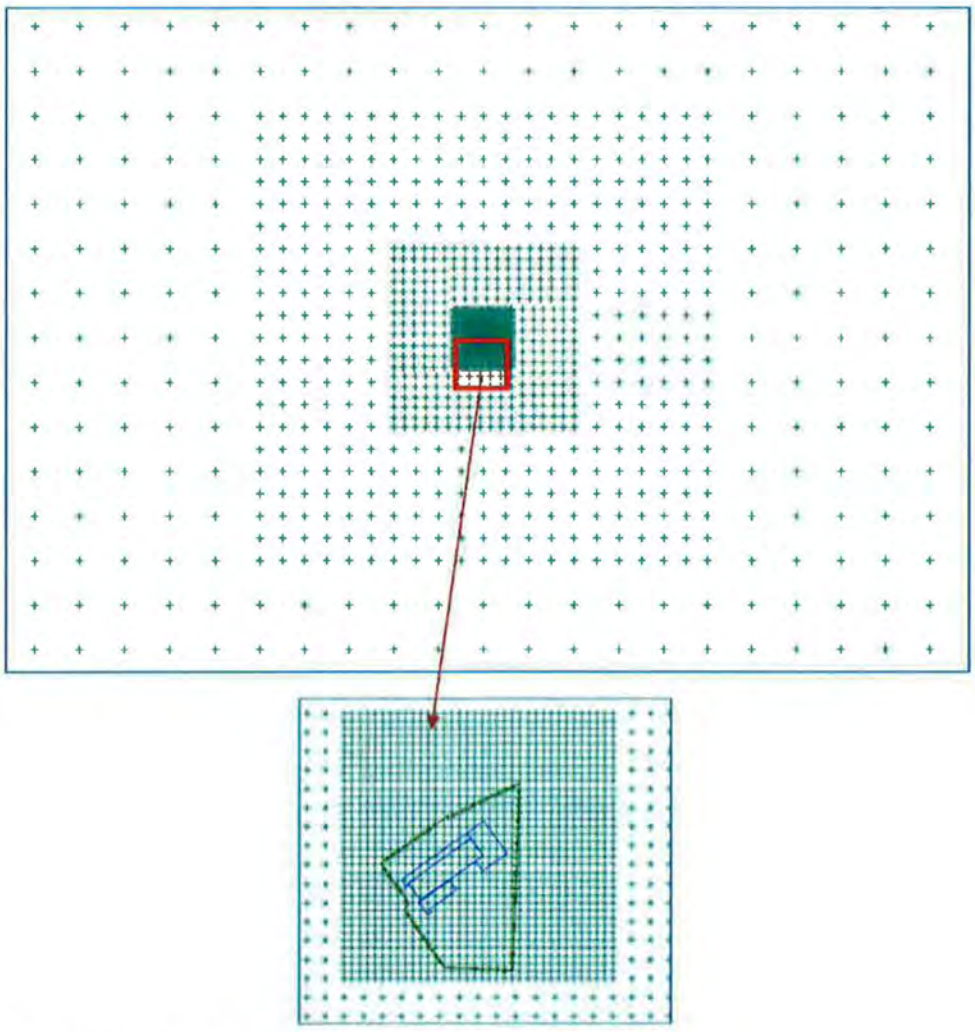

Figure 6-3 Receptor Grid around Sofina Plant

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6.3 TERRAIN AND LANDUSE

CDEM (NRCan 2016) terrain data for the air quality study area was acquired and processed using AERMOD's terrain processor (AERMAP) for use in the dispersion modelling. The topography in the study area is very flat and it ranges from 991 to 1,104 meters above sea level. The New Plant is located in an Industrial – General District zoned area with the proposed site zoned as a Direct Control area. The Eastern Irrigation canal is located northwest of the proposed site which is used for supplying irrigation to southeastern Alberta. The closest residential areas are approximately 4 km to the west and southwest of the proposed site. West of the proposed site is the Stoney Trail Ring Road, a mix of commercial and industrial areas, and agricultural areas.

6.4 BUILDINGS

Buildings and other solid structures can affect the flow of air near a source and cause building downwash effects (e.g., eddies on the downwind side), which have the potential to reduce plume rise and affect dispersion. Generally, building downwash problems may occur if the height of a stack is less than 2.5 times the height of an adjacent building. Adjacent buildings may also affect dispersion from a stack if the stack is located in the building's region of influence, defined as a distance of 5 times the lesser of the width or height of the crosswind face of the building.

For dispersion modelling purposes, building downwash effects were considered for the four stacks at the Facility using the U.S. EPA Building Profile Input Program (BPIP, (U.S. EPA, 1995)) for use with the Plume Rise Model Enhancement (PRIME) downwash algorithms in AERMOD. The building heights vary from 6.35 m to 12.3 m. The building schematic is shown in Figure 6-4.

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a) **top view**

b) **3D view from east (including treated source stacks)**

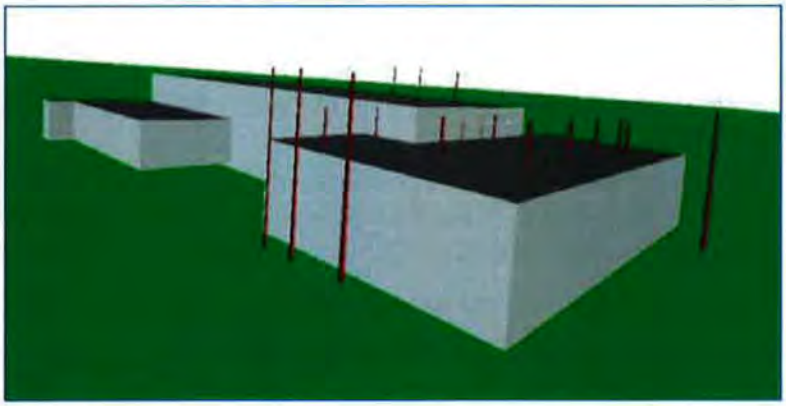

Figure 6-4 Buildings at Proposed Sofina Food Plant

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ODOUR ASSESSMENT

Dispersion Modelling Results and Discussion
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7.0 DISPERSION MODELLING RESULTS AND DISCUSSION

Initially, the base-case (no odour mitigation) data from Table 5-3 was used to predict potential ground-level odour concentrations in the vicinity of the New Plant. The resulting predicted maximum odour concentration (1 hr 99.5th percentile) was 26.2 OU/m^3 located on eastern plant boundary 50 m east of the Live Shed at New Plant. The 1-hour concentration isopleths (99.5th percentile) are illustrated in Figure 7-1.

As the base case emissions resulted in odour concentrations in excess of the 5 OU/m^3 objective, a series of iterative models were developed that substituted emissions from theoretical treatment systems. While there are a wide range of technologies available, the anticipated outlet odor concentration from most of these is similar. Applicable technologies with similar exhaust odour concentrations include, absorptive filters such as activated carbon filters, chemical wet scrubbers, biological treatment such as biofilters, bioscrubbers and biotrickling filters, or thermal oxidation using Regenerative Thermal Oxidizers. Given the space available and assumed nature of the odourous emissions, carbon filters represent good all-around odour removal method that has relatively small footprint and is effective at treating a wide range of odourous compounds. For this level of analysis carbon filters are assumed as the treatment method. The treated emissions are exhausted through stacks extending above the roof line. In each case, the treatment system was assumed to be capable of reducing the source odour concentrations of each process to 300 OU/m^3 and the treated emission stack was placed in the vicinity of the original process exhaust location. The use of 300 OU/m^3 for the treated exhaust odour concentration is based on past experience and use in numerous other studies. Actual treatment emissions may vary but this value represents an acceptable level of performance. In each case, the treatment systems were assumed to be at ground level.

The iterations assumed the theoretical treatment of the strongest odour sources (the Wastewater Pretreatment, Inedible Loading, and Inedible Screening exhausts) and combination of the Live Shed exhausts into one elevated stack until the predicted odour concentrations approached the objective. The odour emission rates used in the final iteration are summarized in Table 7-1.

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Table 7-1 New Plant Emission Summary Table – Odour Controlled

Fan #	Area/Equipment Served	Source Concentration (OU/m³)	Volume Flow Rate (m³/s)	Stack Height (m)	Exhaust Velocity (m/s)	Assumed Stack Diameter (m)	Temperature (Summer/Winter)	Mitigated Emission Rate From Proposed Plant (OU/s)
1	Evisceration - General Exhaust	49	4.72	3.05	17.27	0.59	24°C/20°C	231
2	Kill – Scalder	267	2.83	3.05	17.27	0.46	Ambient when above 20°C/20°C	757
3	Kill – General Exhaust	1,287	8.97	3.05	17.27	0.81	Ambient when above 20°C/20°C	11,536
4	Live Receiving – General Exhaust	496	13.92	3.05	17.27	1.01	Ambient/18°C	6,905
5	Live Receiving - CAS Tunnel	496	1.42	2.59	11.68	0.39	Ambient/18°C	702
6	Live Receiving – Tray Wash	496	1.42	2.59	11.68	0.39	Ambient/18°C	702
7	Live Receiving – Truck Wash	100	2.12	2.59	17.27	0.40	Ambient/18°C	212
CF8	Live Shed	277	113.25**	3.51	17.78	1.27	15°C/15°C	31,370
CF9	Inedible Screening*	300	4.25	3.05	17.27	0.56	Ambient when above 18°C/18°C	1,275
CF10	Inedible Loading*	300	9.34	3.05	17.27	0.83	Ambient when above 18°C/18°C	2,802
CF11	WWTP*	300	17.18	3.05	17.27	1.13	Ambient when above 18°C/18°C	5,154

NOTES:
* Odour treatment applied equivalent to carbon filter unit
** CF8 is a carbon filter proposed for all 5 liveshed stack, therefore the representative flowrate for this stack is 5 times original flowrate (22.65 m³/s)

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Dispersion modelling indicates that the proposed Sofina chicken processing facility will meet the plant boundary objective of 5 OU/m^3 when carbon filter (or equivalent) technology is installed for select processes. Dispersion modelling results are presented in Table 7-2. The odour isopleths for the New Plant, including the odour-controlled sources over a 1-hour averaging period (99.5th percentile), are presented in Figure 7-2.

The maximum predicted concentration (5.7 OU/m^3) occurs on the northern property boundary. This value is slightly above the targeted 5 OU objective, however as seen in Figure 7-2 the concentration contour above 5 OU/m^3 drops in immediate vicinity of the fence line and right before the canal. The Eastern Irrigation District Canal is restricted access and fenced off. The public cannot easily access this area and any recreational use is prohibited by Provincial and City governments. Considering that the facility is located in an industrial zone and there are no sensitive receptors in the vicinity of facility (the nearest residential area is located 2.7 km south east of the plant) no adverse human effects or odour issues are anticipated from predicted odour concentrations.

Table 7-2 Dispersion Modelling Results Odour Concentrations 99.5th % 1-hour Average

Predicted Maximum Odor Concentrations (1hr 99.5th%)			
Averaging	Baseline Model Run OU/m^3	Mitigated Model Run OU/m^3	Odour Objective OU/m^3
1h_99.5th	26.2	5.7	5

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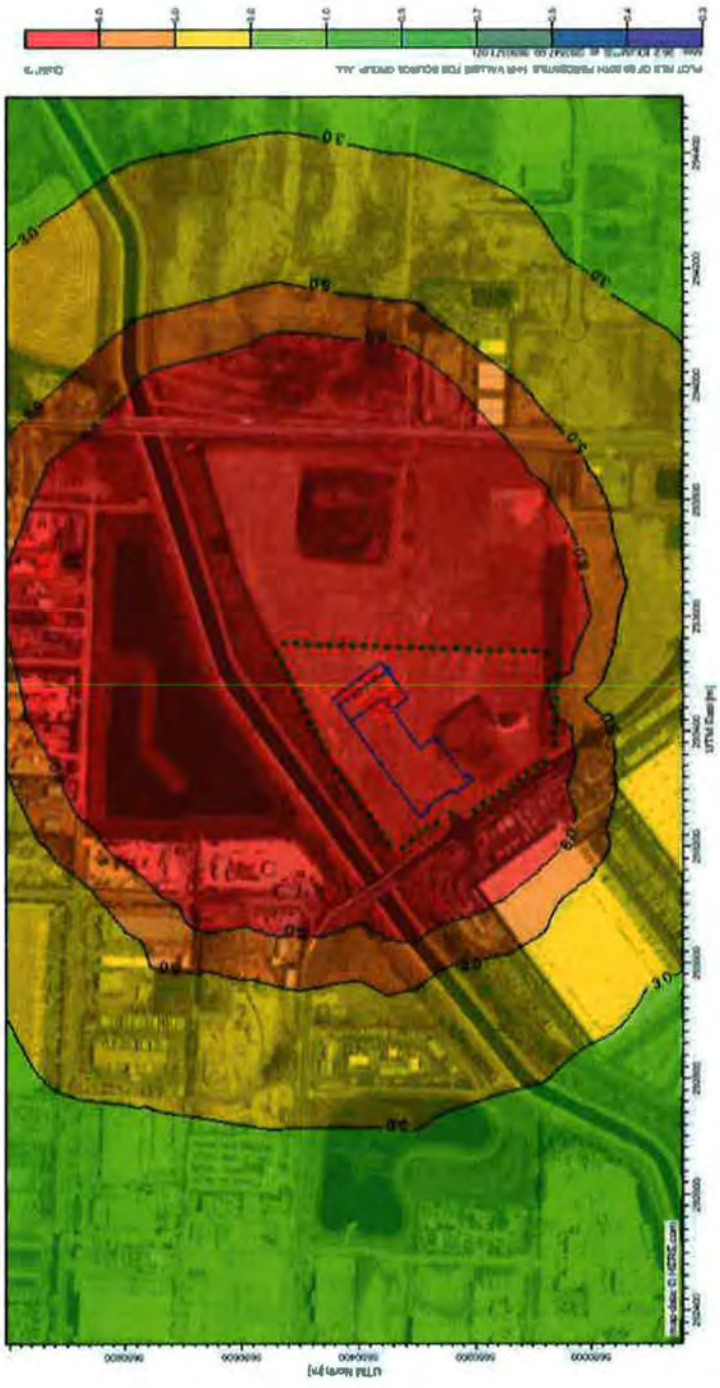

Figure 7-1 Base Case Odour Concentrations (99.5th % 1-hour average odour concentrations OU/m³)

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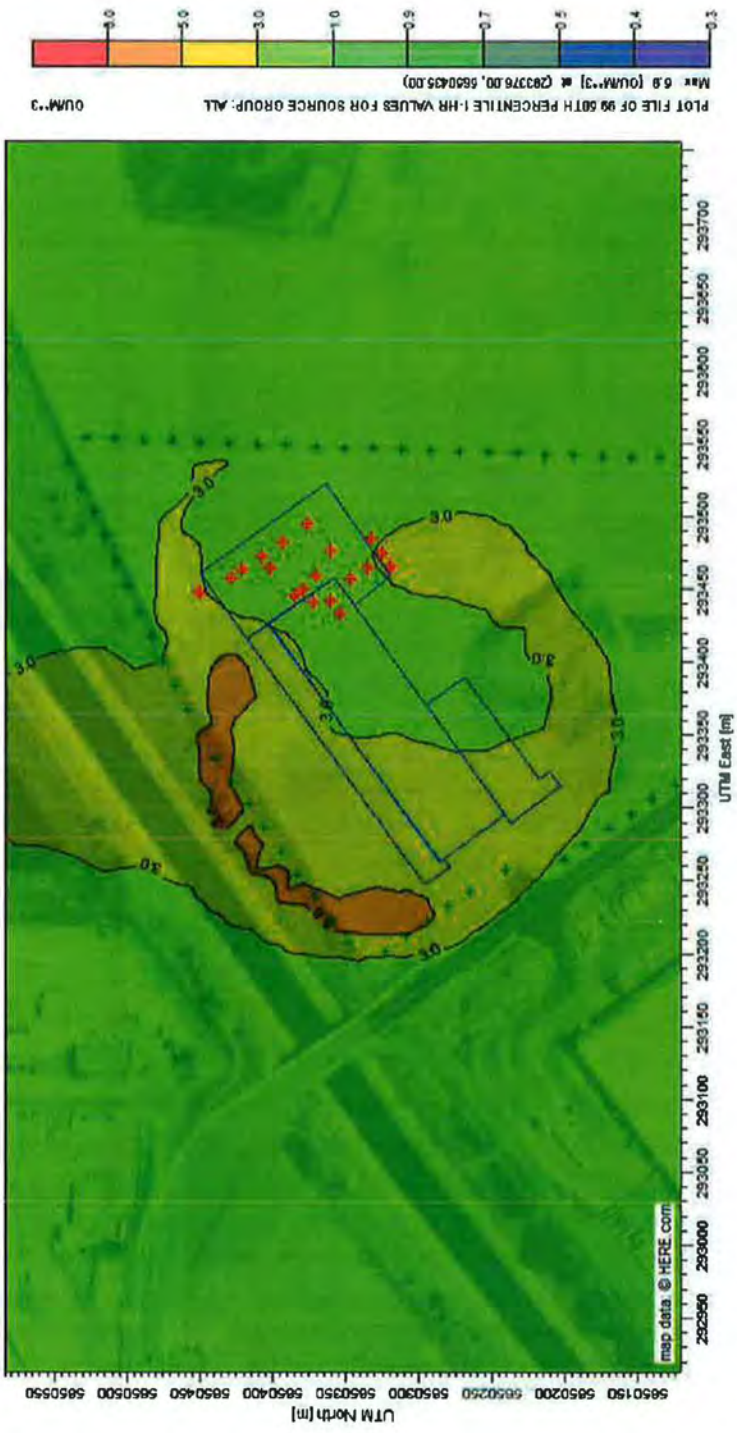

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Figure 7-2 Mitigated Odour Concentrations (99.5th % 1-hour average odour concentrations OU/m^3)

7.5

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8.0 CONCLUSIONS

Dispersion modeling was conducted for the New Plant based on odour sample information from the existing Hurst Road facility and planned dimensions and orientations for the New Plant. The initial AERMOD dispersion modelling results indicated that odour treatment would be required to achieve a predicted odour concentration at or below 5 OU/m^3 off site or at the fence line of the New Plant. Iterative dispersion modelling using was completed to evaluate the treatment of the process area exhausts to determine which processes required treatment to ensure off-site and fence line odour concentration were at or below the 5 OU/m^3 threshold.

The results of the dispersion modelling confirm that treatment of the exhaust from some odourous processes (Inedible Screening, Inedible Loading, and Wastewater Pre-Treatment via activated carbon filter) and combination and enhance dispersion of the Live Shed exhaust would meet the assumed fence line objective. The placement and combination of the exhausted air from the treated processes, the relative position of the plant buildings, and potentially the operation schedule for the processes are all parameters that could be further refined and may further reduce the predicted odour concentrations.

The technical and financial feasibility of the various potential treatment technologies would need to be analyzed prior to implementation of the treatment processes to determine the most efficient method of sufficiently treating the emissions. Based on these results it is feasible that odour emissions should be controllable using emissions control technologies for the odourous processes at the New Plant.

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Appendix A ODOUR SAMPLING FIELD REPORT

Operational Management Plan

Stantec

Memo

To:	Jason Hancock Calgary	From:	Stephen Biswanger Winnipeg
File:	144211190	Date:	September 12, 2018

Reference: Draft Sofina Odour Sampling Field Report

BACKGROUND

Sofina Foods Inc. has operated an existing poultry processing plant in Calgary at 2126 Hurst Road SE since the 1960s. The existing plant site is presently surrounded by a variety of land uses including residential and industrial neighbours as well as an adjacent rail line. Stantec Consulting Ltd. is designing a new poultry processing plant for Sofina Foods Inc. on an 11.836-hectare parcel at 6202, 106th Avenue SE, (Lot 4, Block 5, Plan 171 0868) in the Dufferin II (North) Industrial area. Sofina plans to relocate the Hurst Rd. operations to the new site.

In order to obtain a development permit for the new plant, the City of Calgary requires completion of an odour assessment study to demonstrate mitigation of the anticipated odours from the new plant. The odour assessment will be developed using odour data from the existing plant (where possible). This memo outlines the field odour sample collection work conducted on August 22, 2018, to determine representative odour generation rates that can be used to model odour dispersion at the new facility.

SAMPLE LOGISTICS

Stantec arrived at the site and met with Rob Chrystanthou the morning of August 22, 2018. A brief discussion was held to identify the processes with potential for significant odour generation, determine the optimal practical locations for collecting the odour samples, and to go over the general plan for the odour assessment. Mr. Chrysanthou accompanied the sampling team to each location at the existing plant to observe the sample collection technique and provide safety accompaniment.

ODOUR SAMPLE COLLECTION LOCATIONS

Based on discussion with Rob Chrysanthou, five process areas at the plant were identified as potentially significant odour sources. These areas were the live shed, the scalder, the kill floor, the live receiving area, and the gut room. The on-site sample locations are indicated on Figures 1 and 2 on drawings provided by Sofina to Stantec. In addition, an ambient sample was also collected at the proposed site at the new industrial park. Sampling locations are described in more detail in the attached photo log.

SAMPLE COLLECTION METHODS

EQUIPMENT

A lung sampler and air pump were provided by the odour testing laboratory, Ortech Environmental. The vacuum sampler was a wheeled pelican case with two ports installed to allow Teflon tubing to be affixed to the air pump, the container and a tedlar sample bag.

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Reference: Draft Sofina Odour Sampling Field Report

SAMPLING AND SHIPPING PROCEDURE

For each sample the air pump was used to induce a vacuum within the chamber around the tedlar sample bag and indirectly draw the air into the bag via the sample collection tubing.

- A laboratory supplied, pre-purged, tedlar, sample bag was used for each sample.
- The labeled Tedlar sampling bag was connected to the internal Teflon tube within the vacuum chamber, and the vacuum chamber was sealed.
- Teflon sample tubing was connected to the vacuum chamber and held in the midstream of the subject exhaust. In the case of ambient room samples, the external tubing was not used and the sample was drawn into the bag via the inlet port. The vacuum pump was then turned on to create a vacuum in the chamber and passively draw the sample into the Tedlar sampling bag.
- Each laboratory-prepared sampling bag was purged with the sample air by filling the bag to approximately 2/3 capacity and then disconnecting the tubing and forcing the air out of the sample bag with light pressure prior to purging the bag again using the same procedure. In each case the purge cycle took approximately 3-4 minutes.
- The odour sample was then collected by filling the sample bag to approximately 2/3 capacity using the same procedure.
- Once the sample bag was approximately 2/3 full, the vacuum pump was stopped and the sample collection stopped.
- The Teflon sample tubing was then disconnected and the sampling bag removed from the vacuum case, the bag port was sealed with the supplied plug and placed into a black bag to await shipping to Ortech Environmental for analysis. In each location, two samples were collected consecutively following the same procedure.
- Each sample pair were stored in dark plastic bags and then placed in extra-large boxes, sealed and labelled.
- Samples were identified on the laboratory chain of custody including the name of the sampler, sample type, date and time of sample collection, number of containers and requested analysis.
- Samples were shipped with the chain of custody via overnight courier to Ortech Environmental in Mississauga, Ontario, and proper and complete receipt of the samples was confirmed with Ortech the following day.

PARAMETERS MEASURED

At each sample location at the existing plant, a Kestrel 3000 pocket weather meter was used to obtain measurements of exhaust velocity, temperature, and relative humidity, as well as wind chill, heat stress and dew point. H2S concentrations were measured[1] using an App-Tek 0-200 ppm OdaLog portable gas logger. Exterior sample locations for the roof-top exhaust units were recorded with a handheld Garmin GPS62s. A hand tape measure was used to obtain general dimensions to characterize exhaust parameters such as the sizes of the exhaust openings.

[1] Due to a failed battery in the OdaLog unit, H2S readings were collected on August 28 during a return visit to the site.

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Stantec

September 12, 2018
Jason Hancock
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Reference: Draft Sofina Odour Sampling Field Report

COLLECTED FIELD DATA

Field parameters recorded during the odour sampling event are summarized in Table 1.

Table 1 Measured Exhaust Air Quality Parameters

Sample Location	Field Exhaust Measurements						
	Average (m/s)	Temp (°C)	WC (°C)	Relative Humidity (%)	HI (°C)	Dew Point (°C)	H_2S (ppm)
Live Shed	2.64	22.4	22.3	38.4	21.3	7.4	0
Scalder	10.36	29.3	29.3	87.1	38	26.9	1
Kill Floor	7.72	26.9	26.9	50.2	26.9	15.7	0
Live Rec.	n/a	28.7	28.6	52.7	29.8	18.1	0
Gut Room	n/a	28.8	28.7	60.7	31.1	20.4	0
New Site	2.5	31.2	31.2	14.3	28.3	0.9	-
Notes: WC – Wind Chill Factor; HI – Heat Stress Index							

In addition to the measured air quality parameters, dimensions of the exhaust units and openings were recorded to facilitate estimation of the total exhaust flow rates for the Live Shed, the Scalder, and the Kill Floor exhaust. Exhaust rates were estimated using the average measured exhaust velocity and the measured exhaust opening(s) as summarized in Table 2.

Table 2 Calculated Exhaust Flow Rates

Sample Location	Estimated Exhaust (m^3/s)
Live Shed	127.055
Scalder	22.680
Kill Floor	7.325
Live Rec.	Ambient Room Sample
Gut Room	Ambient Room Sample
New Site	Ambient Air Sample

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LABORATORY RESULTS

Results of the odour laboratory analysis (carried out based on European Standard EN 13725:2003 in accordance with procedures approved by Ontario Ministry of the Environment and Climate Change) are summarized in Table 3. A copy of the full laboratory report is attached.

Table 3 Laboratory Odour Concentration Results

Sample Location	Odour Sample ID	Mean ODTV from Lab Test (OU/m^3 prelim results)
Live Shed	001	126.3
Scalder	002	291.6
Kill Floor	003	98.8
Live Rec.	004	133.2
Gut Room	005	1315.6
New Site	006	49

Notes: ODTV – Odour Detection Threshold Value, the dilution point where 50% of odour panelists will just detect odour presence. Expressed as Odour Units

SUMMARY

A summary of the collected data is included in Table 4, including the measured air quality data, the laboratory odour concentration results, and information provided by Sofina on the plant operations at the time of sample collection.

Stantec

Reference: **Draft Sofina Odour Sampling Field Report**

Table 4 **Summary of Odour concentration and Site Conditions**

Sample Location	Average (m/s)	Temp (°C)	Relative Humidity (%)	H_2S (ppm)	Odour Sample ID	Base Case at Existing Plant at Time of Odour Sample Collection	Mean ODTV from Lab Test (OU/m³ prelim results)	Estimated Exhaust (m³/s)	Estimated Emission Rate From Existing Plant (OU/s)
Live Shed	2.64	22.4	38.4	0	001	52,800 birds in the live shed at the time of air sampling	126.3	127.055	16047
Scalder	10.36	29.3	87.1	1	002	9000 birds per hour	291.6	22.680	6614
Kill Floor	7.72	26.9	50.2	0	003	9000 birds per hour	98.8	7.325	724
Live Rec.	n/a	28.7	52.7	0	004	9000 birds per hour	132.7	Ambient Room Sample	-
Gut Room	n/a	28.8	60.7	0	005	• Frequency of emptying the bin. Approximately 1 bin every 45 minutes. • The feather and gut portions of the bins each are approximately 8'x8'x8'. The feather bin is approximately 2/3 full, the gut bin is between ½ and 2/3 full when it is transferred.	1315.6	Ambient Room Sample	-
New Site	2.5	31.2	14.3	-	006	Open field with some earthworks occurring	49	Ambient Air Sample	-

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Stantec

Reference: Draft Sofina Odour Sampling Field Report

In order to use the data collected from the existing Sofina facility, the results will be normalized for room size and production level to allow conversion to the maximum operations planned for the proposed facility. These calculations will be incorporated in the odour assessment report.

Stantec Consulting Ltd.

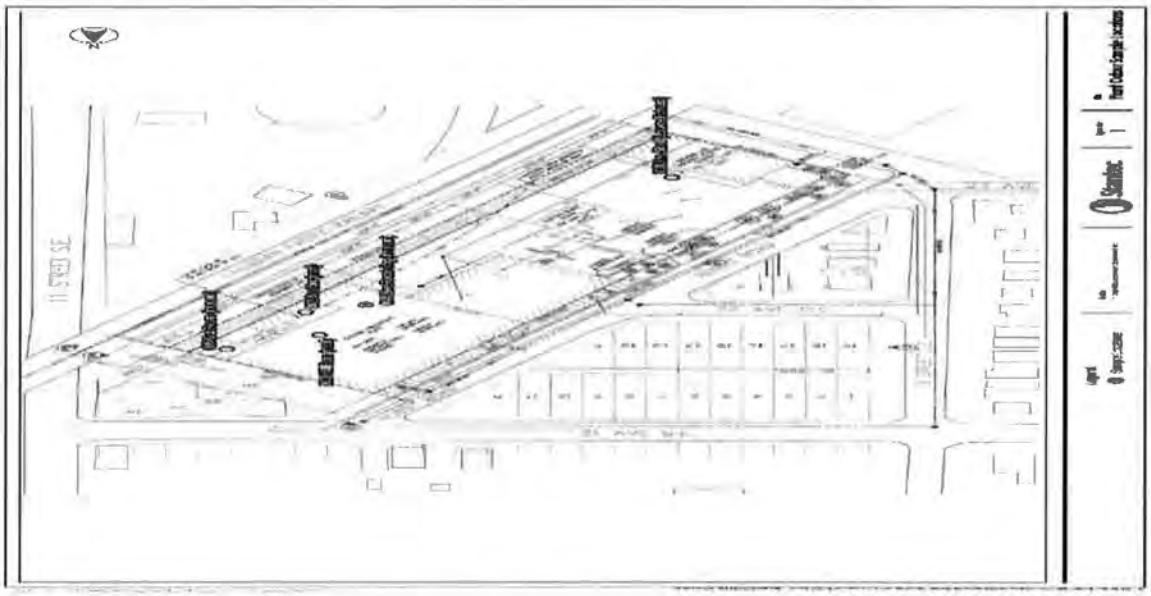
Stephen Biswanger P.Eng. (ME)
Environmental Engineer

Phone: 204-924-7061
Fax: 204-942-2548
stephen.biswanger@stantec.com

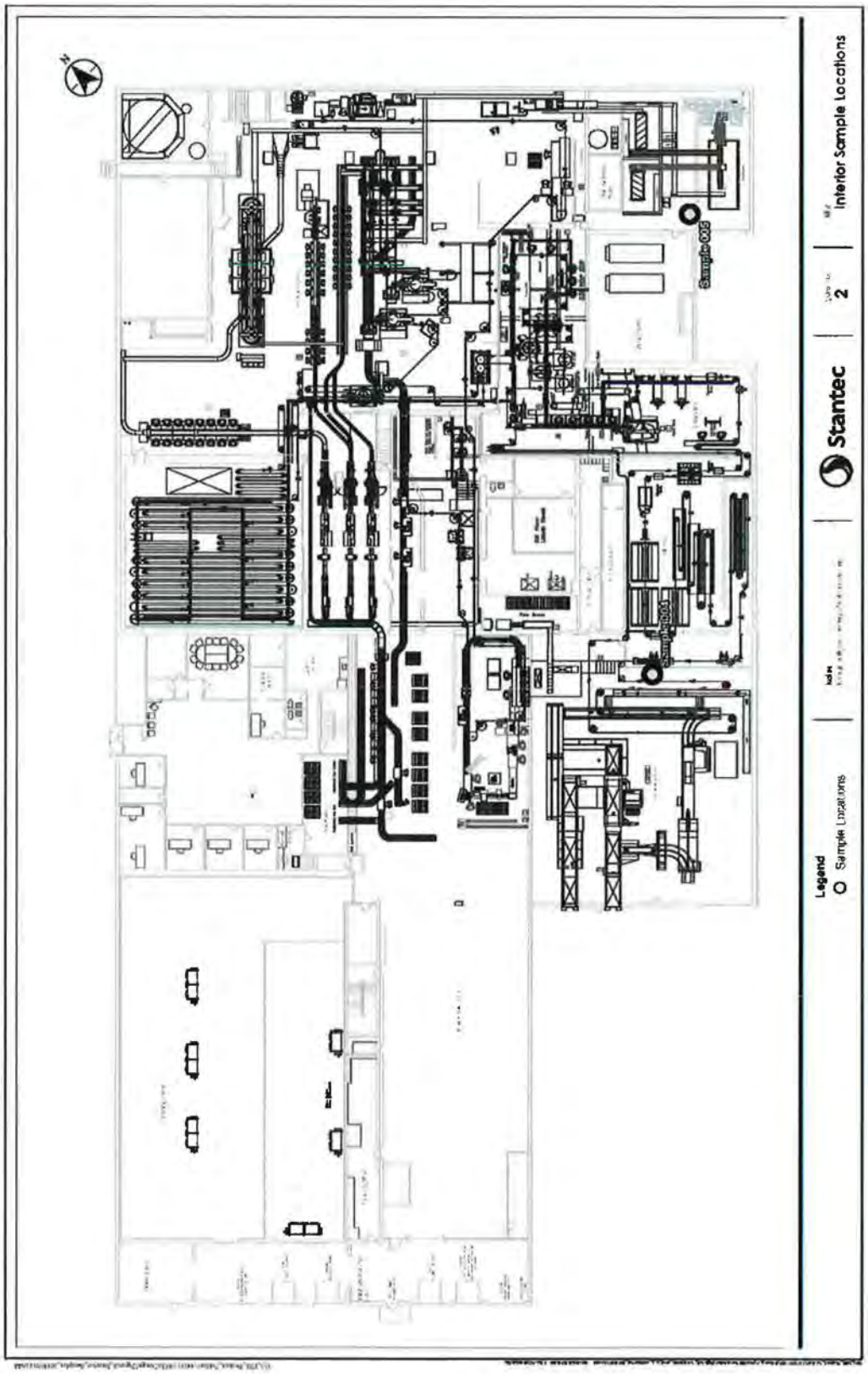
Attachment: Figure 1
Figure 2
Laboratory Report
Photographic Record

Design with community in mind

Operational Management Plan



Operational Management Plan



Operational Management Plan

Photo 1 – Live Shed: Odour sample collected at approximately chest height at an exhaust ventilation louvre immediately prior to air exiting the louvre to the outside of the building along the northeast wall at the approximate mid-point of the building's southwest face.

Photo 2 – Scalder: Odour sample collected from the exhaust of one of two identical roof fan units. The sample tube was inserted approximately 10-15 cm below the top of the exhaust rim mid-way between the center cap and the outer rim.

Photo 3 – Kill Floor: Odour sample collected from the exhaust of a roof fan unit approximately 10-15 cm below the top of the exhaust rim mid-way between the center cap and the outer rim.

Photo 4 – Live Receiving: An ambient odour sample was collected at chest height, mid-way along the northeast wall of the live receiving area.

Stantec

Client/Project	Date
Sofina Odour Sampling Field Report	Sept 2018
	Project No. 144211190
Title	Page
PHOTOGRAPHIC RECORD	Page 1 of 2

Operational Management Plan

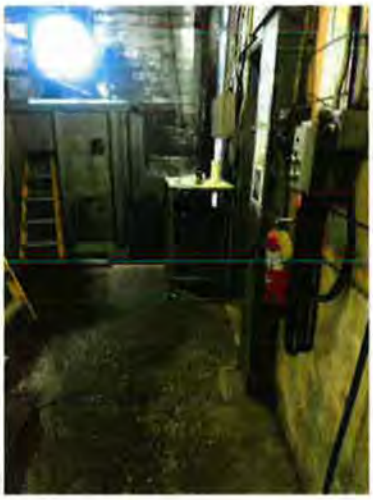


Photo 5 – Gut Room: An ambient odour sample was collected near floor level, between the man door and roll-off bins along the southwest wall of the room.

Photo 6 – New Site: An ambient odour sample was collected at waist height proximate to the property entry at the proposed plant site. The apparent wind direction at the time of sample collection was out of the ENE and grading earthworks were observed underway approximately 200-300 m to the northwest of the sampling location.

Stantec

Client/Project	Date
Sofina Odour Sampling Field Report	Sept 2018
	Project No 144211190
Title PHOTOGRAPHIC RECORD	Page Page 2 of 2

Operational Management Plan

Report No. | 26470

ORTECH
a Kontrol Energy Company

Report:

Stantec
Odour Detection Threshold Value (ODTV)
Analysis of Air Samples

Date: September 7, 2018

Operational Management Plan

Report:

Stantec
Odour Detection Threshold Value (ODTV)
Analysis of Air Samples

Submitted to: Johanna Theroux, M.Sc.
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Report No.: 26470
6 pages, 2 Appendices

Revision History

Version	Date	Summary Changes/Purpose of Revision
1	September 7, 2018	None

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Operational Management Plan

1. INTRODUCTION

ORTECH Consulting Inc. (ORTECH) was requested by Stantec in Winnipeg, Manitoba to determine the odour detection threshold values (ODTV) of twelve Tedlar bag air samples submitted to ORTECH. The samples were collected on August 22nd 2018 at a poultry processing facility, shipped by overnight courier and delivered to ORTECH on August 23rd 2018 for analysis on the same day. The samples were kept in a dark environment until they were analyzed using the dynamic dilution olfactometer at the ORTECH odour test facility in Mississauga, Ontario.

ORTECH provided Stantec with a lung sampler and Tedlar bags to collect air samples. The samples were collected without any field predilution before they were shipped to ORTECH. A Chain of Custody Record for the samples is attached as Appendix 1.

2. TEST METHODOLOGY

The odour samples were analyzed on the same day of delivery by the dynamic dilution olfactometer at the ORTECH odour test facility. This facility is a specialized room, designed to provide an odour-free environment for accurate evaluations.

The olfactometer is a binary port system operated in a non-forced choice mode. The sample bag is pressurized in a pressure vessel, and the resulting flow metered through an electronic mass flow controller at a predetermined rate. The sample is diluted with flow-controlled odorless air and passed to the panel members through one of two evaluation ports. A three-way valve allows the operator to direct the sample through either of the two ports. Each evaluation begins at a high dilution level, which is lowered in a step-wise sequence by a factor of 1.41 at each step. All panelists evaluate each sample simultaneously. At each dilution level, the panelists register their responses by entering the letter of the port at which they detect the odour. The range of dilution ratios of ORTECH's odour test facility is from 5,793 times to 8 times.

The panelists' responses are processed to determine the ODTV for the sample. This is done by a regression analysis of the log of the dilution level versus the probit value of the percent of the panel responding. The point on the plot at which statistically 50% of the panel can just detect the odour is recorded as the ODTV. The ODTV is a dilution factor and therefore has no units. For convenience, however, the ODTV may be expressed in odour units (ou).

A panel with eight members was used for the analyses. They are drawn from a pool of people who routinely participate in this type of work. They have all been tested frequently for odour sensitivity and are considered to be within the normal range.

Operational Management Plan

3. RESULTS

Analytical results for the twelve samples are provided in Appendix 2 and summarized in Table 1. Duplicate samples were collected and analyzed at each of six locations. The table shows the sample reference numbers, descriptions of the sampling sources, test numbers and the sampling time for each sample (four minutes).

The ODTV determined by the odour panel (the Raw ODTV) was multiplied by the field predilution ratio to give the overall ODTV (the Net ODTV) for each sample. Since there was no field predilution, the field prdilution ratio is unity and the Raw ODTV is equal to the Net ODTV. The Coefficient of Variation (calculated as the standard deviation expressed as a percentage of the geometric mean ODTV) is a measure of the variability for each pair of duplicate samples. These Coefficients of Variation are within the normal values, except for sample reference 002 which is somewhat high.

A blank Tedlar bag air sample was analyzed and did not contain any detectable odour.

4. QUALITY ASSURANCE PROGRAM

For this program, ORTECH included an extensive quality assurance/quality control (QA/QC), which included the following tasks:

- Tedlar bags were cleaned with heated air for a period of time until background odours were not detectable.
- Tedlar bag final preparation included leak checks and the confirmation that background odours were absent
- Inspection of all analysis equipment for defects and damage.
- The panelists are screened periodically using n-butanol
- The olfactometer is calibrated periodically for sample dilution ratios and evaluation port volumetric flow rate.
- Blank air was introduced to the panelists before analysis of each odour sample.
- The ORTECH olfactometer and sample analysis procedures are approved by the Ontario Ministry of the Environment and Climate Change for compliance odour testing purposes in Ontario.
- The ORTECH olfactometer and sample analysis procedures are based on European Standard EN 13725:2003.

Calibration data for the ORTECH olfactometer and panelist screening data are kept on file at ORTECH.

Stephen Thorndyke, M.Eng., P.Eng.
Principal, Odour Assessment/Analytical Services

Operational Management Plan

ORTECH
a Kontrol Energy Company

TABLE 1
Air Emission Odour Detection Threshold Values (ODTV)
August 23, 2018

Sample Reference	Sampling Source	Test No.	Sampling Time Start	Finish	Raw ODTV ou	Field Predilution Ratio	Net ODTV ou	Coefficient of Variation %	Geometric Mean ODTV ou
001	Live Shed	1	09:57	10:01	128.1	1.0	128.1	1.4	126.3
		2	10:12	10:16	124.6	1.0	124.6		
002	Scalder	1	11:04	11:08	362.0	1.0	362.0	21.8	291.6
		2	11:22	11:26	234.9	1.0	234.9		
003	EUISC	1	11:42	11:46	90.5	1.0	90.5	8.8	98.8
		2	11:57	12:01	107.8	1.0	107.8		
004	Live Receiving	1	12:59	13:03	149.2	1.0	149.2	11.3	133.2
		2	13:19	13:23	119.0	1.0	119.0		
005	Gut Room	1	13:44	13:48	1217.7	1.0	1217.7	7.7	1315.6
		2	13:59	14:03	1421.3	1.0	1421.3		
006	New Site	1	14:53	14:57	54.6	1.0	54.6	10.9	49.0
		2	15:07	15:11	43.9	1.0	43.9		

ou = odour units
The samples were collected on August 22, 2018 and evaluated on August 23, 2018
The field predilution ratio of 1.0 indicates there was no field predilution

Operational Management Plan

APPENDIX 1

Chain of Custody Record
(1 page)

26470

Page 1 of 1

ORTECH Environmental
804 Southdown Road
Mississauga, Ontario L5J 2Y4
Telephone (905) 822-4120
Facsimile (905) 855-0406

CHAIN OF CUSTODY RECORD

for sample submission

ORTECH Contact: S. Thorndyke   Client Project: 14421190

Samples Submitted by:
Name: Stephen Biswanger
Company: Stantec
Address: 500 311 Portage Avenue
City, Province, Postal Code: Winnipeg, MB, R3B2B9
Telephone No.: 204-924-7061   Fax: 204-453-9012

Analyses Requested: Odour Detection Threshold Quote 26470

Customer Description	Sample Type	Date Sampled	Number of Containers	Please Check for each sample					Sample Preservation	Comments and Bag/Media ID #
001 - LIVESHED	air	8/22/2018	2 bags	✓					☐	
002 - SCALD	air	8/22/2018	2 bags	✓					☐	
003 - EVISC	air	8/22/2018	2 bags	✓					☐	
004 - LIVE REC	air	8/22/2018	2 bags	✓					☐	
005 - CUT ROOM	air	8/22/2018	2 bags	✓					☐	
006 - NEWSITE	air	8/22/2018	2 bags	✓					☐	
									☐	
									☐	
									☐	
									☐	

Note: (1) I understand and abide with ORTECH's "Terms and Conditions", and this signature is considered authorization to proceed with this work/job.

	Print Name	Signature	Date (yy/mm/dd)	Time	Sample disposal
Collected by:	Stephen Biswanger	[signature]	2018/08/22		☐ Return after analysis
Custody Relinquished by (1):	Stephen Biswanger	[signature]	2018/08/22		
Relinquished to:					☑ Discard non-hazardous sample (s) 30 days after analysis
Laboratory Recipient:					
Conditions on Receipt:	☐ Okay ☐ Other (Explain if checked)				Shipped by:

FORM SAR.073 Rev.01/05

Operational Management Plan

APPENDIX 2

Odour Panel Results
(12 pages)

Operational Management Plan

Stantec, Winnipeg — August 23, 2018
Project 26470

Poultry Processing Plant
Liveshed 09:57 -10:01 — Test No. 1

Panelists: 8
OTV = 128.136
Dilution: 1
QTV*Dilution = 128

Dilution	Log (Dilution)	Number	Percent	Probit (r)
5793	3.7629	-1	-12.5%	#N/A
4096	3.6124	-1	-12.5%	#N/A
2896	3.4618	-1	-12.5%	#N/A
2048	3.3113	-1	-12.5%	#N/A
1448	3.1608	-1	-12.5%	#N/A
1024	3.0103	-1	-12.5%	#N/A
724	2.8597	-1	-12.5%	#N/A
512	2.7093	-1	-12.5%	#N/A
362	2.5587	-1	-12.5%	#N/A
256	2.4082	0	0.0%	2.500
181	2.2577	2	25.0%	4.330
128	2.1072	4	50.0%	5.000
91	1.9590	6	75.0%	5.670
64	1.8062	8	100.0%	7.500
45	1.6532	-1	-12.5%	#N/A
32	1.5051	-1	-12.5%	#N/A
23	1.3617	-1	-12.5%	#N/A
16	1.2041	-1	-12.5%	#N/A
11	1.0414	-1	-12.5%	#N/A
8	0.9031	-1	-12.5%	#N/A
6	0.7782	-1	-12.5%	#N/A
5	0.6990	-1	-12.5%	#N/A
4	0.6021	-1	-12.5%	#N/A
3	0.4771	-1	-12.5%	#N/A
2	0.3010	-1	-12.5%	#N/A

x coefficient (slope) -0.12727738
Constant (y-intercept 2.74405688
Std Err of Y Est 0.05414087
r Squared 0.96106083
No. of Observations 5

log(OTV) 2.10766998
OTV 128.13565

1

Operational Management Plan

Stantec, Winnipeg

August 23, 2018
Project 26470

Poultry Processing Plant
Liveshed 10:12 -10:16

Test No. 2

Panelists: 8
OTV = 124.611
Dilution: 1
QTV*Dilution = 125

Dilution	Log (Dilution)	Number	Percent	Probit (r)
5793	3.7629	-1	-12.5%	#N/A
4096	3.6124	-1	-12.5%	#N/A
2896	3.4618	-1	-12.5%	#N/A
2048	3.3113	-1	-12.5%	#N/A
1448	3.1608	-1	-12.5%	#N/A
1024	3.0103	-1	-12.5%	#N/A
724	2.8597	-1	-12.5%	#N/A
512	2.7093	-1	-12.5%	#N/A
362	2.5587	-1	-12.5%	#N/A
256	2.4082	0	0.0%	2.500
181	2.2577	1	12.5%	3.845
128	2.1072	4	50.0%	5.000
91	1.9590	6	75.0%	5.670
64	1.8062	8	100.0%	7.500
45	1.6532	-1	-12.5%	#N/A
32	1.5051	-1	-12.5%	#N/A
23	1.3617	-1	-12.5%	#N/A
16	1.2041	-1	-12.5%	#N/A
11	1.0414	-1	-12.5%	#N/A
8	0.9031	-1	-12.5%	#N/A
6	0.7782	-1	-12.5%	#N/A
5	0.6990	-1	-12.5%	#N/A
4	0.6021	-1	-12.5%	#N/A
3	0.4771	-1	-12.5%	#N/A
2	0.3010	-1	-12.5%	#N/A

x coefficient (slope)	-0.12489506
Constant (y-intercept	2.72003045
Std Err of Y Est	0.0354471
r Squared	0.98330842
No. of Observations	5
log(OTV)	2.09555515
OTV	124.610648

2

Operational Management Plan

Stantec, Winnipeg — August 23, 2018
Project 26470

Poultry Processing Plant
Scalder 11:04 -11:08 — Test No. 1

Panelists:	8
OTV =	362.015
Dilution:	1
QTV*Dilution =	362

Dilution	Log (Dilution)	Number	Percent	Probit (r)
5793	3.7629	-1	-12.5%	#N/A
4096	3.6124	-1	-12.5%	#N/A
2896	3.4618	-1	-12.5%	#N/A
2048	3.3113	-1	-12.5%	#N/A
1448	3.1608	-1	-12.5%	#N/A
1024	3.0103	-1	-12.5%	#N/A
724	2.8597	0	0.0%	2.500
512	2.7093	1	12.5%	3.845
362	2.5587	4	50.0%	5.000
256	2.4082	7	87.5%	6.155
181	2.2577	8	100.0%	7.500
128	2.1072	-1	-12.5%	#N/A
91	1.9590	-1	-12.5%	#N/A
64	1.8062	-1	-12.5%	#N/A
45	1.6532	-1	-12.5%	#N/A
32	1.5051	-1	-12.5%	#N/A
23	1.3617	-1	-12.5%	#N/A
16	1.2041	-1	-12.5%	#N/A
11	1.0414	-1	-12.5%	#N/A
8	0.9031	-1	-12.5%	#N/A
6	0.7782	-1	-12.5%	#N/A
5	0.6990	-1	-12.5%	#N/A
4	0.6021	-1	-12.5%	#N/A
3	0.4771	-1	-12.5%	#N/A
2	0.3010	-1	-12.5%	#N/A

x coefficient (slope)	-0.12215411
Constant (y-intercept	3.16949767
Std Err of Y Est	0.00847892
r Squared	0.99904799
No. of Observations	5
log(OTV)	2.55872713
OTV	362.015468

3

Operational Management Plan

Stantec, Winnipeg — August 23, 2018
Project 26470

Poultry Processing Plant
Scalder 11:22 -11:26 — Test No. 2

Panelists:	8
OTV =	234.913
Dilution:	1
QTV*Dilution =	235

Dilution	Log (Dilution)	Number	Percent	Probit (r)
5793	3.7629	-1	-12.5%	#N/A
4096	3.6124	-1	-12.5%	#N/A
2896	3.4618	-1	-12.5%	#N/A
2048	3.3113	-1	-12.5%	#N/A
1448	3.1608	-1	-12.5%	#N/A
1024	3.0103	-1	-12.5%	#N/A
724	2.8597	-1	-12.5%	#N/A
512	2.7093	0	0.0%	2.500
362	2.5587	1	12.5%	3.845
256	2.4082	2	25.0%	4.330
181	2.2577	5	62.5%	5.320
128	2.1072	8	100.0%	7.500
91	1.9590	-1	-12.5%	#N/A
64	1.8062	-1	-12.5%	#N/A
45	1.6532	-1	-12.5%	#N/A
32	1.5051	-1	-12.5%	#N/A
23	1.3617	-1	-12.5%	#N/A
16	1.2041	-1	-12.5%	#N/A
11	1.0414	-1	-12.5%	#N/A
8	0.9031	-1	-12.5%	#N/A
6	0.7782	-1	-12.5%	#N/A
5	0.6990	-1	-12.5%	#N/A
4	0.6021	-1	-12.5%	#N/A
3	0.4771	-1	-12.5%	#N/A
2	0.3010	-1	-12.5%	#N/A

x coefficient (slope)	-0.12396706
Constant (y-intercept	2.99074264
Std Err of Y Est	0.06438966
r Squared	0.94509727
No. of Observations	5
log(OTV)	2.37090732
OTV	234.913147

4

Operational Management Plan

Stantec, Winnipeg — August 23, 2018
Project 26470

Poultry Processing Plant
EU1SC 11:42 -11:46 Test No. 1

Panelists: 8
OTV = 90.503
Dilution: 1
QTV*Dilution = 91

Dilution	Log (Dilution)	Number	Percent	Probit (r)
5793	3.7629	-1	-12.5%	#N/A
4096	3.6124	-1	-12.5%	#N/A
2896	3.4618	-1	-12.5%	#N/A
2048	3.3113	-1	-12.5%	#N/A
1448	3.1608	-1	-12.5%	#N/A
1024	3.0103	-1	-12.5%	#N/A
724	2.8597	-1	-12.5%	#N/A
512	2.7093	-1	-12.5%	#N/A
362	2.5587	-1	-12.5%	#N/A
256	2.4082	-1	-12.5%	#N/A
181	2.2577	0	0.0%	2.500
128	2.1072	2	25.0%	4.330
91	1.9590	4	50.0%	5.000
64	1.8062	6	75.0%	5.670
45	1.6532	8	100.0%	7.500
32	1.5051	-1	-12.5%	#N/A
23	1.3617	-1	-12.5%	#N/A
16	1.2041	-1	-12.5%	#N/A
11	1.0414	-1	-12.5%	#N/A
8	0.9031	-1	-12.5%	#N/A
6	0.7782	-1	-12.5%	#N/A
5	0.6990	-1	-12.5%	#N/A
4	0.6021	-1	-12.5%	#N/A
3	0.4771	-1	-12.5%	#N/A
2	0.3010	-1	-12.5%	#N/A

x coefficient (slope) -0.12784601
Constant (y-intercept 2.59589453
Std Err of Y Est 0.05485148
r Squared 0.96041339
No. of Observations 5

log(OTV) 1.95666448
OTV 90.5033146

5

Operational Management Plan

Stantec, Winnipeg — August 23, 2018
Project 26470

Poultry Processing Plant
EU1SC 11:42 -11:46 — Test No. 2

Panelists: 8
OTV = 107.777
Dilution: 1
QTV*Dilution = 108

Dilution	Log (Dilution)	Number	Percent	Probit (r)
5793	3.7629	-1	-12.5%	#N/A
4096	3.6124	-1	-12.5%	#N/A
2896	3.4618	-1	-12.5%	#N/A
2048	3.3113	-1	-12.5%	#N/A
1448	3.1608	-1	-12.5%	#N/A
1024	3.0103	-1	-12.5%	#N/A
724	2.8597	-1	-12.5%	#N/A
512	2.7093	-1	-12.5%	#N/A
362	2.5587	-1	-12.5%	#N/A
256	2.4082	-1	-12.5%	#N/A
181	2.2577	0	0.0%	2.500
128	2.1072	2	25.0%	4.330
91	1.9590	6	75.0%	5.670
64	1.8062	8	100.0%	7.500
45	1.6532	-1	-12.5%	#N/A
32	1.5051	-1	-12.5%	#N/A
23	1.3617	-1	-12.5%	#N/A
16	1.2041	-1	-12.5%	#N/A
11	1.0414	-1	-12.5%	#N/A
8	0.9031	-1	-12.5%	#N/A
6	0.7782	-1	-12.5%	#N/A
5	0.6990	-1	-12.5%	#N/A
4	0.6021	-1	-12.5%	#N/A
3	0.4771	-1	-12.5%	#N/A
2	0.3010	-1	-12.5%	#N/A

x coefficient (slope) -0.09165829
Constant (y-intercept 2.49081893
Std Err of Y Est 0.01314771
r Squared 0.99693789
No. of Observations 4

log(OTV) 2.03252748
OTV 107.777344

6

Operational Management Plan

Stantec, Winnipeg

August 23, 2018
Project 26470

Poultry Processing Plant
Live Receiving 12:59 -13:03

Test No. 1

Panelists: 8
OTV = 149.159
Dilution: 1
QTV*Dilution = 149

Dilution	Log (Dilution)	Number	Percent	Probit (r)
5793	3.7629	-1	-12.5%	#N/A
4096	3.6124	-1	-12.5%	#N/A
2896	3.4618	-1	-12.5%	#N/A
2048	3.3113	-1	-12.5%	#N/A
1448	3.1608	-1	-12.5%	#N/A
1024	3.0103	-1	-12.5%	#N/A
724	2.8597	-1	-12.5%	#N/A
512	2.7093	-1	-12.5%	#N/A
362	2.5587	0	0.0%	2.500
256	2.4082	1	12.5%	3.845
181	2.2577	2	25.0%	4.330
128	2.1072	5	62.5%	5.320
91	1.9590	7	87.5%	6.155
64	1.8062	8	100.0%	7.500
45	1.6532	-1	-12.5%	#N/A
32	1.5051	-1	-12.5%	#N/A
23	1.3617	-1	-12.5%	#N/A
16	1.2041	-1	-12.5%	#N/A
11	1.0414	-1	-12.5%	#N/A
8	0.9031	-1	-12.5%	#N/A
6	0.7782	-1	-12.5%	#N/A
5	0.6990	-1	-12.5%	#N/A
4	0.6021	-1	-12.5%	#N/A
3	0.4771	-1	-12.5%	#N/A
2	0.3010	-1	-12.5%	#N/A

x coefficient (slope)	-0.15762142
Constant (y-intercept	2.96175561
Std Err of Y Est	0.03650095
r Squared	0.9865205
No. of Observations	6
log(OTV)	2.17364849
OTV	149.158666

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Operational Management Plan

Stantec, Winnipeg — August 23, 2018
Project 26470

Poultry Processing Plant
Live Receiving 12:59 -13:03 — Test No. 2

Panelists: 8
OTV = 118.962
Dilution: 1
QTV*Dilution = 119

Dilution	Log (Dilution)	Number	Percent	Probit (r)
5793	3.7629	-1	-12.5%	#N/A
4096	3.6124	-1	-12.5%	#N/A
2896	3.4618	-1	-12.5%	#N/A
2048	3.3113	-1	-12.5%	#N/A
1448	3.1608	-1	-12.5%	#N/A
1024	3.0103	-1	-12.5%	#N/A
724	2.8597	-1	-12.5%	#N/A
512	2.7093	-1	-12.5%	#N/A
362	2.5587	0	0.0%	2.500
256	2.4082	1	12.5%	3.845
181	2.2577	1	12.5%	3.845
128	2.1072	3	37.5%	4.680
91	1.9590	5	62.5%	5.320
64	1.8062	7	87.5%	6.155
45	1.6532	8	100.0%	7.500
32	1.5051	-1	-12.5%	#N/A
23	1.3617	-1	-12.5%	#N/A
16	1.2041	-1	-12.5%	#N/A
11	1.0414	-1	-12.5%	#N/A
8	0.9031	-1	-12.5%	#N/A
6	0.7782	-1	-12.5%	#N/A
5	0.6990	-1	-12.5%	#N/A
4	0.6021	-1	-12.5%	#N/A
3	0.4771	-1	-12.5%	#N/A
2	0.3010	-1	-12.5%	#N/A

x coefficient (slope)	-0.19255871
Constant (y-intercept	3.03820293
Std Err of Y Est	0.06839882
r Squared	0.96320842
No. of Observations	7
log(OTV)	2.07540938
OTV	118.962307

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Operational Management Plan

Stantec, Winnipeg — August 23, 2018
Project 26470

Poultry Processing Plant
Gut Room 13:44 -13:49 — Test No. 1

Panelists: 8
OTV = 1217.683
Dilution: 1
QTV*Dilution = 1218

Dilution	Log (Dilution)	Number	Percent	Probit (r)
5793	3.7629	-1	-12.5%	#N/A
4096	3.6124	-1	-12.5%	#N/A
2896	3.4618	-1	-12.5%	#N/A
2048	3.3113	0	0.0%	2.500
1448	3.1608	1	12.5%	3.845
1024	3.0103	7	87.5%	6.155
724	2.8597	8	100.0%	7.500
512	2.7093	-1	-12.5%	#N/A
362	2.5587	-1	-12.5%	#N/A
256	2.4082	-1	-12.5%	#N/A
181	2.2577	-1	-12.5%	#N/A
128	2.1072	-1	-12.5%	#N/A
91	1.9590	-1	-12.5%	#N/A
64	1.8062	-1	-12.5%	#N/A
45	1.6532	-1	-12.5%	#N/A
32	1.5051	-1	-12.5%	#N/A
23	1.3617	-1	-12.5%	#N/A
16	1.2041	-1	-12.5%	#N/A
11	1.0414	-1	-12.5%	#N/A
8	0.9031	-1	-12.5%	#N/A
6	0.7782	-1	-12.5%	#N/A
5	0.6990	-1	-12.5%	#N/A
4	0.6021	-1	-12.5%	#N/A
3	0.4771	-1	-12.5%	#N/A
2	0.3010	-1	-12.5%	#N/A

x coefficient (slope)	-0.08588907
Constant (y-intercept	3.51497961
Std Err of Y Est	0.02640182
r Squared	0.98769406
No. of Observations	4
log(OTV)	3.08553426
OTV	1217.68305

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Operational Management Plan

Stantec, Winnipeg — August 23, 2018
Project 26470

Poultry Processing Plant
Gut Room 13:59 -14:03 — Test No. 2

Panelists: 8
OTV = 1421.292
Dilution: 1
QTV*Dilution = 1421

Dilution	Log (Dilution)	Number	Percent	Probit (r)
5793	3.7629	-1	-12.5%	#N/A
4096	3.6124	-1	-12.5%	#N/A
2896	3.4618	0	0.0%	2.500
2048	3.3113	2	25.0%	4.330
1448	3.1608	3	37.5%	4.680
1024	3.0103	6	75.0%	5.670
724	2.8597	8	100.0%	7.500
512	2.7093	-1	-12.5%	#N/A
362	2.5587	-1	-12.5%	#N/A
256	2.4082	-1	-12.5%	#N/A
181	2.2577	-1	-12.5%	#N/A
128	2.1072	-1	-12.5%	#N/A
91	1.9590	-1	-12.5%	#N/A
64	1.8062	-1	-12.5%	#N/A
45	1.6532	-1	-12.5%	#N/A
32	1.5051	-1	-12.5%	#N/A
23	1.3617	-1	-12.5%	#N/A
16	1.2041	-1	-12.5%	#N/A
11	1.0414	-1	-12.5%	#N/A
8	0.9031	-1	-12.5%	#N/A
6	0.7782	-1	-12.5%	#N/A
5	0.6990	-1	-12.5%	#N/A
4	0.6021	-1	-12.5%	#N/A
3	0.4771	-1	-12.5%	#N/A
2	0.3010	-1	-12.5%	#N/A

x coefficient (slope) -0.12662237
Constant (y-intercept 3.78579515
Std Err of Y Est 0.05894704
r Squared 0.95398646
No. of Observations 5

log(OTV) 3.15268329
OTV 1421.29192

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Operational Management Plan

Stantec, Winnipeg — August 23, 2018
Project 26470

Poultry Processing Plant
New Site 14:53 -14:57 — Test No. 1

Panelists: 8
OTV = 54.572
Dilution: 1
QTV*Dilution = 55

Dilution	Log (Dilution)	Number	Percent	Probit (r)
5793	3.7629	-1	-12.5%	#N/A
4096	3.6124	-1	-12.5%	#N/A
2896	3.4618	-1	-12.5%	#N/A
2048	3.3113	-1	-12.5%	#N/A
1448	3.1608	-1	-12.5%	#N/A
1024	3.0103	-1	-12.5%	#N/A
724	2.8597	-1	-12.5%	#N/A
512	2.7093	-1	-12.5%	#N/A
362	2.5587	-1	-12.5%	#N/A
256	2.4082	-1	-12.5%	#N/A
181	2.2577	-1	-12.5%	#N/A
128	2.1072	0	0.0%	2.500
91	1.9590	1	12.5%	3.845
64	1.8062	4	50.0%	5.000
45	1.6532	6	75.0%	5.670
32	1.5051	6	75.0%	5.670
23	1.3617	8	100.0%	7.500
16	1.2041	-1	-12.5%	#N/A
11	1.0414	-1	-12.5%	#N/A
8	0.9031	-1	-12.5%	#N/A
6	0.7782	-1	-12.5%	#N/A
5	0.6990	-1	-12.5%	#N/A
4	0.6021	-1	-12.5%	#N/A
3	0.4771	-1	-12.5%	#N/A
2	0.3010	-1	-12.5%	#N/A

x coefficient (slope) -0.15827192
Constant (y-intercept 2.52832657
Std Err of Y Est 0.07699594
r Squared 0.93959927
No. of Observations 6

log(OTV) 1.73696699
OTV 54.5716386

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Stantec, Winnipeg — August 23, 2018
Project 26470

Poultry Processing Plant
New Site — 14:53 -14:57 — Test No. 2

Panelists:	8
OTV =	43.861
Dilution:	1
QTV*Dilution =	44

Dilution	Log (Dilution)	Number	Percent	Probit (r)
5793	3.7629	-1	-12.5%	#N/A
4096	3.6124	-1	-12.5%	#N/A
2896	3.4618	-1	-12.5%	#N/A
2048	3.3113	-1	-12.5%	#N/A
1448	3.1608	-1	-12.5%	#N/A
1024	3.0103	-1	-12.5%	#N/A
724	2.8597	-1	-12.5%	#N/A
512	2.7093	-1	-12.5%	#N/A
362	2.5587	-1	-12.5%	#N/A
256	2.4082	-1	-12.5%	#N/A
181	2.2577	-1	-12.5%	#N/A
128	2.1072	0	0.0%	2.500
91	1.9590	1	12.5%	3.845
64	1.8062	2	25.0%	4.330
45	1.6532	5	62.5%	5.320
32	1.5051	5	62.5%	5.320
23	1.3617	6	75.0%	5.670
16	1.2041	8	100.0%	7.500
11	1.0414	-1	-12.5%	#N/A
8	0.9031	-1	-12.5%	#N/A
6	0.7782	-1	-12.5%	#N/A
5	0.6990	-1	-12.5%	#N/A
4	0.6021	-1	-12.5%	#N/A
3	0.4771	-1	-12.5%	#N/A
2	0.3010	-1	-12.5%	#N/A

x coefficient (slope)	-0.19829489
Constant (y-intercept	2.63354872
Std Err of Y Est	0.09560277
r Squared	0.927637
No. of Observations	7
log(OTV)	1.64207425
OTV	43.8605682

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ODOUR ASSESSMENT

Appendix B Example Calculation of Source Odours for New Plant
October 3, 2018

Appendix B EXAMPLE CALCULATION OF SOURCE ODOURS FOR NEW PLANT

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Example Calculation of Source Odours for the New Plant

Laboratory results provided odour concentrations for the samples collected at the existing plant under the conditions specific to the time the samples were collected. To translate the results from the existing plant sampling conditions to the proposed conditions at the New Plant, the results had to be factored based on differences in process room size and production rate. It was assumed that odour source concentrations were directly proportionate to the size of the process room being ventilated as well as the relative difference in production for each process. This meant that the results from the existing plant could be factored based on area to represent a scaled version of the same process at the New Plant production rates. A description of the calculation process is provided below along with example calculations for the Live Shed odour source.

The odour source concentrations for the New Plant were determined using a three step factoring process so that the normalized emissions from the existing plant could be applied to a process room of a different size, as well as a different production throughput at the New Plant.

Step 1: Normalize Existing Source Results

The existing plant laboratory results were normalized to develop an odour concentration per unit process area using the estimated area of the corresponding process room (measured from existing plant drawings provided by Sofina). The result was provided in Table 5-1 of the report as a Normalized Odour Concentration. In the case of the Live Shed this resulted in a normalized odour concentration at the existing plant of:

$$\frac{126.3\ OU/m^3}{725\ m^2} = 0.174\ OU/m^3\ Normalized\ per\ m^2\ of\ space$$

In the case of the Gut Room, because the odour source was considered proportionate to the exposed area of the guts and feathers in the open bins, rather than the volume of guts and feathers produced, a supplemental factor was calculated. The supplemental factor represented the relative open area of the bin as a proportion of the total area of the room as follows:

$$\frac{Gut\ Room\ Odour\ Concentration}{\%\ of\ Room\ Occupied\ by\ Gut\ and\ Feather\ Bin} = \frac{1315.6\ OU/m^3}{11.80\ m^2\ /139\ m^2} = 154.322\ OU/m^3\ per\ \%\ of\ room$$

Step 2: Factor Based on Production or Other Measures

The production factor was accounted for by calculating a ratio between the base case conditions at the existing plant and the corresponding proposed conditions at the new plant. In the case of the Live Shed process this calculation was:

$$\frac{32000\ Birds\ in\ 5\ Live\ Shed\ Compartments}{52800\ Birds\ in\ Existing\ Live\ Shed} = Production\ Factor\ of\ 0.61$$

In the case of the Inedible Loading area at the New Plant, the relative area occupied by the gut and feathers bins vs the size of the room (21.2%), was compared to the same value for the Gut Room at the existing plant (8.5%).

The production factor and the normalized existing plant odour concentration were then multiplied to arrive at a process-factored odour concentration value that could be used to translate the existing plant odour concentration to

Operational Management Plan

the sources at the New Plant, based on both a difference in room size and production rates as provided in Table 5-2. For the Live Shed this calculation went as follows:

$$0.61 \times 0.174\ OU/m^3\ Normalized\ per\ m^2\ of\ space = 0.106\ OU/m^3\ per\ m^2$$

Step 3: Source Concentration and Emission Rate Determination

The source concentration for each process at the New Plant was calculated by multiplying the process-factored concentration by the representative process area at the new plant. For the Live Shed:

$$0.106\ OU/m^3\ per\ square\ meter\ of\ space \times 2625\ m^2 = Source\ Concentration\ of\ 277\ OU/m^3$$

The odour emission rate for the proposed plant odour source was then calculated by multiplying the source concentration by the volumetric flow rate for each process. The results were included in Table 5-3 of the report. For each of the five exhaust fans on the Live Shed this resulted in an odour emission rate of 6,275 OU/s for the base case calculation.

Underlying assumptions:

- **For samples that were collected as ambient samples (Live Receiving room, Gut Room, New Site), it was assumed that the odour concentration was consistent throughout the space.**
- **For samples that were collected directly from exhaust points at the existing plant (Live Shed, Scalder area, and Kill Floor) it was assumed that location sampled was representative of all exhaust points for the process.**
- **While the exhaust rates for the New Plant were determined by the mechanical design team based on the volume of the room, the number of air changes, and the number of exhaust points, the assumption was made that the ceiling heights in each process area of the existing plant were consistent with ceiling heights in the New Plant process areas to which the existing plant results were applied.**

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Appendix B

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Appendix B

B.3 NOISE STUDY

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Appendix B

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Operational Management Plan

Stantec

Sofina Food Inc.
New Poultry Facility, Calgary AB
Noise Impact Assessment

September 26, 2017

Prepared for:

Sofina Food Inc.
City of Calgary
Calgary, Alberta

Prepared by:

Stantec Consulting Ltd.
Calgary, Alberta

Operational Management Plan

Revision	Description	Author		Quality Check		Independent Review	

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Sign-off Sheet

This document entitled Sofina Food Inc. was prepared by Stantec Consulting Ltd. ("Stantec") for the account of The City of Calgary (the "Client"). Any reliance on this document by any third party is strictly prohibited. The material in it reflects Stantec's professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

Prepared by _____

(signature)

Sanaz Zabani

Reviewed by _____

(signature)

Chris Giesbrecht

Approved by _____

(signature)

Operational Management Plan

SOFINA FOOD INC.

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SOFINA FOOD INC.

Abbreviations

ANSI	American National Standards Institute
AB	Alberta
ASL	ambient sound level
dBA	A-weighted decibel
dBC	C-weighted decibel
ISO	International Organization for Standardization
L_{eq}	energy equivalent sound level
LFN	low frequency noise
Lme	emission level
NIA	noise impact assessment
pW	picowatt (1×10^{-10} watt)
PWL	sound power level
RSA	regional study area
SPL	sound pressure level
UTM	Universal Transverse Mercator
W	watt

Operational Management Plan

SOFINA FOOD INC.

New Poultry Facility, Calgary AB – Noise Impact Assessment

Glossary

Term	Definition
Ambient sound level (ASL)	The sound level measured by a Tester at a Point of Reception, which excludes the noise generated by the activity under assessment
Attenuation	A reduction in sound level achieved by various means (e.g., absorption by air, porous materials, barriers).
A-weighting	The weighting network used to account for changes in level sensitivity as a function of frequency. The A-weighting network de-emphasizes the low frequencies in an effort to reflect the relative response of the human ear to noise. See also frequency weighting.
Background sound	Same as ambient sound level
Daytime	Defined as the hours from 07:00 to 22:00 during weekdays and 09:00 to 22:00 during weekends
Decibel (dB)	A logarithmic unit commonly used to quantify magnitudes of sound and vibration levels.
Decibel, A-weighted (dBA)	A logarithmic unit used to quantify sound levels to which A-weighting has been applied.
Emission Level (L_{me})	FHWA TNM emission level at distance 25 m perpendicular from the road's axis / from the parking lot center (dBA)
Energy equivalent sound level (L_{eq})	A continuous equivalent (energy-averaged) sound level calculated over a specified period. It represents the equivalent sound pressure encountered for the period. The time period is often added as a suffix to the label (e.g., $L_{eq}(24)$ for the 24-hour equivalent sound level). L_{eq} is usually A-weighted. A L_{eq} value expressed in dBA is a good, single value descriptor of the level of environmental noise.
Frequency	The number of cycles per second that a periodic signal such as a sound wave oscillates. It is usually expressed in hertz (Hz).
Frequency weighting	A method used to account for differences in sensitivity as a function of frequency. Three standard weighting networks, A, B and C, are used to account for different responses to sound pressure levels. Note: The absence of frequency weighting is referred to as "flat" response or linear weighting.
Hertz (Hz)	The unit of frequency equivalent to a number cycles per second.

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SOFINA FOOD INC.

New Poultry Facility, Calgary AB – Noise Impact Assessment

Term	Definition
International Organization for Standardization (ISO)	An international body that provides scientific standards and guidelines related to various technical subjects and disciplines.
Nighttime	Defined as the hours from 22:00 to 07:00 during weekdays and 22:00 to 09:00 during weekends
Noise	Any unwanted sound. Noise and sound are used interchangeably in this document.
Noise level	Same as sound level.
Octave	The interval between two frequencies having a ratio of two to one. The upper limit of an octave (octave band) is twice its lower limit. For example, the 500-Hz octave band has a lower limit of 353 Hz and an upper limit of 707 Hz.
Point of Reception	Any location at the place of work or residence where noise or sound levels are heard by a complainant.
Sound	A combination of pressure waves of different frequencies and amplitudes travelling through a medium such as air or water.
Sound level	Amplitude of sound pressure expressed in decibels (dB). It is commonly used to refer to sound pressure level.
Sound power	The rate with which acoustic energy radiates from a source.
Sound power level	The magnitude of sound power expressed in decibels. Sound power level can be weighted using a frequency weighting scale and can be specified as an overall level or over a frequency interval.
Sound pressure	The root-mean-square (RMS) of the instantaneous sound pressures during a specified time interval. The unit of sound pressure is in pascals (Pa).
Sound pressure level (SPL)	The magnitude of sound pressure expressed in decibels. The sound pressure level is defined by the following equation where P_0 is the reference pressure. In air, P_0 is usually taken as 2.0×10^{-5} pascal. $$SPL\ (dB) = 20 \log\left(\frac{P_{rms}}{P_0}\right)$$ The unit for sound pressure level is decibels (dB).

Operational Management Plan

SOFINA FOOD INC.

New Poultry Facility, Calgary AB – Noise Impact Assessment

1.0 INTRODUCTION

Stantec Consulting Ltd. is designing a new poultry processing plant for Sofina Foods Inc. on an 11.836-hectare parcel at 6202, 106th Avenue SE, (Lot 4, Block 5, Plan 171 0868) in the Dufferin II (North) Industrial area of Calgary, Alberta. Noise from the Project has the potential to impact receptors in the surrounding area. This report documents the results of a Noise Impact Assessment (NIA) performed to verify Project compliance with the City of Calgary Community Standards Bylaw 5M2004 Part 9: Regulation of Noise (the Noise Bylaw).

The objectives for this NIA were as follows:

1. Identify the applicable Noise Bylaw threshold limits for the Project and the most affected points of reception.
2. Perform Baseline ambient sound level monitoring at the project site.
3. Assess noise emissions from all identified non-negligible noise sources and calculate the corresponding sound power levels.
4. Build a noise model for the Project facility and perform noise propagation calculations over the study area
5. Assess the Project facility compliance with the Noise Bylaw threshold limits.
6. Identify the need for and recommend noise mitigation measures needed to achieve compliance with the Noise Bylaw threshold limits.
7. Document the process, results and recommendations in the NIA report.

2.0 ENVIRONMENTAL NOISE CRITERIA

In this section, a detailed account of the Project's environmental noise impact during operation is assessed. Detailed information is also provided relating to the methods and acoustical modeling results.

2.1 CALGARY BY-LAW

The city of Calgary Community Standards Bylaw 5M2004 Part 9 – Regulation of Noise limits the allowable continuous and non-continuous sounds in residential developments as well as non-residential developments. The Noise Bylaw specifies overall allowable A-weighted (dBA) sound level limits over a 1 hour period during the daytime and nighttime periods. The daytime period occurs between the hours of 07:00 and 22:00 of the same day on weekdays or 09:00 and 22:00 on weekends. The nighttime period occurs between the hours of 22:00 and 07:00 of the same day on weekdays or 22:00 and 09:00 on weekends.

The sound level limits at points of reception are defined by three categories (i.e., residential, non-residential, and downtown residential). These limits are provided in the Bylaw and are summarized in Table 1.

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SOFINA FOOD INC.

New Poultry Facility, Calgary AB – Noise Impact Assessment

Table 1 – City of Calgary Bylaw 5M2004 Sound Level Limits

Time of Day	Sound Level Limit (dBA) – 1 Hour Equivalent (Leq,1HR)	
Residential	Residential	Non-Residential
Daytime Weekday or Weekend (07:00 – 22:00 or 09:00-22:00)	65 dBA [1]	85 dBA [1]
Nighttime Weekday or Weekend (22:00 – 07:00 or 22:00-09:00)	50 dBA [1]	85 dBA [1]

Note:
1 the greater value of the sound level limit or five (5) decibels over the ambient noise measured over a one-hour period during daytime or nighttime.

In this assessment, the conservative assumption will be made that noise from Project operations is generally continuous for comparison with the Noise Bylaw threshold limits.

2.2 POINTS OF RECEPTION

The most affected points of reception were identified based on the definition provided in the Bylaw. The points of reception are summarized in Table 2 and shown in Figure 1. The closest residential area is selected as the most affected point of reception in a residential area. The closest existing facility and highest noise impact on the project boundary (determined by the noise model) are selected as the most affected points of reception in non-residential areas.

Table 2 – Summary of Most Affected Receptors

Receptor ID	Description	UTM NAD83 Coordinates			Approximate Distance from Project Fence Line (m)	Applicable Project Noise Threshold Limit (dBA)	
		Zone	Easting (m)	Northing (m)		Day	Night
R01	Private home in 84 Street SE	12	295505	5648583	2450	65	50
L01	Existing warehouse facility, across 94Ave SE	12	293252	5650131	40	85	85
L02	Highest Noise Impact on Project Fence Line	12	293542	5650401	0	85	85

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SOFINA FOOD INC.

New Poultry Facility, Calgary AB – Noise Impact Assessment

Figure 1 – Project Receptor Locations

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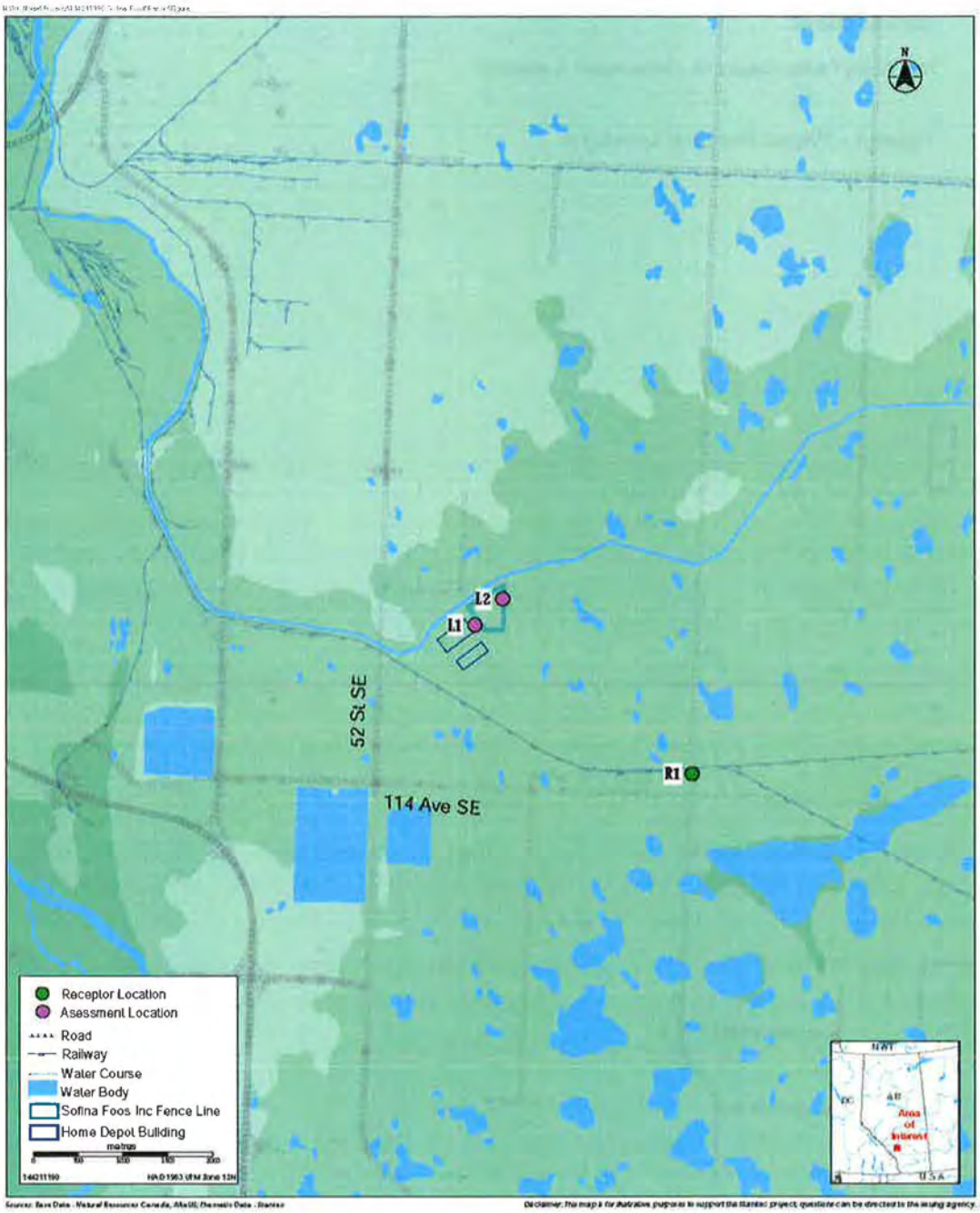

Project Receptor Location

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Figure 1

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3.0 AMBIENT NOISE MONITORING

A baseline ambient monitoring program was carried out at the proposed site from September 18 to 19, 2018. During the noise monitoring period, continuous noise measurement was conducted within the proposed site. The objective of this noise monitoring program was to measure the baseline sound level at this location. The existing acoustic environment around the Project is influenced by industrial and residents' activities, local road traffic, airplane flyovers, and natural environment (i.e., birds).

3.1 MONITORING PROCEDURE

Noise monitoring was performed using a Bruel & Kjaer type 2250 sound analyzer with type 4189 microphone. This analyzer is a Class 1 precision instrument with laboratory traceable calibration within 24months. The analyzer calibration was checked with a type 4231 calibrator before and after data collection. The analyzer was equipped for outdoor sound measurements, set to record the energy equivalent sound level (Leq) in one-minute intervals, and placed at location 1, shown in Figure 3 from 14:00 September 18 to 16:00PM September 19, 2018.

The measured sound levels at monitoring location were analyzed using the Brüel and Kjær BZ5503 Measurement Partner Suite® software program. Audio sound recordings were reviewed to identify noise sources during periods of elevated sound level (e.g., natural sounds and local activities). Measurements during non-representative weather condition (i.e., wind speed greater than 15 km/hour or rain precipitation) were removed from the data set. In addition, noise levels from activities that are not considered representative of the normal acoustic environments at the measurement location were also removed from the data set. These activities include noise monitoring equipment setup and events close to the microphone. Daytime and nighttime Leq values for each 24-hour period were then calculated at monitoring location.

3.2 AMBIENT MONITORING RESULTS

The measured daytime and nighttime equivalent sound levels at monitoring location for daily period is shown in Table 3. The daily period starts at 14:00 PM and extend until 16:00 PM the following day (e.g. September 18 14:00 PM to September 19 16:00 PM).

There are approximately 23 hours of valid measurement data including 14.5 hours during daytime and 8 hours during nighttime. The overall baseline sound level is 50.3 dBA during the daytime and 43.9 dBA during the nighttime period. These baseline sound levels at monitoring location are below the City of Calgary Noise Bylaw limits.

The measured sound level (Leq, 1min) time history is presented in Figure 2. Isolated data are presented in purple and red on the graphs. The purple graph represents invalid data due to anomalous noise events while the red graph represents invalid data due to non-representative weather conditions. Isolated noise events at this location included animals (birds) close to the microphone, truck dozer operating inside the proposed site, helicopter and airplane flyover and Stantec personnel activities at close range to the microphone. The gray graph represents the filtered data that were used for the Leq calculations.

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New Poultry Facility, Calgary AB – Noise Impact Assessment

Table 3: Ambient Monitoring Results

Time Period	Daytime (7:00 to 22:00)		Nighttime (22:00 to 7:00)	
	L_{eq} (dBA)	Valid Measurement Time (minutes)	L_{eq} (dBA)	Valid Measurement Time (minutes)
September 18 14:00 to September 19 7:00	47.4	374	43.9	498
September 19 7:00 to September 19 16:00	51.7	501	N/A	N/A
Overall	50.3	875	43.9	498
Note: "N/A" no measurement data				

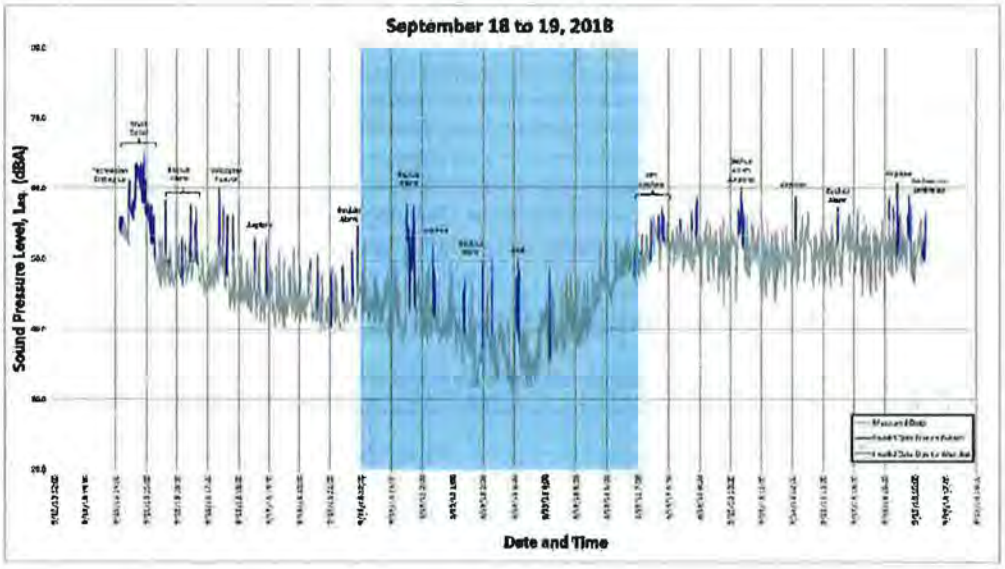

Figure 2: Measured Sound Levels (Leq 1min) Time History Graph for Monitoring Location (September 18 and 19, 2018)

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New Poultry Facility, Calgary AB – Noise Impact Assessment

Figure 3: Ambient Monitoring Location

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New Poultry Facility, Calgary AB – Noise Impact Assessment

4.0 NOISE PROPAGATION MODELLING

4.1 MODELLING METHODOLOGY

Sound propagation calculations for the analysis was conducted in accordance with International Organization for Standardization (ISO) 9613 standards parts 1 and 2 (ISO 1993, 1996). ISO 9613 is commonly used by noise practitioners and is accepted by regulatory bodies across Canada. Calculations under ISO 9613-2 account for mild inversion and/or downwind conditions (winds from source to receiver of 3–11 km/h). Calculations under this standard meet the requirements of provincial regulators (e.g., Alberta Energy Regulator and Alberta Utilities Commission) and are suitable for noise impact assessments for industrial facilities. Propagation calculations were performed using Cadna/A (v4.5.151) modelling software from DataKustik, which incorporates ISO 9613 prediction algorithms.

Table 4 summarizes the modelling parameters used for operation analysis.

Table 4 – Modelling Parameters

Item	Model Parameters	Model Setting
1	Temperature	10°C
2	Relative Humidity	70%
3	Propagation Standard	ISO 9613-1, ISO 9613-2
4	Ground Conditions and Attenuation Factor	Ground Absorption: 0.4 (G = 1 absorptive, G = 0 is reflective);
5	Receptor Height	1.5 m above ground
6	Topography	Flat (no topography)
7	Foliage Attenuation	None (conservative)
8	Operating Conditions	100% throughput (equipment and vehicle movements)

The acoustic model was constructed using the following assumptions:

- The assessment represents the Project design and knowledge of noise sources as of September 2018.
- Moving vehicle paths are estimated, based on facility layout

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4.2 NOISE EMISSIONS

Noise emission sources associated with the Project are primarily mechanical process equipment, building mechanical systems, and transport vehicles. Mechanical process equipment is noise emission from sources inside the building to outside. Building mechanical systems include HVAC, and transformers and was based on the September 5 Preliminary Design Report. Moving vehicles on the facility property were incorporated in the acoustic model including trucks for incoming deliveries and product shipment and staff vehicles. Vehicle quantities are based on peak hour volume estimates. A 15km/h maximum speed limit was assumed. The noise propagation model takes the conservative approach of assuming that idling trucks are present at all loading bay positions. Noise from HVAC sources is not known at this stage in the design, so a conservative estimate of 95dBA for each HVAC source on the building roof has been assumed. HVAC sources include the fan from each air handling unit or make up air unit including its intake and exhaust.

Noise source emissions levels for Project operation were calculated from noise measurements at the existing Poultry Processing Facility at 2126 Hurst Rd. SE. and noise source emission prediction methods from acoustic engineering literature. In instances where no vendor or other published data was available noise emission levels were estimated using guidance provided in the text by David Bies and Colin Hansen *Engineering Noise Control: Theory and Practice* (Bies and Hansen 2005) and Department for Environment Food and Rural Affairs (DEFRA) publication *Update of Noise Database for Prediction of Noise on Construction and Open Sites* (DEFRA 2005). Moving vehicles were modelled using the FHWA Traffic Noise Model (TNM) calculation model with inputs for vehicle type, trip counts, speed, and road surface.

Table 5: Noise Emission Levels

Noise Source	Qty	Reference	Type	octave band center frequency, Hz									
				31.5	63	125	250	500	1k	2k	4k	8k	dBA
Moving Trucks	14/h	TNM	Lme	-									48.6
Idling Trucks	31	Existing facility msmt.	PWL	91	102	100	93	97	97	92	91	86	101
Backup Alarms	3	DEFRA	PWL	89	95	102	102	98	113	99	94	89	113
Staff Vehicles	420/h daytime 245/h nighttime	TNM	Lme	-									57.5
HVAC	27	Typical	PWL	110	115	108	95	83	76	71	70	66	95
Transformer	5	Bies & Hansen	PWL	68	74	76	71	71	65	60	55	48	71
Building Indoor Sound Level	1	Existing facility msmt.	SPL	78	79	84	82	79	79	76	77	77	85

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4.3 RESULTS

Sound levels from the Project were calculated at three points of reception representing the most affected receptor points for residential and non-residential locations. Noise Bylaw compliance at these locations is indicative of overall compliance at all other points of reception. The predicted sound level results are compared to the limits defined in the Noise Bylaw in order to assess compliance in Table 6. Sound propagation contours representing equal sound level emission from Project sources are shown in Figure 4.

Table 6 – Predicted Sound Levels and Compliance with City of Calgary Bylaw

Receptor ID	Project Noise Contribution (dBA, $L_{eq,1HR}$)		Sound Level Limit (dBA, $L_{eq,1HR}$)		Compliance with Bylaw (Yes / No)
	Daytime	Nighttime	Daytime	Nighttime	
R01	34.2	34.2	65	50	Yes
L01	63.9	63.9	85	85	Yes
L02	74.8	74.8	85	85	Yes

Figure 4: Project Sound Propagation Contours

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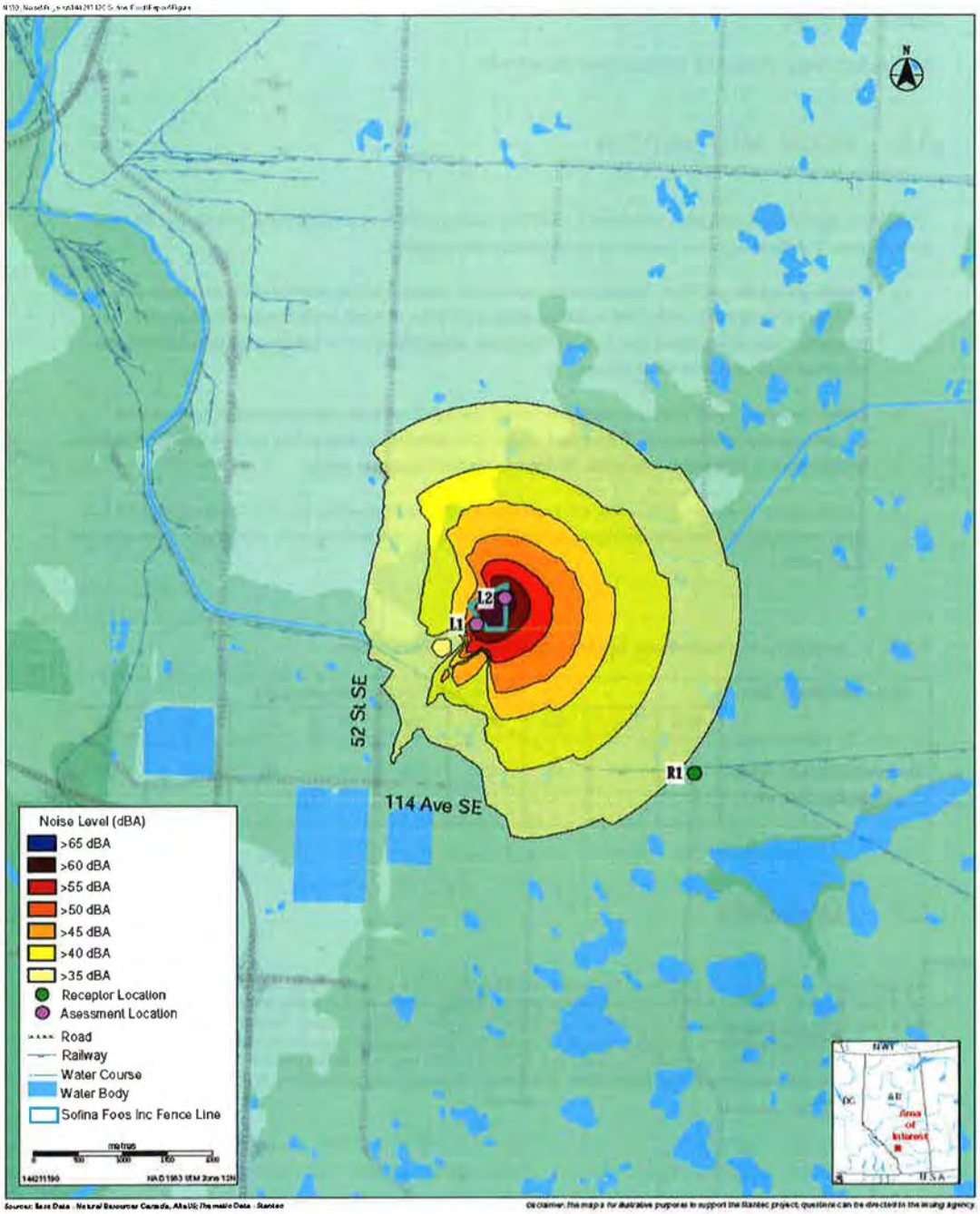

Noise Contour Map for Proposed Sofina Food Inc.

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Figure 4

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5.0 NOISE MITIGATION

Although no special noise mitigation needs were identified, some inherent noise mitigation is provided by the basic facility design. The following items provide some inherent noise mitigation.

- **Building Façade and Roof.** Insulated metal panels are selected for the majority of building walls with mechanical equipment inside. The sound insulation properties of these metal panels will adequately attenuate noise transmission from indoors. Fire rated assemblies and the building roof have better noise insulation properties than the building walls.
- **HVAC Sources.** The 95dBA assumption for HVAC sources is a reasonable assumption from which to develop supplier specifications. Odour control on HVAC exhausts and screening barriers may provide some additional noise attenuation which has not been included in the noise model.
- **Landscaping.** Portions of the facility are lower than grade. No attenuation from this landscape barrier has been included in the noise model, however below grade areas will proving some shielding of noise emission from vehicles.

Table 7: Acoustic Performance for Noise Mitigation Measures

Noise Mitigation Item	Octave band center frequency, Hz								
	31.5	63	125	250	500	1k	2k	4k	8k
Modelled Building Façade Transmission Loss, dB	10	6	15	22	28	36	40	44	44

6.0 SUMMARY

Baseline noise monitoring was performed to document and evaluate the existing sound level at the proposed facility site. Noise emission sources from the proposed new poultry facility were identified using the preliminary design report and a visit to the existing facility. Expected noise emission levels were compiled using measurements, reference texts, and modelling algorithms. A noise propagation model was constructed using conservative assumptions about facility operations and emission levels. The noise propagation model results indicate that the Project sound levels will be below daytime an nighttime Noise Bylaw limits at the most affected points of reception in residential and non-residential areas.

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7.0 REFERENCES

City of Calgary, October 2014. Community Standards Bylaw 5M2004 Part 9 – Regulation of Noise. Calgary, Alberta

Bies, D.A. and C.H. Hansen. 2003. Engineering Noise Control Theory and Practice, Third Edition. New York, United States of America.

DataKustik (DataKustik GmbH). 2017. Cadna/A Computer Aided Noise Abatement Model, Version 2017 MR1, Munich, Germany.

Department for Environment Food and Rural Affairs (DEFRA), 2005. Update of Noise Database for Prediction of Noise on Construction and Open Sites. London, England

TNM - FHWA Federal Highway Administration Model (http://www.trafficnoise- USA model.org) TNM Version 2.5, McTrans Center University of Florida, 2088 Northeast

Waldo Road, Gainesville, Fl 32609, http://mctrans.ce.ufl.edu

ISO (International Organization for Standardization). 1993. Standard 9613-1, Acoustics – Attenuation of sound during propagation outdoors – Part 1: Calculation of absorption of sound by the atmosphere. Geneva, Switzerland.

ISO (International Organization for Standardization). 1996. Standard 9613-2, Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation. Geneva, Switzerland.

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Appendix B

B.4 EFFLUENT REPORT

Operational Management Plan

Stantec

Effluent Report
Sofina New Poultry Facility, Calgary AB

October 3, 2018

Prepared for:

Stephanie Loria, File Manager, Community Planning - South

Prepared by:

Stantec

Operational Management Plan

Revision	Description	Author		Quality Check		Independent Review	
0	DP Application	SM	9/26	SM	10/3	KD	10/2

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Sign-off Sheet

This document entitled Sofina New Poultry Facility Effluent Report was prepared by Stantec Consulting Ltd. ("Stantec") for the account of Sofina Foods Inc. (the "Client"). Any reliance on this document by any third party is strictly prohibited. The material in it reflects Stantec's professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

Prepared by _____

Simon Meikle, P.Eng. (signature)

Reviewed by _____

Kevin Drake, P.Eng. (signature)

Approved by _____

Christopher J. Redel, Dipl. AT (signature)

PROFESSIONAL ENGINEER ALBERTA
SIMON A. MEIKLE
3 OCTOBER 2018

PERMIT TO PRACTICE
STANTEC CONSULTING LTD.
Signature _____
Date 3 October, 2018
PERMIT NUMBER: P 0258
The Association of Professional Engineers and Geoscientists of Alberta

Operational Management Plan

SOFINA NEW POULTRY FACILITY EFFLUENT REPORT

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SOFINA NEW POULTRY FACILITY EFFLUENT REPORT

Introduction

1.0 INTRODUCTION

1.1 BACKGROUND

Sofina Foods Inc. (Sofina - owners of Lilydale) is relocating their Poultry Processing Facility from its current location at 2128 Hurst Rd. SE, to a new site located in the Dufferin II Industrial area. Sofina has secured land in the Dufferin II (North) Industrial Sub Division for a new poultry processing facility. The proposed land has been re-zoned to a DC district (LOC2017-0266/CPC2018-0295) to allow for the construction of a Slaughter house.

The new facility will process live chicken into various meat cuts for institutional, commercial and retail customers. The facility will be a primary processor and will not produce further processed or cooked products. The facility will not render or further process any by-products of the process.

The facility will be designed to process 13,500 birds per hour and will operate over two eight-hour shifts, Monday to Friday, with a third shift for cleaning and sanitation of the plant. There are no formal operations scheduled for weekends except shipping. Any other weekend work will be associated with facility maintenance, not production.

The facility has been designed to the guidelines established by the Canadian Food Inspection Agency (CFIA) for food plant construction and operation. In addition, the design reflects the highest standards for both animal welfare and people health and safety.

Wastewater generated from the poultry processing facility will be pre-treated prior to being discharged to The City's sanitary sewer system in the Process Wastewater Treatment Plant (PWWTP) located on the proposed new site.

1.2 SCOPE OF DOCUMENT

The effluent report is supplemental to the submission for Development Permit Application – Planning Rationale and Studies Report (DP Number: 2018-3439) issued to The City on July 18, 2018.

This effluent report is intended to outline the design criteria for the PWWTP including the anticipated influent flows, and influent and effluent wastewater characteristics. The report also provides a detailed description of the pre-treatment process, solids handling, odor management and effluent monitoring for the proposed works.

This effluent report is also intended to further clarify comments received from The City in the Detailed Team Review response to the Development Permit Application (received August 16, 2018). However, several of the noted conditions regarding the PWWTP will not be able to be provided at this time. Once the process equipment for the PWWTP has been tendered and an equipment vendor has been selected, further design information will be received so that an operations plans, maintenance plans, and start-up and commissioning procedures for the PWWTP can be developed. This information can be shared with The City at that time.

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SOFINA NEW POULTRY FACILITY EFFLUENT REPORT

Introduction

1.3 REFERENCE DOCUMENTS

Please refer to the following additional documents referenced by this effluent report:

- Sofina Foods Poultry Processing Facility (DP2018-3439) – Development Permit Application – Planning Rationale and Studies Report, dated July 18, 2018, Stantec Architecture
- Development Permit 2018-3439 – Detailed Team Review (DTR), dated August 16, 2018, The City of Calgary
- Sofina Foods Poultry Processing Facility (DP2018-3439) – Sanitary Servicing Analysis Technical Memorandum (Rev0), dated August 13, 2018, from Jeff Berg, M.Sc., P.Eng., Stantec Consulting Ltd.

Operational Management Plan

2.0 DESIGN CRITERIA

2.1 WASTEWATER FLOWS & EQUALIZATION STORAGE CAPACITY

The proposed Sofina Poultry Processing Facility will generate process wastewater flows ranging from 23 L/s to 34 L/s (average 29 L/s) based on two shifts, as well as cleanup and sanitization. As detailed in the *Sofina Foods Poultry Processing Facility - Sanitary Servicing Analysis Technical Memorandum*, the design discharge flow for the entire facility is 24.5 L/s (Peak Dry Weather Flow). An inflow and infiltration (I&I) allowance of 3.5 L/s is calculated for the site, providing a Peak Wet Weather Flow for the site of 28 L/s.

To meet the maximum Peak Dry Weather sewer discharge limit of 24.5 L/s, an equalization tank is proposed to mitigate peak flows greater than the allowable discharge limit. The equalization tank can then be emptied over the weekend when there are no poultry processing operations. Process flows are anticipated to occur between 10:00PM Sunday and 3:59AM Saturday each week.

Although the flows are based on information and water use by the existing Hurst Road facility, a 15 percent factor of safety (F.O.S.) is applied to ensure adequate equalization tank storage is provided. Additionally, an allowance for 0.86 L/s non-process flows discharge direct to the sanitary sewer has been made. Therefore, the maximum PWWTP discharge rate is 23.64 L/s.

- Total Weekly Facility Process Influent Flow = 12,631 m³ (includes 15 percent F.O.S.)
- Total Sanitary Discharge at 23.64 L/s during process operational hours = 10,723 m³ (assumes 126 hours per week)
- Total Equalization Storage Volume Required = 1,908 m³
- Minimum Weekend Discharge Flow Rate = 1,908 m³ / 42 hrs = 45.4 m³/hr = 12.62 L/s

An equalization storage tank 'active' capacity of 2,000 m³ is proposed. The tank will have adequate capacity to buffer the peak instantaneous flows from the facility during the 5 working day operations and will provide adequate storage during the weekend to maintain a minimum flow through the treatment process.

Equalization storage is graphically shown in Figure 2.1 based on influent and discharge flow rates.

SOFINA NEW POULTRY FACILITY EFFLUENT REPORT

Design Criteria

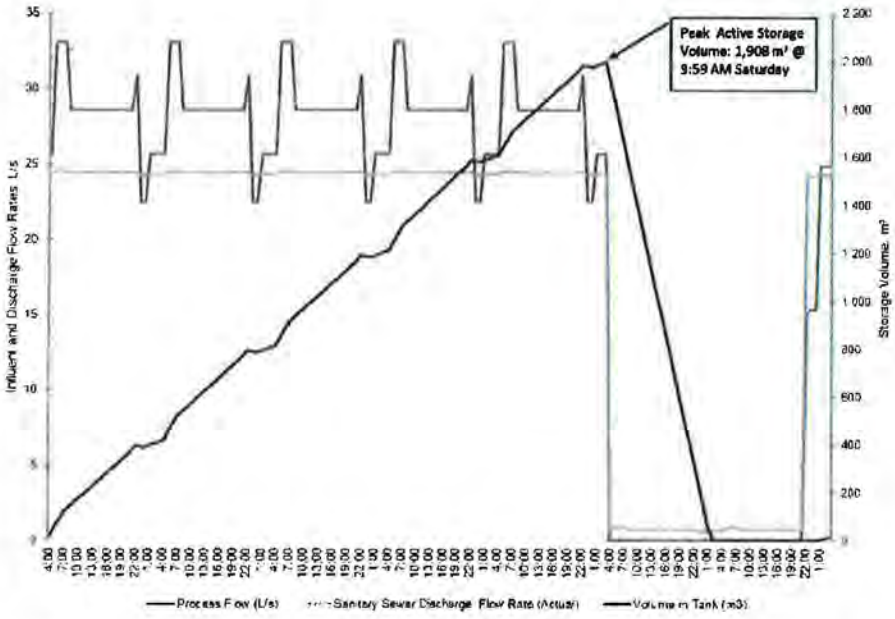

Figure 2.1 Sofina Poultry Processing Facility PWWTP Equalization Storage Volume

2.2 RAW WASTEWATER CHARACTERISTICS

Raw wastewater is received only from the Sofina Poultry Processing Facility, and therefore no hazardous materials are expected in the wastewater; only process waste from the poultry processing operations.

To determine the characteristics of the raw wastewater at the PWWTP for the proposed Poultry Processing Facility, several sources of data sampling were used, including historical wastewater concentration data from composite sampling at existing Sofina plant between January 2014 and December 2017, as well as grab samples collected between May 23, 2018 and May 29, 2018.

Sampling at the existing facility is conducted on untreated, raw wastewater. A schematic of the existing facility is provided in Figure 2.2 for reference of additional sampling locations in the following sections.

Data from the raw wastewater sampling is provided in Appendix A.

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SOFINA NEW POULTRY FACILITY EFFLUENT REPORT

Design Criteria

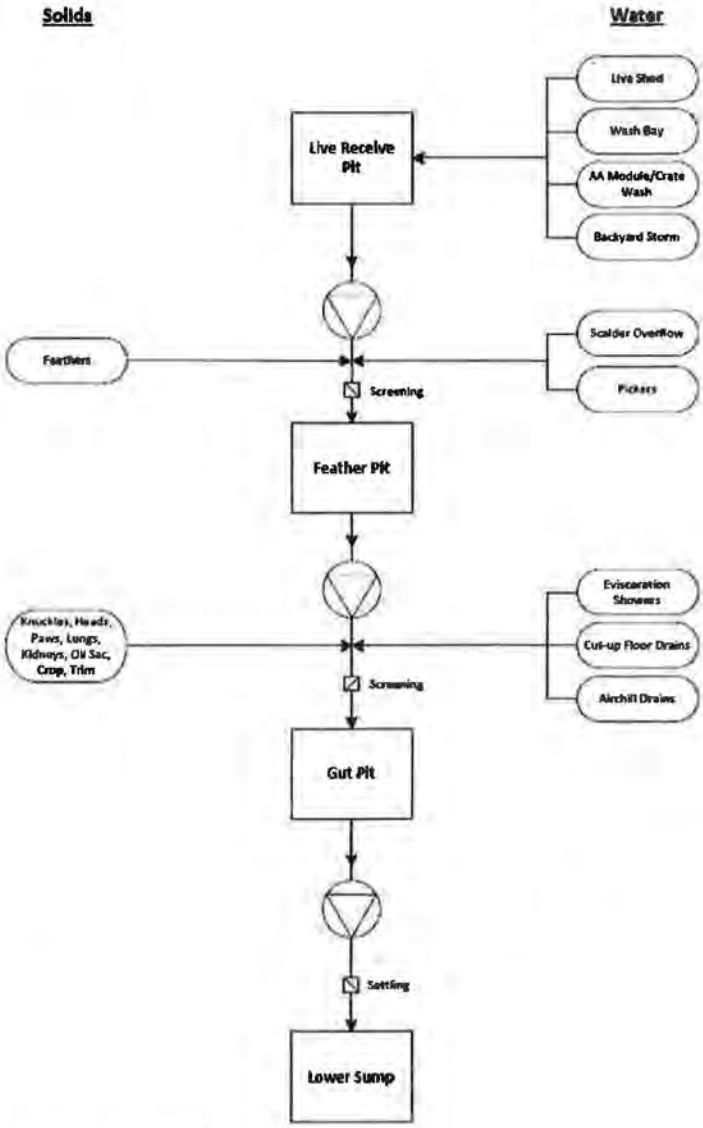

Figure 2.2 Wastewater Map at the Existing Facility

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SOFINA NEW POULTRY FACILITY EFFLUENT REPORT

Design Criteria

Based on the sampling that has been undertaken by Sofina, the raw wastewater characteristics proposed for the PWWTP at the new Poultry Processing Facility are summarized in Table 2.1. While detailed sampling and analysis was conducted for the Live Receiving, Feather Pit, and Gut Pit, it is the Lower Sump that is the most representative of the raw influent wastewater for the new PWWTP. As such, the values for the Lower Sump are used in developing the design raw wastewater characteristics.

Table 2.1 – Design Raw Wastewater Characteristics

Parameter	Units	Minimum	Maximum	Average (rounded)
BOD_5 - Total	mg/L	730	1900	1250
BOD_5 - Soluble	mg/L	272	588	400
COD	mg/L	1780	2650	2025
FOG	ppm	119	264	210
Ammonia -N	mg/L	10.9	20.1	15
TKN	mg/L	108	201	150
TP	mg/L	16.1	66.9	27
TSS	mg/L	512	1800	1010
VSS	mg/L	512	1480	840
pH	N/A	6.47	7.18	6.83

2.3 EFFLUENT LIMITS

The proposed treatment system will be designed to generally meet the requirements stated in "Schedule A" of Bylaw 14M2012 and specifically meet the following parameters and limits stated in "Schedule C" of Bylaw 14M2012, as noted below in Table 2.2.

Table 2.2 – Effluent Discharge Limits

Parameter	Units	Value
BOD_5 - Total	mg/L	300
COD	mg/L	600
FOG	ppm	100
TKN	mg/L	50
TP	mg/L	10
TSS	mg/L	300
pH	N/A	5.5 ~ 8.5

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SOFINA NEW POULTRY FACILITY EFFLUENT REPORT

Wastewater Treatment Process Description

3.0 WASTEWATER TREATMENT PROCESS DESCRIPTION

Process wastewater streams will be processed in the on-site PWWTP facility prior to being discharged to The City sanitary system. The process includes one (1) mm rotating drum screens to remove solids, followed by flow equalization and dissolved air flotation (DAF). The DAF process will remove additional solids, fats oils and grease (FOG) and particulate 5-day biochemical oxygen demand (BOD_5). The effluent from the DAF process will be further polished in a downstream biological treatment process to reduce additional BOD_5, total-phosphorus and total kjeldahl nitrogen (TKN) before final discharge to The City sewer. Solids generated by the DAF and biological processes will be dewatered and sent off-site for additional processing. A description of the unit processes is provided below.

3.1 RAW WASTEWATER INFLUENT SUMP

All wastewater generated in the proposed Poultry Processing Facility operations including sanitation flows, live receiving and floor washdowns will be directed to a raw wastewater influent sump. The sump will be equipped with two submersible pumps (duty/standby) to pump the received flows to the screening equipment.

The basis of design for the raw wastewater sump are as follows:

- Design flows: 35 L/s
- No. of chambers: One (1)
- Approximate dimensions: 2.4 m x 2.4 m x 5.7 m deep
- No. of pumps: Two (2), duty + standby
- Type of pumps: Submersible
- Pump motor size: 5 HP, each

3.2 SCREENING

Screening is critical for the removal of coarse solids and to protect the downstream equipment such as pumping and the DAF process. A rotary drum screen is proposed with a 20-mesh opening in an "outside-in" configuration. The screened wastewater will flow by gravity into the concrete equalization (EQ) tank located below the main plant floor. Screenings will be scraped off the screen by a doctor blade and fall by gravity through a chute into a receiving bin. Screening will be disposed off-site as a part of the plant's waste management strategy.

Since up to 70% of influent BOD, COD, and phosphorus loading could be in the insoluble form, effective screening will reduce the load on the downstream process to meet the effluent discharge limits. The 20-mesh screen is anticipated to remove the majority of the insoluble and particulate components in the wastewater.

The basis of design for the raw wastewater sump are as follows:

- Design capacity: 35 L/s
- No. of Screens: Two (2), duty + standby
- Screen Opening: 20-mesh (1 mm)
- Rotation speed: 9 rpm
- Approximate dimensions: 1.2 m x 1.5 m x 1.3 m high (not including auger)
- Material of Construction: 304 L SS
- Drive motor size: 0.75 HP

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3.3 EQUALIZATION (EQ) TANK

The proposed Poultry Processing Facility will generate variable flows from various process operations such as trailer washing in the receiving bays, scalding, cut up rooms, chilling, sanitation etc. Based on information received from Sofina, the hourly flows can vary from 23 L/s to 34 L/s with an average flow of 29 L/s during a typical shift. In addition, the wastewater quality will vary based on flow variation from the above-mentioned chicken processing operations. An EQ tank is proposed to address the following objectives:

- Wastewater flow equalization to maintain a continuous flow rate and consistent operation of the treatment process and minimize frequent start/stop;
- Provide wastewater quality/load buffering to maintain a consistent feed quality to the DAF and the downstream biological treatment process; and
- Allows storage of plant wastewater during weekdays to facilitate continuous operation of the downstream biological treatment process during weekends and the ability maintain an active biomass throughout the week

An EQ tank with a capacity of 2,000 m³ is proposed to address the influent flow variation, provide a constant discharge flow rate to the sanitary sewer meeting the maximum discharge flow rate permissible. A minimum flow of 12.62 L/s during the weekend will ensure the tank is emptied prior to the start of influent flows the following week.

The EQ tank will be constructed with a minimum three (3) chambers (in series) such that they can be by-passed individually for cleaning. The contents of the EQ tank will be completely mixed by aeration to prevent solids settling, while at the same time preventing septic conditions and associated odours. Aeration diffusers across the floor of each EQ tank chamber will be supplied with process air from a central blower system.

The basis of design for the equalization tank are as follows:

• No. of tanks:	Three (3), in series
• Total effective capacity:	2,000 m³
• Type of aeration system:	Coarse Bubble
• No. of Aeration Blowers:	N + 1, duty + standby
• Blower motor size:	20 HP, each
• No. of EQ Pumps:	Minimum one (1) per EQ tank cell, only one (1) pump in operation at any given time, shelf spare standby pump
• EQ Pump Capacity:	11 L/s (min.) – 24.5 L/s (max.)
• EQ Pump Motor size:	5 HP, each c/w VFD
• Maximum liquid level:	4.6 m plus 0.6 m freeboard
• Material of Construction:	Concrete

3.4 PRE-TREATMENT DISSOLVED AIR FLOTATION (DAF) UNIT

Dissolve air flotation (DAF) is a common pre-treatment process employed in the poultry processing industry which is based on physical/chemical treatment of the wastewater. DAF relies on the use of micron-sized air bubbles which are introduced into the wastewater stream. These "microbubbles" attach to the solids and fats/oils and grease (FOG) particles present in the wastewater to create a solids-air matrix. Polymers are typically also added to assist in floc formation. The resulting process increases buoyancy of the matrix and causes it to rise to the surface of the water

Operational Management Plan

where it can be collected by mechanical skimming. Although there are variations in this technology, the preferred vendor will be selected through a competitive bidding process.

A pre-treatment DAF unit is proposed upstream of a biological wastewater treatment tank. The pre-treatment DAF unit will be designed to remove approximately 95% of TSS and FOG. Screened wastewater will be pumped into the pre-treatment DAF unit from the EQ tanks. The flow rate to the pre-treatment DAF unit will be monitored using inline magnetic flow meters, and controlled using variable frequency drives on the EQ tank transfer pumps so that the rate of flow into the DAF does not exceed the maximum permissible flow of 23.64 L/s (see Section 2.1). Flow data will be recorded in the PWWTP PLC.

Bench testing of wastewater collected from the existing Sofina facility was completed by Veolia Water Technologies Canada Inc (Veolia) in Quebec, Canada. A composite sample collected on August 14, 2018, and a validation grab sample collected on August 28, 2018 were analyzed by Veolia to evaluate the effectiveness of the DAF physical/chemical process in pollutant removal. The Veolia treatability study is provided in Appendix B for reference. A summary of the Veolia results is provided below:

- The DAF or "GEM" (Veolia proprietary technology similar to a conventional DAF) treatment process is an effective physical/chemical process for reducing the strength of the wastewater prior to biological treatment.
- Various food grade coagulant and cationic/anionic polymers were used with positive results resulting in good, clarified, effluent water quality.
- TSS removal as high as 97% was observed in the bench tests.
- BOD removal of 70-79% was observed in the bench tests.
- Additional metal-based polymer addition may be required in downstream processes to further reduce phosphorus concentrations, however, effluent concentrations less than the discharge limit of 10 mg/L total phosphorus were observed.
- Downstream biological treatment is required for TKN reduction.

The results of the bench study are an indication of the products' potential and performance, and are not 100% indicative of the treatment process results. The bench study is intended to provide information on the treatability of the process wastewater from the proposed Poultry Processing Facility. These tests should be revisited and witnessed by a client's representative before a final design is implemented.

Effluent from the pre-treatment DAF unit is directed to the downstream biological wastewater treatment process. The DAF effluent has a high dissolved oxygen content of 0.9 ppm to 2 ppm which is beneficial for the biological process. Final DAF treatment process effluent quality is dependent on the coagulant dose and polymer dose. Expected quality is provided in the treatability study in Appendix B; however, final quality values of the DAF effluent will be confirmed by the selected equipment vendor.

For the Sofina PWWTP, organic (food grade) coagulants and polymers, that are approved by the CFIA, are proposed such that the resulting DAF sludge can be beneficially used by other parties. Sludge or "float" from the DAF process will be sent to a sludge thickener (vendor specific technology, to be determined) for additional processing.

A summary of the design is as follows:

- Design capacity: 24.5 L/s
- No. of DAF units: One (1)
- No. of DAF recycle pumps: Two (2), duty + standby
- No. of DAF air compressors" Minimum one (1) plus shop spare

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- DAF approximate dimensions: 2.5 m x 6 m
- Estimated TSS Removal: 95%*
- Estimated FOD Removal: 95%*
- Sludge transfer pump capacity: 20 m³/h @ 40 psig, motor 7.5HP

** to be confirmed based on an effective coagulant and flocculant program commissioned by the equipment supplier*

3.5 BIOLOGICAL WASTEWATER TREATMENT

The pre-treatment DAF effluent will flow into a biological wastewater treatment process. The biological treatment process is proposed to reduce the remaining BOD_5, COD, TP and TKN (via nitrification) such that the target effluent quality (Table 2.2) can be achieved on a consistant basis. For this project, a Moving Bed Biofilm Reactor (MBBR) is proposed. The MBBR is an established technology that is based on the biofilm principle where microorganisms grow on small specially designed plastic carriers that are kept suspended in the biological treatment tank (bioreactor). The carriers are designed to provide a large protected surface area for the biofilm to grow and optimal conditions for the bacteria culture when the carriers are suspended in wastewater. The bioreactor is kept aerated using diffusers across the floor of the tank, supplied by process air blowers.

While various design options are available, the basis of design is an MBBR process that uses a cylindrical plastic carriers (approximately 25 mm in diameter) with a specific surface area of 800 m^2/m^3. The mass load of pollutant (e.g. COD) that can be treated is directly proportional to the surface area of media in each reactor. The sloughed biofilm will be captured in the clarifier units further downstream. The MBBR process has no return activated sludge (RAS). The proposed MBBR system consists of three (3) MBBR tanks in series where the first MBBR will remove 80% of the COD load, the second will polish the remaining COD that is still in the reactor and the third one will be for nitrification.

A summary of the design is provided as follows:

- Number of Trains (in parallel): One (1)
- Number of Reactors per Train: Three (3)
- Volume of each bioreactor: 200 m^3
- Total volume of bioreactor: 600 m^3
- Hydraulic Retention Time (HRT) at design flow: 6.8 h
- MBBR side water depth: 4.6 m
- MBBR specific surface area: 800 m^2/m^3
- Total Air Requirement: 2850 Nm^3/h
- No. of blowers: Four (4), three (3) duty + one (1) standby
- Blower motor power: 50 HP, each

3.6 CLARIFICATION DISSOLVED AIR FLOTATION (DAF) UNIT

The effluent from the MBBR is directed to a second clarification DAF unit, similar to the pre-treatment DAF process described in Section 3.3. The clarification DAF unit is provided to achieve final solids/liquid separation. The floated solids form a dense foam/sludge mixture that is removed by mechanical skimming and is sent to a sludge holding tank for further processing. The final effluent from the second stage DAF will be discharged to The City's sanitary sewer system by gravity. The effluent will meet the limit criteria shown in Table 2.2.

The basis of design is summarized as follows:

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SOFINA NEW POULTRY FACILITY EFFLUENT REPORT

Wastewater Treatment Process Description

- Design capacity: 24.5 L/s
- No. of DAF units: One (1)
- DAF approximate dimensions: 2.0 m x 8.5 m x 3.7 m
- Recirculation rate: 30%
- Design rise rate: 20 m/h
- TSS Capture: 70%
- No. of DAF recycle pumps: Two (2), duty + standby
- DAF recycle pump motor power: 20 HP
- No. of DAF air compressors" Minimum one (1) plus shop spare

3.7 FINAL EFFLUENT MONITORING

There will be a manhole accessible from the exterior of the Sofina property that will allow The City to monitor, sample and test the final effluent. A sampling and testing protocol will also be implemented by Sofina to record the daily flows discharged to the sanitary sewers as well as undertake its own sampling and testing for compliance. At a minimum, a composite sampler on the PWWTP influent and final effluent discharge to the sanitary sewer will be installed for monitoring and compliance testing by Sofina.

Since the final treated effluent is discharged on a continuous basis to The City's sanitary sewer system, we do not anticipate any record keeping associated with load monitoring and/or manifest system for this facility.

3.8 SLUDGE PROCESSING

Sludge produced by the pre-treatment DAF unit, along with screenings collected by the preliminary treatment influent screens will be directed to the rendering collection bins by conveyors. The material is to be combined with the poultry processing facility offal and sent to a rendering facility for further processing.

Post MBBR clarifier DAF process sludge will be directed to a sludge holding tank. The tank contents will be aerated to prevent solids settling and keep the biomass aerobic. The blended sludge is expected to be approximately 4% solids (dry-weight basis). A centrifuge dewatering system is proposed to further dewater the biomass solids. The sludge from the sludge holding tank will be pumped to a centrifuge, producing a dewatered cake of approximately 15% to 18% solids. The dewatered cake will go into a container for disposal, while the centrate will be returned to the EQ tank for further treatment with the incoming wastewater.

The sludge produced through wastewater treatment process at the Sofina facility will not be released directly to The City's sanitary sewer system. Possible disposal options for the dewatered sludge cake being reviewed currently includes off-site disposal to The City's sludge disposal facility. The possible use of metal coagulants or polymers for total phosphorus reduction in the wastewater treatment process may eliminate disposal at a composting facility.

The basis of design is summarized as follows:

- Estimated sludge produced by post MBBR DAF: 18 m^3/d @ 4% solids
- Volume of aerated sludge tank: 335 m^3
- Estimated storage of blended sludge: 10 days
- Number of centrifuges: One (1), operated 7 h/day and 5 days/week
- Centrifuge feed flow: 5 m^3/h
- Centrifuge feed pump power: 5 HP

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- Centrifuge drive motor: 15 HP (main drive) and 4 HP (back-drive)
- Dewatered cake production: 12 m³/d

3.9 PROCESS WASTE SOLIDS

Process waste solids will be stored indoors in trucks or bins and removed for further processing and disposal off-site by a third-party contractor in sealed, water tight trucks. The frequency of removal of solid wastes will depend on production, and will be confirmed once an equipment vendor is selected.

3.10 CHEMICAL FEED SYSTEMS & PWWTP DRAINS

The PWWTP at the Sofina Poultry Processing Facility will handle several coagulant and polymer chemicals used in the wastewater treatment process. Chemical spill containment within the chemical storage area will enable opportunity to neutralize any chemical spills.

3.10.1 Chemical Feed Systems

The proposed wastewater treatment and sludge handling will involve the following chemical feed systems:

- **Organic Coagulant for Pre-treatment DAF**: The coagulant will be an "organic" based polyamide coagulant. It will be stored in tote tank containers fed by duty/stand-by mechanical diaphragm metering pumps.
- **Organic Polymer**: The use of a flocculation agent is essential for the DAF process. The polymer will be selected by the equipment vendor. Use of both "organic" dry anionic and cationic polymers are proposed to enhance the flocculation process. The chemicals will be received in 25 kg bags and a 0.25% to 0.5% solution prepared using an automatic polymer makeup system. Typically, warm water is required for the polymer preparation. The automatic polymer preparation/dilution system is an automatically controlled batching unit capable of preparing polymer. The system utilizes sequential batching from a high shear, first stage wetting system into a mix tank with a low shear mixer. The system is equipped with a 100 L hopper which will store the dry polymer bags. The solution will be dosed using progressive cavity pumps.
- **Organic Polymer for Clarifier DAF Unit**: The use of a polymer helps with post-MBBR clarification. A polymer feed system complete with polymer activation and dilution system will be provided to be used as needed for DAF operation.
- **Organic Polymer for Sludge Dewatering**: Polymer is required for sludge dewatering and a polymer system is recommended to be used for the centrifuge operation.
- **Antifoaming Agent**: MBBR operation can lead to foaming. To mitigate this issue one (1) antifoam dosing package is included c/w diaphragm-type metering pumps, associated piping and accessories.

3.10.2 PWWTP Drains

The PWWTP drains, both within the chemical storage area and the process areas, will drain to the PWWTP influent sump, upstream of the screens. No spill will be discharged direct to The City's sanitary sewer system.

3.11 PWWTP PROCESS EQUIPMENT REDUNDANCY

A partially redundant PWWTP system will be provided. Screening equipment, pumping, chemical dosing, and aeration blowers will have redundant standby units to ensure transfer and treatment of wastewater through the Plant.

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SOFINA NEW POULTRY FACILITY EFFLUENT REPORT

Wastewater Treatment Process Description

The DAF units, biological wastewater treatment process, and sludge dewatering equipment will be singular units with no redundancy. In the event of a short duration shutdown for these processes, flow will continue to be screened and stored in the EQ tanks. Extended shutdowns will require management of the discharge to The City's sanitary sewer system:

- The pre-treatment treatment DAF unit is a physical/chemical system. With redundancy in the chemical delivery, water recycle pump systems, and air compressor systems, only a failure of mechanical components of the DAF unit will have a negative effect on the process, resulting in a bypass of the treatment system and discharge of screened wastewater to the sanitary system. Shelf spares for the chain drive of the DAF will be required to minimize repair time.
- An upset or failure in the biological system that cannot be managed will result in a possible surcharge. With redundant aeration blowers, and the biological treatment tanks being located within the facility, the likelihood of a process upset due to a lack of oxygen or cold weather is mitigated. A possible system shock may occur if a chemical is discharged into the process wastewater drains; however, since Sofina is responsible for the entire influent flow to the PWWTP, there are likely to be no unforeseen hazardous chemical discharges. A management plan will be developed to handle a process upset in the biological treatment tank.
- While there is only one sludge centrifuge, provisions will be made for dewatering of the sludge tank to a transport truck for off-site processing in case of maintenance activities.

The following table outlines the proposed equipment redundancy for the PWWTP

Table 3.1 – Equipment Redundancy

Equipment / System	No. of Units Proposed	Redundancy
Influent Transfer Pumps	2	Duty / Standby
Influent Screens	2	Duty / Standby
EQ Tank	Minimum 3 tanks	Compartmentalized for maintenance
EQ Transfer Pumps	N + 1	Duty / Standby
Pre-treatment DAF Unit	1	Duty
Sludge Thickener	1	Duty
Biological Treatment	3 tanks	Duty
Aeration Blowers	N + 1	Duty / Standby
Clarifier DAF Unit	1	Duty
DAF Pumping Systems	N + 1	Duty / Standby
DAF Air Compressor	N + 1	Duty / Standby
Chemical Pumps	N + 1	Duty / Standby
Sludge Centrifuge	1	Duty

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4.0 ALBERTA ENVIRONMENT & PARKS

4.1 EPEA APPROVAL TO OPERATE

Per the letter from Brynn Choquette, P.Eng., Industrial Approvals Engineer, Alberta Environment and Parks (AEP) in Appendix C, the proposed PWWTP will be discharging to The City's Municipal Wastewater Collection system, and therefore an EPEA Approval to Operate from AEP is not required.

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SOFINA NEW POULTRY FACILITY EFFLUENT REPORT

ODOUR MITIGATION STRATEGY

5.0 ODOUR MITIGATION STRATEGY

The wastewater treatment system will be located in an enclosed area to minimize the spread of odours. Additionally, all processes including process tanks, such as the equalization tanks and the MBBR, will also be enclosed. The equalization tank is aerated to prevent septic conditions and the formation of H_2S. There are no sources of exposed wastewater in the designed system.

As identified in Table 5.1, scrubbers on the ventilation system exhaust will control odour emanating from the PWWTP. The area will be continuously ventilated at six air changes per hour to meet fire protection regulations (NFPA 820), which will also aide in reducing odours.

Table 5.1 - Noise, Odour and Dust Control - Poultry Operations

Location	Activity	Noise, Odour and Dust Control
Process Wastewater Treatment Plant (PWWTP)	Treatment of Wastewater and Loading of solid waste screenings and dewatered sludge	• Controlled enclosed holding space (noise and odour control) • Odour control on ventilation exhaust (Odour control)

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APPENDIX A

Raw Wastewater Sampling Results

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Table A.1 Sofina Wastewater Sampling, Existing Plant 2014 - 2017

		Internal Testing								City Testing		
	Surcharge Limit	300	300	600		100		10	50	300	300	100
	Extra Strength Limit mg/L	1200	1200	2400	NG	450	5 - 10	0	0	1200	1200	450
Month	Date	BOD	TSS	COD	Total ammonia	Oils and greases	pH	Phosphorus	TKn Nitrogen	City BOD	City TSS	City Oils and greases
1	29-Jan-14	1,000	490	1,940	12	82	6.7	58	116			
4	10-Apr-14									1,100	784	659
4	11-Apr-14									1,400	1,000	774
8	12-Aug-14									1,220	908	701
8	26-Aug-14									1,270	770	457
1	26-Jan-15									1,710	1,237	606
1	29-Jan-15	870	170	1,200	10	59		29	120			
2	24-Feb-15	900	560	1,800	23	350		19	140			
3	11-Mar-15									806	664.5	429
3	24-Mar-15	1,100	540	1,700	17	650		16	120			
4	14-Apr-15	920	760	1,500	23	110		19	140			
5	12-May-15	1,700	1,300	2,700	17	350		17	110			
6	3-Jun-15	1,000	500	1,500	34	71		17	99			
7	6-Jul-15	1,820	1,750	3,010	36	208	6.8	18	135			
9	2-Sep-15	1,070	740	2,240	34	283	7.2	13	87			
7	14-Jul-15	981	718	2,090	17	73	6.8	20	101	1,700	1,038	475
7	29-Jul-15									1,560	1,100	968
10	6-Oct-15	1,930	1,580	2,080	39	319	6.6	18	102			
11	4-Nov-15	960	955	2,280	21	121	7.0	14	117			
11	13-Nov-15									1,500	973	560
11	19-Nov-15									1,302	1,125	692
12	1-Dec-15	1,010	900	2,240	18	158	7.2	18	110			
1	19-Jan-16	1,460	673	2,260	14	839	7.3	19	125			
2	23-Feb-16	1,370	848	2,070	5	67	7.1	15	12			
3	8-Mar-16									1,090	678	362
3	30-Mar-16									1,310	870	514
3	31-Mar-16	581	385	1,740	19	510	7.1	19	142			
5	12-May-16	759	306	1,080	17	281	6.9	15	92			
6	21-Jun-16	945	1,360	1,520	31	398	7.1	15	94			
7	26-Jul-16									1,640	1,023	510
	26-Jul-16	1,440	803	1,600	14	1,420	7.2	18	132			
8	16-Aug-16									1,240	796	333
8	30-Aug-16	1,160	896	1,770	19	785	7.2	18	137			
9	30-Sep-16	856	1,100	1,310	22	197	6.6	18	131			
10	20-Oct-16	548	187	995	27	657	7.4	18	112			
12	13-Dec-16									1,280	598	300
12	21-Dec-16									1,010	648	300
12	29-Dec-16	735	514	1,760	12	157	7.4	20	143			
3	30-Mar-17									1,220	853	543
3	15-Mar-17	774	575	2,710	9	306	7.0	14	87			
4	4-Apr-17									1,190	792	363
8	2-Aug-17									1,160	936	579
8	10-Aug-17									998	1,134	649
12	12-Dec-17									1,160	734	353
12	15-Dec-17									1,570	1,302	487
	Average	1,069.6	777.1	1,887.3	20.5	352.1	7.0	19.2	112.6	1,292.5	907.3	524.2

	Average 2014	1,000	490	1,940	12	82	7	58	116	1,248	866	648
	Average 2015	1,188	875	2,026	24	229	7	18	115	1,430	1,023	606
mg / L	Average 2016	983	708	1,831	18	531	7	17	112	1,282	789	387
	Average 2017	774	575	2,710	9	306	7	14	87	1,218	959	496

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Table A.2 Supplemental Sampling Results from the Live Receiving Pit (May 2018)

Parameter		Unit	Live Receiving 2018/05/23 AM	Live Receiving 2018/05/23 PM	Live Receiving 2018/05/24 AM	Live Receiving 2018/05/24 PM	Live Receiving 2018/05/25 AM	Live Receiving 2018/05/25 PM	Live Receiving 2018/05/28 AM	Live Receiving 2018/05/28 PM	Live Receiving 2018/05/29 AM	Live Receiving 2018/05/29 PM
BOD	5 Day	mg/L	2,510	972	1,430				204	814	2630	3640
FBOD	Filtered	mg/L	312	292	850				220	208	826	1610
COD		mg/L	2,890	2,760	1,930				1,740	2,160	3,040	6,580
Oil/Grease	Total	mg/L	662	385	486				343	166	844	880
Ammonia-N	NH3-N	mg-N/L	6.84	7.84	26.8				9.82	20.2	20.1	61.1
TKN	Total	mg-N/L	67.8	76.7	302				92.6	159	196	416
TP	Total	mg-P/L	35	16.8	30.1				16.9	27	34.5	57.2
Solids	Total Suspended	mg/L	770	2,030	1,770			1,650	467	762	1,200	6,890
Solids	Fixed Suspended	mg/L	45	92	607			410	46	54	30	500
Solids	Volatile Suspended	mg/L	725	1,940	1,160			1,240	419	706	1,200	6,190
pH			8.46	8.43	8.89				8.89	7.41	8.52	8.96

Table A.3 Supplemental Sampling Results from the Feather Pit (May 2018)

Parameter		Unit	Feather Pit 2018/05/23 AM	Feather Pit 2018/05/23 PM	Feather Pit 2018/05/24 AM	Feather Pit 2018/05/24 PM	Feather Pit 2018/05/25 AM	Feather Pit 2018/05/25 PM	Feather Pit 2018/05/28 AM	Feather Pit 2018/05/28 PM	Feather Pit 2018/05/29 AM	Feather Pit 2018/05/29 PM
BOD	5 Day	mg/L	2,880	3,830	2,680	922	534	801	672	852	1870	834
FBOD	Filtered	mg/L	987	2,240	1,460	1,340	1,070	1,120	604	764	756	722
COD		mg/L	8,530	7,310	8,540	5,620	3,430	2,960	4,480	2,400	6,450	2,800
Oil/Grease	Total	mg/L	586	288	313	185	319	251	280	183	288	150
Ammonia-N	NH3-N	mg-N/L	34.7	54.7	49.5	61.5	38.4	56.9	27.8	25.5	26.5	32.9
TKN	Total	mg-N/L	250	401	394	296	254	296	229	237	279	192
TP	Total	mg-P/L	57.7	97.6	56.5	69.8	37.7	40.5	31	40.4	54.5	32.9
Solids	Total Suspended	mg/L	2,410	3,740	1,990	4,310	4,190	2,560	1,550	1,540	1,140	1,030
Solids	Fixed Suspended	mg/L	375	343	420	580	1040	490	345	130	40	91
Solids	Volatile Suspended	mg/L	2040	3,400	1,570	3,730	3,150	2,070	1,210	1,410	140	940
pH			6.25	5.81	6.79	5.99	6.39	6.74	6.3	6.79	6.47	6.89

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Table A.4 Supplemental Sampling Results from the Gut Pit (May 2018)

Parameter		Unit	Gut Pit 2018/05/23 AM	Gut Pit 2018/05/23 PM	Gut Pit 2018/05/24 AM	Gut Pit 2018/05/24 PM	Gut Pit 2018/05/25 AM	Gut Pit 2018/05/25 PM	Gut Pit 2018/05/26 AM	Gut Pit 2018/05/26 PM	Gut Pit 2018/05/26 AM	Gut Pit 2018/05/29 PM
BOD	5 Day	mg/L	1,390	1,220	1,160	730	1,900	1,670	1460	867	1170	898
FBOD	Filtered	mg/L	459	588	420	446	420	358	273	396	272	361
COD		mg/L	2,520	1,880	1,780	2,650	1,850	1,900	1,790	2,070	1,980	1,790
Oil/Grease	Total	mg/L	178	264	256	201	239	176	119	248	181	207
Ammonia-N	NH3-N	mg-N/L	16.4	14.3	12.4	15.7	10.9	18.1	11.8	17.3	11.9	20.1
TKN	Total	mg-N/L	156	148	201	115	147	108	116	187	126	151
TP	Total	mg-P/L	66.9	16.6	26	19.4	19.4	36.2	19.7	30.6	21.9	18.1
Solids	Total Suspended	mg/L	675	1,740	1,360	605	1,800	1,330	565	635	577	512
Solids	Fixed Suspended	mg/L	35	427	240	155	325	430	30	30	64	30
Solids	Volatile Suspended	mg/L	640	1,310	1,120	750	1,480	900	555	605	514	512
pH			6.71	6.47	6.83	6.98	6.95	7.05	6.62	7.01	6.69	7.18

Table A.5 Supplemental Sampling Results from the Lower Sump (May 2018)

Parameter		Unit	Lower Sump 2018/05/23 AM	Lower Sump 2018/05/23 PM	Lower Sump 2018/05/24 AM	Lower Sump 2018/05/24 PM	Lower Sump 2018/05/25 AM	Lower Sump 2018/05/25 PM	Lower Sump 2018/05/26 AM	Lower Sump 2018/05/26 PM	Lower Sump 2018/05/29 AM	Lower Sump 2018/05/29 PM
BOD	5 Day	mg/L	1,120	412	722	910	777	644	698	926	917	1050
FBOD	Filtered	mg/L	370	270	363	292	406	406	392	380	402	380
COD		mg/L	1,960	950	1,850	1,740	1,630	1,690	1,770	2,150	1,770	1,850
Oil/Grease	Total	mg/L	189	116	226	198	296	193	192	271	243	208
Ammonia-N	NH3-N	mg-N/L	13.7	11.4	16.4	15.2	12.6	17.4	9.76	15.1	11.5	17.3
TKN	Total	mg-N/L	136	79.6	129	124	123	141	114	135	118	137
TP	Total	mg-P/L	18.5	11.1	18	22	16.4	19.9	14.8	21.2	17.8	17.5
Solids	Total Suspended	mg/L	597	385	716	541	487	679	573	600	635	546
Solids	Fixed Suspended	mg/L	16	40	<50	32	<30	43	23	100	30	29
Solids	Volatile Suspended	mg/L	581	325	716	509	487	636	550	500	635	519
pH			6.79	6.88	6.71	7.11	6.98	7.19	6.74	6.95	6.79	7.16

APPENDIX B

Veolia Water Technologies Canada Ltd. Treatability Study

Operational Management Plan

Laboratory testing – Lilydale Chicken Processing Plant (Sofina) effluent treatability study

Prepared by: Myriam De Ladurantaye-Noël, Eng.
Revised by: Aymeric Simon
Daniel Lamarre, Eng.

1 Introduction

Veolia Water Technologies Canada Inc. (Veolia) proposed their services in order to find an effluent treatment at Lilydale Chicken Processing Plant in Calgary (Sofina). Sofina plant is currently discharging its effluent to the City of Calgary sewer, generating important disposal costs considering the high organic, phosphorus and grease concentration of the effluent. The present laboratory study aims the evaluation of pollutant removal using a physico-chemical treatment in order reach sufficient solids and greases removal to be discharged charge-free in the City sewer. Organic removal (biological oxygen demand, nitrogen and phosphorus) was also validated in order to help the conception of a biological treatment downstream the tested physico-chemical treatment if further treatment is needed. The objective of treatment is as stated by the City of Calgary and are resumed in Table 1.

Table 1: City of Calgary sewer discharge limits to be obtained with Lilydale Chicken Processing plant effluent

Parameters	Units	Objective	Comments
Total Oil and Grease ($O\&G_t$)	**mg/L**	100	Main objective of laboratory study
Total suspended solids (TSS)	**mg/L**	300	
Total chemical oxygen demand (COD_t).	**mg/L**	600	Removal with physico-chemical treatment only if mainly particular (otherwise biological removal needed)
Total biological oxygen demand (BOD_{5t})	**mg/L**	300	
Total Kjeldahl Nitrogen (TKN)	**mg N/L**	50	
Total phosphorus	**mg P/L**	10	Removal by adsorption with inorganic coagulant

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This report summarises various physico-chemical testing completed by Veolia's laboratory in St-Laurent, QC.

2 Method

Two pails from a composite sampling, taken over 20 hours of operation at Lilydale Chicken Processing Plant, were sent overnight to Veolia's laboratory. Two weeks later, two pails from a grab sampling were sent to Veolia's laboratory for additional testing. Both samples sent to Veolia's laboratory were considered representative of the water quality expected at Sofina during Chicken Processing and Sanitation.

The samples were first refrigerated, to preserve its quality. A portion of each of the sample was sent to an accredited external laboratory for characterization. Tests were executed on the second portion of the samples by Veolia in Saint Laurent.

The selected technologies for this application are the **GEM** (Gas Energy Mixing) system and the **dissolved air flotation** (DAF) system.

- GEM flotation is characterized by the generation of big and low density flocs with a double polymer usage step. Therefore successive dosage of two oppositely charged polymers (cationic and anionic polymers) is used, preceded by a coagulation conditioning. Mixing through this flocculation step is due to liquid solid gas mixers forming a vortex, which incorporate small air bubbles to the formed flocs. This chemical conditioning, which includes the incorporation of little air bubbles to the flocs, is favorable to sludge flotation.
- DAF flotation is characterized by the generation of low density flocs where microbubbles are attached, causing the flotation of the flocs. The raw water is first conditioned in a coagulation tank, where contaminants such as O&G and proteins are destabilised. This destabilisation is essential to create seeds for flocs. Once coagulation is completed, the addition of polymer helps to consolidate the formation of flocs to be removed from the water matrix. Separation of the flocs from the chemically conditioned

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water is assured by the DAF equipment. Injection of highly pressurised white water creates the formation of micro air bubbles as the pressure suddenly drops in the system. These bubbles attach themselves to the chemically formed flocs, creating a low-density sludge that floats.

Reproduction of DAF process was possible in Veolia's laboratory using a regular jar-tester bench testing apparatus for chemical conditioning and a laboratory size DAF bench testing apparatus. These are represented respectively in Figure 1 and Figure 2.

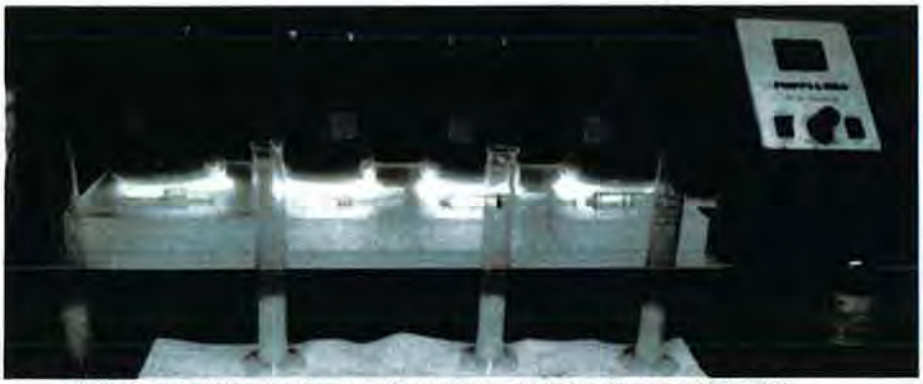

Figure 1: Jar-test laboratory bench testing apparatus (used for chemical conditioning)

Figure 2: Dissolved air flotation (DAF) laboratory bench testing apparatus

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The chemicals tested by Veolia for the GEM and the DAF application are presented in Table 4. When available, chemicals registered at the Canadian Food Inspection Agency (CFIA) (marked with a "*") were used to allow disposal of sludge to a rendering facility instead of landfill disposal.

Table 2: Chemical tested in Veolia's laboratory for optimization of chicken processing facility effluent

Tested chemicals	Type of chemical	Objective of chemical addition
Hydrex™ 69253 GR *	Inorganic coagulant (ferric based)	Destabilization of proteins, organics and O&G (CFIA approved)
Hydrex™ 3423 *	Organic coagulant	Destabilization of proteins, organics and O&G (CFIA approved)
Hydrex™ 6418	Cationic dry polymer	Flocculation of destabilised particles (DAF)
Hydrex™ 69510 GR *	Cationic dry polymer	Flocculation of destabilised particles (GEM) (CFIA approved)
Hydrex™ 6115 *	Anionic dry polymer	Flocculation of destabilised particles (GEM) (CFIA approved)
H_2SO_4	Acid	Acidification for breaking proteins (GEM)
NaOH	Base/ Alkali	pH neutralization after breaking the proteins

In order to evaluate the performances of the DAF and the GEM processes on Sofina's water sample and to compare the different conditions tested, an effluent water characterization was completed on the best clarified water samples. An estimation of sludge production and composition was also completed on the best conditions tested. Most of the optimization of the process was completed by visual inspection and validated once optimized through analyses on the clarified water.

3 Results

3.1 Raw waters characterization

The first step to determine the chemical dosages to apply to the water sample for optimal treatment was to evaluate its composition. A sample of each of the two samples received at Veolia's laboratory was sent to an external accredited laboratory (Eurofins in Pointe-Claire, QC) for characterization. The composition of the samples received to Veolia's laboratory is presented in Table 3.

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Table 3: Raw water quality as received to Veolia's laboratory and measured by an accredited external laboratory (Eurofins)

Parameters	Units	Composite raw water sample (2018-08-14)	Grab raw water sample (2018-08-28)
pH	-	6.59	6.27
Turbidity	NTU	401	625
Alkalinity	mg $CaCO_3$/L	346	-
Conductivity	µS/cm	1336	-
Total suspended solids (TSS)	mg/L	530	843
Total chemical oxygen demand (COD_t).	mg/L	1320	2220
Soluble chemical oxygen demand (COD_s)	mg/L	380	835
Total carbonated biological oxygen demand ($cBOD_{5t}$)	mg/L	1050	1870
Soluble carbonated biological oxygen demand ($cDBO_{5s}$)	mg/L	324	428
Total Oils and Grease ($O\&G_t$)	mg/L	224	450
Mineral Oils and Grease ($O\&G_m$)	mg/L	11	-
Total Kjeldahl Nitrogen (TKN)	mg N/L	156	146
Ammonia (NH_4)	mg N/L	71.0	77.4
Nitrite + Nitrate (NO_x)	mg N/L	< 0.02	-
Total phosphorus	mg P/L	24.3	22.9
Ortho-phosphate ($O\text{-}PO_4$)	mg P/L	12.3	-
Chloride (Cl^-)	mg/L	218	-
Sulfate (SO_4^{2-})	mg/L	71.2	-

The raw water is rich in organics, oil and grease, total suspended solids and phosphorus. The main objective is to remove particulate contaminants and oil and grease using the physico-chemical process. Determination of the organics (BOD and COD) and phosphorus removal will be necessary as a great fraction of these contaminants are in solid/colloid forms (only 30% are visible in the soluble form for BOD and COD and phosphorus could be removed using metal-based coagulant in the treatment chain).

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3.2 GEM application

Testing with the GEM technology was first conducted on the sample. According to previous testing on similar effluents, validation of the chemical selection was first completed on the chicken processing plant sample from Sofina. Three major approaches were tested in Veolia's laboratory with the GEM technology:

- Breaking of blood proteins by acidification of the effluent down to pH 2.0, neutralization, followed by flocculation;
- Simple flocculation of the effluent using polymer for solids removal mainly; and,
- Coagulation of blood proteins using a coagulant (organic or metal-based), followed by flocculation.

Tests completed on the GEM technology for the treatability study of Sofina plant are presented in Table 4. Tests from series 1 (1A, 1B, 1C, 1D, 1E and 1F) were completed on the composite sample only (sample collected on August 14th 2018). Tests 2A and 3A were completed on the second sampling sent on August 28th, being the two most promising results obtained from the first testing campaign. Resulting clarified water, for the best testing completed for each method of treatment with the GEM, are presented in Table 5.

Table 4: GEM tests completed on Sofina Chicken Processing plant at Veolia's laboratory

Test ID	Coagulant type/ Coagulation process	Coagulant dosage	Cationic polymer dosage (Hydrex™ 69510 GR)	Anionic polymer dosage (Hydrex™ 6115)	Visual observations
1A	Acidification at pH 2.5 with H_2SO_4 Neutralization at pH 6.5 with NaOH	None	20 mg/L	None	
1B	None	None	20 mg/L	None	

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Test ID	Coagulant type/ Coagulation process	Coagulant dosage	Cationic polymer dosage (Hydrex™ 69510 GR)	Anionic polymer dosage (Hydrex™ 6115)	Visual observations
3A	None	None	20 mg/L	None	
1C	None	None	40 mg/L	10 mg/L	
1D	Organic coagulant Hydrex™ 3423	12 mg/L	20 mg/L	None	
1E	Ferric Coagulant Hydrex™ 69253 GR	1550 mg/L	30 mg/L	10 mg/L	
1F	Ferric Coagulant Hydrex™ 69253 GR	155 mg/L	40 mg/L	10 mg/L	
2A	Ferric Coagulant Hydrex™ 69253 GR	233 mg/L	40 mg/L	15 mg/L	-

Water production for external laboratory characterization was completed on tests 1A, 1B, 1D and 1F, being the tests showing the most promising results after visual observations.

Table 5: Clarified water quality after GEM treatment as measured by an accredited external laboratory (Eurofins)

Parameters	Units	Test 1A	Test 1B	Test 1D	Test 1F	Test 2A
Operation conditions — Coagulant dosed		None (acidification)	None	Hydrex™ 3423	Hydrex™ 69253 GR	Hydrex™ 69253 GR
Operation conditions — Polymer dosed		Hydrex™ 69510 GR	Hydrex™ 69510 GR	Hydrex™ 69510 GR	Hydrex™ 69510 GR Hydrex™ 6115	Hydrex™ 69510 GR Hydrex™ 6115
pH (intern)	-	6.86	6.95	7.02	6.85	6.47
Turbidity (intern)	NTU	13.4	14.4	13.0	10.1	14.9
Total suspended solids (TSS)	mg/L	8	16	14	18	-
Total chemical oxygen demand (COD_t).	mg/L	428	385	514	447	-
Soluble chemical oxygen demand (COD_s)	mg/L	398	373	329	369	-
Total carbonated biological oxygen demand ($cBOD_{5t}$)	mg/L	328	370	391	317	358
Soluble carbonated biological oxygen demand ($cDBO_{5s}$)	mg/L	354	309	292	243	-
Total Oils and Grease ($O\&G_t$)	mg/L	7	7	7	< 5	-
Mineral Oils and Grease ($O\&G_m$)	mg/L	< 5	< 5	6	< 5	-
Total Kjeldahl Nitrogen (TKN)	mg N/L	102	110	107	103	97.3
Total Phosphorus	mg P/L	17.2	15.6	17.1	6.38	5.83

Total suspended solids removal is good, with 97% of TSS removal. Since a good part of the organic loading is particulate (70% of the BOD is particulate), a good removal of organic concentration is also achieved, though not complete (ammonia and BOD concentrations are still above the objectives). Dosage of an inorganic coagulant (ferric sulfate) helps to meet the phosphorus target, but sludge management is easier with no coagulant addition (Test 1B). In both cases, the produced sludge is eligible for rendering disposal as all chemicals used with the GEM application are registered to the CFIA.

CPC2018-1286 - Attach 3
ISC: UNRESTRICTED

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Recommended chemicals for this application are the two following:

- With inorganic coagulant dosage for phosphorus removal:
  - Hydrex™ 69253 GR; inorganic coagulant (ferric sulfate)
  - Hydrex™ 69510 GR; cationic polymer (dry)
  - Hydrex™ 6115; anionic polymer (dry)
- Without phosphorus removal (easier management of the sludge; more compact):
  - Hydrex™ 69510 GR; cationic polymer (dry)

3.3 Classic Dissolved Air Flotation (DAF)

Since good performances were obtained using a ferric inorganic coagulant while testing the GEM technology, and previous experiences had shown similar conclusions, testing on the DAF technology was focused on the following chemistry:

- Hydrex™ 69253 GR; inorganic coagulant (ferric sulfate)
- Hydrex™ 6814; cationic polymer (dry)

Testing completed on both samples received from Sofina Chicken Processing Plant is presented in Table 6.

Table 6: Optimization test for DAF technology on Sofina Chicken Processing Plant effluent at Veolia's laboratory

TEST ID	Raw water sample	Coagulant dosage (mg/L)	Polymer dosage (mg/L)	Turbidity (NTU)	pH	Sample appearance
1A	Comp	155	10	-	-	Little floculation
1B	Comp	388	5	-	-	Turbid supernatant
1C	Comp	775	2	-	-	Clear supernatant; sludge is sinking
1D	Comp	775	3	4.2	5.66	Clear supernatant; 10% sludge production
3A	Comp	775	1	4.2	5.66	Clear supernatant; 10% sludge production
3B	Comp	775	2	6	5.66	Clear supernatant; 10% sludge production
3C	Comp	775	3	10.2	5.63	Clear supernatant; sludge is sinking
6A	Grab	775	5	4.7	5.46	Clear supernatant; 5% sludge production
6B	Grab	155	5	-	-	Little floculation
6C	Grab	465	5	18.1	5.80	Turbid supernatant
9A	Grab	155	5	44.4	6.23	Turbid supernatant; 3% sludge production
9B	Grab	465	5	16.0	5.98	Slightly turbid supernatant; 6% sludge production
9C	Grab	775	5	6.45	5.56	Clear supernatant; 6% sludge production

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The best results have been observed while dosing 775 mg/L of ferric sulfate with adequate cationic polymer addition (relative to the water quality; the two samples tested had not shown the same need for polymer addition). Figure 3 illustrates the clarified water quality according to the coagulant dosage, as observed in Test 9A, 9B and 9C. Test 9C is a replicate of Test 6A, with the same water quality, as a comparative for the coagulant dosage impact. Table 7 presents the water characterization of the two samples sent to the accredited external laboratory for validation of the treatment efficiency.

Figure 3: DAF tests with different coagulant dosage (155 mg/L, 465 mg/L and 775 mg/L) and polymer dosage with DAF application on Sofina's effluent (Test series 9)

Table 7: Clarified water quality after DAF treatment as measured by an accredited external laboratory (Eurofins)

Parameters	Units	Test 1D	Test 6A	Test 9A	Test 9B
Coagulant dosage (Hydrex™ 69253 GR)	**mg/L**	**775**	**775**	**155**	**465**
pH (internal)	-	5.66	5.46	6.23	5.98
Turbidity (internal)	NTU	4.21	4.7	44.4	16.0
Total suspended solids (TSS)	mg/L	7	8	63	21
Total chemical oxygen demand (COD_t).	mg/L	366	422	595	557
Soluble chemical oxygen demand (COD_s)	mg/L	239	380	-	-
Total carbonated biological oxygen demand ($cBOD_{5t}$)	mg/L	223	299	-	-
Soluble carbonated biological oxygen demand ($cDBO_{5s}$)	mg/L	181	277	-	-
Total Oils and Grease ($O\&G_t$)	mg/L	< 5	6	19	7
Mineral Oils and Grease ($O\&G_m$)	mg/L	< 5	-	-	-

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Parameters	Units	Test 1D	Test 6A	Test 9A	Test 9B
Coagulant dosage (Hydrex™ 69253 GR)	mg/L	775	775	155	465
Total Kjeldahl Nitrogen (TKN)	mg N/L	75.2	75.0	81.6	75.1
Total Phosphorus	mg P/L	0.27	0.26* 0.16	7.4* 7.9	1.8* 1.58

* Results obtained by internal measurements

Total suspended solids removal is good, with up to 97% of TSS removal when dosing 775 mg/L of coagulant. Since a good part of the organic loading is particulate (70% of the BOD is particulate), a good removal of organic concentration is also achieved, though not complete (ammonia concentrations is still above the objectives and BOD concentration is slightly over objective). Dosage of an inorganic coagulant (ferric sulfate) helps to meet the phosphorus target. Tests with low coagulant dosage (155 mg/L of coagulant) worked well in Test 9A. However, it only worked on the second sample received; the minimum coagulant dosage to allows flocculation and sludge flotation seems to be slightly over 155 mg/L. Recommended chemicals for this application are the following:

- Hydrex™ 69253 GR; inorganic coagulant (ferric sulfate)
- Hydrex™ 6418; cationic polymer (dry)

3.4 Comparison between the two tested flotation technologies

Good performances were obtained from both technologies tested on Sofina Chicken Processing Plant effluent. The results from both technologies are summarised in Figure 4, Figure 5 and in Table 8.

Raw water and GEM clarified water with ferric sulfate (Test 2A) with grab sample collected on August 28th 2018	Raw water and DAF clarified water with ferric sulfate (Test 6A) with grab sample collected on August 28th 2018

Figure 4: Visual comparison between the GEM and the DAF technologies on the grab sample collected August 28th at Sofina Chicken Processing Plant

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Raw water and GEM clarified water on composite sample | Raw water and GEM clarified water on grab sample

Figure 5: Visual aspect of the GEM clarified water with no use of coagulant at Sofina Chicken Processing Plant

Table 8: Comparison between clarified water quality after GEM and DAF treatment as measured by an accredited external laboratory (Eurofins)

Parameters	Units	Objective	GEM	GEM		DAF	
Operation conditions	Coagulant dosage		None	155 mg/L	233 mg/L	775 mg/L	
	Polymer dosage		20 mg/L cationic	40 mg/L cationic 10 mg/L anionic		1-5 mg/L cationic	
		Test ID	1B	1F	2A	1D	6A
pH (internal)	-	-	6.95	6.85	6.47	5.66	5.46
Turbidity (internal)	NTU	-	14.4	10.1	14.9	4.21	4.7
Total suspended solids (TSS)	mg/L	300	16	18	-	7	8
Total chemical oxygen demand (COD_t).	mg/L	600	385	447	-	366	422
Soluble chemical oxygen demand (COD_s)	mg/L		373	369	-	239	380
Total carbonated biological oxygen demand ($cBOD_{5t}$)	mg/L	300	370	317	358	223	299
Soluble carbonated biological oxygen demand ($cDBO_{5s}$)	mg/L		309	243	-	181	277
Total Oils and Grease ($O\&G_t$)	mg/L	100	7	< 5	-	< 5	6
Mineral Oils and Grease ($O\&G_m$)	mg/L		< 5	< 5	-	< 5	-
Total Kjeldahl Nitrogen (TKN)	mg N/L	50	110	103	97.3	75.2	75.0
Total Phosphorus	mg P/L	10	15.6	6.38	5.83	0.27	0.16

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The water qualities of the clarified water in all three cases are similar. With no coagulant, with the GEM technology, a good water quality as well as a good sludge quality can be achieved at low dosages. The phosphorus concentration is still higher than expected, but in a whole treatment chain it could be removed downstream, limiting the phosphorus limitation for any biological treatment.

For the same coagulant dosage, the GEM performs better than the DAF; similar performances are seen comparing a GEM operating with 155 mg/L of inorganic coagulant while the DAF operates at 775 mg/L of the same coagulant. DAF performances at lower coagulant dosage are not as good as the GEM for TSS and COD_t (particulate) removal.

Higher coagulant dosages were tested on GEM technology to determine if better organic removal could be achieved while increasing the coagulant dosage. No good result came from these tests as the sludge grows looser and became difficult to skim from the clarified water.

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4 Conclusions

GEM and DAF testing were completed on two samples from Sofina Chicken Processing Plant shown a good TSS removal for both samples. More specifically, the testing completed by Veolia shown that:

- TSS removal as good as 97% can be achieved with both technologies;
- BOD removal is mostly due to TSS removal, allowing a removal of 70%-79% of total BOD;
- The chemicals used for the GEM process as demonstrated for Sofina are Hydrex™ 69253 GR for coagulation, Hydrex™ 69510 GR for cationic polymer and Hydrex™ 6115 for anionic polymer. Good clarified water quality as well as easier sludge management could also be achieved using only a cationic polymer (Hydrex™ 69510 GR), if phosphorus removal can be provided downstream;
- The chemicals used for the DAF process as demonstrated for Sofina are Hydrex™ 69253 GR for coagulation and Hydrex™ 6418 for cationic polymer;
- Similar performances are seen on the DAF and the GEM but less inorganic coagulant is required on the GEM to achieve similar results;
- Most compliance except Nitrogen and BOD are met with both technologies while using inorganic coagulant.

The results obtained on both samples tested confirm the GEM and the DAF flotation process efficiency.

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APPENDIX C

Alberta Environment & Parks Letter: EPEA Approval to Operate Clarification

Operational Management Plan

Alberta Environment and Parks

Operations
South Saskatchewan Region
2nd Floor, 2938 – 11 Street NE
Calgary, AB T2E 7L7
Telephone: 403-297-7605
Fax: 403-297-2749
www.aep.alberta.ca

August 30, 2018

Delivered by Email:
RChrysanthou@sofinafoods.com

Mr. Robert Chrysanthou
Director, Engineering
Sofina Foods Inc.
2126 Hurst Road SE
Calgary, AB T2G 4M5

Dear Mr. Chrysanthou:

Subject: Approval under the *Environmental Protection and Enhancement Act* (EPEA) For the Purpose of Constructing a New Poultry Plant at 6202 – 106 Ave SE in Calgary, Alberta

Thank you for your inquiry on August 30, 2018 asking whether or not an EPEA Approval is required for the proposed poultry plant.

Based on the description of your activity in your August 30, 2018 email, an Approval under the EPEA is not required at this time. The rationale for this is as follows:

- The proposed poultry plant will direct all industrial wastewater generated in the plant to the municipal waste water collection system.
- The proposed poultry plant does not meet the definition of a "meat plant" under section 2(2) (ii) of the EPEA *Activities Designation Regulation,* AR 276/2003 (ADR) because industrial wastewater will not be released into the environment.

It remains your responsibility to meet the general provisions of the EPEA and associated regulations.

If the proposed activity changes in such a way that it meets the definition of an activity listed in the ADR then an Approval will be required and must be obtained before any construction is undertaken.

If you have any questions, please contact me at 403-297-5940.

Sincerely,

Brynn Choquette, P.Eng.
Industrial Approvals Engineer

cc: Kate Vasicek, AEP

Operational Management Plan

Appendix B

B.5 SANITARY SERVICING STUDY

Operational Management Plan

Stantec

Memo

To:	City of Calgary Water Resources	From:	Jeff Berg, M.Sc., P.Eng. Stantec Consulting Ltd.
File:	144211190	Date:	August 13, 2018

Reference: Sofina Foods Poultry Processing Facility (DP2018-3439) – Sanitary Servicing Analysis – Rev0

INTRODUCTION

Sofina Foods Inc. (Sofina) is proposing a new poultry processing facility to be located in the Dufferin North subdivision of Calgary on 106 Avenue SE. This sanitary study has been prepared in support of Development Approval application DP2018-3439 for the proposed facility.

The major goals of this study are multifold as follows:

(1) Present the proposed sanitary design and discharge rates for the new facility with backup design calculations.

(2) Investigate the existing tributary sewers' ability to meet the required level of service for both pre- and post-development conditions.

(3) Confirm required equalization storage volume to mitigate peak flow rates into the City sanitary system.

(4) Determine the peak flows to the downstream system caused by the proposed development.

STUDY AREA

The proposed site for the new poultry processing facility is located at 6202 - 106 Avenue SE (Plan 1710868; Block 5; Lot 4) in the Dufferin North subdivision of Calgary as shown in Figure 1 below.

The three figures provided in Appendix A of the report show the proposed area in question including details of the proposed sanitary tie-in to 106 Ave SE. This sanitary catchment area was previously studied as part of the East Shepard Phase 2 Development Planning (EXP Services, 2015). Appendix B summarizes the sanitary calculations previously completed for this development area in that study. For consistency with that work, the methodology used in this study considers sanitary capacity up to the tie-in to the existing 525 mm sanitary sewer pipe on 68 St SE.

Figure 1: Proposed Sofina Foods Site

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Reference: **Sofina Foods Poultry Processing Facility (DP2018-3439) – Sanitary Servicing Analysis**

SANITARY FLOW ANALYSIS

Pre-Development Sanitary Flows

For comparative purposes with buildout flows, pre-development sanitary flows were calculated for the buildout of the tributary area assuming the Sofina Parcel is non-contributing[1]. Buildout design densities and unit flow rates were previously established and approved by the City as part of the previously completed sanitary study for this area. These design-densities and unit flow rates have not been reviewed as part of this study.

Table 1.0 shows the predicted pre-development flows for each of the sewer pipes tributary to this development from the upstream to the downstream end.

Table 1.0: Pre-Development Sanitary Flows

US MH	DS MH	Contributing Population[1]	Harmon's PF	PDWF (L/s)[2]	Contributing Area (ha)[3]	PWWF (L/s)[4]
41	40	417	4.01	4.46	27.78	12.2
40	39	417	4.01	4.46	27.78	12.2
39	38	417	4.01	4.46	27.78	12.2
38	37	417	4.01	4.46	27.78	12.2
37	36	732	3.88	7.57	48.76	21.2
36	35	732	3.88	7.57	48.76	21.2
35	12	1204	3.75	12.01	80.26	34.5

1. Assumes 15 employees/ha as per original sanitary study with exception of Sofina Development with no employment for the pre-development condition. Assumes buildout of remaining tributary parcels.
2. Based on 230 L/c/d (as per original study) and HPF.
3. Assumes 12.35 ha Sofina parcel is non-contributing.
4. Based on 0.28 L/s/ha

Table 2.0 presents the predicted peak hydraulic loading for the pre-development condition for each of the sewer pipes tributary to this development from the upstream to the downstream end at the 525 mm sanitary tie-in (MH 12).

Table 2.0: Pre-Development Hydraulic Loading

US MH	DS MH	PWWF (L/s)	Pipe Diameter (mm)	US Invert (m)	DS Invert (m)	Pipe Length (m)	Pipe Capacity (L/s)	% Pipe Full
41	40	12.2	250	31.059	30.241	136.32	46.8	26.1%
40	39	12.2	250	28.844	28.162	136.32	42.7	28.6%
39	38	12.2	250	28.132	27.554	115.74	42.7	28.7%
38	37	12.2	250	27.524	26.963	112.16	42.7	28.6%
37	36	21.2	300	26.933	25.272	113.44	116.4	18.2%
36	35	21.2	300	25.242	24.701	108.25	68.0	31.2%
35	12	34.5	375	24.596	23.953	128.74	116.5	29.6%

[1] I&I has been excluded for this parcel for Pre-Development flows.

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Reference: Sofina Foods Poultry Processing Facility (DP2018-3439) – Sanitary Servicing Analysis

From Table 2.0, all tributary sewers are operating well below full pipe capacity for the predevelopment condition.

Post-Development Sanitary Flows

Stantec Consulting and Sofina Foods Inc. met with the City of Calgary (the City) to review the proposed new poultry processing facility on May 10, 2018. During this discussion, the City identified that the existing sanitary lift station servicing the Dufferin North subdivision limits the maximum permissible wastewater discharge rate into the sanitary system. The City's Water Resources group has conducted draw down tests at the lift station and has confirmed that the capacity of the lift station is less that the design value, and the City has confirmed it is not feasible to upsize the pumps to increase the lift station's capacity.

The City has defined a maximum allowable sanitary discharge rate as follows:

	24.5 L/s peak dry weather flow
+	3.5 L/s Inflow & Infiltration*
	28 L/s peak wet weather flow

**Note: 3.5 L/s Inflow & Infiltration is based on a 12.35 ha total area, which is the 11.84 ha Sofina lot plus half of the adjacent 106 Av SE. The typical Inflow & Infiltration unit rate of 0.28 L/s/ha was used.*

An email from the City confirming the allowable Sanitary discharge rate of 28 L/s including allowance for I&I is included as Appendix C.

The Sofina processing facility will operate 5 days/week with 24 hour/day operation during that time and is planned to be closed for the remaining 2 days/week. When operating, the facility is expected to have an average daily flow of 25.2 L/s (2,176.5 m^3/d). Accounting for an additional 15% Factor of Safety (FOS) in the design, this number increases to 28.97 L/s (2,502.7 m^3/d). The predicted peak hourly flow from the facility (with 15% FOS) is 33.92 L/s. Predicted hourly design flows for the facility (with 15% FOS) are presented in Appendix D.

Dividing the projected design flows by a total of 7 days, yields a weekly average of 20.69 L/s (with 15% FOS) discharged to the sanitary system by the facility, which is less than the allowable 24.5 L/s.

To mitigate the difference between the peak design flows and the allowable discharge rate, Stantec is proposing an equalization tank suitable to store and discharge wastewater at or below the maximum permissible rate. The facility would be automatically controlled to limit the discharge from the wastewater treatment system at the facility to a maximum of 24.5 L/s with excess flow stored in an equalization tank.

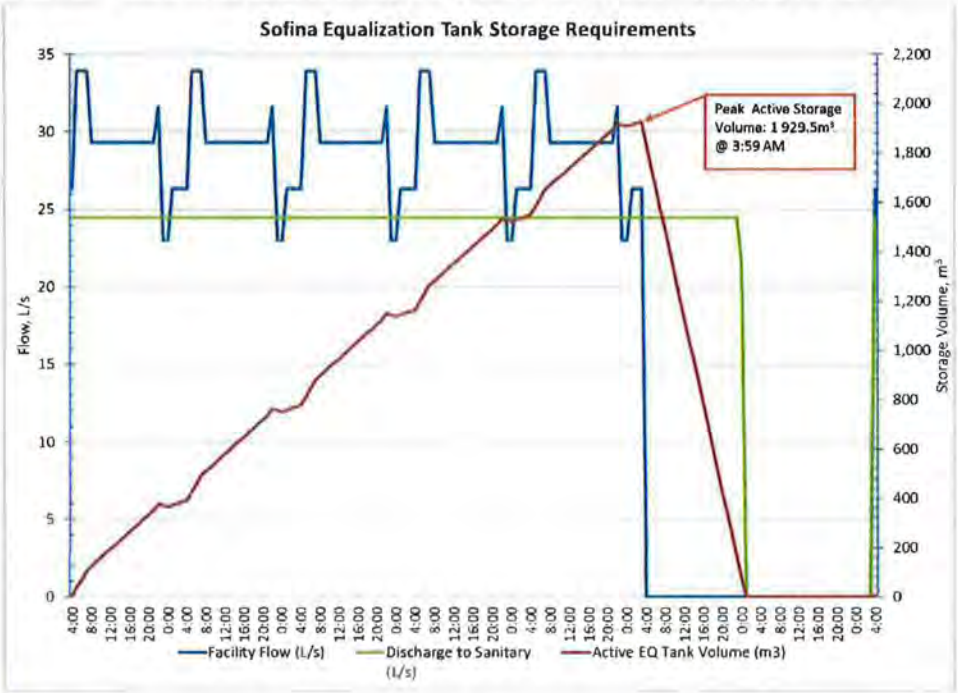
With a maximum day flow rate of 28.97 L/s (2,502.7 m^3/d) (including 15% FOS) and an allowable discharge rate of 24.50 L/s (2,116.8 m^3/d), there is an excess daily flow of up to 385.9 m^3 that must be stored in an equalization tank for treatment on the two (2) non-processing days of the week. The total required storage volume is calculated as follows:

	385.9 m^3	excess flow/day
X	5	days/week
	1929.5 m^3	Required Storage

At the maximum allowable release rate, the storage facility would be fully emptied in 21.9 hours. Figure 2 below shows the predicted equalization tank liquid volume by hour over a one-week period (including 15% FOS)

Operational Management Plan

Reference: **Sofina Foods Poultry Processing Facility (DP2018-3439) – Sanitary Servicing Analysis**



Based on the discussion in the previous section, for the post development calculations, a peak discharge flow of 28.0 L/s was added to the pre-development flow conditions presented in Table 2.0. Table 3.0 presents the predicted peak hydraulic loading for the post-development condition for each of the sewer pipes tributary to this development from the upstream to the downstream end.

Table 3.0: Post-Development Hydraulic Loading

US MH	DS MH	PWWF (L/s)[1]	Pipe Diameter (mm)	US Invert (m)	DS Invert (m)	Pipe Length (m)	Pipe Capacity (L/s)	% Pipe Full
41	40	12.2	250	31.059	30.241	136.32	46.8	26.1%
40	39	40.2	250	28.844	28.162	136.32	42.7	94.2%
39	38	40.2	250	28.132	27.554	115.74	42.7	94.2%
38	37	40.2	250	27.524	26.963	112.16	42.7	94.2%
37	36	49.2	300	26.933	25.272	113.44	116.4	42.3%
36	35	49.2	300	25.242	24.701	108.25	68.0	72.4%
35	12	62.5	375	24.596	23.953	128.74	116.5	53.6%

1. Assumes 28 L/s (24.5 L/s peak dry weather flow + 3.5 L/s inflow & infiltration from the Sofina Parcel tie in at MH40

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From Table 3.0, all tributary sewers are projected to operate below full pipe capacity. From this, it can be reasonably concluded that the sewers upstream of the 525 mm tie-in on 68th St SE have sufficient capacity to accommodate the incremental flow from the proposed Sofina Poultry Processing Facility.

PEAK DOWNSTREAM FLOWS

From Table 3.0, the projected peak wet weather flow to be discharged to the 525 mm trunk sewer on 68 Ave SE (MH 12) from the Dufferin North subdivision is 62.5 L/s.

It is recommended that the impact of a total flow of 62.5 L/s on the downstream system (D.S. of MH 12) be reviewed by City of Calgary Planning & Analysis using the City's existing MIKE URBAN Sanitary Model. It is noted that this calculated value is likely to be conservative when considered on the downstream trunks based on conservative sanitary generation assumptions (for employment populations) and Harmon peaking factor assumption on the larger system.

CONCLUSIONS & RECOMMENDATIONS

Based on the preceding analysis, the following conclusions can be made:

a) The pre-development peak sanitary flows to the 525mm tie-in on 68 St SE (excluding the Sofina parcel) are approximately 34.5 L/s.

b) With automatic controls to limit the discharge from the wastewater treatment system at the facility to the City sanitary system to a maximum of 24.5 L/s, a 2,000 m^3 active volume equalization tank has sufficient capacity to buffer the difference between peak facility design flows and the allowable discharge rate.

c) The calculated post-development peak sanitary flows to the 525mm tie-in on 68 St SE (excluding the Sofina parcel) are approximately 62.5 L/s.

d) It can be reasonably concluded that the sewers upstream of the 525 mm tie-in on 68th St SE have sufficient capacity to accommodate the incremental flow from the proposed Sofina Poultry Processing Facility.

e) It is recommended that a total flow of 62.5 L/s on the downstream system be reviewed by City of Calgary Planning & Analysis using the City's existing MIKE URBAN Sanitary Model.

CLOSURE

This memo is to be used as an information document for sanitary servicing for the Sofina Poultry Processing Facility in the City of Calgary. Please contact the undersigned if you have any further questions.

CORPORATE AUTHORIZATION

This document, entitled "Sofina Foods Poultry Processing Facility (DP2018-3439) – Sanitary Servicing Analysis" was prepared by Stantec Consulting Ltd. The material in it reflects Stantec Consulting Ltd.'s best judgment in light of the information available to it at the time of preparation. Any use, which a third party makes of this report or reliance on or decisions made based on it, are the responsibilities of the third parties. Stantec Consulting Ltd. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

Operational Management Plan

Reference: **Sofina Foods Poultry Processing Facility (DP2018-3439) – Sanitary Servicing Analysis**

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The Association of Professional Engineers and Geoscientists of Alberta

CORPORATE AUTHORIZATION

PROFESSIONAL ENGINEER ALBERTA
JEFF BERG
2018-08-13

RESPONSIBLE ENGINEER

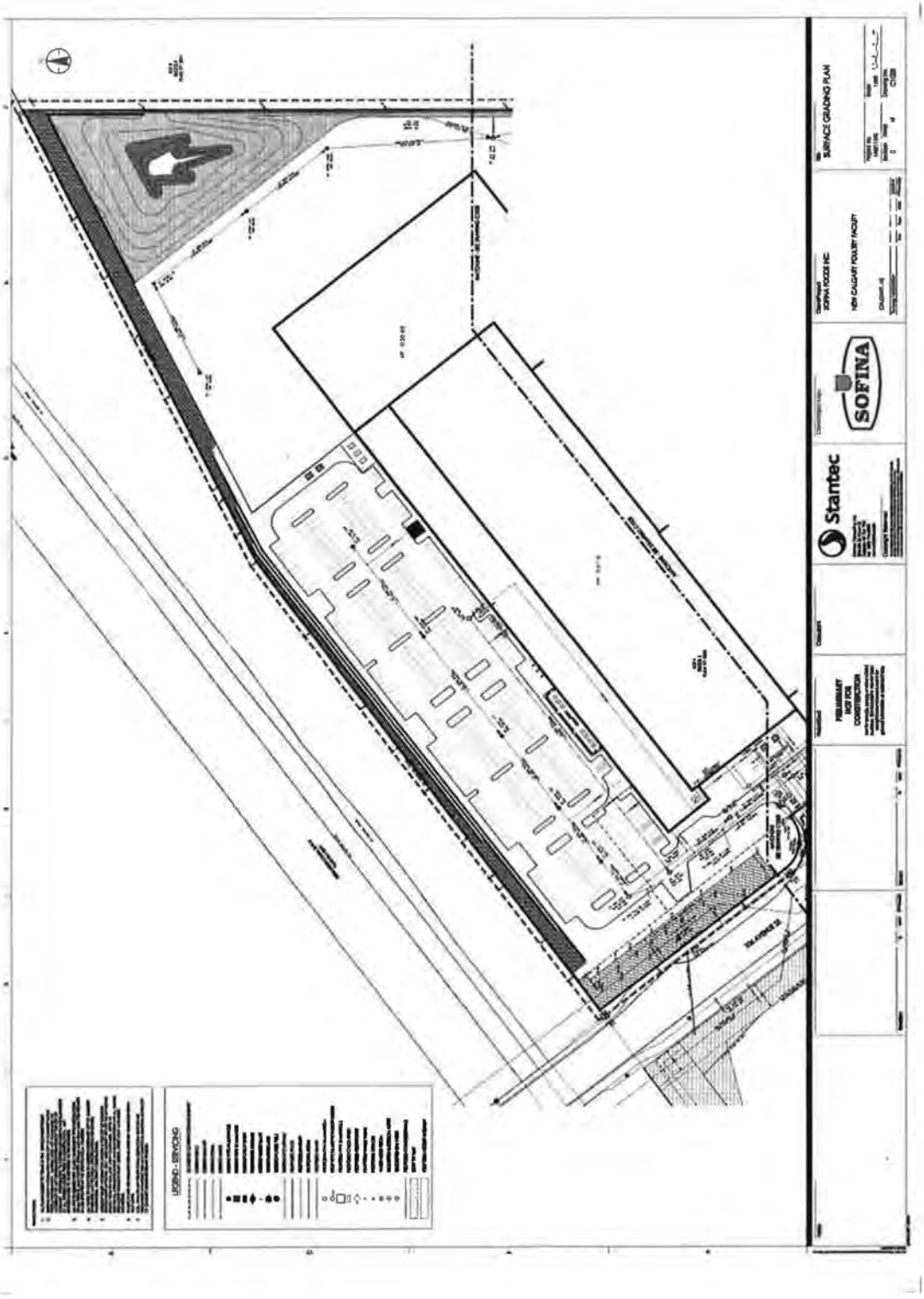
Design with community in mind

Operational Management Plan

APPENDIX A
Study Area

Operational Management Plan

Operational Management Plan



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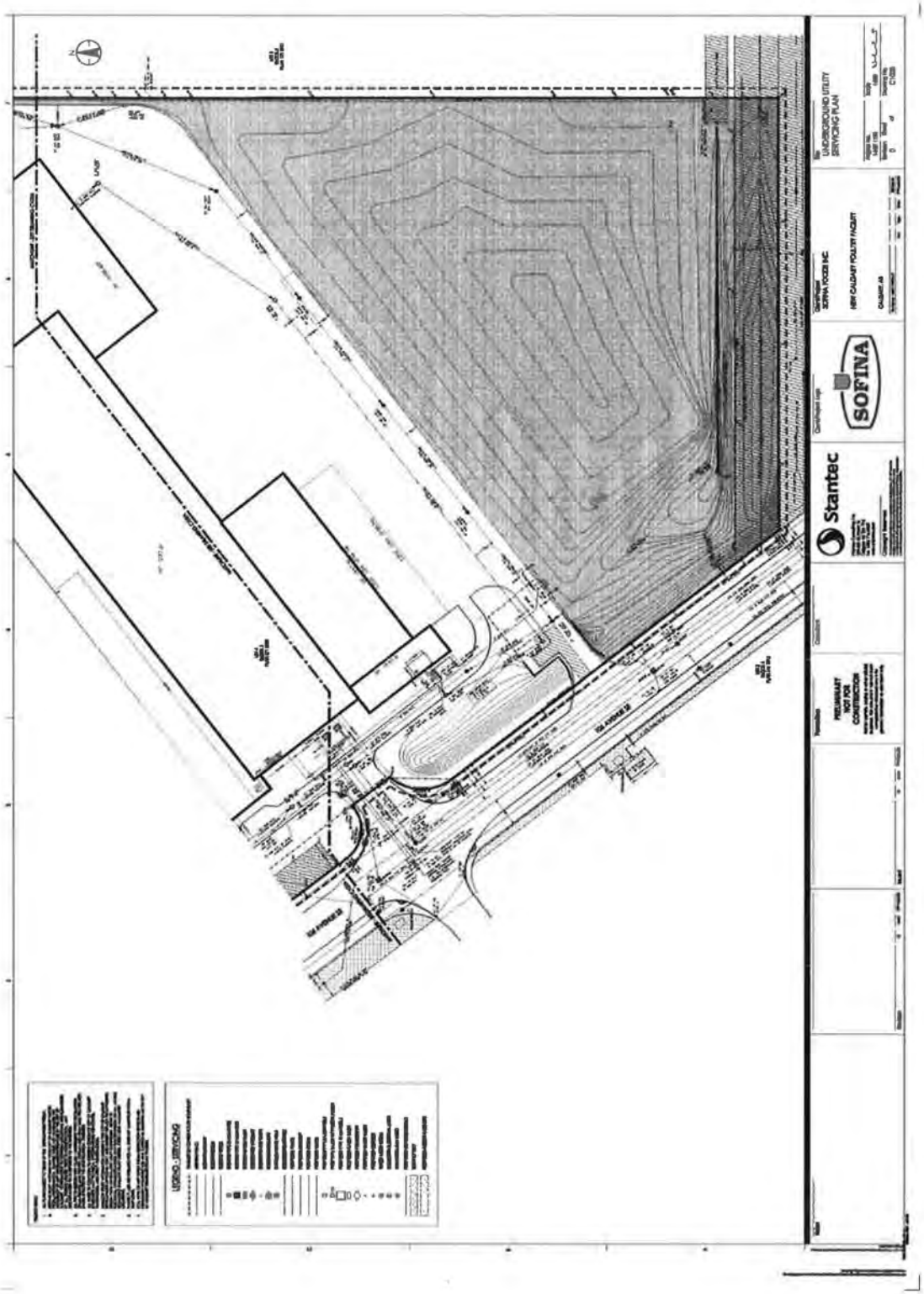

Operational Management Plan

APPENDIX B
East Shepard Phase 2 Development Planning
Sanitary Analysis

Operational Management Plan