

**2019**

# Environmental Management Plan Bounty Farm Ltd.



**Environmental Engineering Solutions EES-Guyana**

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# 1 Introduction

## 1.1 Purpose

An Environmental Management Plan is a written document which basically outlines mitigation measures and principles for the management of various operations in order to reduce potential negative impacts to the environment. The environmental measures implemented should also take into consideration feasible options in order to factor in viable sustainable and economic elements.

Therefore, according to EPA Guyana, an Environmental Management Plan (EMP) can be defined as an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented, and that the positive benefits of the projects are enhanced (EPA Guyana, 2013).

As such an EMP is recognised as a tool that can be used to provide assurance that developers make suitable provisions for counteracting negative impacts that occur through the project implementation and operation (EPA Guyana, 2013). Furthermore, a complied Environmental Management Plan together with proper implementation mechanisms such as monitoring, record keeping and pollution abatement measures, will result in improved environmental performance of an operation.

Key overriding principles of an EMP are that:

- the EMP document should provide a description of the methods and procedures for mitigating and monitoring impacts.
- The EMP should be balanced, objective and concise, and be easily understood by other parties.
- The document should also:
  - Ensure responsibility for the content and commitments contained in the plan.
  - Set out environmental objectives and targets which the developer needs to achieve in order to reduce negative impacts.
  - Include adaptive management strategies and a description of the methods and procedures for mitigating and monitoring impacts and,
  - State any limitations that apply.



(DEAT, 2004) (Environmental Management Plan Guidelines, 2014)

## 1.2 Objectives of the EMP

The objectives of the EMP are aimed at ensuring that the developer maintains adequate control over the project operation in order to:

- Minimise the extent of impact during design, construction and operations
  - Identify the environmental issues/risks associated with operation
  - Provide the context of the local and regional environment
  - Describe the activity to determine permit conditions by the Agency
  - Prevent long term environmental degradation.
  - Contribute to environmental awareness of the workforce.
  - Ensure commitment to implementation of mitigation actions.
  - Facilitates progress towards environmental targets
  - Act as a tool for continual improvement of environmental performance.
  - Outline the mitigation measures that will be taken, and the procedures for their implementation.
- (DEAT, 2004)(EPA Guyana, 2013)

The EMP document therefore, as a guideline tool will assist in minimising the potential environmental impact of the operation activities, and as a consequence the operation activities will be maintained at an environmentally acceptable level.

## 1.3 Components of the EMP

This Environmental Management Plan has been developed for the handling and processing of poultry production and will cover the following items:

- Prevention and Control
- Mitigation Measures
- Health and Safety
- Training and Awareness
- Emergency Response
- Waste Management

Monitoring, implementation, and supervision are fundamental aspects to the successful execution of this EMP. It is important therefore, that the implementation and monitoring of this EMP are adhered to by the Developer. Consequently, all potential impacts, mitigation measures and procedures to be implemented, which are outlined and described within this EMP document, will be the responsibility of the Bounty Farm Ltd. Bounty Farm Ltd will take every step to adhere to the EMP and appoint oversight personnel for the implementation, monitoring and dealing with Environmental related matters.

This Environmental Management Plan (EMP) has been prepared by a team from Environmental Engineering Solutions for the poultry production operations on behalf of the Bounty Farm Ltd. The EMP has been developed in accordance with EPA Guyana guidelines to establish specific safeguards and controls to be employed at the design, development and operations phase. It provides environmental management guidance to Bounty Farm Ltd and assigns oversight responsibilities to specific personnel.

This Environmental Management Plan is provided by the Bounty Farm Ltd. in compliance with the condition process for the Application for an Environmental Authorisation (Permit) (in accordance with EPA's Guidelines for the Preparation of Environmental Management Plan). The EMP document for the Operation will assist in the decision making process of the Agency to determine the conditions under which the Permit will be approved and granted in accordance with the Environmental Protection Act 1996.

## 1.4 Company Profile

Bounty Farm originated from a very small project by Company patriarch John Fernandes in 1958. This small venture grew until Bounty Farm was established 10 years later in 1968. Back then, its main focus was the production of crops like citrus, vegetables and ground provision. Poultry was then introduced in 1965 by Mr. Billy Fernandes, and since 1994 Bounty Farm also has worked with private farmers in the contract of rearing baby chicks. By the year 1997, the Bounty Farm Ltd Poultry Processing Plant was opened at Timehri (Cheddi Jagan Research Centre, 2000). The Farm sits on 60 acres of land at Timehri East Bank Demerara and at that location a fully integrated poultry farming operation takes place. The operation site comprises, a Hatchery, 20 tons per hour Feed Mill, Processing Plant, Stores, Poultry Unit, Workshop and a Day care facility for employee's children (Primus, 2015).

*Figure 1: Bounty Farm Ltd.*



**Photo taken by:** Mr. Isidro Espinosa (2018)

Bounty Farm Ltd is Guyana's largest supplier of chicken. It supplies most of the major fast food outlets, a number of supermarkets in Guyana. Of the Company's more than eighteen (18) products, its main ones are Baby Chicks and Poultry Feed (Primus, 2015). Additionally, due to its quality operating production standards to meet sanitary requirements, Bounty Farm Ltd. was granted approval for trade regionally of poultry products with Caricom members states. However, the Company will only tap into the regional market when the need arises to fulfil any shortages. (Stabroek News, 2017)

Minister of Agriculture, Noel Holder during a visit to the company's headquarters at Timehri, East Bank Demerara on December 30<sup>th</sup> 2016 hailed the contributions of Bounty Farms Ltd. to Guyana's economic development. Bounty Farm Ltd over the past years invested some US\$46M in the poultry industry and has a state-of-the-art hatchery. In addition, the Company also has a modern feed factory which augments the Local feed supply needs. According to Minister Holder, the operations at Bounty Farm Ltd and the investments the Company has made ensures that the local poultry and feed industry continues to thrive. Guyana's poultry industry has recorded significant growth over the past years. (Kaieteur News, 2016)

## 2 Legal Framework and Policy

Bounty Farm Ltd, Timehri East Bank Demerara operations falls under the jurisdiction of the laws of the Co-operate Republic of Guyana. The relevant legal requirements, national policies, guidelines, regulatory bodies governing the implementation, operation and efficient management of the processing plant are outlined and explained in the chapter.

### 2.1 Policies, Strategies and Plans

A number of key policies, strategies & plans established to guide development activities in Guyana in an effort to ensure that natural resources are sustainably utilized and environmental impacts minimized are as follow:

#### 2.1.1 Green State Development Strategy (GSDS) 2017

The Green State Development Strategy (GSDS) was developed to guide Guyana's economic and sociocultural development outlining a long term vision over the next 15 years. The Strategy provides a framework for achieving a green state economy, the sustainable development goals (SDG), and other related targets. The objective of the strategy is to reorient and diversify Guyana's economy, reducing reliance on traditional sectors and opening up new sustainable income and investment opportunities in higher value adding and higher growth sectors. The central themes to contribute to the transition includes structural transformation, sustainable management of natural resources, renewable energy transition, development of resilient infrastructure, capacity building for human development, improved institutional governance and international cooperation for green trade and investment.

#### 2.1.2 Low Carbon Development Strategy (LCDS) 2013

The Low Carbon Development Strategy was launched June 2009. After a series of consultations, revised versions of the document were published in 2010 and 2013. The document basically sets out Guyana's strategy to forge a low carbon economy over the coming years and outlines the focus of implementation for the period 2013 to 2015. The LCDS aims to achieve two goals, these goals are the transformation of Guyana's economy to deliver greater economic and social development for the people of Guyana by following a low carbon development path; and the provision of a model for the world on how climate change can be addressed through low carbon

development in developing countries, if the international community takes the necessary collective actions, especially relating to REDD+.

### 2.1.3 National Development Strategy (NDS) 2001-2010

The National Development Strategy, 2001 – 2010 was developed to achieve Guyana's national economic development, social harmony and well-being. Therefore, taking this into consideration, the strategy sets out a number of objectives and strategies to meet the goal of socio-economic development across different sectors, inclusive of the agricultural sector. These objectives are to attain high rates of economic growth as possible; eliminate poverty in the country; achieve geographical unity; attain equitable geographical distribution of economic activity; and to diversify the economy.

### 2.1.4 National Environmental Action Plan (NEAP) 1994

The National Environmental Action Plan (NEAP), was developed in 1994, to identify the major environmental problems in the country and to formulate appropriate policies to address those problems. The plan further outlines the main environmental policy objectives for the sound management of the environment and natural resources. Twelve stated policy objectives were outlined, one of which called for the conduct of environmental assessments for proposed development activities that may significantly affect the environment. In keeping with this environmental policy objective, the Environmental Protection Act was enacted in June 1996 and includes the legal framework for undertaking an environmental impact assessment.

### 2.1.5 Environmental Guidelines: Poultry Rearing Operations (2013)

The Environmental Guidelines: Poultry Rearing Operations were developed and approved by EPA board in 2013. These guidelines were therefore developed by EPA to provide guidance for environmentally healthy poultry production development in Guyana. The guidelines encourage the use of best management practices and technologies to safeguard the environment, the health and safety of workers, and the well-being of residents in close proximity to Poultry Production Operations.

## 2.2 Legislation

The main legislations governing the operation of Bounty Farms Ltd processing plant are discussed as follows:

- Environmental Protection Act (1996)
- Environmental Protection (Authorisations) Regulations (2000)
- Environmental Protection (Water Quality) Regulation 2000
- Environmental Protection (Air Quality) Regulation 2000
- Environmental Protection (Hazardous Waste Management) Regulation 2000
- Environmental Protection (Noise Management) Regulation 2000
- Environmental Protection (Litter Enforcement) Regulations 2000
- Pesticides and Toxic Chemicals Control Act (2000)
- Occupational Safety & Health Act (1997)
- Labour Act (1942)
- National Insurance and Social Security (1969)

### 2.2.1 Environmental Protection Act (1996)

The Environmental Protection Act Cap 20:05 act no. 11 of 1996 (amended by act no. 17 of 2005), which established the Environmental Protection Agency and the agencies functions, is the principle act which governs the environmental regulatory framework of Guyana.

The Act provides for the management, conservation, protection and improvement of the environment and governs the prevention and control of pollution; the assessment of potential impacts from economic development on the environment through the development of an Environmental Impact Assessment (if required). These methods, procedures, and criteria are mandated by law in order for the need for the preservation and stability of the eco-systems, diversity of species and to protect and improve human welfare, and the environment.

To assist in the effective management of the environment, the Environmental Protection Act has accompanying regulations which aids in governing environmental protection in Guyana. These regulations are as follows:

- Environmental Protection (Authorisations) Regulations 2000, 2005



- Environmental Protection (Water Quality) Regulations 2000
- Environmental Protection (Air Quality) Regulations 2000
- Environmental Protection (Hazardous Wastes Management) Regulations 2000, 2005
- Environmental Protection (Noise Management) Regulations 2000
- Environmental Protection (Litter Enforcement) Regulations 2000)

### 2.2.2 Environmental Protection (Authorisation) Regulations 2000, 2005

The Regulations outlines the procedure and requirements for issuing of Environmental Authorisations (Permit) for any developmental activity which may possibly have adverse impacts on the environment and renewal of such permits. The Environmental Authorisation issued would stipulate permitted conditions for ensuring and maintaining the environmental integrity of the area throughout the life of the operation. After issuance of the permit, the operations are hereafter monitored by the EPA to ensure compliance. As such, it should be noted that this EMP Report Document is a direct result of the Environmental Authorisation decision making process governed under the laws of Guyana.

### 2.2.3 Environmental Protection (Water Quality) Regulation 2000

The water quality regulation was established to protect Guyana's inland/ coastal waters by controlling effluent discharge. This regulation requires that any developer involved in any operation, construction, modification/ extension of facilities discharging effluents must apply for an **Environmental Authorisation**. The regulation states that effluents discharged in inland/ coastal water or land shall not exceed established discharge parameter limits set by Guyana National Bureau of Standards (GNBS). The GNBS Effluent discharge parameter limits are indicated in *Table 1* below:

*Table 1: General Environmental Guideline Values for Effluent Discharge*

Categories	GNBS Limits
<b>pH</b>	5.0 – 9.0
<b>Temperature</b>	< 40
<b>BOD</b> for 5 days	< 50 mg/L
<b>COD</b>	< 250 mg/L

<b>DO</b>	--
<b>TSS</b>	< 50 as TSS
<b>N as NH<sub>3</sub></b>	< 10 mg/L
<b>Total N</b>	--
<b>Phosphorous (P)</b>	< 2 mg/L
<b>CN Total (Cyanide)</b>	< 1 free: 0.1
<b>Phosphate (PO<sub>4</sub><sup>-</sup>)</b>	--
<b>Chlorine (Cl)</b>	< CL: 0.2
<b>Surfactant</b>	--
<b>Phenols</b>	< 0.5 mg/L
<b>Coliforms</b>	< 400 MPN per 100 mls
<b>Oil and Grease (O&amp;G)</b>	< 10 mg/L

**Source:**(GNBS, 2002)

The provisions reiterate the establishment of sampling points; effective keeping of records; reports on effluent discharges, water quality and biological integrity; management of spills/ accidental discharge and encouragement of proper disposal/ treatment of effluents discharge. Bounty Farm Ltd. will ensure adherence to the water quality regulations through the implementation of appropriate measures to keep possible discharge within the prescribed limits set by the GNBS. This will not only help to protect the environment, but will also ensure that the activities are conducted in keeping with the legal requirements of the country.

#### 2.2.4 Environmental Protection (Air Quality) Regulation 2000

The air quality regulation outlines the requirement to limit and control the amount of air pollutants emitted into the atmosphere. The regulation requires that any developer involved in any construction, installation, operation, modification/ extension of any facility that emits air contaminant must apply for an **Environmental Authorisation**. The regulation also states the air contaminant for which parameter limits are to be established.

There is no air quality parameters (limits) established to date in Guyana. Nevertheless, Bounty Farm Ltd will ensure that their operations are controlled and restricted to a minimum emission value, through the implementation of appropriate measures to protect the health of workers and

the environment. The Company will be guided by International ambient air quality standards recommended and used by the EPA to show its commitment to a healthy work environment.

#### 2.2.5 Environmental Protection (Hazardous Waste Management) Regulation 2000, 2005

The hazardous waste management regulation was developed with the primary aim of protecting the environment by controlling hazardous waste discharges. The regulation requires that any developer involved in any operations that generates, transports, treats, stores or disposes of hazardous waste, must submit an application for an **Environmental Authorisation**. The regulation also stipulates and outlines the provisions for reporting; record keeping; emergency preparedness planning; and transportation of hazardous waste, while at the same time encouraging Developers to utilise appropriate disposal/ treatment mechanisms of hazardous waste identified in the regulations.

Bounty Farm Ltd. will take all precautionary measures required to ensure the safe handling and disposal of hazardous material/ substances utilised in the different stages of the operations. This will be done in an effort to ensure that the integrity of the environment is protected and that all workers and nearby residents are protected from negative health-related implications.

#### 2.2.6 Environmental Protection (Noise Management) Regulation 2000

The environmental protection (noise management) regulation manages and controls noise emissions within Guyana. According to this regulation, it is required that any Developer involved in any operation, construction, installation, modification/ extension of a facility that emits noise must apply for an **Environmental Authorisation** from the Agency (EPA). The Regulation also stipulates that noise decibel levels are not to be greater than the established permissible noise level/ limits by the Guyana National Bureau of Standards (GNBS) which have been adopted by EPA. The permissible Noise levels are indicated in *Table 2* below:

*Table 2: GNBS Guideline Values for Noise in Specific Environment*

Categories	Daytime Limits in dB (06:00 – 18:00h)	Night time Limits in dB (18:00 – 06:00)
<b>Residential</b>	75	60
<b>Institutional</b>	75	60
<b>Educational</b>	75	60
<b>Industrial</b>	100	80

<b>Commercial</b>	80	65	
<b>Construction</b>	90	75	
<b>Transportation</b>	100	80	
<b>Recreational</b>	100	18:00 – 01:00hr	100
		01:00 – 08:00hr	70

**Source:**(GNBS, 2010)

Bounty Farm Ltd. will take all necessary action to ensure that there is adherence to the stipulated noise regulations by the implementation of measures, to maintain minimal noise levels to protect the environment and to safeguard the health of workers.

### 2.2.7 Environmental Protection (Litter Enforcement) Regulations 2013

The Litter Enforcement regulations address among other aspects, litter offences, penalties and the power of the local authority to enter premises and to remove derelict vehicles. The Regulations are enforced by the EPA through its recently established Enforcement and Compliance Division.

Under the Litter Regulations, it is an offence to litter in a public place and persons who are found guilty of littering shall be liable to a fine of between fifty to one hundred thousand dollars (\$50,000 - \$100,000) or three months' imprisonment. Bounty Farm Ltd. will ensure that there is adherence to the stipulated litter enforcement regulations by implementation of measures where necessary to protect the environment from solid waste pollution at the facility.

### 2.2.8 Pesticides and Toxic Chemicals Control Act (2000)

The Pesticides and Toxic Chemicals Control Act no. 13 of 2000, resulted in the establishment of the Pesticides and Toxic Chemicals Control Board, which is intended to regulate the manufacture, importation, transportation, storage, sale, use and disposal of pesticides and other toxic chemicals. In this Act, toxic chemicals refer to “any disinfectant or any other substance known to be poisonous, corrosive, irritating, capable of causing a sensitive reaction or sensitive to man or animal that is used in agriculture, the arts, commerce or industry or for any domestic or other purposes”. As a consequence, Bounty Farm Ltd. will take every precaution in the proper use and storage of any chemicals used in the day to day operation at the facility.

### 2.2.9 National Insurance and Social Security Act (1969)

The National Insurance and Social Security Act cap 36:01 establishes the national insurance and social security system, which covers and protects workers. The persons/ individuals to be insured under this act by payment of contributions must be sixteen (16) years and older, under sixty (60) years of age, self-employed, and gainfully employed. The national insurance and social security system provides benefits for old age, invalidity, survivors' benefits, sickness, maternity, funeral and industrial benefits. Bounty Farm Ltd. intends to comply with Guyana's social security laws to ensure the welfare of all the staff employed by the Company.

### 2.2.10 Labour Act (1942)

The Labour Act cap 98:01 provides for the establishment of the Department of Labour, for the regulation of the relationship between the employer and the employees. The Act stipulates and establishes procedures regulating wages paid; minimum rate wages payable; hours of work; the rights and obligation of the employees; and provides for settlement of differences between employees and employers. Bounty Farm Ltd. intends to comply with Guyana labour laws and policies to protect and safeguard the welfare of all the staff employed by the operation

### 2.2.11 Occupational Safety and Health Act (1997)

This OSH Act cap 99:06 provides for the registration and regulation of industrial establishments/ operation to ensure the occupational safety and health of workers, and inevitably prevent, as far as possible, avoidable injuries due to negligence and/or oversights in safety. The Act stipulates that companies and employers must ensure that measures are implemented to ensure the safety of all operating facilities and machinery, the provision of adequate ventilation, lighting, sanitary facilities and access to potable water; the identification of hazardous chemicals, physical and biological agents to be used during operations of the facility, and regulation of both the usage and storage of these. Bounty Farm Ltd. fully intends to comply with the OS&H Act to protect and safeguard the welfare of all the staff employed by the Company.

## 2.3 Permits/ Licenses

The permits/licences/certificates issued by the Guyana Livestock Development Authority and the Environmental Protection Agency as a requirement for the operation of the processing facility in Guyana are:

### 2.3.1 Environmental Permit

The Environmental Protection Act 1996 under *Part 4 Environmental Impact Assessment Section (11)* and the Environmental Protection (authorization) Regulation 2000 under *Part 2 General Section (12) and Part 3 Power to Grant Environmental Authorization Section (17)*; requires that an environmental permit must be issued by the Agency (EPA) to any project which may significantly affect the environment. The Permit is issued by the Agency upon review and analysis of the application for an Environmental Authorization and other relevant documentations requested by the EPA. Such documents include the Environmental Management Plan (EMP) or Environmental Social Impact Assessment (ESIA); which is submitted by the developer. The holder of the permit is required to take all the necessary steps to minimize, prevent and/ mitigate adverse environmental impacts from the operation.

## 2.4 Institutions

The central institution which governs the operation of Bounty Farms Ltd processing plant is discussed as follows:

### 2.4.1 Department for the Environment (DOE)

The Department of Environment, Ministry of Presidency has oversight and policy coordination over the Environmental Protection Agency, Protected Areas Commission and the Wildlife Commission. The Department has the mandate to coordinate and lead all efforts in transforming Guyana into a sustainable and green state by effective management of the Environment. Its efforts entail working to develop an environmental system that safeguards the integrity of the natural environment and protects public health through the development and adoption of appropriate, sustainable and coherent policies and programmes(DOE, 2018).

### 2.4.2 Environmental Protection Agency (EPA)

The Environmental Protection Agency established under the EPA Act Cap 20:05 act no. 11 of 1996 is the principal authority for *environmental management* in Guyana. The EPA falls under the umbrella of the Department of Environment, Ministry of Presidency with the responsibility to oversee the effective management, conservation, protection, and improvement of the environment. Whereby in Sec. 4 (1) (a), the EPA is given the mandate to “*take such steps as are*



*necessary for the effective management of the natural environment so as to ensure conservation, protection and sustainable use of its natural resources”*

In addition, the Agency is given the overall responsibility to “*co-ordinate the environmental activities of all persons, organizations and agencies*” [Sec. 4(1) (c)]; and is mandated “*to play a coordinating role in the preparation and implementation of cross-sectored programmes of environmental contents*” [Sec. 4(1) (1)]. The mandate to serve as the highest authority for granting Environmental Authorizations, where they are required, is supported by Sec. 5 which states that “*any person or authority under any other written law, vested with power in relation to the environment shall defer to the authority of the Agency and shall request an environmental authorization from the agency before approving or determining any matter...*”. The EPA therefore is the body in charge of granting environmental permits for projects, including those for the Bounty Farm Ltd

#### 2.4.3 Ministry of Agriculture

The Ministry of Agriculture has direct oversight over the Agricultural sector in Guyana. The Ministry main function is to “ensure the formulation and implementation of policies and programmes which facilitate the development of agriculture and fisheries in Guyana” So as to contribute to the enhancement of rural life; sustainable improvement in agricultural production and market chain; the maintenance of a sound physical and institutional environment for present and future productive activities. This function is addressed through Administration; Crops and Livestock Support Services; Fisheries Department; and Hydrometeorological Services. (Ministry of Agriculture, 2018)

#### 2.4.4 Guyana Livestock Development Authority (GLDA)

The Guyana Livestock Development Authority (GLDA) falls under the purview of the Ministry of Agriculture. The GLDA emerged as a semi-autonomous agency to develop the architecture that will support the drive in satisfying mankind’s need to access safe, wholesome and affordable food, particularly food emanating from livestock. As such the thrust of the agency is to “promote greater efficiency in the livestock production industry and to enhance services in livestock husbandry, livestock health and research, and to make provision for effective administration; also for internal competition between industries and the regulation of trade, commerce and export of

livestock or livestock products.” As established, the GLDA, also delivers public services related to animal production, animal health, animal genetics, marketing, training and extension services as well as regulatory services (Ministry of Agriculture, 2018).

#### 2.4.5 Ministry of Social Protection

The Ministry of Social Protection functions to regulate the relationship between the employers and employees, and ensure OH&S standards in the workplace. The Ministry also provide public support programmes for suicide prevention, childcare protection, and human trafficking prevention, special cases such as disabilities, domestic violence, and rape. Additionally, the Ministry caters for the provision of old age pension for the elderly.

#### 2.4.6 National Insurance Scheme (NIS)

The National Insurance Scheme (NIS) is a social security organisation, which maintains a system of social security by securing contributions from both employees and employers to generate benefits during sickness and accidents. NIS also provides other benefits for example old age, invalidity, industrial etc.

### 2.5 International Conventions

International conventions are global agreements in which various countries signal their commitment to work together in an effort to meet numerous obligations and targets in order to maintain the environment, minimise impacts and ensure mankind’s well-being. The key international conventions Guyana has assented to or ratified, which relates to the Bounty Farm Ltd. Poultry Production operation are as follows:

- Occupational Safety and Health Convention
- Basel Convention on the Control of Trans boundary Movements of Hazardous Wastes and Their Disposal
- United Nations Framework Convention on Climate Change (UNFCCC)
- Montreal Protocol on Ozone Depleting Substances
- Vienna Convention for the Protection of the Ozone Layer
- Protocol Concerning Pollution from Land Based Sources and Activities.

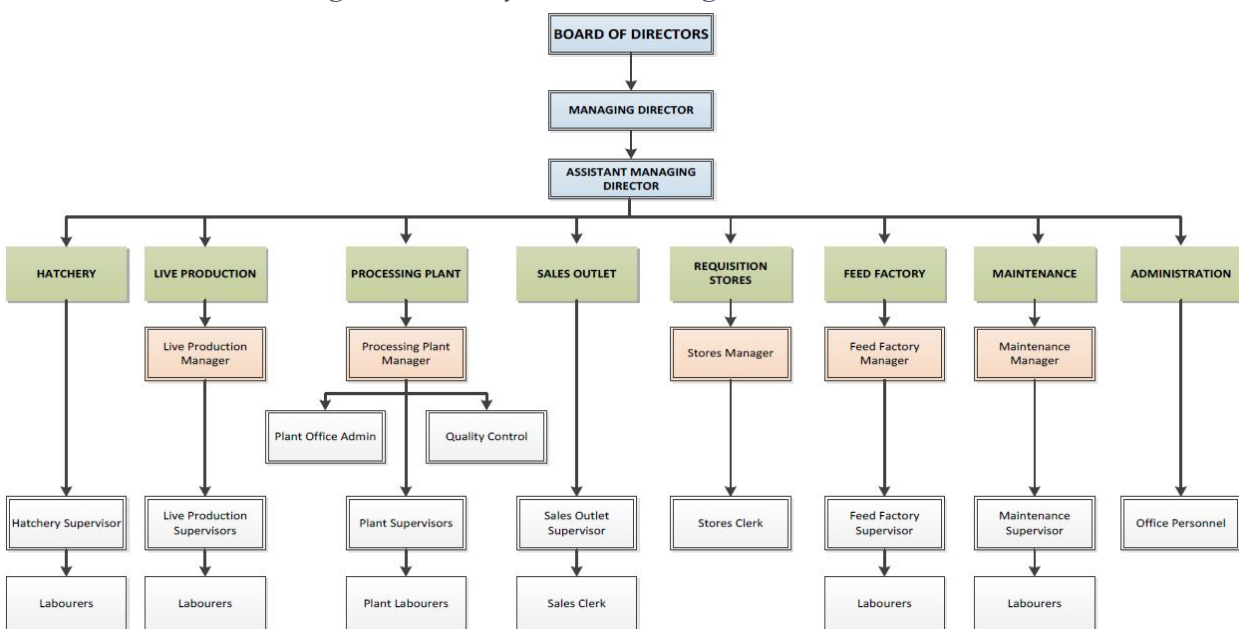
## 3 Operations Description

### 3.1 Overview

Bounty Farm was established as a private limited company in 1976 and since its establishment has cemented its place in Guyana's economy by earning the reputation as the market leader in Guyana's poultry industry. Bounty Farm Ltd. boasts four supermarkets and a broiler poultry production operation. The company's overall operation includes hatchery, broiler production, feed manufacturing, chicken processing, marketing, distribution and customer service. The head office is based in Georgetown and the poultry operation is located in Timehri.

Bounty Farm's processed chicken is supplied nationwide to leading restaurants, fast food franchises, hotels, supermarkets, and Mom-and-Pop shops. Processed chicken is also supplied to the chain of J. P. Santos supermarkets, an affiliated company. The operational activities and services provided by Bounty Farm Ltd. occurs six (6) days a week Monday to Saturday between the hours of 7:00 am to 4:00 pm. Monday to Friday is focused on production while Saturday is dedicated to servicing. The Company's operations are guided by a Board of Directors and a management team consisting of a Managing Director, Assistant Managing Director and department managers, please refer to *Figure 2* below.

*Figure 2: Bounty Farm Ltd. Organisation Chart*



**Source:** Bounty Farm Ltd. (2018)

## Commitments

Bounty Farm Limited is committed to providing its customers with products and services by achieving the highest standards of quality, whilst maintaining its integrity and ethics. The aim of the Company is to have a product safety and hygiene approach. As such Bounty Farm Ltd upholds the improvement and implementation of Good Manufacturing Practices and the Hazard Analysis and Critical Control Points (HACCP) program. In addition to guaranteeing product quality Bounty Farm Ltd. is dedicated to sound environmental, health and safety practices in order to protect the environment and safeguard the health and safety of employees and the community which is in keeping with the laws of the Co-operative Republic of Guyana.

## 3.2 Resources

### Access Road

The established access road to the Bounty Farm Production facility is from the East Bank Demerara Highway (*please refer to Figure 3*). Upon entering the premises, the compound has well maintained and established internal road way (*please refer to Figure 4*) for the traversing of vehicles with stocks.

*Figure 3: East Bank Demerara Highway (Timehri)*



**Photos taken by:**Mr. Isidro Espinosa (2018)



*Figure 4: Internal Roads (Bounty Farm Ltd.)*



**Photos taken by:**Mr. Isidro Espinosa & Ms. Carlene Bascom (2018)

### **Land Resource**

Bounty Farm Ltd. has a land size area of 60 acres, mainly utilised as follows:

- Ten (10) acres for manufacturing (poultry processing and feed mill operations)
- Ten (10) acres for Orchards citrus farm for internal use (Subsistence Farming)
- Five (5) acres for poultry farming
- One (1) acre for staff housing, and
- Thirty-Four (34) acres unused land (natural vegetation growth).

### **Infrastructure**

The general established infrastructure of the Bounty Farm Ltd site location used in the day to day management and operational activities of Poultry production includes the following:

- offices,

- housing,
- workshop,
- Feed mill,
- Processing Plant,
- Storage (freezer, and silos)
- Farm and
- Day care.

*Please refer to Appendix 1 for the layout of the compound facility and related infrastructure.*

### **Equipment**

The main equipment utilised at the Bounty Farm Ltd poultry production operation at Timehri, East Bank Demerara consists of the following:

- Meyn poultry processing line (processing plant),
- Metal Detector,
- Blast Freezer,
- Centrifuge,
- Oettevanger mill line (feed mill),
- Cyclone,
- Delivery trucks,
- Washing machine,
- Crate washer,
- Tumble dryer,
- Drying cabinet,
- Transformer (1.5 megawatts),
- Generator 850 KVA (1.8 megawatts).

### **Employment Details**

Bounty Farm Ltd has a total of 750 staff employed with the Company of which the poultry operation with a fully integrated broiler facility has a staff complement of approximately 400 persons. The 400 employees which span across the facility work in administration, maintenance, transportation, quality control, and processing etc.



Because the operations are on-going the company has implemented a system of staff uniforms by colour code for easy identification of staff e.g. yellow coats are supervisors/quality control, green coats are maintenance, and brown coats are for evisceration. Safety gears are provided for staff in every department and consist of chemical gloves, cut resistant gloves (*Figure 5*), goggles, ear plugs, dust mask, respirators, coats, freezer coats, and insulated boots.

*Figure 5: Cut Resistant Gloves*



**Photo taken by:**Mr. Isidro Espinosa (2018)

### **Bio-Security**

Bounty Farm Ltd is highly committed to food quality control and as such mandates micro and analytical tests, namely testing of chicken for shipment, testing of finished products, testing of processing equipment (every 3 months) and water analysis. Key microbiological parameters checked are total plate count, E. coli, coliforms, salmonella, and listeria. (*Please refer to Appendix 2 Location of Bioluminescence Testing and Appendix 3 for Processing Plan Hygienic Zone*)

In an effort to ensure quality control and bio-security through the prevention and control of pathogens at the site, Bounty Farm Ltd also has strict personal hygiene and health stipulations for employees to avoid contamination. Strict sanitary measures have been put in place by the provision of sanitary stations (inclusive of knee operated sinks, sanitizers, tissues dryers) at strategic locations (*please refer to Figure 6*). Personal hygiene apparels (*Figure 7*) are also provided to workers such as long boots, hair nets, beard nets, coats, aprons, gloves. Visitors to

the plant are also required to wear the same apparel with the addition of a plastic covering over footwear to prevent unwanted contamination.

*Figure 6: Sanitary Station*



Photos taken by: Mr. Isidro Espinosa (2018)

*Figure 7: Protective Apparel*





**Photos taken by:** Mr. Isidro Espinosa (2018)

Foot baths are also placed at the entrance of the processing rooms to disinfect footwear before entering the processing area (*Figure 8*). The Company also ensures that no food, smoking, drinks, and jewellery are allowed in the processing plant. In addition, at the end of each daily production, the processing area and equipment are cleaned and disinfected. The estimated consumption of chemical (detergent) is approximately 12 Litres per day (5 days per week).

*Figure 8: Foot Bath*



**Photo taken by:** Ms. Carlene Bascom (2018)

Pest control management is also taken seriously by the use and placement of rodent traps (*Figure 10*) around the compound and different buildings are checked every fifteen (15) days and traps replaced. Fly traps (*Figure 9*) in the interior of the different buildings are checked and replaced weekly. The company also caters for poultry health management through regular veterinary checks. Please refer to Appendix 4 for Rat Trap Locations, Appendix 5 for Fly Trap Locations and Appendix 6 for Pest Operators: management of rat stations.

*Figure 9: Fly Traps*



**Photos taken by:** Mr. Isidro Espinosa (2018)





*Figure 10: Rat Trap in Compound*



**Photo taken by:**Ms. Carlene Bascom (2018)

### **Water Consumption**

Water used for cleaning, and for orchard and poultry production is provided by the Guyana Water Inc. The estimated water consumption is approximately 40,000 gallons per day (5 days per week). Approximately 800,000 gallons of water are consumed monthly. The water utilised in the poultry production at the processing plant undergoes strict pre-requisites to ensure high quality control and food safety as a precautionary measure. As a consequence, the water utilised undergoes chlorine treatment and filtration (*Figure 11*). Additionally, water analysis is done annually at a certified lab to check for key parameters such as E. coli, Coliforms, heavy metals, nitrates and nitrites, total plate count, Cryptosporidium, Giardia, off flavours and odours.

*Figure 11: Chlorine Treatment*



**Photo taken by:** Mr. Isidro Espinosa (2018)

### **Energy Consumption**

The energy consumed by the Bounty Farm Ltd. Processing Plant is supplied and obtained by the Guyana Power and Light Corporation (GPL). The average monthly energy consumed from GPL is 68,460 KW per hour. However, in the event of a GPL power failure Bounty Farm Ltd. has a backup transformer and generators (*please refer to Figure 12*) which allows for the assurance of constant power flow and continued processing operation production. The transformer has a capacity of 1.5 megawatts and generator with a generating capacity of 850 KVA which is approximately 680 kW. The diesel fuel consumed by Bounty Farm Ltd is approximately 4,000 gallons per month. The fuel consumed is utilised mainly by the trucks, generator and broiler.

*Figure 12: Generator Room*



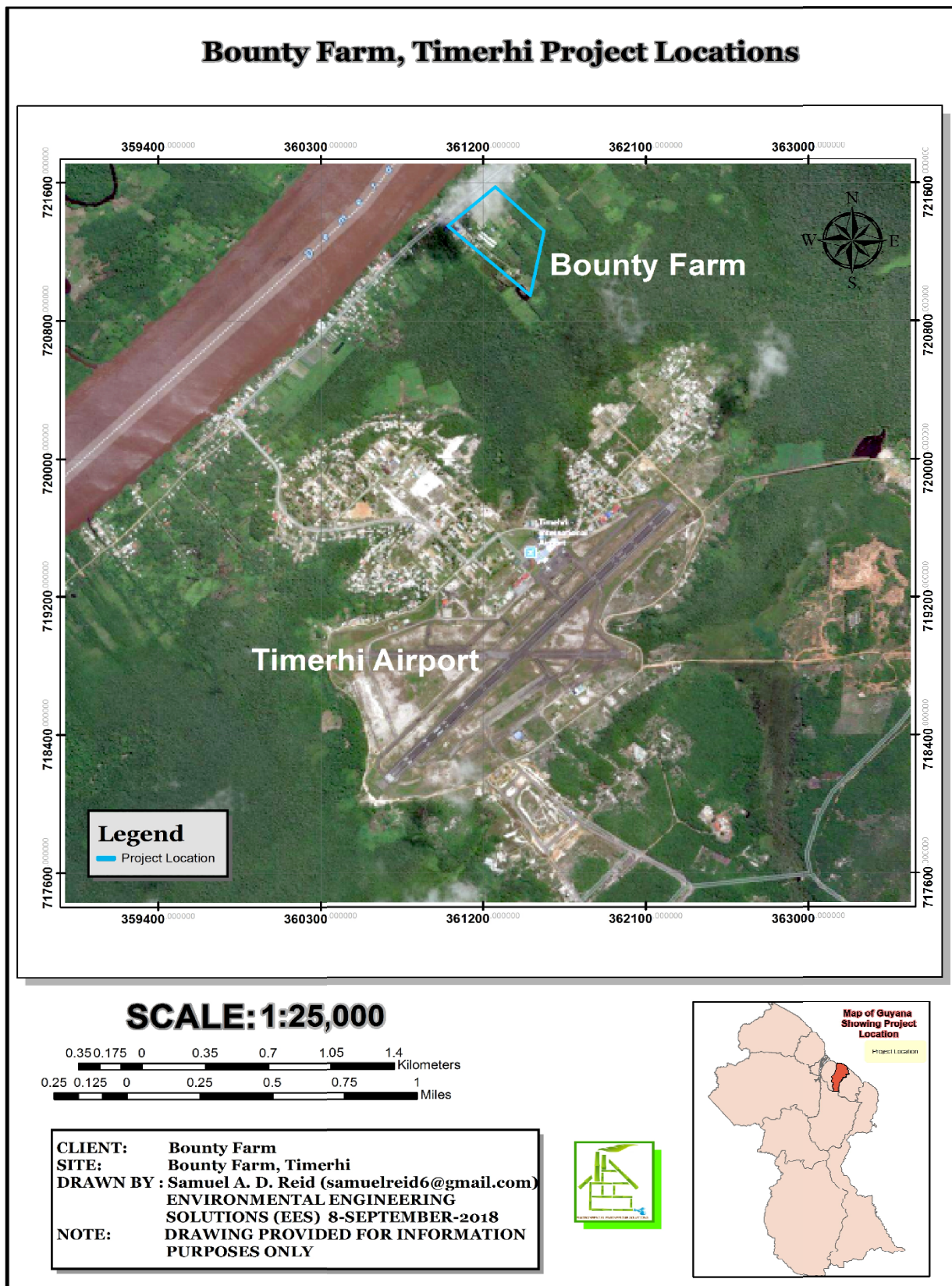
**Photo taken by:** Mr. Isidro Espinosa (2018)

### 3.3 Site Location

The Bounty Farm Ltd. poultry operations are located at Timehri, East Bank Demerara as seen on the following page in *Figure 13*. Timehri village is approximately twenty-one (21) miles from the Capital City of Georgetown.



Figure 13: Bounty Farm Ltd. Location Map



Drawn by: Mr. Samuel Reid (2018)

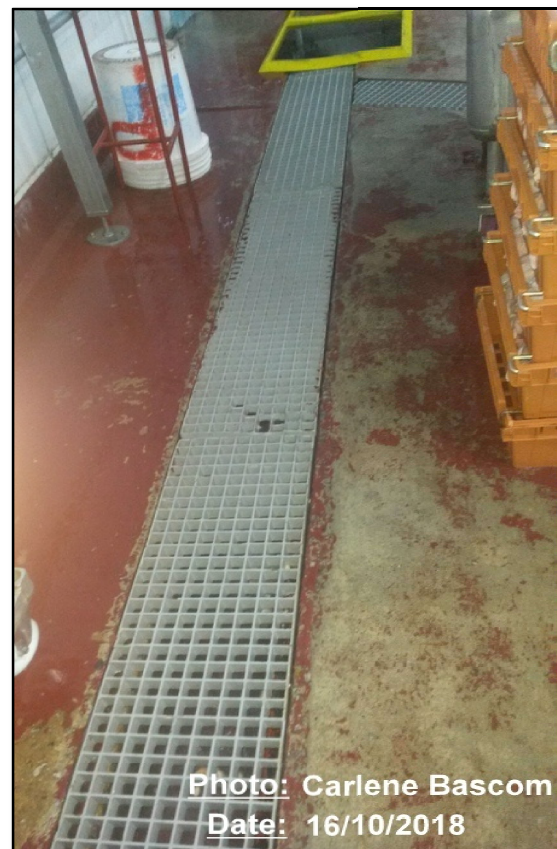


### 3.4 Waste Management

The very nature of poultry production will result in waste generation, as such the preservation of the environment and health is a major concern for the management and staff of Bounty Farm Ltd. Therefore, Bounty Farm Ltd. is committed to making all necessary efforts to minimize the impact on the environment. Consequently, Bounty Farm Ltd. has implemented a number of waste management measures to tackle the weekly waste generated at the facility.

The liquid and solid condemn waste is drained from the processing plant through a network of internal drainage (*please refer to Figure 14*) to a collection area. At this point the accumulated collected waste then passes through the **centrifuge** (*Figure 15*) which separate the solid from liquid waste. The separated solid waste is given free of cost to pig farmers, the feathers goes directly to the municipal landfill, and the waste water is discharged into external drains (*Figure 16*) which leads to the Demerara River. Along the processing line, the heads and rejected feet are collected, ground and sold for dog food. The visceral and veins disposed in the **offal separator** are reused as the feed for animals.

*Figure 14: Internal Drainage Network*







Photos taken by: Mr. Isidro Espinosa & Ms. Carlene Bascom (2018)



*Figure 15: Centrifuge*



**Photos taken by: Isidro Espinosa & Carlene Bascom (2018)**

*Figure 16: Waste Water Discharge Point*

**Photo taken by: Ms. Carlene Bascom (2018)**



At the Feed mill the solid condemned feed is bagged off for disposal, while the edible condemned feed is given free of cost to pig farmers who would come to the facility to uplift same. Additionally, to minimise much waste, Bounty Farm Ltd has installed a **cyclone** to the Hammer Mill to collect dust and recirculation.

Waste oil and waste diesel is collected and stored in 45 gallon drums. Bounty Farm Ltd sells some of the waste oil to chain saw operators, while the remaining waste oil and waste diesel is used in the process of live chicken production for brooding (*please refer to Appendix 7for Brooding Temperature and Humidity Chart*) to produce optimal temperature and heat for chicks only in the nights.

Metal Scraps are gathered in the metal park and reutilised for maintenance. Additionally, used pipes are reutilised for maintenance. Used motor batteries are gathered and delivered to a supplier. Writing paper is also reutilised, while the litter and manure waste generated from the live chicken production pens are mainly sold to eddoe farmers.

Puran Brothers garbage disposal service collects non-edible waste and general domestic waste from the compound and transports same to the Haags Bosch Landfill site three (3) times a week. With regard to sanitation, Bounty Farm Ltd has installed flush toilet facilities in the compound based on the principal of twenty (20) persons per toilet.

As a consequence, the compound facility has a total of nineteen (19) flush toilets, and 4 urinals located across the compound as follows, main office two (2); daycare one (1); workshop one (1); outside staff two (2); security one (1) toilet and one (1) urinal; the plant seven (7) females and three (3) males with 3 urinals; and the office two (2). Two septic tanks of dimensions 13.5' (L) x 7.5' (W) x 5.5' (H) and 75' x 80' (H) (Round Septic Tank) are present in the compound to facilitate the collection and storage of sewage generated from the toilets on the premises. The septic tanks are cleared as required by Puran Brothers disposal services.

### 3.5 Production Operation Process

A Bounty Farm Ltd operation activity at the Timehri site location includes a broiler production process to produce poultry for meat consumption. As such the production operation activities entail the following components:

**Feed Mill Production.** The purpose of the Bounty Farm Ltd. feed mill is to produce and have a feasible source of good quality, and well balanced feed (*Figure 17 and 18*) needed for the best live chicken production operation at the site, and for retail. The feed mill production generates feed at approximately 1,100 tonnes per week; that is approximately 4,400 tonnes per month. *Please refer to Appendix 8 for Feed Mill Flow Diagram*

Additionally, because the feed mill is operated by Bounty Farm Ltd. it ensures that the feed produced is of prime quality for healthy broiler growth. The feed produced are the starter feed which is high in protein for nutrients; the grower feed which is high in energy to promote growth; and the finisher feed which is also high in energy to add weight. In addition to poultry feed, Bounty Farm Ltd. also produces cattle livestock and pig feed.

*Figure 17: Packaged Feed Stock*



**Photos taken by: Ms. Carlene Bascom (2018)**



*Figure 18: Delivery of Ingredients for Feed*



**Photo taken by:** Ms. Carlene Bascom (2018)

**Live Chicken Production.** The live chicken production basically entails the rearing of broiler birds at the site location (*please refer to Figure 19*). However, the Company also use chicken reared by contracted farmers. The live chicken production starts with the hatchery which incubates fertile eggs that will produce healthy chicks. Once the chicks are hatched they are cared for under certain optimal moisture and temperature condition to produce healthy broiler birds for meat processing.

*Figure 19: Chicken Pens*



**Photos taken by:**Mr. Isidro Espinosa (2018)

When the Broiler birds have reached prime weight (approximately 42 days or seven weeks to reach optimal weight), the birds are ready for meat processing. At the end of the growing cycle, the live broiler birds are caught and transported to the processing plant. The live chicken production generates approximately 27,000 birds per week; i.e. approximately 108,000 birds per month.

**Processing Plant.** The poultry processing plant, which is a modern facility operates under strict hygienic conditions and has the capacity to process 3,500 chickens per hour. At the processing plant the live broiler birds are received at the loading area (*Figure 20*), then off loaded and prepared for meat processing by suspending the live birds by their feet on a conveyor. The stages of meat processing basically entail:

- Defeathering (*Figure 21*)
  - Humane stunning to calm and immobilise the birds;
  - Euthanizing birds and bleeding:
  - Scalding by putting the birds in warm water to relax feathers
  - Removal of feathers (defeathering)
  - Washing
- Evisceration (*Figure 22*)
  - Opening of the body cavity
  - Removal of internal organs
  - Removal of giblets
  - Removal of neck, hock & legs.
  - Washing
- Packaging (*Figure 23*)
  - Whole chickens
  - Cut-up meat into portions
  - Further processing such as deboning
  - Metal scanning
  - Blast freezer storage

Bounty's current production rate stands at 3200 birds per hour, which equates to astonishing 110,000 – 130,000 birds processed per week. *(Please refer to Appendix 9 for the Processing Plant Flow Diagram and Appendix 10 for the Plant Map).*

*Figure 20: Chicken offloading area*



**Photo taken by:**Mr. Isidro Espinosa (2018)

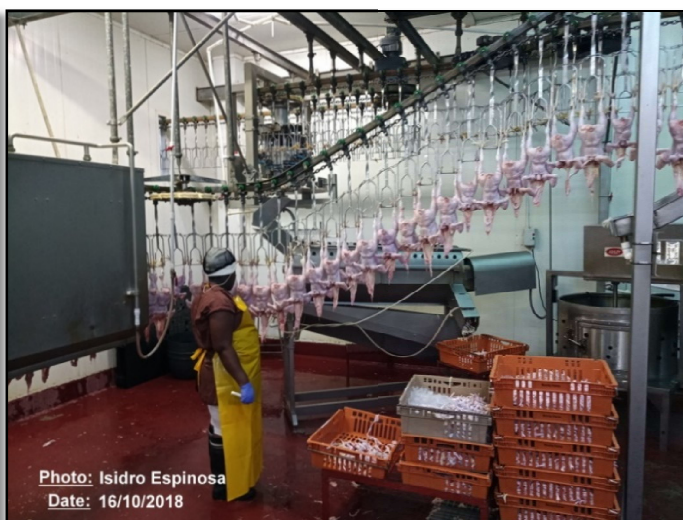
*Figure 21: Defeathering Room*





Photo taken by: Isidro Espinosa (2018)

*Figure 22: Evisceration Room*







Photos taken by:Mr. Isidro Espinosa (2018)

*Figure 23: Packaging Room*







Photos taken by:Mr. Isidro Espinosa (2018)

**Retail Market:** After the production process, the final processed meat products are then supplied and delivered (*Figure 24*) to Bounty Farm Ltd Supermarkets and other retail supermarkets, shopping centres and stores in Guyana.

*Figure 24: Delivery Trucks*



**Photos taken by:** Mr. Isidro Espinosa and Ms. Carlene Bascom (2018)



## 4 Description of the Environment

This chapter presents and discusses information on the existing environmental and socioeconomic condition of the immediate surrounding environment of the Bounty Farm Ltd. Poultry Production Operation, Timehri, East Bank Demerara.

### 4.1 Physical Environment

#### 4.1.1 Climate

Guyana enjoys a Tropical Humid Climate, whereby the high rainfall, humidity and temperatures are characteristics of our climate. The rainfall pattern in Guyana is influenced by the movement of the ITCZ (Inter-Tropical Convergence Zone). The tropical heat and humidity is influenced by the north easterly winds blowing from the Atlantic Ocean. Notably, Guyana's climate is also influenced by the effects of the El-Niño (higher temperatures) and la Niña (higher precipitation) phenomenon.

Temperatures in Guyana vary geographically, with high altitude regions experiencing cooler temperatures than the coastal, lowland and savannah zones. Mean air temperatures in the upland regions and the interior (west) side of the country are between 20°C to 23°C. Mean air temperatures across the rest of the country range from 25°C to 27.5°C, reaching as high as 31°C, due to the stabilizing effect of the sea and the north-easterly trade winds (Ministry of the Presidency, 2015).

Precipitation patterns are generally associated with two distinct wet seasons (April to July) and (November to January) and two dry seasons where the mean annual precipitation is greater than 2000mm/year. On the contrary Guyana's savannah only experience one wet season and a longer dry season with a mean annual precipitation of 1400-1800mm/year (Ministry of the Presidency, 2015).

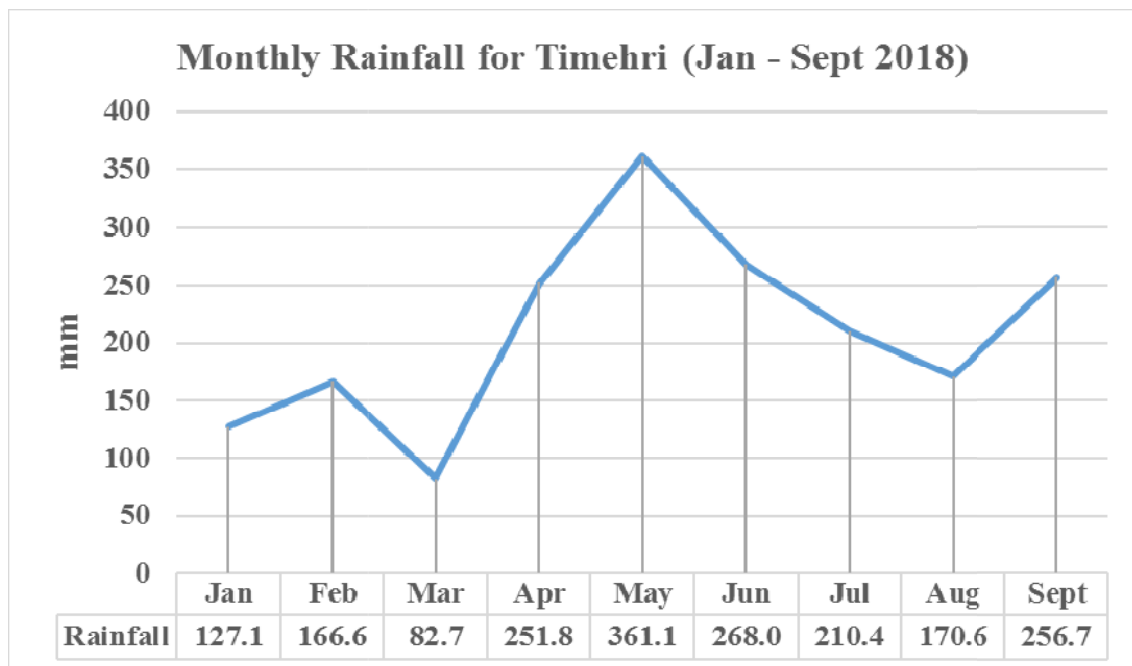
In the Timehri, EBD area where Bounty Farm Ltd poultry production operation is situated, the climate is monitored by the Timehri Hydromet weather station, Ministry of Agriculture. Therefore, to have a general assessment of the climate in that area the average mean temperature and precipitation climate elements were analysed. Please refer to *Table 3* and *Figures 25 & 26*.

Table 3: Monthly Mean Temperature and Rainfall 2018

2018 Period	Rainfall (mm)	Mean Temp (°C)
January	127.1	25.1
February	166.6	24.6
March	82.7	25.5
April	251.8	26.6
May	361.1	26.3
June	268.0	26.7
July	210.4	27.1
August	170.6	27.2
September	256.7	27.6

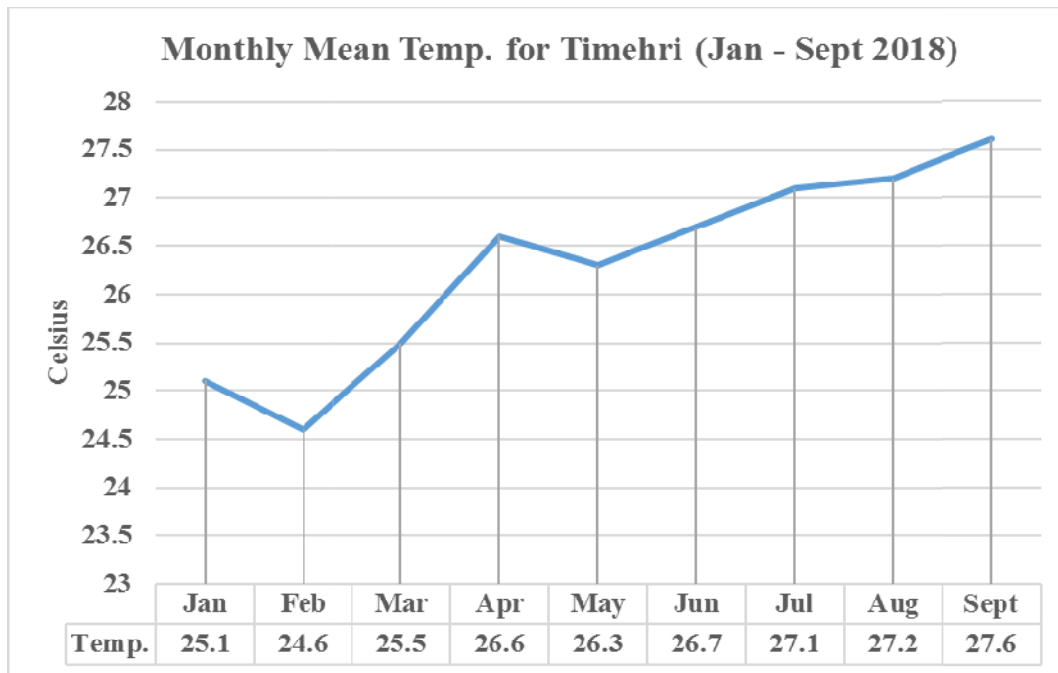
Source: Hydromet (October 26<sup>th</sup> 2018)

Figure 25: Monthly Rainfall for Timehri (Jan – Sept 2018)



Illustrated by: Carlene Bascom (2018)

Figure 26: Monthly Mean Temp. for Timehri (Jan – Sept 2018)



**Illustrated by:** Carlene Bascom (2018)

The Timehri area for the period Jan – Sept 2018 received approximately 1,895 mm of rain over the nine (9) month period. Rainfall levels fluctuated over the nine (9) month period with the highest rainfall occurring in May measuring 361.1 mm and the lowest rainfall recorded in March measuring 82.7 mm. The average mean temperatures for the Timehri area range from 24.6°C to 27.6°C over the nine (9) month period, indicating a temperature increase over the period of 3°C. The highest mean temperature was recorded in September measuring 27.6°C and the lowest mean temperature was recorded in February measuring 24.6°C.

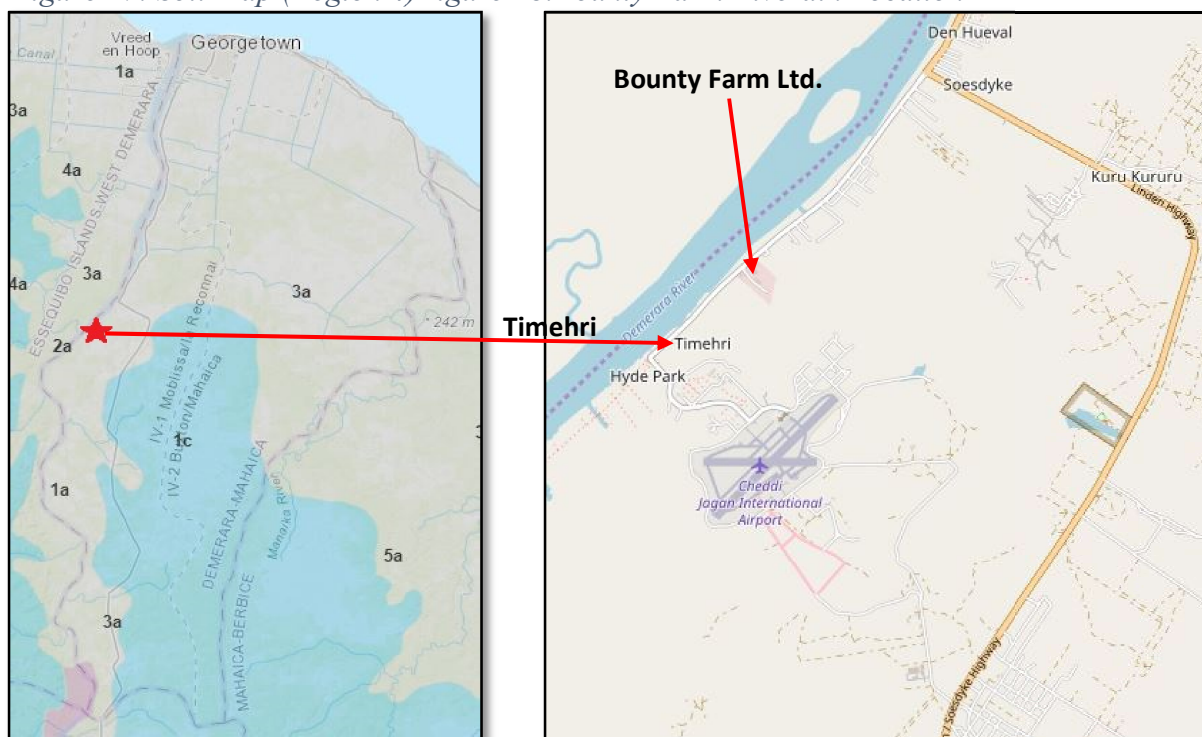
#### 4.1.2 Topography, Geomorphology and Soils

Timehri village EBD, Region 4 Demerara-Mahaica is situated on the Coastal Plain of Guyana and in the geomorphological vantage point, the Coastal Plain is underlain by the Corentyne group of rocks (Daniel, 2001). Topographically, Timehri village is characterized as an undulating terrain with lower elevations above sea level closer to the bank of the Demerara River.

The Soil in the Timehri area (Figure 27) consist of Low Humic Gleys of high and medium base status, fluvio marine phase, riverain soils (Fluvaquents) and Low Humic Gleys of high base status, marine phase "frontland clay" (Hydraquents). Therefore, the soils in the Timehri area

have a land capability classification of good to moderate agricultural land for cultivation (GL&SC, 2013).

*Figure 27: Soil Map (Region 4) Figure 28: Bounty Farm Riverain Location*



**Source:** NAREI Soil Map (2018)

**Source:** Arcgis Map (2018)

Bounty Farm Ltd. Poultry production operation (*Figure 28*) is located not far east of the Demerara River. As such, the Operation is situated specifically on Low Humic Gleys – Riverain Soils (Fluvaquents) within the Timehri area. These soils are silty loam to silty clay over clay texture, poorly drained, and deep. This soil type developed over alluvial deposits and is moderate to high in fertility, with fertility decreasing away from the coast (GL&SC, 2013).

#### 4.1.3 Surface Water Quality

The term Water Quality basically refers to the biological, chemical and physical characteristic interactions of the water ecosystem(UofA). Therefore, the environmental quality of the water has a direct influence on aquatic life and human health if point and non-point source pollution are left unchecked. Water quality testing was done to provide information on effluent discharge from the operation as well as from the source of activity downstream to assess the quality of the water. The assessment was to establish baseline conditions of the surrounding environment, and to determine what extent if any, discharge from the operations can affect the aquatic environment.



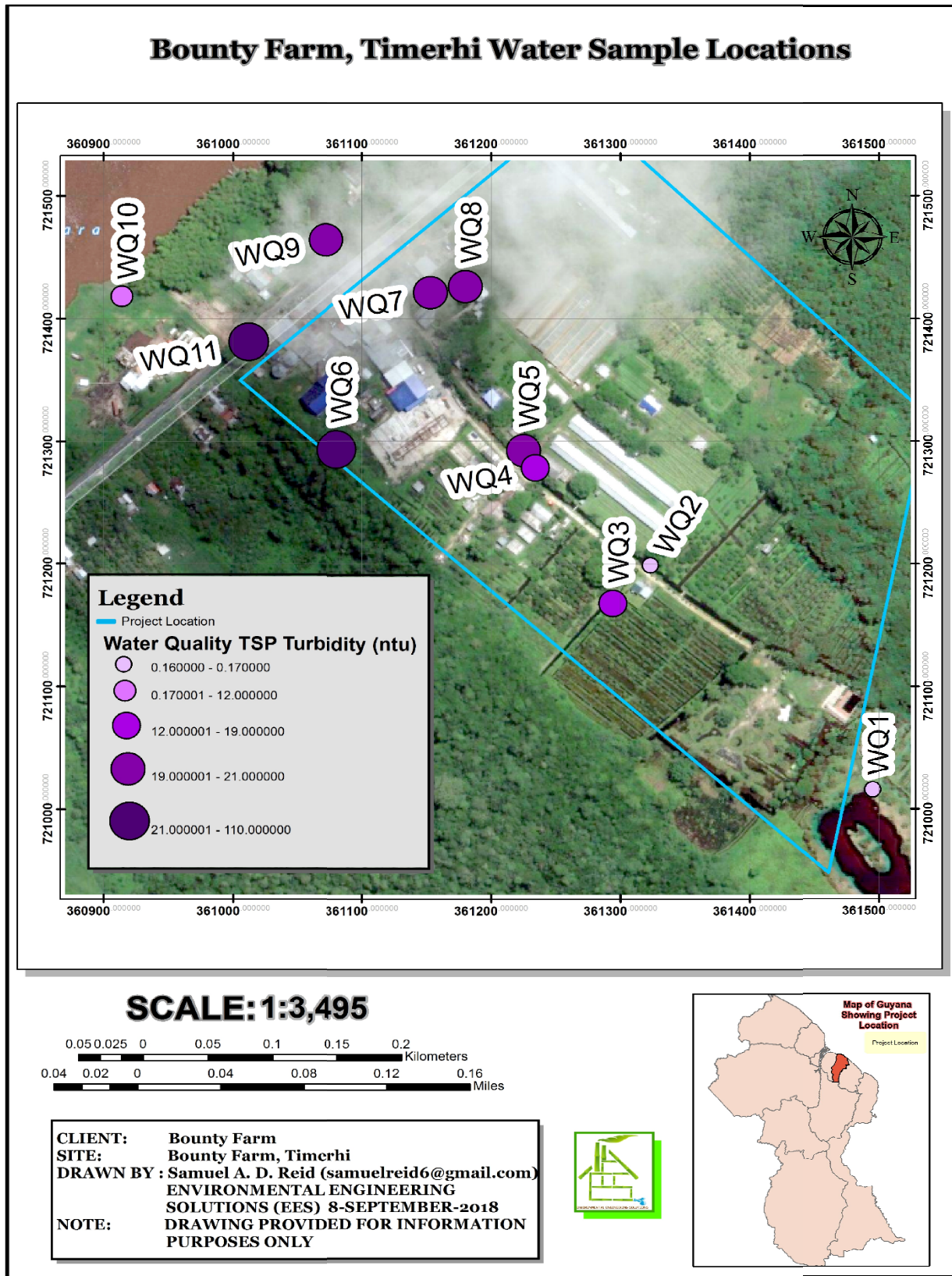
Water samples were collected and analysed to determine the quality of surface water within, and around the Bounty Farm Ltd. Eleven (11) plus Two (2) water samples were collected on May 25<sup>th</sup>, May 28<sup>th</sup> and September 8<sup>th</sup> 2018 within and around the Compound. The samples collected were analysed both infield and at a certified laboratory. The sample locations were selected at strategic points within the area in order to provide an indication of the baseline surface water quality. The locations where the samples were collected are visually identified on the map (*Figure 29*) as the WQ points. *Tables 4, 8&9* outline and describe the data collected, while the graphs (*Figure 30, 31, 32,33, &34*) depict sampled readings analysed in comparison with the threshold limits for water quality parameters.

*Table 4: Description of Surface Water Quality Sample Points*

Surface Water Quality Description					
Sample ID	Coordinates		Collection Time	Weather Condition	Sample Location
	21N	UTM			
WQ1	0361495	0721016	12:21	Sunny	Spring Water
WQ2	0361323	0721199	12:29	Sunny	Before Sluice
WQ3	0361294	0721168	12:34	Sunny	Spring Pump Entrance
WQ4	0361234	0721278	12:38	Sunny	After Sluice
WQ5	0361225	0721292	12:40	Sunny	First Grill Intersection
WQ6	0361080	0721293	12:45	Sunny	Outside Discharge
WQ7	0361153	0721421	13:05	Sunny	Well Area
WQ8	0361118	0721426	13:14	Sunny	Before Gate
WQ9	0361072	0721464	13:18	Sunny	Outside Sluice by River
WQ10	0360914	0721418	13:32	Sunny	River
WQ11	0361012	0721381	13:41	Sunny	Discharge at Road

**Samples collected by:** Mr. Isidro Espinosa & Mr. Osbert Ellis (September 8<sup>th</sup> 2018)

Figure 29: Surface Water Quality Sample Point Location



Drawn by: Mr. Samuel Reid (2018)

The samples collected were analysed for several parameters which are key indicators generally used to determine the quality of water. The parameters measured are mainly that of Temperature, pH, Turbidity, Biological Oxygen Demand (BOD), Total Suspended Solids (TSS), Chemical Oxygen Demand (COD), Oil and Grease, Total Nitrogen, and Phosphate. High occurrences and changes in these parameters will aid in providing a good indication assessment of possible water pollution that can affect aquatic life and human health.

Consequently, the data set sample point measurement taken were then assessed for comparison with the threshold water quality standards set by the Guyana National Bureau of Standards (GNBS) General Environmental Guideline Values for Effluent Discharge (*Table 5*), the Guyana Geology and Mines Commission (GGMC) water quality criteria, the International Finance Corporation World Bank Group environmental wastewater and ambient water quality guidelines (*Table 6*), the US EPA Recreational water quality criteria (*Table 7*), as well as acceptable water quality limits by the EPA Guyana.

*Table 5: General Environmental Guideline Values for Effluent Discharge*

Categories	GNBS Limits
<b>pH</b>	5.0 – 9.0
<b>Temperature</b>	< 40
<b>BOD</b> for 5 days	< 50 mg/L
<b>COD</b>	< 250 mg/L
<b>DO</b>	--
<b>TSS</b>	< 50 as TSS
<b>N as NH<sub>3</sub></b>	< 10 mg/L
<b>Total N</b>	--
<b>Phosphorous (P)</b>	< 2 mg/L
<b>CN Total (Cyanide)</b>	< 1 free: 0.1
<b>Phosphate (PO<sub>4</sub><sup>-</sup>)</b>	--
<b>Chlorine (Cl)</b>	< CL: 0.2
<b>Surfactant</b>	--
<b>Phenols</b>	< 0.5 mg/L

<b>Coliforms</b>	< 400 MPN per 100 mls
<b>Oil and Grease (O&amp;G)</b>	< 10 mg/L

*Source:* (GNBS, 2002)

*Table 6: Guidelines for Wastewater and Ambient Water Quality*

Pollutants	Guideline Value
<b>pH</b>	6 – 9
<b>BOD</b>	30 mg/L
<b>COD</b>	125 mg/L
<b>Total Nitrogen</b>	10 mg/L
<b>Total Phosphorus</b>	2 mg/L
<b>Oil and Grease</b>	10 mg/L
<b>Total Suspended Solids</b>	50 mg/L
<b>Total Coliform Bacteria</b>	400 MPN / 100 ml

*Source:*(IFC, 2007)

*Table 7: Recommended Guidelines for Recreational Water Quality*

Indicator	Recommendation 1		Recommendation 2	
	GM (cfu/100mL)	STV (cfu/100mL)	GM (cfu/100mL)	STV (cfu/100mL)
<b>Enterococci (marine &amp; fresh)</b>	35	130	30	110
<b>E. coli (fresh)</b>	126	410	100	320

*Source:*(USEPA, 2012)

**Results and Discussion:** As part of conducting the environmental baseline assessment, the following water quality parameter data below was recorded, demonstrated and analysed.

Table 8: Surface Water Quality Sampling Results (A)

Surface Water Quality									
Sample ID	Temp.*	pH*	Turbidity*	BOD*	TSS*	COD*	Oil & Grease*	Total N*	Phosphate*
	°C		NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
	<40		30, 50	<50	<50	<250	<10	10	2
WQ1	40.2	5.79	016	ND	2.00	79	6.00	1.0	<0.54
WQ2	38.8	5.50	017	ND	9.00	80	9.20	0.8	<0.54
WQ3	37.3	5.67	019	ND	ND	82	7.40	0.8	<0.54
WQ4	35.5	5.50	019	ND	8.00	71	4.25	0.5	<0.54
WQ5	35.1	5.56	020	ND	10.6	69	4.60	1.5	<0.54
WQ6	32.1	6.22	110	13.50	648	1270	45.80	58.5	1.38
WQ7	32.7	6.25	020	8.10	3.00	53	8.60	0.6	<0.54
WQ8	33.6	5.61	021	6.93	2.50	87	7.00	0.8	<0.54
WQ9	33.1	5.65	020	7.95	12.5	84	5.80	0.7	0.21
WQ10	-	6.29	012	11.40	220	527	13.6	22.3	3.53
WQ11	-	5.56	096	ND	123	214	15.2	1.3	1.54

\*Labsample test by: Kaizen Environmental Services (Guyana) Inc. (June 15<sup>th</sup> 2018) Appendix 11

\*Infield sampling by: Mr. Isidro Espinosa & Mr. Osbert Ellis (September 8<sup>th</sup> 2018)

**Note:**

**Temp.** – Temperature, **BOD** – Biological Oxygen Demand, **TSS** – Total Suspended Solids, **COD** – Chemical Oxygen Demand, **Total N** – Total Nitrogen, **ND.** – Not Detected

Figure 30: Surface Water Quality Parameters (Temp. & pH)

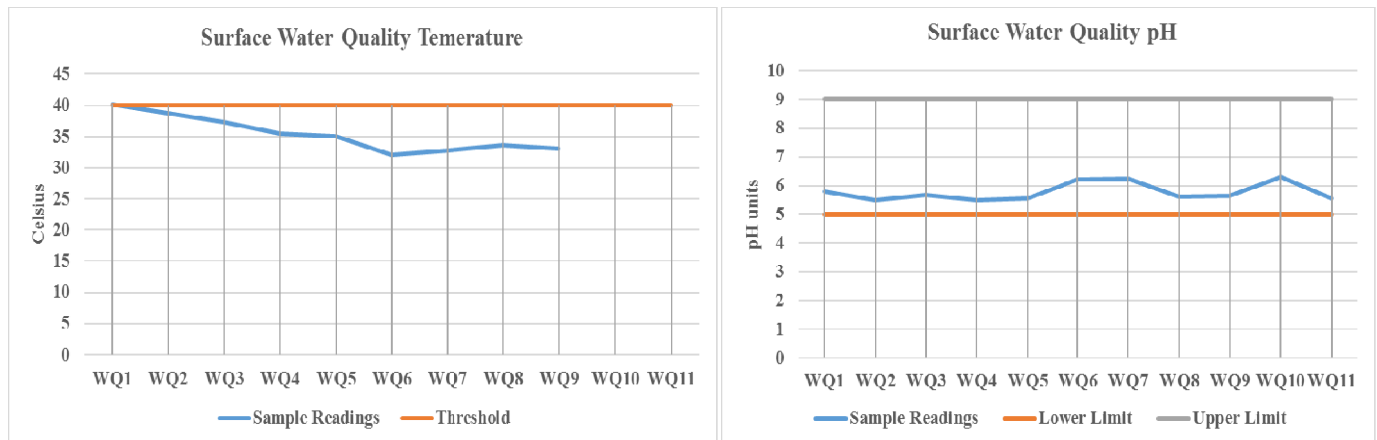


Figure 31: Surface Water Quality Parameters (Turbidity. & TSS)

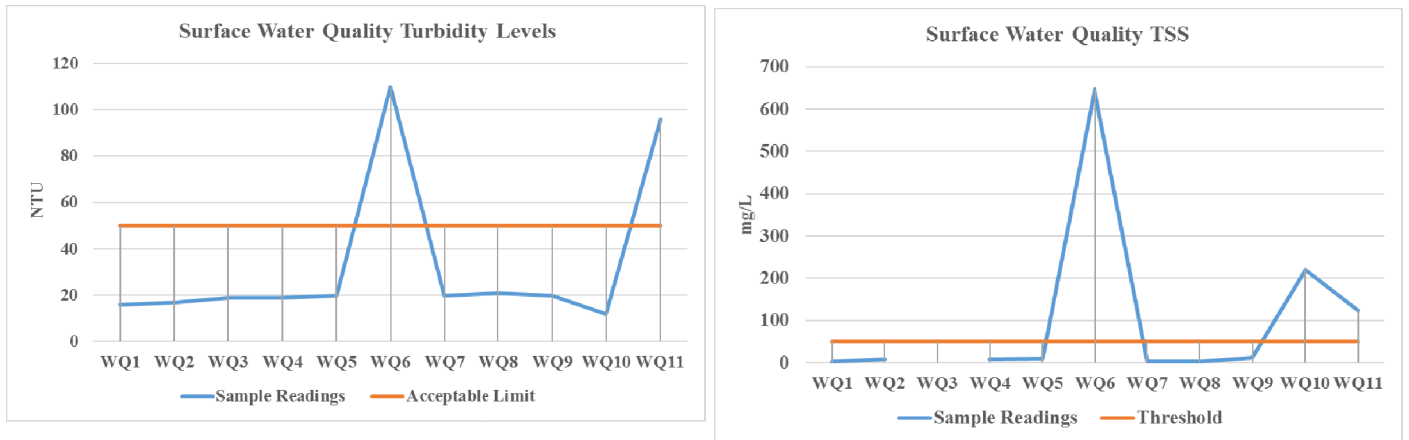


Figure 32: Surface Water Quality Parameters (COD & BOD)

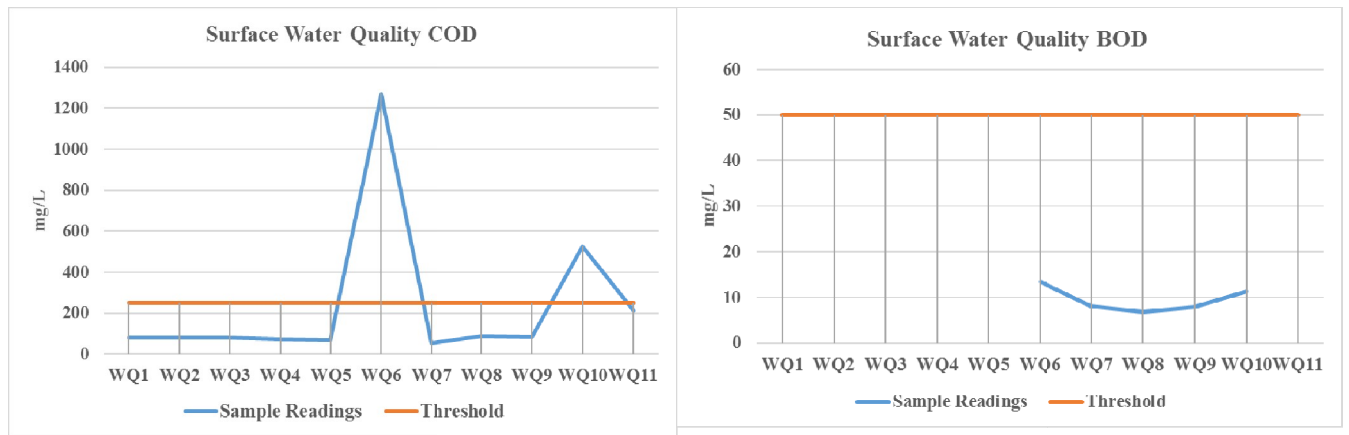


Figure 33: Surface Water Quality Parameters (Phosphate & Total Nitrogen)

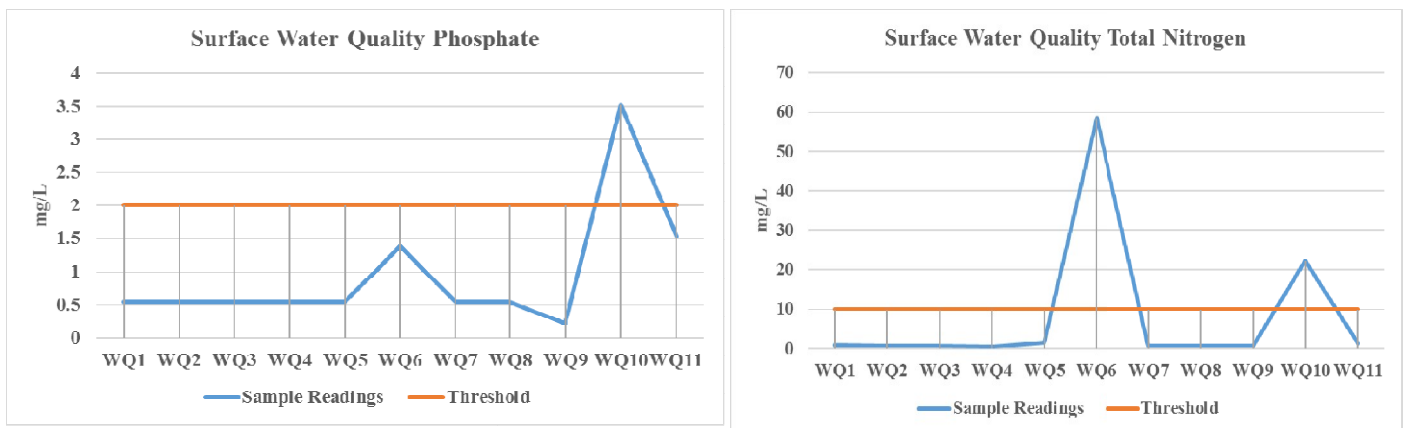


Figure 34: Surface Water Quality Parameters (Oil & Grease)

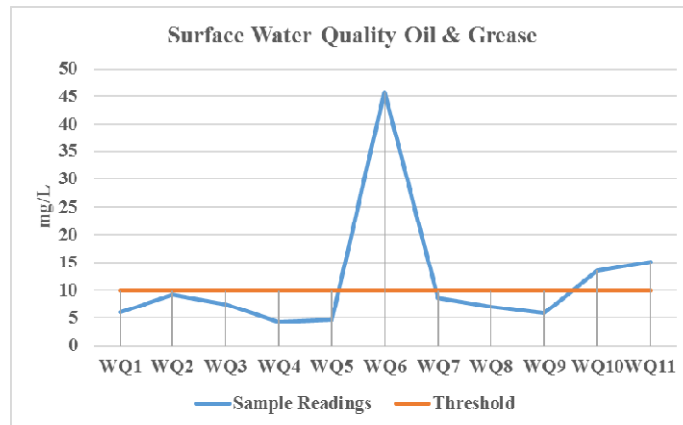


Table 9: Surface Water Quality Sampling Results (B)

Surface Water Quality		
Sample ID	Total Coliform CFU/100mL	E.Coli CFU/100mL
FA1	ND	ND
FA2	34	18

**Labsample test by:** Kaizen Environmental Services (Guyana) Inc. (June 18<sup>th</sup> 2018) *Appendix 12*

**ND.** – Not Detected

**Temperature** - The surface water temperature sample readings ranged from 33.1 °C to 40.2 °C during the time of collection in the field. Based on observations the data collected was within the GNBS accepted Guidelines for Industrial effluent, general environment limit range of <40 °C (as can be seen clearly on the temperature graph *Figure 30* and *Table 8*), which is considered healthy for aquatic living organisms to thrive in. However, it was noted that sample point WQ1 recorded a reading of 40.2 °C, with the 0.2 °C above the GNBS threshold being considered negligible to have any significant impact on the aquatic environment.

**pH** - The pH analysis of the surface sample readings collected ranged from 5.50 to 6.29 pH, indicating that water in the area is slightly acidic. The pH measurement collected were all within the 5.0 - 9.0 pH GNBS accepted Guidelines for Industrial effluent, general environment range



(as can be clearly seen on the pH graph *Figure 30* and *Table 8*). This indicates that the water samples measured are from a healthy environment for aquatic organisms to live and thrive.

***Turbidity*** - The turbidity level of the water sample readings ranged from 016 NTU to 110 NTU. Based on the results, WQ6 (110 NTU) and WQ11 (096 NTU) were above the GGMC water quality criteria of 30 NTU and the acceptable limit of 50 NTU by EPA Guyana (as can be clearly seen on the turbidity graph *Figure 31* and *Table 8*). The sample point areas WQ6 (Outside Discharge) and WQ11 (Discharge at Road) indicates high level of poor water clarity in water discharged, which further will reduce sunlight penetration in the area. Turbidity generally increases closer to the bank of a stream/ flowing canal or the source of erosion/ effluent run off.

***BOD (Biochemical Oxygen Demand)*** - BOD levels of the water sample readings were not detected in six (6) samples (WQ1, WQ2, WQ3, WQ4, WQ5, & WQ11). For the remaining samples, WQ6 to WQ10 readings ranged from 6.93 mg/L to 13.50 mg/L which were all well within the GNBS accepted Guidelines for Industrial effluent, general environment range of <50 mg/L. This can be clearly seen on the BOD graph *Figure 32* and *Table 8*, indicating a healthy aquatic environment for organisms to live and thrive. It should also be noted that the readings were also well below the World Bank Group IFC EHS Guideline for wastewater and ambient water quality of 30 mg/L.

***Total Suspended Solids*** - TSS levels of the water sample readings were not detected in one (1) sample (WQ3). The remaining sample readings collected ranged were 2 mg/L to 648 mg/L. Based on the results, WQ6 (648 mg/L), WQ10 (220 mg/L) and WQ11 (123 mg/L) were above the GNBS accepted Guidelines for Industrial effluent, general environment range of <50 mg/L. This is clearly depicted on the TSS graph *Figure 31* and *Table 8*. The sample point areas WQ6 (Outside Discharge), WQ10 (River), and WQ11 (Discharge at Road) indicates high level of suspended sediments in the water discharged. The TSS level at WQ10 was high as a result of sampling close to the bank of the bank of the River. While high readings were recorded at WQ6 & WQ11 due to flow of water or the source of erosion/ effluent run off.

***COD (Chemical Oxygen Demand)*** – The COD levels sample readings ranged from 69 mg/L to 1270 mg/L. Based on the results obtained, WQ6 (1270 mg/L), and WQ10 (527 mg/L) were above the GNBS accepted Guidelines for Industrial effluent, general environment range of <250



mg/L. It should be noted that while WQ11 (214 mg/L) was within the range of <250 mg/L, it should be carefully monitored to ensure levels keeps within the limit. This can be clearly seen on the COD graph *Figure 32* and *Table 8*. The sample point areas WQ6 (Outside Discharge), WQ10 (River), and WQ11 (Discharge at Road) indicates the occurrence of higher levels of organic matter being broken down in the water. This indicates the possibility of the presence of pollutants/effluents in the water.

**Oil and Grease (OG)** – The oil and grease levels recorded ranged from 5.80 mg/L to 45.8 mg/L. Based on results obtained, WQ6 (45.8 mg/L), WQ10 (13.6 mg/L), WQ11 (15.2 mg/L) were above the GNBS accepted Guidelines for Industrial effluent, general environment range of <10 mg/L. This is clearly depicted on the oil and grease graph *Figure 34* and *Table 8*. The sample point areas WQ6 (Outside Discharge), WQ10 (River), and WQ11 (Discharge at Road) indicates the presence of pollutants/effluents in the water.

**Total Nitrogen** - Total Nitrogen sample readings ranged from 0.5 mg/L to 58.5 mg/L. Based on the results obtained WQ6 (58.5 mg/L) and WQ10 (22.3 mg/L) were above the World Bank Group IFC EHS Guideline for wastewater and ambient water quality of 10 mg/L. This is clearly depicted on the total nitrogen graph *Figure 33* and *Table 8*. The sample point areas WQ6 (Outside Discharge), and WQ10 (River), indicates the presence of pollutants/effluents in the water which can lead to the process of eutrophication.

**Phosphates** - Phosphate levels of the collected samples ranged from 0.21 mg/L to 3.53 mg/L. Based on the results WQ10 (3.53 mg/L) was above the World Bank Group IFC EHS Guideline for wastewater and ambient water quality of 2 mg/L. It should be noted that while WQ6 (1.38 mg/L) and WQ11 (1.54 mg/L) were within the limit of 2 mg/L, it should be carefully monitored to ensure levels keeps within the limit. This is clearly depicted on the phosphate graph *Figure 33* and *Table 8*. The sample point area WQ10 (River), indicates the process of eutrophication is occurring in the water due to the higher presence of phosphate discharge.

**Total Coliform** - Total Coliform count of the water sample were not detected in FA1. However, for FA2 the sample count result was 34 CFU/100mL. Therefore, the actual bacteria count recorded was well within the GNBS accepted Guidelines for Industrial effluent, general environment statistical probability of 400 MPN/100mL. This is clearly seen in *Table 9* indicating a healthy aquatic environment for organisms to live and thrive.

***E. Coli*** - E. Coli count of the water sample were not detected in FA1. However, for FA2 the sample count result was 18 CFU/100mL. The actual bacteria count recorded was well within both of the USEPA recommended Guidelines for Recreational Water Quality of GM 126 CFU/100 mL (recommendation 1) and GM 100 CFU/mL (recommendation 2). This can be clearly seen in *Table 9* indicating a healthy aquatic environment for organisms to live and thrive. It should also be noted that the readings were far below the STV recommendations of 410 CFU/100mL and 320CFU/100mL respectively.

The result of the analyses of surface water quality for the most part indicates conditions conducive of a healthy aquatic environment for the sustenance of aquatic life. However, it was discovered that there is the presence of pollutant discharge/ contamination entering the water way. The key sample points noted was that of WQ6, WQ10 and WQ11.

Bounty Farm Ltd. reiterates its commitment to the maintenance of the environment and is committed to the continual improvement of its environmental system to ensure that the operations have minimal impact on the aquatic environment. Consequently, the company has plans to further treat the processing plant wastewater before discharge (*please refer to recommendations for further details*).

#### 4.1.4 Noise Condition

Noise pollution by definition is the regular exposure to elevated sound levels that can possibly lead to adverse effects in humans or other living organisms (Environmental Pollution Centers, 2017). As such, the intensity of the sound generated by various activities is of key concern to health. Prolonged exposure to sounds louder than 80dB is considered hazardous to hearing (EPA Guyana, 2017). Therefore, as human hearing is only receptive to certain sound levels, a A-weighting noise assessment would provide data on existing noise levels. This assessment establishes baseline conditions of the surrounding environment and determines to what extent if any, noise from the operations can affect the general environment and the health of staff and community.

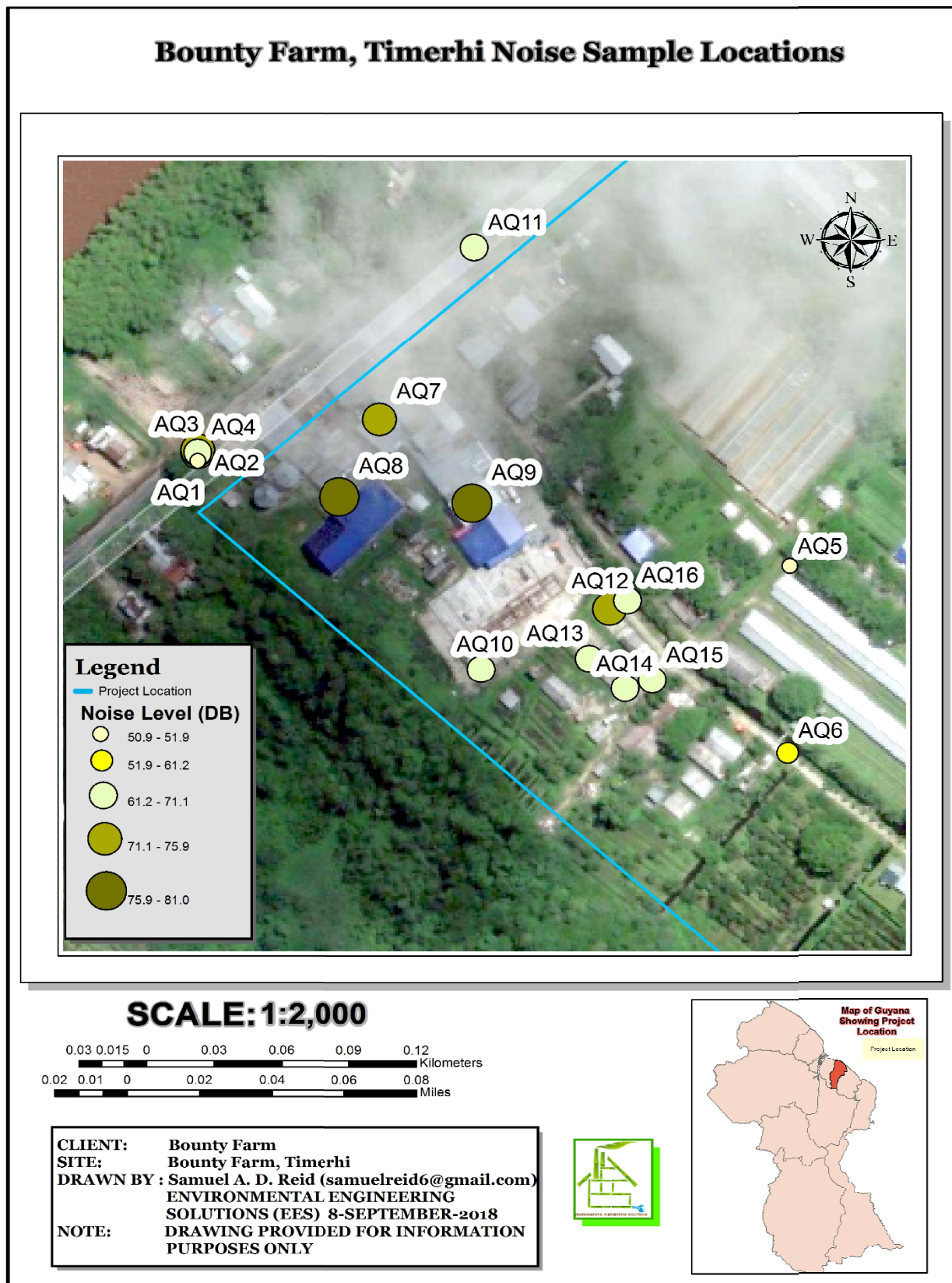
Noise measurements were taken at various strategic locations within, and around Bounty Farm Ltd. The existing sound environment in, and around Bounty Farm Ltd. is characterized as an Industrial zone because of operational activities. Noise level measurements were recorded at sixteen (16) sample locations on September 10<sup>th</sup> 2018. The sample locations were selected at strategic points within the area in order to provide an indication of the baseline noise level. The locations where the samples were collected are visually identified on the map (*Figure 35*) on the following page as the NL points. *Table 11* outlines the data collected, while the graph (*Figure 36*) depicts sampled readings analysed in comparison with the Guyana National Bureau of Standards (GNBS) Guideline values for Noise in specific environment (*Table 10*).

*Table 10: GNBS Guideline Values for Noise in Specific Environment*

Categories	Daytime Limits in dB (06:00 – 18:00h)	Night time Limits in dB (18:00 – 06:00)	
<b>Residential</b>	75	60	
<b>Institutional</b>	75	60	
<b>Educational</b>	75	60	
<b>Industrial</b>	100	80	
<b>Commercial</b>	80	65	
<b>Construction</b>	90	75	
<b>Transportation</b>	100	80	
<b>Recreational</b>	100	18:00 – 01:00hr	100
		01:00 – 08:00hr	70

**Source:** (GNBS, 2010)

Figure 35: Noise Level Sample Point Location



Drawn by: Mr. Samuel Reid (2018)

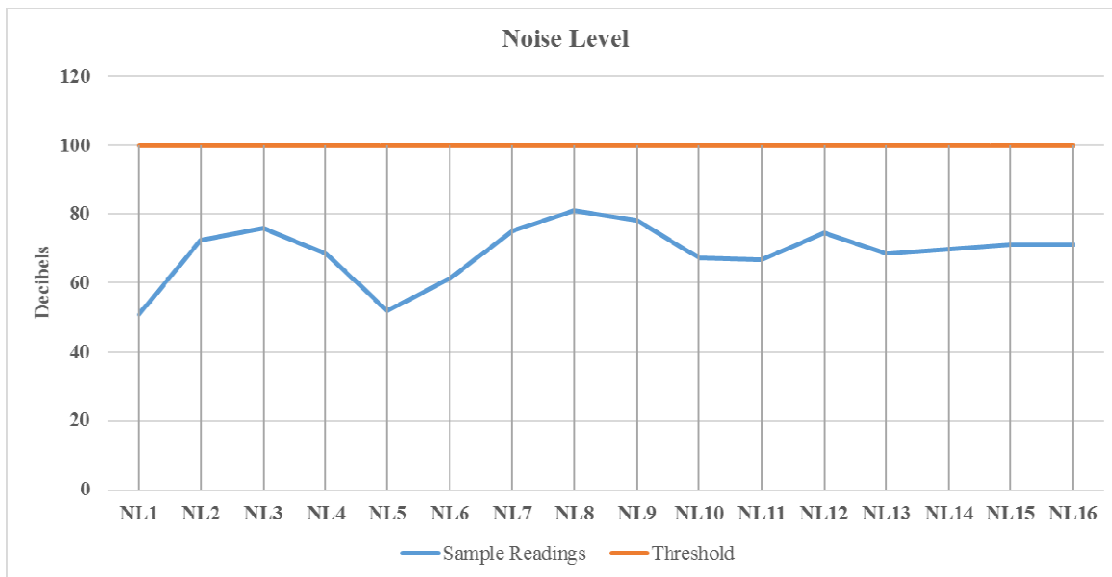
**Results and Discussion:** As part of conducting the environmental baseline assessment, the following noise level data below was recorded, demonstrated and analysed.

*Table 11: Noise Levels Sampling Results*

Noise Levels					
Sample ID	Coordinates		Start Time	Noise dB Low	Temp. °C
	21N	UTM			
NL1	0361005	0721378	15:00	50.9	26.6
NL2	0361005	0721378	15:22	72.5	26.3
NL3	0361005	0721378	15:34	75.9	23.4
NL4	0361005	0721378	15:46	68.4	22.9
NL5	0361268	0721325	16:00	51.9	26.2
NL6	0361267	0721238	15:36	61.2	28
NL7	0361086	0721393	15:50	75.1	30.5
NL8	0361068	0721357	15:55	81.1	31
NL9	0361127	0721354	15:55	78.2	31.2
NL10	0361131	0721277	16:02	67.2	31.2
NL11	0361128	0721473	16:33	66.6	30.5
NL12	0362188	0722305	16:34	74.5	30.1
NL13	0362179	0722282	16:44	68.4	29.1
NL14	0362195	0722268	17:02	69.8	29.4
NL15	0362207	0722272	17:06	71.2	29.2
NL16	0362196	0722309	17:11	71.2	28.8

**\*Infield sampling by:** Mr. Isidro Espinosa & Ms. Shamika Higgins (September 10<sup>th</sup> 2018)

Figure 36: Noise Level Readings



During the time of monitoring, the noise level readings recorded in the area ranged from 50.9 to 81.1 dB. Based on results obtained, the highest noise level recorded was at NL8 (81.1 dB). Additionally, it was also observed that all the data recorded was within the Guyana National Bureau of Standards (GNBS) Guideline Values for Noise in Specific Environment daytime limit (06:00 – 18:00h) for Industrial zone (100 dB). This can be clearly seen in the noise graph *Figure 34* and *Table 11* indicating good noise level conditions.

The recorded noise level results obtained clearly indicate a healthy conducive surrounding environment for the sustenance of life. The results also highlight that any noise activities generated from the poultry production operation at Bounty Farm Ltd has no noticeable impact on the surrounding environment of the community. This is in keeping with the maintenance of a healthy environment and staff welfare.

#### 4.1.5 Air Quality

Air pollution is contamination of the indoor or outdoor environment by any chemical, physical or biological agent that modifies the natural characteristics of the atmosphere (WHO, 2012). This is becoming an increasingly significant problem to growth and development of cities and communities. The air pollutants of major public health concern include: particulate matter, carbon monoxide, ozone, nitrogen dioxide, sulphur dioxide and metals, such as lead (Hedges,

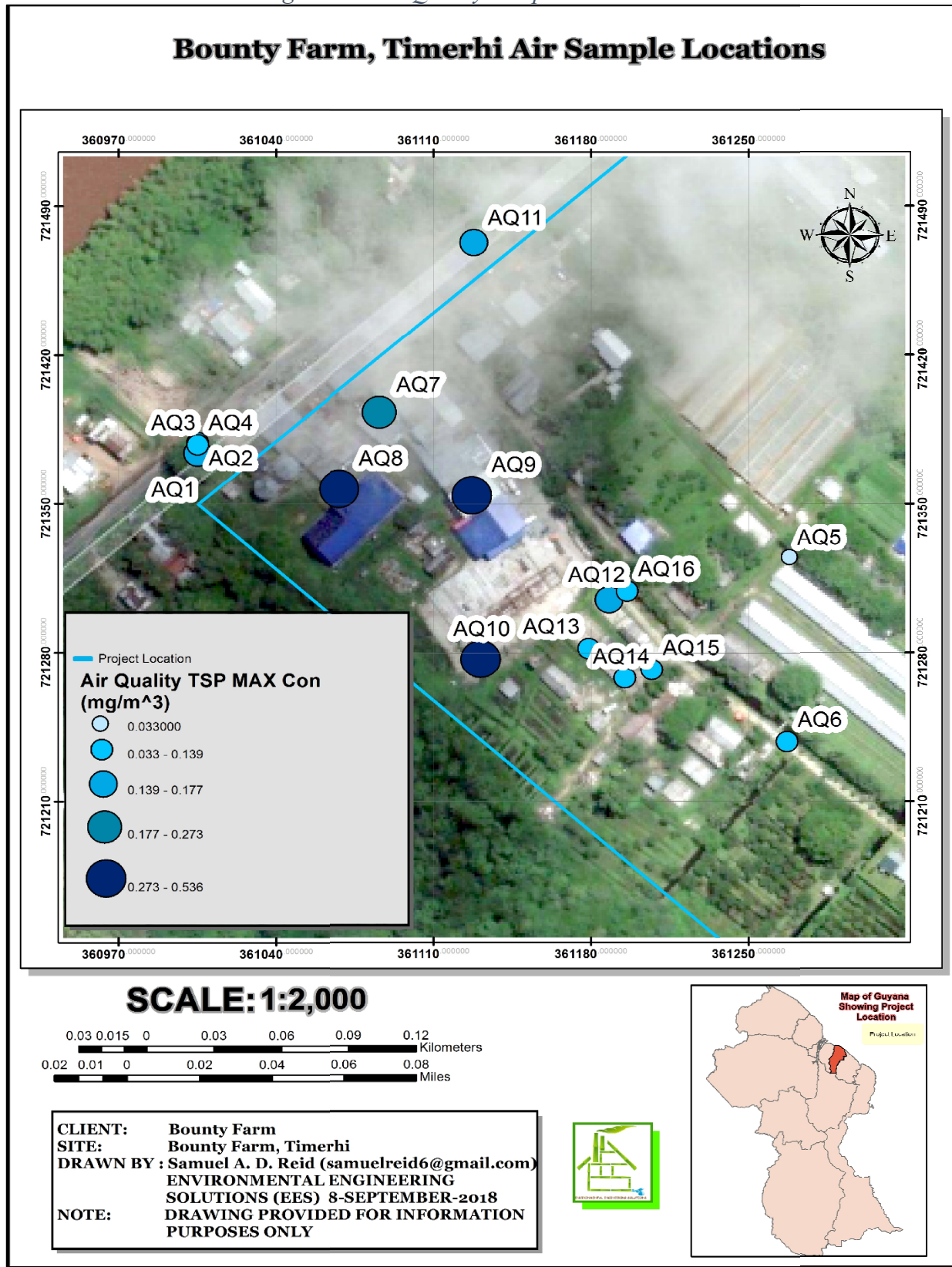
2004)(WHO, 2012). Therefore, air quality assessment was done to establish baseline conditions of the surrounding environment and to determine to what extent if any, emissions from the operations can affect the atmosphere.

Sixteen (16) air sample readings were recorded on September 10<sup>th</sup> 2018 within, and around the Compound. The sample locations were selected at strategic points within the area in order to provide an indication of the baseline air quality. The locations where the samples were collected are visually identified on the map (*Figure 37*) on the following page as the AQ points. *Tables 14* outlines the data collected, while the graphs (*Figure 38, 39&40*) depicts sampled readings analysed in comparison with the threshold limits for air quality parameters.

The measured parameters recorded are some of the key indicators generally used to determine air quality. These parameters of primary focus for this assessment are mainly that of Total Suspended Solids (TSS), Particulate Matter (PM2.5 and PM10), Formaldehyde (HCHO) and Total Volatile Organic Compounds (TVOC). High occurrences and changes in these parameters will aid in providing a good indication assessment of possible air pollution that can affect the atmosphere and human health. As a consequence, the parameter measurements recorded were assessed in comparison with the USA National Ambient Air Quality Standards (NAAQS) (*Table 12*), the World Health Organisation and EAS Inc. Indoor Air Quality Guidelines (*Table 13*).



Figure 37: Air Quality Sample Point Location



Drawn by: Mr. Samuel Reid (2018)



Table 12: National Ambient Air Quality Standards

Parameter	Type	Averaging Time	Level	Form
<b>PM<sub>2.5</sub></b>	Primary	Annual	12.0 µg/m <sup>3</sup>	Annual arithmetic mean, averaged over 3 years.
	Secondary	Annual	15.0 µg/m <sup>3</sup>	Annual arithmetic mean, averaged over 3 years.
	Primary and Secondary	24-hour	35 µg/m <sup>3</sup>	98 <sup>th</sup> percentile, averaged over 3 years.
<b>PM<sub>10</sub></b>	Primary and Secondary	24-hour	150 µg/m <sup>3</sup>	Not to be exceeded more than once per year on average over a 3-year period.
<b>Total Suspended Particles (TSP)</b>	Primary	24-hour	260 µg/m <sup>3</sup>	Not to be exceeded more than once per year.
		Annual	75 µg/m <sup>3</sup>	Annual geometric mean.
	Secondary	24-hour	150 µg/m <sup>3</sup>	Not to be exceeded more than once per year.
		Annual	60 µg/m <sup>3</sup>	Annual geometric mean.

Source: (USEPA, 2016)(USA EPA, 2016)

Table 13: Indoor Air Quality Guidelines for TVOC and HCHO

Parameter	Guideline		Notes
<b>TVOC</b>	0.3 mg/m <sup>3</sup>	300 µg/m <sup>3</sup>	Low Level of Concern
	0.5 mg/m <sup>3</sup>	500 µg/m <sup>3</sup>	Acceptable Level
<b>HCHO</b>	0.1 mg/m <sup>3</sup>	100 µg/m <sup>3</sup>	Short-term (30 min)

Source:(EAS Inc, 2015)(WHO, 2010)

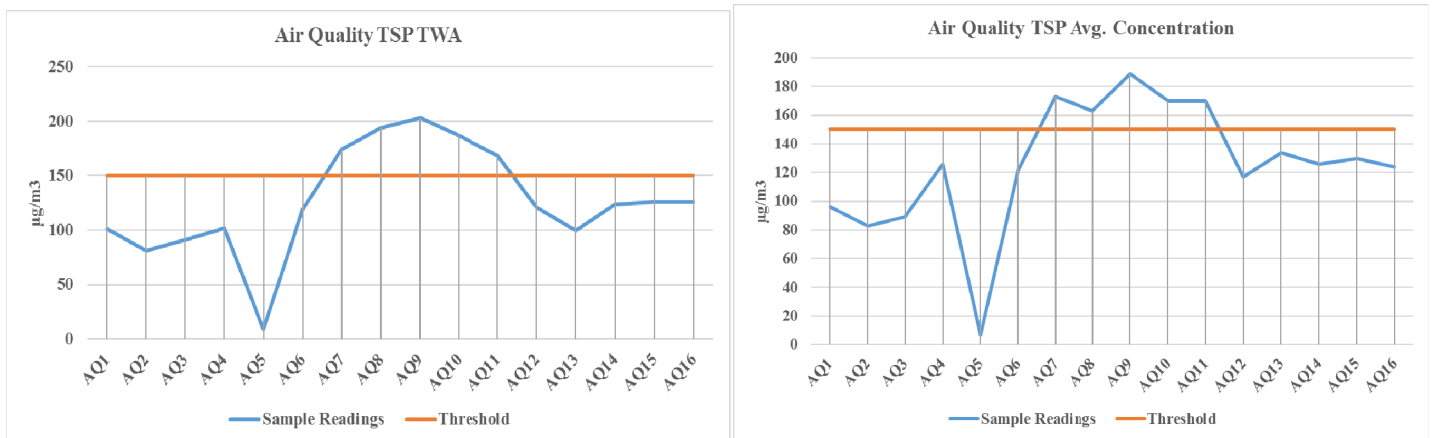
**Results and Discussion:** As part of conducting the environmental baseline assessment, the following air quality parameter data below was recorded, demonstrated and analysed.

Table 14: Air Quality Sampling Results

Air Quality										
Sample ID	Coordinates		Start Time	Data RAM			TEMPO		HCHO	TVOC
	21N	UTM		TWA	Max. Con	Avg. Con	PM2.5	PM10		
AQ1	0361005	0721378	15:00	101	159	96	12.9	17.3	38	27
AQ2	0361005	0721378	15:22	81	96	83	6.4	9.2	0	82
AQ3	0361005	0721378	15:34	91	96	89	7.0	9.8	0	114
AQ4	0361005	0721378	15:46	102	131	126	10.0	14.2	0	108
AQ5	0361268	0721325	16:00	9	33	7	17.0	22.4	0	2
AQ6	0361267	0721238	15:36	119	124	122	16.8	24.4	0	3
AQ7	0361086	0721393	15:50	174	273	173	15.3	21.0	0	3
AQ8	0361068	0721357	15:55	194	432	163	17.2	23.8	1	3
AQ9	0361127	0721354	15:55	203	487	189	16.4	22.9	0	1
AQ10	0361131	0721277	16:02	187	536	170	17.6	24.7	0	2
AQ11	0361128	0721473	16:33	168	177	170	20.1	28.1	0	3
AQ12	0362188	0722305	16:34	121	147	117	15.1	22.1	0	3
AQ13	0362179	0722282	16:44	100	138	134	13.8	18.1	0	0
AQ14	0362195	0722268	17:02	124	133	126	17.4	24.1	0	3
AQ15	0362207	0722272	17:06	126	136	130	17.5	22.6	0	2
AQ16	0362196	0722309	17:11	126	139	124	18.7	26.0	0	2

Infield sampling by: Mr. Isidro Espinosa & Ms. Shamika Higgins (September 10<sup>th</sup> 2018)

Figure 38: Air Quality Parameter (TSP)



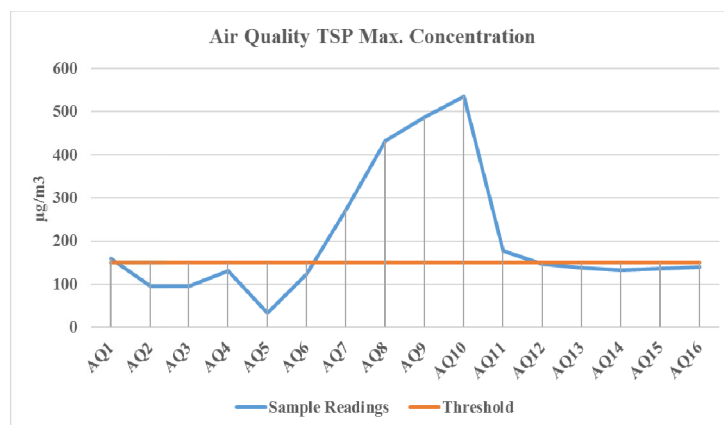


Figure 39: Air Quality Parameters ( $PM_{2.5}$ ,  $PM_{10}$ )

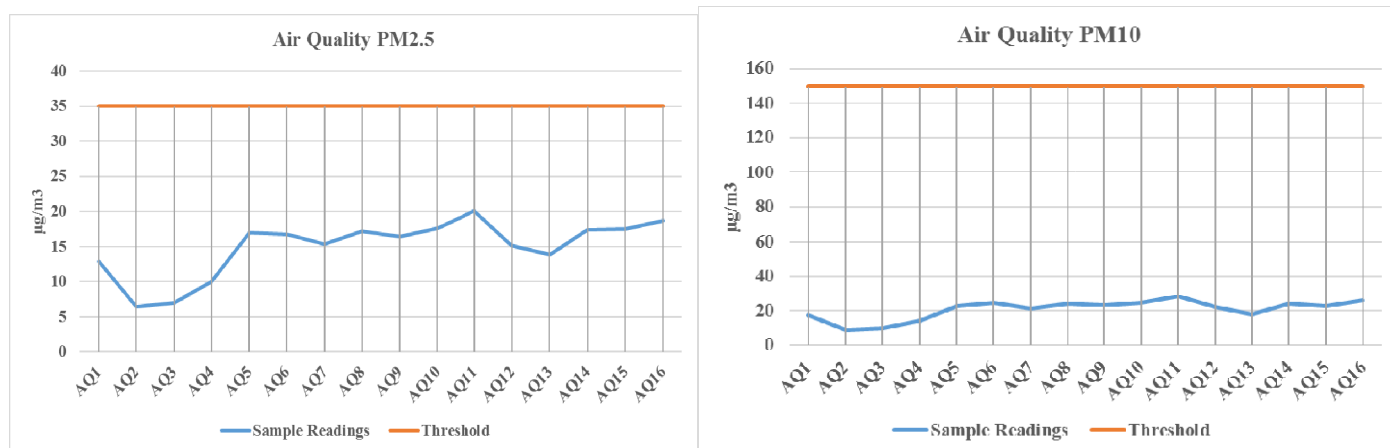
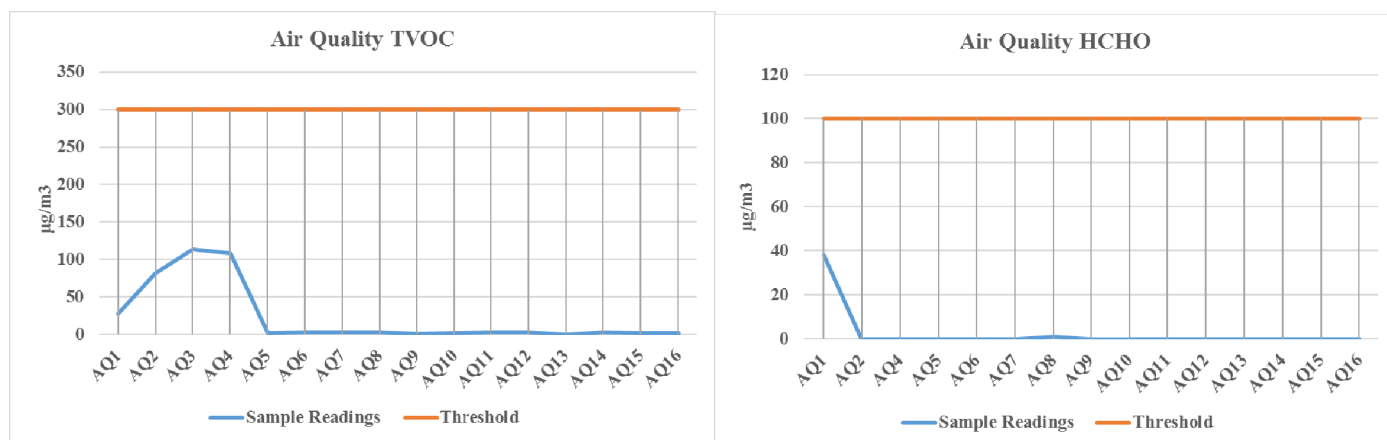


Figure 40: Air Quality Parameters (TVOC, HCHO)



Illustrated by: Ms.Carlene Bascom (2018)

**Particulate Matter:** The Total Suspended Particulates (TSP) sample readings recorded, varied among the sample points and ranged from 9  $\mu\text{g}/\text{m}^3$  to 203  $\mu\text{g}/\text{m}^3$  Time Weighted Average (TWA), 33  $\mu\text{g}/\text{m}^3$  to 536  $\mu\text{g}/\text{m}^3$  Maximum Concentration (Max Conc.), and 7  $\mu\text{g}/\text{m}^3$  to 189  $\mu\text{g}/\text{m}^3$  Average Concentration (Avg. Conc.), during the monitoring period. The highest readings recorded for TWA were AQ9 (203  $\mu\text{g}/\text{m}^3$ ), Max Conc. AQ10 (536  $\mu\text{g}/\text{m}^3$ ) and Avg. Conc. AQ9 (189  $\mu\text{g}/\text{m}^3$ ).

Based on the results, it was observed that TWA readings AQ7 (174  $\mu\text{g}/\text{m}^3$ ), AQ8 (194  $\mu\text{g}/\text{m}^3$ ) AQ9 (203  $\mu\text{g}/\text{m}^3$ ), AQ10 (187  $\mu\text{g}/\text{m}^3$ ) and AQ11 (168  $\mu\text{g}/\text{m}^3$ ); Max Conc. readings AQ1 (159  $\mu\text{g}/\text{m}^3$ ), AQ7 (273  $\mu\text{g}/\text{m}^3$ ), AQ8 (432  $\mu\text{g}/\text{m}^3$ ), AQ9 (487  $\mu\text{g}/\text{m}^3$ ), AQ10 (536  $\mu\text{g}/\text{m}^3$ ) and AQ11 (177  $\mu\text{g}/\text{m}^3$ ); and Avg. Conc. readings AQ7 (173  $\mu\text{g}/\text{m}^3$ ), AQ8 (163  $\mu\text{g}/\text{m}^3$ ), AQ9 (189  $\mu\text{g}/\text{m}^3$ ), AQ10 (170  $\mu\text{g}/\text{m}^3$ ) and AQ11 (170  $\mu\text{g}/\text{m}^3$ ) were above the US NAAQS TSP limit of 150  $\mu\text{g}/\text{m}^3$  24-hour average. This can be clearly seen on the TSP graphs *Figure 38* and *Table 14*, indicating high occurrence of suspended particulate (0-100  $\mu\text{m}$ ) in the air at the time of monitoring. This can possibly be due to wind activity (direction and speed).

Although TSP levels were high, it should also be noted that not all of TSP consist of particulate matter harmful to health (inhalable) and therefore TSP readings should be analysed in conjunction with  $\text{PM}_{2.5}$  and  $\text{PM}_{10}$  to better assess the quality of the air.

With regard to  $\text{PM}_{2.5}$  and  $\text{PM}_{10}$  it was observed that measured readings varied across the sample site locations, ranging from 7 to 20.1  $\mu\text{g}/\text{m}^3$  for  $\text{PM}_{2.5}$  and 9.2  $\mu\text{g}/\text{m}^3$  to 28.2  $\mu\text{g}/\text{m}^3$  for  $\text{PM}_{10}$ . The highest readings recorded for  $\text{PM}_{2.5}$  was AQ11 (20.1  $\mu\text{g}/\text{m}^3$ ) and  $\text{PM}_{10}$  AQ11 (28.1  $\mu\text{g}/\text{m}^3$ ). Based on the results obtained, the  $\text{PM}_{2.5}$  and  $\text{PM}_{10}$  measurements were all well within the US NAAQS  $\text{PM}_{2.5}$  of 35  $\mu\text{g}/\text{m}^3$  24-hour average and  $\text{PM}_{10}$  of 150  $\mu\text{g}/\text{m}^3$  24-hour average. This is clearly depicted on the PM graphs *Figure 39* and *Table 14*, indicating good quality of air in the area.

**Formaldehyde (HCHO):** the concentration of the HCHO hydrocarbon at the sample points ranged from 0  $\mu\text{g}/\text{m}^3$  to 38  $\mu\text{g}/\text{m}^3$ , during the monitoring period. The highest HCHO measurement was recorded at AQ1 (38  $\mu\text{g}/\text{m}^3$ ). Based on the results obtained, all readings recorded were well below the WHO Guideline of 100  $\mu\text{g}/\text{m}^3$  short-term (30 minutes). This can be clearly seen on the HCHO graph *Figure 40* and *Table 14*, indicating good air quality.

**Total Volatile Organic Compounds (TVOC):** concentration of TVOC at the sample points ranged from 0  $\mu\text{g}/\text{m}^3$  to 114  $\mu\text{g}/\text{m}^3$ , during the monitoring period. The highest TVOC measurement was recorded at AQ3 (114  $\mu\text{g}/\text{m}^3$ ). Based on the results obtained, all readings recorded were well below the EAS Inc. Guideline of 300  $\mu\text{g}/\text{m}^3$  which is the ideal target for a low level of health concern. This can be clearly seen on the TVOC graph *Figure 40* and *Table 14*, indicating good air quality.

The recorded air quality measurements obtained clearly indicates a healthy conducive surrounding atmosphere for the sustenance of life. The results obtained also clearly highlights that Bounty Farm Ltd. poultry production operation has no noticeable impact on the surrounding environment of the community. This is in keeping with the maintenance of a healthy environment and staff welfare.

## 4.2 Biological Environment

Guyana's floral diversity is estimated to include over 8,000 species (inclusive of Ferns, Mosses etc.) with approximately 6,500 of those species identified, and 50% endemic. There are approximately 1,815 known species of fishes, amphibians, birds, reptiles and mammals. Fishes are very diverse, with 352 species of freshwater bony fishes and 501 species of marine fishes (EPA Guyana, 2010)(CBD, 2018)

The Timehri biological environment has been influenced and modified due to development activities for housing, agriculture, road infrastructure, production, service utility supply to name a few. These development activities have thus resulted in a reduction of the flora diversity of the area. Additionally, the Fauna in the area consist of animals which are domesticated and have adapted to a built-up environment of human settlement.

## 4.3 Socio-Economic Environment

Timehri Village, East Bank Demerara is a residential community located in Region four (4) Demerara Mahaica. The village is 41 km south of the capital city Georgetown and falls under the jurisdiction of the RDC Timehri Sub-Office Region 4. The name Timehri is an Amerindian (Carib) word meaning “paintings and drawings on the rock” and these rock motifs (cultural heritage sites) are located deep in the Guyana hinterland and predate European arrivals to Guyana (Wayne, 2014). The Timehri village is the proud home to the:

- Cheddi Jagan International Airport (since 1997); formally known as the Timehri International Airport (since 1969) and Atkinson aerodrome (since 1941)
- Guyana Motor Racing & Sports Club, South Dakota Circuit where competitors across the Caribbean meet to participate in annual motor racing events.
- Greenfield Farms, a USAID/GTIS project using advanced agricultural technologies to cultivate non-traditional crops.
- Bounty Farm Ltd. Guyana's leading fully integrated poultry producing Company.
- Guyana Defence Force Timehri base Camp Stephenson.

(Airport Technology, 2018)(Wayne, 2014)

The village of Timehri has a total population of 4,433 of which 49% are males gender and 51% females. The number of households in the village total 1,215(BOS, 2012). Timehri is predominately comprised of persons of mixed decent (38%) followed by Africans (28.8%), East Indians (27.5%), Amerindians (5%) and the remainder 0.6% consisting of Portuguese, Chinese, White, Other (BOS, 2012).

Seventy four percent (74%) of the residents attribute their beliefs to the Christian Faith, followed by 16% Hindu, 6% comprising Bahai, Rastafarian and Muslim Faiths and 5% having no religious beliefs(BOS, 2012). The employment of residents spans a variety of sectors inclusive of the Disciplined Services, Managers, Professionals, Technicians, Clerical Support, Service and Sales, Skilled Agricultural, Forestry and Fishery, Craft, Plant & Machine Operators & Assemblers and Elementary Occupation as a source of livelihood. Other means of livelihood consist of Remittance, Pensions, Parental/Spousal Support and Savings. (BOS, 2012)

The Timehri Village is a progressively developing area comprising stable electricity, potable water, tar pitch roads with a majority of households having electricity (85%) as their source of lighting (*Figure 41*). A large portion of the households used LPG cooking gas (66%) as their source of energy for cooking (*Figure 42*) and most households have flush toilets with septic tanks (53%) as their toilet facility (*Figure 43*).



Figure 41: Source of Lighting (Timehri)

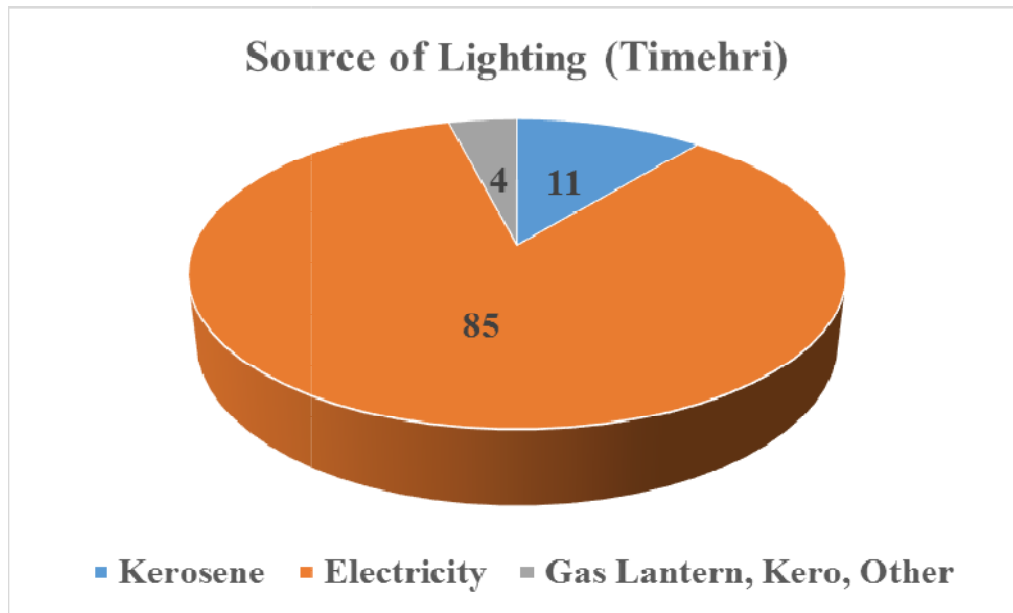


Figure 42: Source of Cooking (Timehri)

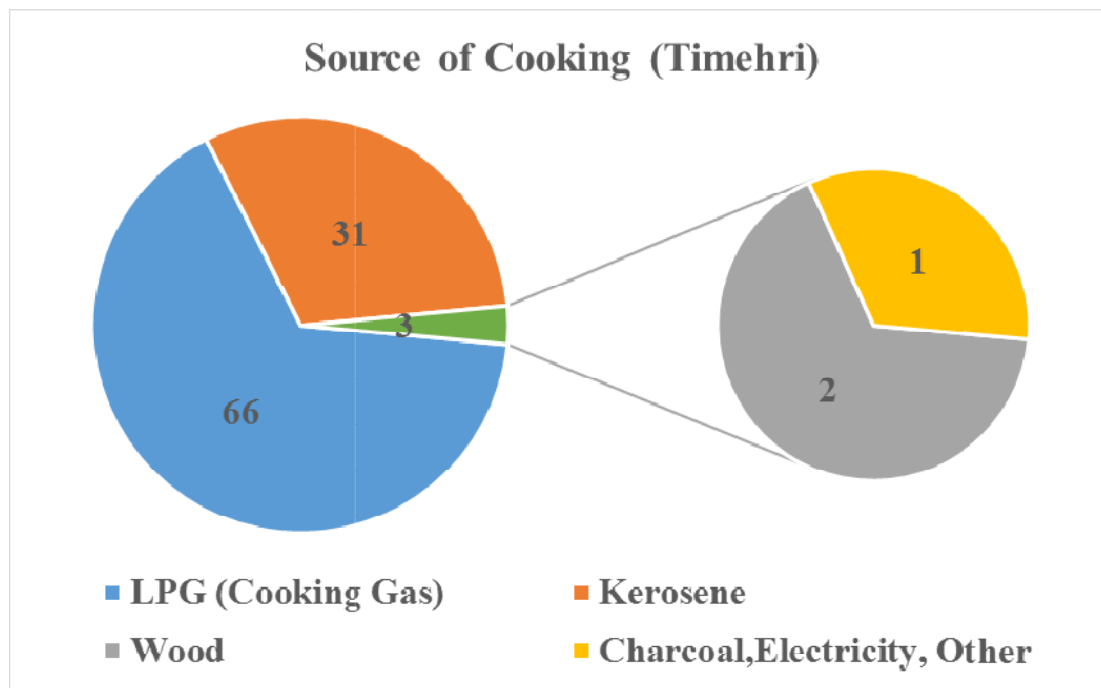
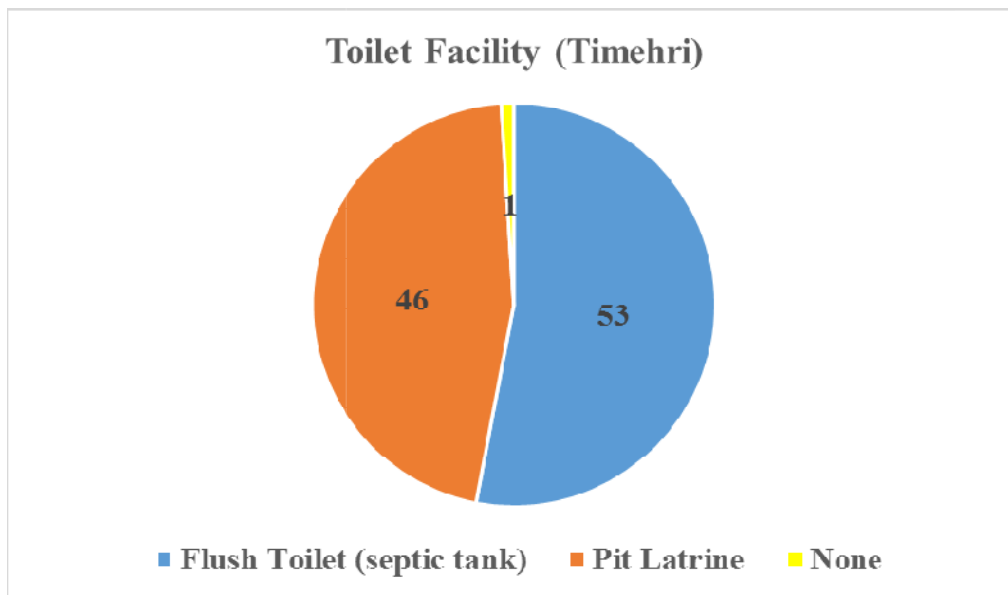


Figure 43: Toilet Facility (Timehri)



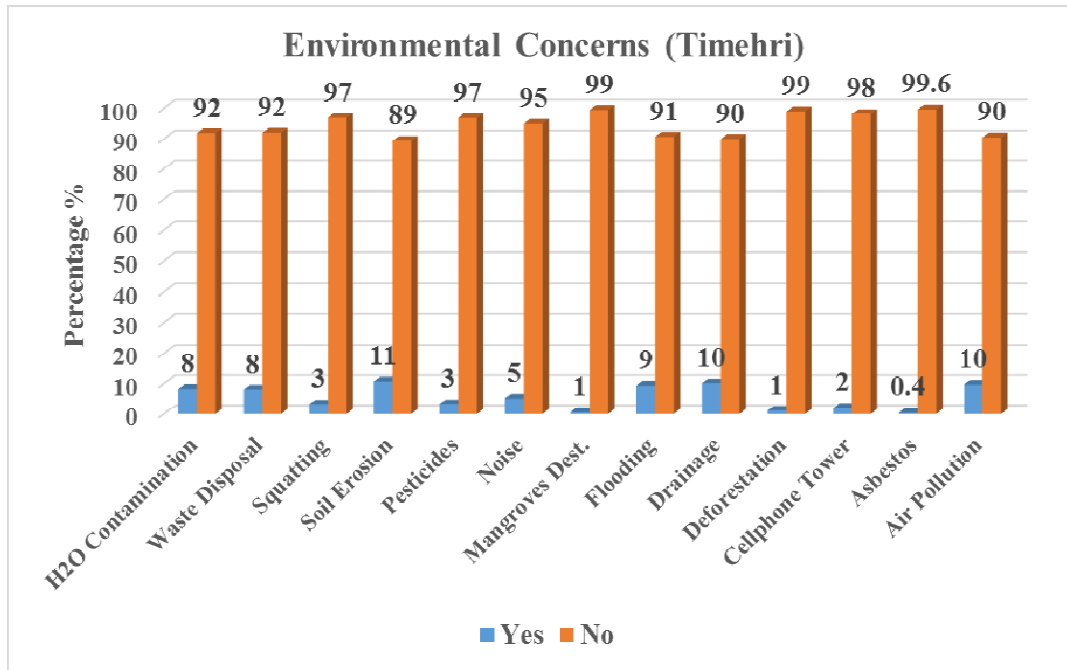
**Illustrated by:** Carlene Bascom (2018)

In the event that there is a fire, villagers of Timehri can call on the Fire Station at the Cheddi Jagan International Airport. With regard medical service, the villagers are able to visit the Timehri Health Centre and/or the Guyana Defence Force's Health Centre at Camp Stephenson. Pertaining to education, the children in the village attend the Timehri Nursery school, then Timehri Primary school. Thereafter, depending on the children's performance at the National Grade Six Assessment, children might attend the Soesdyke Secondary or be placed at another school along the East Bank Demerara (Whaul, 2015). Based on data from (BOS, 2012), the highest level of education attained by most of the residents who completed studies was secondary (58%), followed by primary (30%), None/Nursery (7.4%), University/Tertiary (3.3%), Post-Secondary (1.2%), and other (0.2%).

With regard to environmental matters in the village of Timehri, a majority of households' method of garbage disposal is burning (81%), followed by dumping (6%), burying (5%), public garbage collection (5%), private garbage collection (2%) and 0.6% consisting of compost and other (BOS, 2012). Additionally, the area rarely suffers from flooding and based on the response of residents responses, which is an overwhelming majority of ninety percent (90%), there are no particular environmental concerns in the village (*Figure 44*)(BOS, 2012). Key indicators to note

are the air, noise and water categories, where the general ambient environment of the village does not suffer from environmental issues that can affect human health and well-being.

*Figure 44: Environmental Concerns (Timehri)*



**Illustrated by:** Carlene Bascom (2018)

## 5 Potential Environmental Impacts

The following chapter outlines the potential environmental impacts that maybe associated with the operation at Bounty Farm Ltd. Poultry Production. This section also identifies any mitigation measures that may be implemented to better manage the effects imposed on the environment by this development.

### 5.1 Operation Phase

The operation phase of the Bounty Farm Ltd development process aims to undertake the activities associated with the operation of the Processing Plant. Therefore, it is the goal of the Bounty Farm Ltd. that all operational activities are well managed, to ensure that the surrounding environmental integrity is protected and maintained, and complies with the Environmental Protection Act 1996. Additionally, Bounty Farm Ltd. will also ensure that regular inspections and reporting on Environmental, OS&H and Quality Control is done. The potential environmental impacts and mitigation measures to be implemented by Bounty Farm Ltd for the duration of the operation phase of is outlined in *Table 15* below:

*Table 15: Operation Phase Impact & Mitigation Measures*

Aspect	Environmental Impacts	Mitigation Measures
<b>Operation Phase</b>		
Air Quality	Dust emissions	<ul style="list-style-type: none"> <li>Shut down idle vehicles and equipment when appropriate</li> </ul>
		<ul style="list-style-type: none"> <li>All Vehicles and equipment must be regularly checked and maintained.</li> </ul>
		<ul style="list-style-type: none"> <li>Establish appropriate speed limit within compound</li> </ul>
		<ul style="list-style-type: none"> <li>Have in place and use an efficient work schedule for feed mill operation.</li> </ul>
		<ul style="list-style-type: none"> <li>Feedstock, manure, and litter must be stored in an enclosed area.</li> </ul>
		<ul style="list-style-type: none"> <li>Ensure, to securely cover loads such as feedstock, manure &amp; litter when transporting.</li> </ul>
		<ul style="list-style-type: none"> <li>Proper housekeeping to manage build-up of dust. Keep place tidy.</li> </ul>
		<ul style="list-style-type: none"> <li>Ensure that all staff are provided with, and wear dust mask when handling feed stock or litter.</li> </ul>
	VOC and GHG emissions	<ul style="list-style-type: none"> <li>Develop a management plan to organise the sustainable delivery of goods, materials and</li> </ul>



		products to and from the plant.
		<ul style="list-style-type: none"> <li>• Vehicles should be retrofitted with emission control equipment (such as exhaust mufflers)</li> </ul>
		<ul style="list-style-type: none"> <li>• Ensure regular checks and maintenance of vehicles, freezer, and machines/equipment.</li> </ul>
		<ul style="list-style-type: none"> <li>• Turn-off all the machinery and equipment when not in use.</li> </ul>
		<ul style="list-style-type: none"> <li>• Have in place and use an efficient machinery and work schedule.</li> </ul>
	Odour Nuisance	<ul style="list-style-type: none"> <li>• Proper housekeeping and hygiene practices should be applied on a daily basis</li> </ul>
		<ul style="list-style-type: none"> <li>• Manure and bedding material should be removed from site on a regular basis.</li> </ul>
		<ul style="list-style-type: none"> <li>• Proper ventilation system in the plant</li> </ul>
		<ul style="list-style-type: none"> <li>• Keep dust levels low as odour are absorbed and carried by dust particles</li> </ul>
		<ul style="list-style-type: none"> <li>• Chicken waste must be maintained at optimal moisture content and temperature to control odours.</li> </ul>
		<ul style="list-style-type: none"> <li>• No processing of waste should occur at the plant.</li> </ul>
		<ul style="list-style-type: none"> <li>• Dead chickens should be collected and disposed of regularly.</li> </ul>
		<ul style="list-style-type: none"> <li>• Chicken pens must be well ventilated to avoid odours.</li> </ul>
Noise& Vibrations	Noise levels	<ul style="list-style-type: none"> <li>• Ensure the plant and machinery onsite is in proper working condition.</li> </ul>
		<ul style="list-style-type: none"> <li>• Ensure all equipment and vehicles are maintained regularly.</li> </ul>
		<ul style="list-style-type: none"> <li>• Restrict noise activities to daylight hours</li> </ul>
		<ul style="list-style-type: none"> <li>• Provision of PPE for hearing protection to staff.</li> </ul>
		<ul style="list-style-type: none"> <li>• Use of modernised low noise machinery and vehicles</li> </ul>
		<ul style="list-style-type: none"> <li>• Shut down idle vehicles and equipment when not in use.</li> </ul>
	Vibrations	<ul style="list-style-type: none"> <li>• Machinery must be installed on cast concrete floor foundation to absorb any vibrations.</li> </ul>
		<ul style="list-style-type: none"> <li>• Place cushions on operator's and driver's seats.</li> </ul>
		<ul style="list-style-type: none"> <li>• Use suspension seats where possible</li> </ul>
		<ul style="list-style-type: none"> <li>• Cover hand tools with insulation rubber/ tool wraps</li> </ul>
		<ul style="list-style-type: none"> <li>• Maintain operating machinery, equipment and tools on a regular basis.</li> </ul>
Water Quality	Water Pollution	<ul style="list-style-type: none"> <li>• Regular maintenance of centrifuge.</li> </ul>

		<ul style="list-style-type: none"> <li>• Installation of Grease Interceptor to further treat waste water.</li> </ul>
		<ul style="list-style-type: none"> <li>• Spills should be cleaned up promptly and disposed correctly by the authority.</li> </ul>
		<ul style="list-style-type: none"> <li>• Surface water quality should be routinely sampled and analysed for potential pollutants.</li> </ul>
		<ul style="list-style-type: none"> <li>• During general cleaning use environmentally friendly disinfectants.</li> </ul>
		<ul style="list-style-type: none"> <li>• Feed stock, manure, litter and other processing materials stored away from enter waterways.</li> </ul>
		<ul style="list-style-type: none"> <li>• Designated area for vehicles maintenance should be maintained.</li> </ul>
		<ul style="list-style-type: none"> <li>• Vehicles and equipment/machinery should be properly maintained to prevent contamination of water due to spills/leaks.</li> </ul>
<b>Aesthetic</b>	<b>Waste Generation</b>	<ul style="list-style-type: none"> <li>• Chicken Manure and bedding material should be removed from pens on a regular basis.</li> </ul>
		<ul style="list-style-type: none"> <li>• Chicken Manure should be stored in enclosed area.</li> </ul>
		<ul style="list-style-type: none"> <li>• Rejected chicken parts should be collected and appropriately removed.</li> </ul>
		<ul style="list-style-type: none"> <li>• Spills should be cleaned up promptly and disposed correctly by the authority.</li> </ul>
		<ul style="list-style-type: none"> <li>• Mortalities should be stored in bio-hazard bins at a suitable holding facility until removed from site.</li> </ul>
		<ul style="list-style-type: none"> <li>• All personnel handling general and hazardous waste must be issued with appropriate PPE.</li> </ul>
		<ul style="list-style-type: none"> <li>• The compound and plant must be maintained in a neat and tidy condition.</li> </ul>
		<ul style="list-style-type: none"> <li>• All fuels must be stored safely and well labelled.</li> </ul>
		<ul style="list-style-type: none"> <li>• Waste drums should be placed at strategic locations (away from drains) for disposal use.</li> </ul>
		<ul style="list-style-type: none"> <li>• All drums should be covered and cleared on a regular basis.</li> </ul>
		<ul style="list-style-type: none"> <li>• Waste oil and other hazardous waste must be stored in a designated impermeable container and disposed of appropriately.</li> </ul>
		<ul style="list-style-type: none"> <li>• No littering by staff to be allowed within the plant or compound.</li> </ul>
		<ul style="list-style-type: none"> <li>• All waste must be transported and disposed of properly at the Haags Boch Landfill site.</li> </ul>
<b>OS&amp;H</b>	<b>Safety &amp;Health</b>	<ul style="list-style-type: none"> <li>• Workers must be adequately trained to follow</li> </ul>

		all safety procedures.
		<ul style="list-style-type: none"> <li>Workers should be provided with appropriate PPE protective clothing and footwear at all times.</li> </ul>
		<ul style="list-style-type: none"> <li>Sanitary facilities and changing rooms provided for staff must be regularly cleaned and maintained.</li> </ul>
		<ul style="list-style-type: none"> <li>Maintenance of appropriate Health and Safety signage</li> </ul>
		<ul style="list-style-type: none"> <li>Safe drinking water should be provided for consumption by personnel.</li> </ul>
		<ul style="list-style-type: none"> <li>Wash and disinfect all equipment.</li> </ul>
		<ul style="list-style-type: none"> <li>Proper housekeeping and sanitation measures should be up kept on a regular basis.</li> </ul>
		<ul style="list-style-type: none"> <li>Mortalities must be collected and removed on a regular basis.</li> </ul>
		<ul style="list-style-type: none"> <li>Maintain a safe workplace, plant and work systems</li> </ul>
		<ul style="list-style-type: none"> <li>Provision of first aid kits for staff and spill equipment.</li> </ul>
		<ul style="list-style-type: none"> <li>No Person must enter the site unless authorised to do so by security.</li> </ul>
		<ul style="list-style-type: none"> <li>Chemicals must be stored in a designated enclosed area</li> </ul>
		<ul style="list-style-type: none"> <li>Sanitise bird housing and storage areas on a regular basis</li> </ul>
		<ul style="list-style-type: none"> <li>Chickens must be healthy and vaccinated. (Proper animal care)</li> </ul>
		<ul style="list-style-type: none"> <li>Transport Vehicles must be disinfected regularly.</li> </ul>
		<ul style="list-style-type: none"> <li>Maintenance and checks for rodent bait and fly traps. Pest control management measures</li> </ul>
		<ul style="list-style-type: none"> <li>Regular quality control checks to prevent contamination.</li> </ul>
		<ul style="list-style-type: none"> <li>Emergency Preparedness plan in place</li> </ul>
		<ul style="list-style-type: none"> <li>Have regular monitoring and auditing checks by health inspector and Vet.</li> </ul>
<b>Biological</b>	Biodiversity	<ul style="list-style-type: none"> <li>Pollution prevention measures to ensure protection of the water environment.</li> </ul>
		<ul style="list-style-type: none"> <li>Pollution prevention measures to ensure protection of the soil environment.</li> </ul>

## 5.2 Decommissioning Phase

In the event of a decommissioning phase in the Bounty Farm Ltd operation, the Company will aim to undertake the activities associated with the decommissioning of the Processing Plant in a safe manner. Therefore, it is the goal of the Bounty Farm Ltd. that all decommissioning activities are well managed to ensure that the surrounding environmental integrity is protected and maintained and complies with the Environmental Protection Act 1996. The potential environmental impacts and mitigation measures to be implemented by Bounty Farm Ltd for the duration of the decommissioning phase of project is outlined in *Table 16* below:

*Table 16: Decommissioning Phase Impacts and Mitigation Measures*

Parameters	Environmental Impacts	Mitigation Measures
<b>Decommissioning Phase</b>		
<b>Rehabilitation</b>	Environmental Degradation	<ul style="list-style-type: none"> <li>Area must be rehabilitated as soon as possible.</li> </ul>
		<ul style="list-style-type: none"> <li>Removal of infrastructure, equipment and waste materials</li> </ul>
		<ul style="list-style-type: none"> <li>Vegetation establishment</li> </ul>
		<ul style="list-style-type: none"> <li>Erosion prevention</li> </ul>
		<ul style="list-style-type: none"> <li>End land use requirement</li> </ul>
<b>Air Quality</b>	GHG & VOC	<ul style="list-style-type: none"> <li>Ensure regular checks and maintenance of vehicles and machinery</li> </ul>
		<ul style="list-style-type: none"> <li>Turn off equipment when not in use.</li> </ul>
		<ul style="list-style-type: none"> <li>Have in place and use an efficient machinery and work schedule.</li> </ul>
		<ul style="list-style-type: none"> <li>Develop a management plan to organise the efficient removal of materials and debris.</li> </ul>
		<ul style="list-style-type: none"> <li>Vehicles should be retrofitted with emission control equipment (such as exhaust mufflers)</li> </ul>
	Dust	<ul style="list-style-type: none"> <li>Spray water during demolition to control dust</li> </ul>
		<ul style="list-style-type: none"> <li>Transport and handling of material must be avoided under high wind conditions.</li> </ul>
		<ul style="list-style-type: none"> <li>All loads must be securely covered when being transported.</li> </ul>
		<ul style="list-style-type: none"> <li>Limit the height of stockpiles that face exposure to winds.</li> </ul>
		<ul style="list-style-type: none"> <li>Exposed stockpiles should be protected against strong winds.</li> </ul>
		<ul style="list-style-type: none"> <li>Shut down idle vehicles and equipment when appropriate.</li> </ul>
		<ul style="list-style-type: none"> <li>All vehicles and equipment should be regularly</li> </ul>



		checked and maintained.
		<ul style="list-style-type: none"> <li>Establish appropriate speed limit with the compound.</li> </ul>
<b>Aesthetics</b>	Visual	<ul style="list-style-type: none"> <li>Ensure, to remove and clear waste from site and demolish facilities to Haags Bosch landfill</li> </ul>
		<ul style="list-style-type: none"> <li>Confine clearing and construction work only to the area for demolition.</li> </ul>
		<ul style="list-style-type: none"> <li>Ensure that the site and general surroundings are kept in a tidy and neat manner.</li> </ul>
		<ul style="list-style-type: none"> <li>Stipulate period for demolition and through careful planning and implementation stick to scheduled timelines to complete demolition in a timely fashion.</li> </ul>
<b>Socio-economic</b>	Loss of employment	<ul style="list-style-type: none"> <li>Ensure that all social security payments are made during the project for workers</li> </ul>
	Project closure	<ul style="list-style-type: none"> <li>Severance package for employees</li> </ul>
		<ul style="list-style-type: none"> <li>See how best to absorb some of the workers in other production areas of the company</li> </ul>
	Loss of Revenue	<ul style="list-style-type: none"> <li>Research &amp; Development to Invest in other ventures</li> </ul>

### 5.3 Compliance

In the Co-operate Republic of Guyana, sources of air emissions must comply with the EPA Act 1996 cap 20:05 and accompanying Environmental Regulations and GNBS emission standards. The Bounty Farm Ltd. will ensure compliance with all the relevant Acts, Regulations, policy and standards. The Company will also comply with all the specific conditions outlined in the Environmental Permit to be issued. Bounty Farm Ltd will adhere to the Mitigation measures outlined in the EMP for the processing project. The Company's environmental policy reiterates and outlines Bounty Farm Ltd Commitment to Environmental Compliance and will take all necessary precautions to ensure minimum impacts to the environment and human health, ensuring environmental integrity and workers wellbeing.

## 6 Monitoring Plan

This chapter outlines the Environmental parameters that will be monitored during the project implementation. The plan also takes into consideration the documentation of information and the

roles and responsibilities of key organisations/institutions/ personnel during the operation of the Bounty Farm Ltd processing plant.

## 6.1 Responsibility

The Bounty Farm Ltd will appoint a designated personnel (*Table 17*) who will have direct oversight and responsibility to implement the EMP mitigation measures and monitoring programme for the operation plant. The designated personnel will coordinate with the plant operation management staff to ensure environmental integrity and workers health and safety. The designated personnel will also work in coordination with the EPA, and externally contacted environmental services to ensure compliance with the details of the EMP and the laws of Guyana.

*Table 17: Appointed Environmental Liaison*

Name	Designation	Office Contact No.
<b>Mr. David Fernandes</b>	Assistant Managing Director	(592) 600-8935

## 6.2 Training

The Bounty Farm Ltd will implement Environmental, and OS&H Awareness Training for staff to ensure adequate understanding of the Environmental and OS&H matters. The training will entail:

- OS&H and environmental risks associated with the work.
- General operation of the plant;
- Environmental management and mitigation measures in place;
- Specific job roles and procedures;
- Contingency plans and emergency procedures.
- Food safety, defence & fraud.

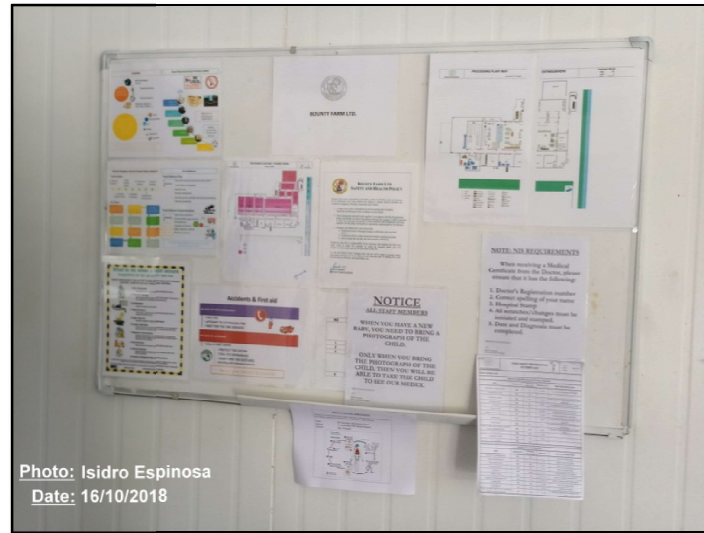
Training will also include:

- Induction training on appointment;
- Specialist training (as required for specific job role); and
- Refresher training as required.

In addition to the regular internal programmes for staff, the Bounty Farm Ltd also allows selected staff to undergo external training with agencies such as the Guyana Red Cross Society, the Pesticide Control Board and Food Safety Preventative Control Alliance (*Please refer to Appendix 13 for PCQI Training Certificate and Appendix 14 for Pest Control Applicators Exam Results*). The Company also has visible reminders to staff about environmental, OS&H and internal matters through a number signage and notice board (*please refer to Figure 45*)

*Figure 45: Sign and Notice Boards*





**Photos taken by:**Mr. Isidro Espinosa &Ms. Carlene Bascom (2018)

### 6.3 Monitoring Programme

This Monitoring Programme below(*Table 18*) outlines the environmental parameters to be monitored during the operation of the Bounty Farm Ltd.

*Table 18: Monitoring Programme*

Parameters	Responsibility	Frequency	Location of monitoring
<b>Air Quality</b> <ul style="list-style-type: none"> <li>• Particulate Matter (PM)</li> <li>• Total Suspended Particulate (TSP)</li> <li>• Total Volatile Organic Carbon (TVOC)</li> <li>• Formaldehyde (HCHO)</li> </ul>	Bounty Farm Ltd/ EES	Quarterly/ Biannually	1. Boundaries of the compound 2. Within the Project area
<b>Noise Levels</b> <ul style="list-style-type: none"> <li>• Decibels (dB)</li> </ul>	Bounty Farm Ltd/ EES	Quarterly/ Biannually	1. Boundaries of the compound 2. Within the Project area
<b>Surface Water Quality</b> <ul style="list-style-type: none"> <li>• pH</li> <li>• Temperature</li> <li>• Biological Oxygen Demand (BOD)</li> <li>• Chemical Oxygen Demand (COD)</li> <li>• Total Suspended Solid (TSS)</li> <li>• Oil &amp; Grease</li> <li>• Conductivity</li> <li>• Turbidity</li> <li>• Total Nitrogen</li> <li>• Nitrate</li> </ul>	Bounty Farm Ltd/ EES	Quarterly/ Biannually/ Monthly	Drains Within the Compound

• Phosphate			
<b>Aesthetics</b> • Visual • Waste Management	Bounty Farm Ltd	Daily/ Weekly	1. Waste Disposal Containers 2. General area in compound
<b>OS&amp;H</b> • Site Inspection • Health Inspection	Bounty Farm Ltd	Daily/ Weekly	Project area and compound
<b>Documentation</b> • Auditing	Bounty Farm Ltd/ EES	Annually	Data Filing and Records

## 6.4 Documentation of Information

Bounty Farm Ltd will establish and maintain relevant documentation/ report of records that are necessary to facilitate an effective and efficient operation. The reports established will comprise:

- Incident Report
- Complaint Report
- Equipment Fault & Maintenance Report
- OS&H and Environmental Inspection Report
- Monitoring Sampling Report

These reports will be used to maintain and determine the effectiveness of environmental measures and procedures implemented by the monitoring/ inspecting and reporting of key aspects to minimise environmental and OS&H effects.

### 6.4.1 Report Management

#### 6.4.1.1 Incident/ Accident Reports

An incident report is a report where all the details of specific incident is recorded. This report is submitted to the Quality Control Department for further actions and investigations on the specific incident. The report will also define steps for solutions and improvement.

Bounty Farm Ltd will make all efforts to safeguard the health and safety of workers with the provision of personnel protective gears, and employee training in environmental and OS&H awareness. Hence, to maintain a safe and healthy work environment at the operation, a thorough accident investigation will be undertaken, immediately after an incident or accident in order to



ascertain the cause, and the risk, and to recommend and implement corrective actions and/ preventative measures.

The persons discovering an incident/accident or fault must report the matter to the Supervisor and/ Quality Control Officer immediately. The relevant officer will gather and record the details about the matter/ occurrence. This report will be submitted to the Quality Control Manager for review and the necessary corrective action implemented.

#### *6.4.1.2 Complaint Reports*

A complaint is an expression of dissatisfaction; however it is made, about the standard of service, lack of action, or a matter of concern affecting an individual or group. The approach Bounty Farm Ltd will take to address complaints from groups or individuals, which can comprise staff/ communities/ customers/ or other stakeholders, is to be objective and conduct relevant investigations to address the matter of concern documented/ recorded.

Any complaint made against the service/ actions of Bounty Farm Ltd. will be comprehensively documented by the Supervisor on the ground and reported to the Quality Control Officer within 8 hours. All complaints received must then be acknowledged within five (5) working days. An investigation of the complaint is to be undertaken by the appropriate officers to analyse and recommend actions to resolve the complaint. The appropriate department will then be required to take the necessary actions recommended.

A response must be provided to the complainant within 30 working days on the outcome of their complaint and the action taken. If the complaint is still pending after 30 working days, feedback must be provided to the complainant at 15-day intervals until resolved. If the complaint cannot be resolved internally it must be referred to an external agency.

#### *6.4.1.3 Maintenance*

Maintenance is critical for Bounty Farm Ltd to be able to compete successfully in the poultry industry, both at the national and international levels. To be successful, the Company's production systems and equipment performance must be efficient to enhance the operating effectiveness, increase production quality, and maintain customer satisfaction, while reducing

overhead costs. For this to be effective, regular schedule maintenance will need to be aligned with the production logistic operation.

The principal responsibility of maintenance is to keep assets and equipment in good, safe, configured working condition to perform their intended functions; ensure the health and safety of workers; perform all maintenance activities in an efficient and effective manner; conserve and control the use of spare parts and material; operate utilities and conserve energy.

The regular scheduled or emergency maintenance at the plant will be performed by the maintenance technicians. Maintenance and fault reports will be submitted to the Maintenance Manager/ Superintendent for review. After maintenance, the conformation of the effectiveness shall be verified by the Department Manager, Supervisor, Maintenance Foreman and the Quality Control Officer at an agreed time.

#### *6.4.1.4 Monitoring*

Environmental monitoring is an important feature of Bounty Farm Ltd environmental programme. Monitoring is key to knowing whether the quality of our environment is maintained within the set parameter threshold or has worsen and needs to be addressed. Environmental Monitoring will provide the basis for making informed decisions about the quality of the environment; measure and evaluate the Company's environmental performance, analyse root cause of problems, assess compliance with legal requirements and ensure the health, well-being of workers/ visitors in the facility.

The Environmental Engineering Solutions (EES) in collaboration with the Quality Control Officer will conduct regular scheduled monitoring within, and around Bounty Farm Ltd operation at Timehri, EBD. Data measured and recorded will be analysed and evaluated by EES and a report will be submitted to the Quality Control Department Manager for review and the implementation of appropriate recommendations. After the implementation of the appropriate corrective/ preventative measure, confirmation of their effectiveness shall be verified by the Department Manager, Supervisor and the Quality Control Officer at an agreed time.

#### 6.4.1.5 *Inspections (Audits)*

Effective safety and health inspections would be one of the most important incident prevention tools in the Bounty Farm Ltd safety and health programme. The main purpose of the audit is to reveal potential dangers, confirm smooth working operation and ensure compliance of the Company's environmental, occupational safety and health:

- Guidelines,
- Measures implemented,
- Policies,
- Monitoring,
- Effective documentation/record keeping,
- Dissemination/ posting of material safety data sheets, instructions, and emergency procedures.
- Appropriate signage and notifications

The environmental/ OS&H inspection will be conducted by the Quality Control Officer based on scheduled inspections times. Upon the completion of the scheduled environmental, occupational safety and health inspections, non-conformity issues discovered will be recorded and submitted to the Manager of the Quality Control Department. The non-conformities represent potential breaches or a need for improvement. The root cause of the non-conformity will be investigated by the Quality Control Officers and the recommended appropriate corrective and/ preventative measure adopted for mitigation by the relevant department manager/ supervisor. After the implementation of the appropriate corrective/ preventative measure, confirmation of their effectiveness shall be verified by the Department Manager, Supervisor and the Quality Control Officer at an agreed time.

#### 6.4.2 *Annual reporting*

The Bounty Farm Ltd Quality Control Department in conjunction with the Environmental Engineering Solutions (EES) will prepare an Environmental Annual report, which will provide a record of all the complaints, incidents, enhancements and inspections documented on a monthly basis within the accounting year for the plant operation. This annual data will be made available to the relevant external governing bodies such as the Environmental Protection Agency upon request on compliance related matters or during the renewal process for an environmental permit.

## 6.5 Monitoring and Mitigation Cost

The estimated costs budget for the implementation of the monitoring plan and mitigation measures are outlined in *Table 19* below.

*Table 19: Monitoring and Mitigation Cost*

Activity	Estimate Cost (Guy\$) per year
<b><i>Training</i></b>	
Environmental & OS&H	Internal Expenditure
<b><i>Monitoring &amp; Inspection</i></b>	
Air Quality	\$250,000
Noise Levels	\$65,000
Water Quality	\$340,000
Aesthetics, OS&H	Internal Expenditure
Documentation	Internal Expenditure
<b>Mitigation Measures</b>	Internal Expenditure

## 7 Environmental Preparedness and Response Plan

The chapter outlines the Emergency Preparedness and Response Plan for the Bounty Farm Ltd. plant operation as follows:

### 7.1 Overview

According to the UNEP's Governing Council, an environmental emergency is defined as, "sudden-onset disasters or accidents resulting from natural, technological or human-induced factors, or a combination of these, which causes or threatens to cause severe environmental damage as well as loss of human lives and property" (UNEP, 2002). In addition, an emergency is defined as a serious, unexpected, and potentially dangerous situation requiring immediate action (Concise Oxford English Dictionary 11th Edition). Therefore, in light of the operation activities that will be undertaken by the Bounty Farm Ltd. plant operations, possible emergencies can arise. The Bounty Farm Ltd has taken a precautionary approach to establish an Emergency Preparedness and Response Plan in the event of the occurrence of an emergency. The developed plan is intended to provide an overview of the Company's emergency procedures and contact details in the event of an emergency.

### 7.2 Purpose of the EPRP

The purpose of this Emergency Preparedness and Response Plan is to provide clear planned procedures, coordinated strategy and information that will enable Bounty Farm Ltd to prepare for and effectively respond to emergency situations. The primary objective of this plan is to help prepare for, and plan for potential impacts that could result from the operation, and maintenance of the plant. The overall goals of the plan will be by all means necessary to:

- Ensure the preservation of life
- Identify and assess potential hazards and emergencies,
- Prevent potential adverse impacts to human health, safety, property, and the environment,
- Prevent the occurrence of incidents and accidents,
- Assure preparedness in the event of an emergency,
- Provide an early organised response to emergencies,
- Ensure effective communication of emergency procedures,
- Restore essential operations as soon as possible, and



- Ensure product quality control.

### 7.3 Responsibility

The protection of the environment, product quality control, the health and safety of all employees, and the public are integral aspects of the Bounty Farm Ltd operation activities. As such the Bounty Farm Ltd Crisis Management Committee is responsible for the emergency planning and the effective management and response to any emergency situation related to the operation, and maintenance of the processing plant. The Company is thus highly committed to the process to ensure timely and appropriate responses, as Bounty Farm Ltd. values highly the contribution of their staff to safeguard their health and well-being.

### 7.4 Identification of an Emergency

Bounty Farm Ltd is very highly committed to quality control, so much so that it has implemented a Hazard Analysis and Critical Control Points (HACCP) plan for possible food contamination hazards such as microbial, allergens, chemical, physical and GMO material covering the poultry processing operation process (*please refer to Appendix 15 for HACCP Team*).

The operation and general maintenance of the company can possibly pose a number of potential hazards to both the operation and life of personnel. As such the most effective response to any given situation is to have awareness of the hazards, its potential effects and consequences. Additionally, one must have a good understanding of the resources and actions necessary to respond. Therefore, the possible types of Emergencies that can possibly arise and be encountered at the Bounty Farm Ltd Plant are:

- Medical emergencies such as injuries and heart attack,
- Hazardous Material spills (release) from chemicals and fuels.
- Natural events such as flooding
- Security such as crime and threats to personnel and plant.
- Fires such as electrical and fuel
- Product Contamination such as broken glass

## 7.5 Emergency procedures

Emergency response procedures manage events that are not anticipated, almost totally unlikely to occur or reasonably anticipated. It is therefore imperative to plan for worst case scenarios or adopt general procedures. It is also important to recognize that although highly unlikely, an emergency can have serious impacts well beyond the individual or the operation involved. Therefore, every precautionary measure will be taken and put in place to ensure the life and safety of all staff and visitors to the plant.

Hence, all staff has a role to play in the event of an emergency and are constantly made aware of emergency procedures. The roles may include rescue, sounding of the alarm, extinguishing of fires, first aid attendance, or simply staying out of the way of designated emergency response personnel. Possible emergencies include, but are not limited to the following:

- Fires/ explosions
- Accidents/ medical situations
- Oil/ Fuel/chemical Spills (Hazardous)
- Criminal activity/ violence (Security)
- Product contamination (Quality Control)

The reactions of workers in the event of an emergency depend on how well the workers are prepared for an emergency. Henceforth, Bounty Farm Ltd will ensure that all employees are familiar with, and know of the following:

- Layout of the Plant identifying all emergency exits,
- Location of alarm points,
- Location of fire extinguisher,
- Location of spill kits with instructions,
- A place of safe refuge in the event of an emergency.
- Excavation procedure,
- The internal and external emergency contact list.

### 7.5.1 Emergency events

#### **Fires**

In the event of a fire anywhere in the compound:

- Activate the building fire alarm system closest to you. Notify security, emergency contacts and the fire station.
- Place a towel over your nose and mouth, if smoke is present.
- Rescue/ remove individuals in immediate danger/ harm by assisting them from the area. If possible when leaving, close all doors behind you.
- If possible
  - Confine/ contain the fire/ smoke/ toxic combustion to the area where the fire started as much as possible. Close all doors and windows, cutting flow of oxygen to the fire and preventing smoke from spreading.
  - Extinguish fires; staff should only attempt to extinguish small, contained fires where their safety is assured, have an escape route behind them and other staff members are available to assist.
  - Turn off all equipment.
- Evacuate the building immediately via the nearest exist and move to the closest area furthest away from the event. Points to remember when evacuating are:
  - Do not delay on hearing the alarm- evacuate immediately.
  - Walk don't run
  - When evacuating, do not return for personal belongings
  - Keep calm and assist others to exist.
  - If on fire, stop drop and roll.
  - Before opening any door check knobs, if hot use alternate, exist. If the knob is cool, open slightly and if there is hot draft or smoke visible use alternate exist.
  - If you are not near your work area/ station when the alarm sounds, DO NOT RETURN to the work area/ station until further instructed.
- If unable to evacuate
  - Close any doors and seal all cracks to reduce fire and smoke spread.

- Call security/ and contact from emergency list and inform where you are located.  
If possible, signal to emergency team by waving out any window or by any means possible.
- Turn off and unplug all electrical equipment.
- Move to the most protected area in the room for refuge.
- Crouch low to the floor, if smoke enters the room/ area.
- Cover nose and mouth with towel.
- If on fire, stop drop and roll.
- Remain calm, do not panic and listen for any instructions given by rescuers.

### *Considerations*

1. Workers are to follow the directions of emergency personnel.
2. Emergency evacuation drills will be done periodically.
3. Unauthorised workers are not to tamper with the fire extinguishers or alarms.
4. Workers are asked to report any malfunction of fire equipment.
5. Audits should be performed routinely to ensure path to exists are lit, cleared and never blocked.

### **Medical Situation**

In the event of a medical situation or accident:

- Assess the situation to the best of your ability.
- Call for the trained first aid attendant, providing as much information as possible.
- The first aid attendant provides the necessary first aid care.
- If seriously ill/ injured, alert the nearest hospital and transfer the patient to the hospital
  - Do not attempt to move seriously injured persons without instructions from the trained medical first aid attendants'/ hospital paramedics.

### *If Burnt*

- Cool the burn in cold running water until pain is relieved.
  - Do not use ice, since this can freeze skin and cause more damage.
  - Do not pop the burn blisters
- Alert/ call the first aid attendant, providing as much information as possible.
- The first-aid attendant provides the necessary first aid care.

- If required, seek further medical attention.

#### *If Chemical Exposure*

- Immediately remove contaminated clothing.
- Flush the affected area (skin/ eyes) with running water for 15 minutes.
- Alert/ call the first-aid attendant, providing as much information as possible and the chemical involved.
- Alert the hospital and seek medical attention from the Doctor.

#### **Glass/Brittle Plastics (Quality Control)**

- No glass or brittle plastics are to be used in the Processing Plant, except where absolutely necessary.
- No glass should be brought into Processing Plant by the employees in their personal belongings.
- Employees must report eyeglass breakage and lost contacts lenses.
- A specific cupboard dedicated to the “broken glass” equipment is located in the Store Room. There is a brush, a pan, and a covered box to use for waste disposal. The cupboard is secured by a padlock (keys available in the office).
  - If glass or hard plastic breakage happens, the Supervisors and Quality Control Department Personnel must be informed immediately,
  - All production activity 10 feet around the breakage must stop,
  - Broken glass or hard plastic is thrown away in specific bin for broken glass,
  - The floor must be swept in order to remove the smallest shards,
  - All products in open bags and crates must be emptied and thrown away,
  - Ten (10) feet around the breakage must be swept; full product already sealed must be swept too,
  - The Quality Control Department Personnel and Supervisor verify that the area is correctly cleaned and then can authorize the work to resume,
  - The Quality Control Department Personnel records the incident in the “Broken glass form”,
  - Glass or brittle plastic breakage must be disposed in a trash bag and removed from the Processing Plant and the compound as soon as possible,



- Potentially contaminated products must be disposed and inspected prior to release.
- List of Glass and Brittle Plastics is maintained by the Quality Control Department; and a monthly inspection is conducted to ensure that any accidental breakage is noted. All glass, brittle and hard plastic items on the list cover the entire Processing Plant where it could jeopardize the product.

### **Infectious Diseases (Quality Control)**

If Employees of the Company, Visitors or External Service Providers have or are suspected to have the following **symptoms**,

- Upset stomach, vomiting
- Diarrhoea
- Skin rash or disease, sores, boils, infected wounds

or are known to have a food-borne disease, they must immediately

- inform the security guard who will report this immediately to the Processing Plant Manager.
- The Processing Plant Manager will take the appropriate measures to protect the food line.
- If at work or during the visit, they must not engage in food handling and
- Should seek medical attention.

### **Spill**

In the event of spillage, the following steps must be respected:

- In case of spillage, the staff must inform the Supervisor immediately,
- The Supervisor and/or the Quality Control Personnel isolate the spillage by the creation of a secured perimeter of 10 feet around the incident,
- A worker can be appointed to secure the perimeter and ensure that no activities continue and that nobody will walk within the perimeter (risk of spreading and contamination),
- The Supervisor identifies and removes the source of spillage with protective equipment,
- The Supervisor designates two (2) workers to keep the area safe,
- The Supervisor uplifts the spillage kit from the cupboard located in the Plant Store (keys are in the office),

- With the spillage kit, the two (2) workers designated commence the spillage cleaning operation under the control of the Supervisor. If products are affected, they must be discarded,
- At the end of the spillage cleaning operation, the Supervisor inspects the area to ensure that cross contamination has been avoided, and gives the authorization to resume activities in the area,
- Supervisors and or Quality Control Personnel must fill up an incident report.

*Please refer to Appendix 16 for list of trained Bounty Farm Ltd personnel in Spill Management*

### **Intrusion and Theft (Criminal Activity)**

- the Security Guard must do the turn of security checks every two (2) hours to secure the site and to prevent unauthorized entry and theft.
- In case of an intrusion by unauthorized person,
  - the Security Guard must escort him to the entrance of the Processing Plant.
  - He must call the Processing Plant Manager or the Assistant Managing Director and report the incident. The Processing Plant Manager is in charge to authorize or non-authorize the entrance to the site.
- In case of termination of job of an Employee, the Processing Plant Manager will advise Security Guard to deny the entrance to the concerned staff.
- If the person is authorized, the control of non-employees' policies shall be applied, if not, the unauthorized person must leave the site as soon as possible. During his/her presence, the Security Guard or the Processing Plant Manager must remain with him/her.
- In accordance of the truck schedule, the loading and unloading of trucks are scheduled to prevent risk of intrusion and theft. The Security Guard or the Stores Manager must control the items.
- The cameras (CCTV) are in place to prevent intrusion and theft.
- Periodically, a perimeter of the site is randomly chosen to be monitored for suspicious activities. The Quality Control Officer shall do a report and an action plan if it is necessary to be applied by the relevant persons.
- Out of the period of activity, after the production, the Security Guards shall ensure that the high risk areas have by padlocks. The high risk areas are:
  - The gas and diesel tanks

- The water station area and tanks
  - The finished products storage
  - The store
  - The generator area
  - The production areas
  - Refrigeration areas
- Unexpected changes in inventory (product or equipment) are reported to the appropriate personnel by Administrative Department or Supervisors.
  - Any intrusion or theft must be reported and investigated by the Security Guard, the Assistant Managing Director and the Processing Plant Manager.
  - If the situation by severity requires the support of the relevant authorities (Police, Coast Guard, Bombers), the Assistant Managing Director is required to call and to involve the relevant authorities.

#### **Malicious Acts (Criminal Activities)**

- Each Employee, Supervisors, Security Guards and Managers have the ability to report any suspicious activity and unauthorized person or vehicle.
- The measures of the company to prevent the malicious acts are:
  - Suspicious packages are reported to appropriate personnel (Security Guard, Supervisors or Managers).
  - The fuel bond is protected.
  - The restricted areas must be respected (security map).
  - Previously unattended materials are checked before use.
  - Access to ingredients and packaged product are restricted.
  - The products are examined for possible tampering and are controlled.
  - The chemical and hazardous materials are in restricted area and locked with padlock.
  - Generator area is protected.
  - The boiler area is secured.
  - The water pump and water reserve are secured.
  - CCTVs are available on the food line and the site.
  - Access to computer system is protected through passwords.

- Employees have restrictions on what they can bring in or take from facility (no phones and no cameras).
- Color codes for uniform employees are in place to detect inappropriate person.
- The customer complaints are investigated
- Abnormal inventory must be reported

## 7.6 Emergency Equipment

Bounty Farm Ltd. will have in place several key equipment on site that will be utilise in the event of an emergency. The equipment are as follows:

- Fire extinguishers,
- Sand Buckets,
- Spill kits,
- First aid kits,
- Alarms, and
- Smoke Detectors.

### **First-Aid Kits**

By definition First-Aid is the immediate and temporary care/help given to the victim of an accident or sudden illness until professional medical treatment and help can be obtained. First-aid response is important in an emergency because, quick first-aid response:

- Could mean the difference between life and death.
- Can reduce the severity of a particular injury obtained/or illness.

Due to carelessness and/or negligence on the part of employees around equipment, possible injuries can occur. As such, Bounty Farm Ltd have numerous well-stocked First-Aid Kits on site within the plant. The company will ensure that each kit is clearly labelled and easily identifiable. There should also be instruction guidelines on the utilisation of the kit's contents. Bounty Farm Ltd will be responsible for the establishment, maintenance, and to visibly post all information regarding adequate first-aid supplies, providers, equipment and location in the event of an onsite injury.

The Company will take all necessary precautions to designate first-aid attendants or Medics (*please refer to Appendix 17for a list of trained Guyana Red Cross first-aid attendants*). The

names and contact number of the trained first-aid attendants will be posted alongside the first-aid kits sufficient for the number of employees within the operation. The first-aid kits will be regularly inspected and replenished as need requires by Managers and Supervisors. Records will be kept by Managers and Supervisors on what has been used from the first-aid kit at each point location, by whom, and the reason for its use. This will be done in order to keep an inventory record of the first-aid supplies.

It is the responsibility of all managers, supervisors and staff to be familiar with the contents of the first-aid kits and have basic first-aid knowledge to assess an injured person and provide any immediate medical assistance; such as CPR (if qualified), maintain open airways if breathing is an issue, prevent heavy blood loss; while awaiting a trained first-aid attendant. Hence, in the event of an accident or emergency, staff must immediately alert and summon the first-aid attendant or Medic and provide as much information as possible. The injured party must not be moved unless it is of necessity to protect their lives or to prevent further injury from occurring.

First-aid attendants or Medics will be qualified health care professionals trained in first-aid for:

- Respiratory arrest, cardiac arrest (CPR), haemorrhage, lacerations/abrasions,
- Amputations, musculoskeletal injuries, shock, eye injuries, burns,
- Loss of consciousness, extreme temperature exposure (hypothermia/hyperthermia),
- Paralysis, poisoning, loss of mental functioning, and drug overdose.
- Application of dressings and slings.
- Treatment of strains, sprains, fractures, bites, stings, contact with poisonous plants/animals/ material.
- Immobilization, handling and transporting injured persons.

### **First-Aid Content**

The acceptable quantity of first-aid kits/materials to number of workers will be determined by the Quality Control Department. The Quality Control Department will also be responsible through the first-aid attendants/supervisors to maintain the contents of each first-aid kit/materials. The first-aid kit and materials should be stored in a dust/water proof appropriate container. Each first-aid kit shall contain, but not limited to the following items *Table 20*:



*Table 20: Contents of the First-Aid Kit*

Contents of the First-Aid Kit	
Gauze pads	Latex gloves
Large gauze pads (at least 8" x 10")	Resuscitation equipment such as resuscitation bag, airway, or protective facemask
Box adhesive bandages (Band-Aids)	Elastic wraps
Package gauze roller bandage at least 2" wide	Splint
Triangular bandages	Directions for requesting emergency assistance
Rubbing alcohol / alcohol wipes	Burn cream
Scissors	Snake bite kit
Tweezers	Ammonia inhalants
Adhesive tapes	Cold packs
Butterfly closures	Anti-diarrhoeal Medicine
Eye wash kit	Ibuprofen, Panadol (Pain tablets)
Hand mirror	Hand Sanitizer
Cotton balls	Antiseptic Cream
Limacol	Antibiotic Ointment

Additional first-aid materials needed but not limited to the following are:

- Two (2) clean acceptable Blankets
- Rigid stretcher

### **Spill Kits**

A spill is an accidental release of hazardous substances such as fuel, oil, lubricants or chemicals in the environment and if not controlled can have adverse impacts on the environment and potential fire hazard. Therefore, Bounty Farm Ltd. has recognised that spills - relating to fuel, oil, and other lubricants - may emanate from the operation. If this occurs, it can pose a great threat and cause adverse impacts to the environment. In this regard, the company will acquire spill kits to be used for remedial actions against any spills occurring onsite. Basically, a spill kit is a collection of items that are used to control, contain and clean up spills in the environment.

A well-stocked spill kit saves on much needed time to contain and clean up the environment in the event of a spill, because all the items needed to manage the spill are in one place and ready for use and can be transported right to the spill. The spill kit usually comprises absorbent material, neutralising material, PPE, and disposal bags. Clearly labelled kits will be strategically placed in the plant and the Maintenance Department where oil, fuel, or any other lubricants are utilised. Key personnel whose duties include constant contact with these materials (such as

drivers etc.) and supervisors will be identified and trained in the contents of all spill kits and the procedure(s) to be followed in the event of a spill.

### **Fire Extinguishers and Sand Buckets**

A fire extinguisher basically is a portable device which is used to control and quench manageable fires in the event of an emergency. Therefore, fire extinguisher is an important equipment to have in fire defence and preventing loss of life and property and shouldn't be overlooked or brushed aside. The reason being is that a small fire in a matter of minutes can spread and destroy an entire structure. However, while proper procedure and training can minimize the chances of an accidental fire occurring in the plant, one must still be prepared to deal with a fire in the event it occurs. Bounty Farm Ltd. will ensure that the plant is equipped with functional fire extinguishers. These extinguishers will be located at strategic points within the compound (*Figure 46*) Please refer to Appendix 18 for Location of Processing Plant Fire Extinguishers. These strategic points will be clearly marked and accessible to employees who will have knowledge of their position.

*Figure 46: Fire Extinguishers & Sand Bucket*



Photo taken by: Mr. Isidro Espinosa (2018)

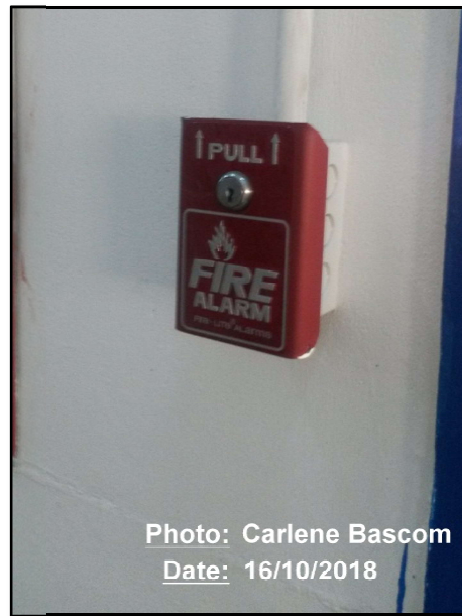
Fire extinguishers will be inspected on a monthly basis by the Managers of the site. Moreover, the extinguishers will undergo an official inspection by an officer of the Guyana Fire Service (GFS), on a biannual (six months) basis to ensure that they are functioning effectively and are in accordance with recommendations of the GFS with regards to the maintenance of fire extinguishers. Additionally, all employees of the Bounty Farm Ltd are required to undergo basic training in the utilisation of a fire extinguisher. It is of vital importance that staff have a general understanding of the proper way to use and handle a fire extinguisher, so as to prevent damage to property and safeguard life in the event of a fire.

Further, sand buckets will be located at strategic locations throughout the site (*Figure 46*). These will be used to supplement the extinguishing actions in the event of a fire, especially if a fire extinguisher is not immediately available at that point. It should be noted that personnel must never try to use the fire extinguisher on an out of control fire, as this action can endanger the personnel. Therefore, in the event a fire becomes out of control, Managers/ Supervisors must ensure that the trained professionals are called i.e. the fire station to prevent loss of life.

### **Fire Alarms**

Alarms are key electronic devices that can be used as early audio warning systems to notify all workers in the plant that an evacuation is required, or warn that danger is present such as a fire emergency. These alarms will be activated manually in the event of an emergency. Therefore, Bounty Farm Ltd has installed a fire alarm system (*Figure 47*) to be able to effectively alert all staff in the event of an emergency situation. Due to the importance of the alarm system it is key that the system is not triggered or pranked so that when there is need for initiation persons respond promptly. Therefore, designated staff will be authorised by Bounty Farm Ltd to sound the alarm in the event of an emergency. Also, in the event of a system test being conducted, the staff will be notified of the day and time of the test or drill exercise, to ensure they are in proper working order.

*Figure 47: Fire Alarm*

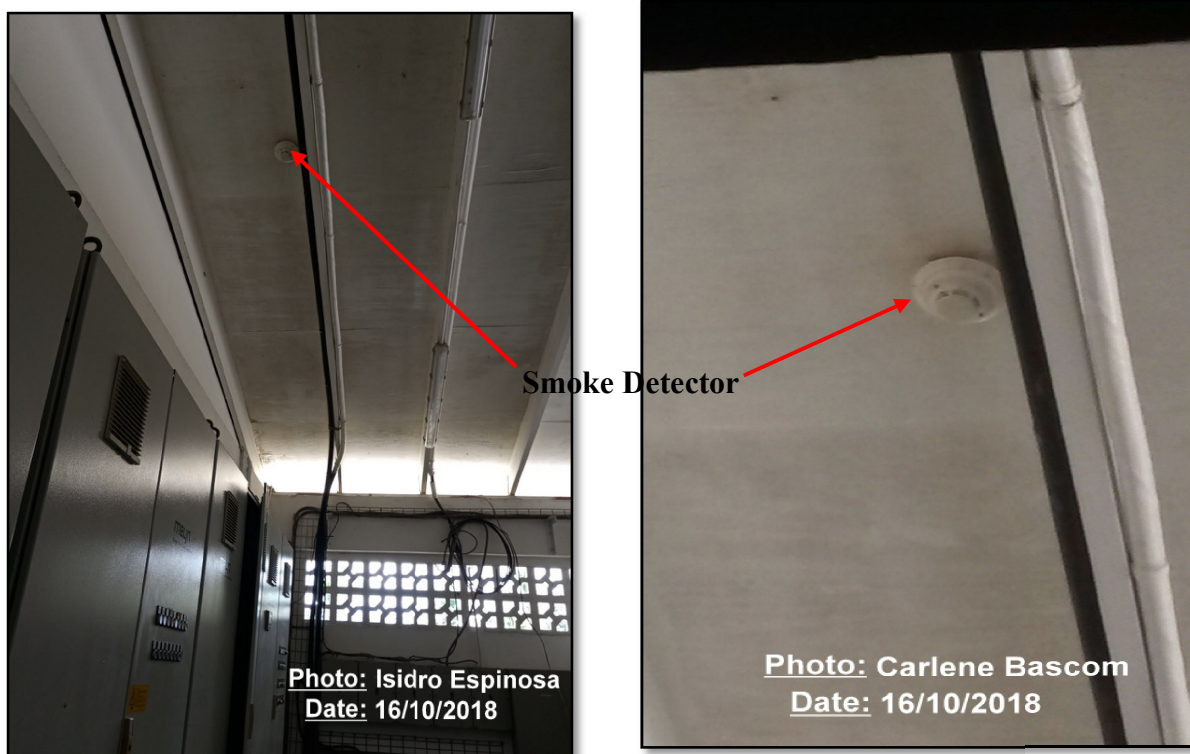


**Photo taken by:** Ms.Carlene Bascom (2018)

### **Smoke Detectors**

Visible identification of smoke more than often signifies that a fire is nearby which can be dangerous to life and property. A smoke detector can be used as a good early audio warning signal that a fire is occurring, and prompt action can extinguish the fire before it spreads. Therefore, smoke detectors are key devices that can be used as a reliable way to detect and sound an alarm that smoke is present. In addition, the smoke detectors can also be used as a prevention tool to deter smoking within the plant and near flammable substances to reduce possible risk of fire ignition and combustion. In this respect, Bounty Farm Ltd has installed smoke detectors (*Figure 48*) in key strategic locations and will ensure that all detectors are regularly maintained and kept in good working order.

*Figure 48: Smoke Detector*



**Photos taken by:**Mr. Isidro Espinosa and Ms. Carlene Bascom (2018)

## 7.7 Training and Drills Exercises

Bounty Farm Ltd will be required to do training in environmental matters, and OS&H and conduct drill exercises such as fires, spills, mock recovery, and medical emergency scenario situations. Such training and drill exercise scenarios are to educate staff and develop their understanding of the elements, and the actions necessary to respond to an emergency, so that no life is loss and no one left behind. Mock recovery drills especially will also be conducted annually to practice a recall scenario to safeguard customer's health.

The training and drill exercises to be undertaken will also be used by the Company to test and evaluate compliance and implementation of the Emergency Preparedness and Response Plan. Such training and exercises conducted will also aid in the improvement and update of the plan as needed. The Bounty Farm Ltd. will conduct staff orientation training for all new employees and will conduct regular training and drill exercises on a biannual basis. The training and drill exercises will include, but not be limited to:

- emergency contact list,

- Emergency identification,
- Evacuations and assembly point,
- Emergency scenarios,
- Emergency equipment use,
- Waste management.

## 7.8 Emergency Contact Details

In the event of an emergency the personnel and institutions that should be contacted are listed in *Table 21* on the following page. The internal contact list will be posted on the plant at a strategic location to be seen by staff. Contacts on the list will be called as appropriate in the event of an emergency. The primary duties of the emergency contacts are to ensure the safety of the staff and visitors to the plant site during an emergency.

Each member of the Crisis Management Committee must be available in case of an emergency situation 24hr/7 days a week. Registered Yum! Emergency contacts are shaded in the background.

*Table 21: Internal Emergency Contact*

Designation	Name	Responsibility	Contact Number
<b>Managing Director</b>	Mr. Patrick De Groot	Liaise with legal Counsel	(592) 691-0299
<b>Assistant Managing Director</b>	Mr. David Fernandes	Decision making. External communication with customers, media and authorities.	(592) 600-8935
<b>Processing Plant Manager</b>	Mr. Keith Fernandes	Problem Investigation	(592) 646-7979
<b>Quality Control Officer</b>	Mr. Peter Ho-A-Lim	Problem Investigation	(592) 661-7910
<b>Production Supervisor</b>	Mr. Dhanraj Persaud	Product recall: Localisation via traceability information	(592) 608-1538

The external emergency contact list (*Table 22*) will be posted in the main administrative offices and offices of the internal contact. This external emergency contact list consists of a list of emergency contact numbers for the relevant external agencies, in the event that an emergency has gone beyond the control of the internal company's emergency response actions; or requires further attention. The Managers will therefore be able to contact the following relevant key agencies and institutions:



*Table 22: External Emergency Contact*

Organisation	Telephone Number
Timehri Health Centre	(592) 261-4221
Diamond Hospital	(592) 265-4681-5
Fire Station (Timehri)	(592) 261-2291, 261-2211
Environmental Protection Agency	(592) 225-5467-69, 225-5471-72, 225-6044/48, 225-0506
Guyana Police Station (Timehri)	(592) 261-2222
Guyana Police Force A Division	(592) 225-6940

## 7.9 Review

The emergency preparedness and response plan established by the Bounty Farm Ltd will be reviewed on an annual basis to determine relevancy and effectiveness of training, drill exercises, response process and emergency equipment. Where it is deemed necessary, improvements and updates to the plan will be made and instituted. The plan will also be reviewed, in the event an emergency was to occur at the Bounty Farm Ltd, to ensure a smooth process and effectiveness. Any amendments to the plan will be further communicated to all staff.

## 8 Closing Statement

The preceding chapters of this Environmental Management Plan described the plant operation processes for the poultry operation activities of Bounty Farm Ltd, and the potential negative environmental impacts of the operations. The document also identified a range of mitigation measures, the monitoring plan and an emergency preparedness response plan.

Consequently, this Environmental Management Plan document provides a clear understanding of the environmental and social impacts from the poultry operations. The Environmental aspects of this operation have been closely analysed to minimise adverse social, environmental, safety and health impacts. With careful management and monitoring, there should be minimal adverse impacts on workers' safety, health and well-being; and also the environment.

### 8.1 Recommendation

Based on the reporting and assessment it is recommended that Bounty Farm Ltd. Poultry Production Operation install a Grease Interceptor as an additional wastewater treatment measure. The Grease Interceptor would facilitate further wastewater processing to compliment the functional Centrifuge which removes large solids from the wastewater.

The main goal in the installation of a Grease Interceptor is to further process wastewater before discharge in order to remove fat, oil, grease and other sediments from the wastewater. Therefore, in keeping with environmental commitments Bounty Farm Ltd. will install a Grease Interceptor that best fits, and compliments the operations' wastewater generation capacity.

Grease Interceptor sizes range from 350 gals up to 10,000 gals' liquid holding capacity and from 1,765 lb to 50,400 lb grease sludge capacity. If interceptors are required to be of larger capacity, companies like Rockford Separators (Interceptors Direct) manufacture custom made orders (Interceptors Direct, 2018)(Rockford Separators, 2018).

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## 10 Appendices

Appendix 1: Layout of compound facility and infrastructure

Appendix 2: Location of Bioluminescence Testing

Appendix 3: Processing Plan Hygienic Zone

Appendix 4: Rat Trap Locations

Appendix 5: Fly Trap Locations

Appendix 6: Pest Operators: management of rat stations

Appendix 7: Brooding Temperature and Humidity Chart

Appendix 8: Feed Mill Flow Diagram

Appendix 9: The Processing Plant Flow Diagram

Appendix 10: The Plant Map

Appendix 11: Kaizen Analysis Data Report 1

Appendix 12: Kaizen Analysis Data Report 2

Appendix 13: PCQI Training Certificates

Appendix 14: Pest Control Applicators Exam Results

Appendix 15: HACCP Team

Appendix 16: List of trained Bounty Farm Ltd personnel in Spill Management

Appendix 17: A list of trained Guyana Red Cross first aid attendants

Appendix 18: Location of Processing Plant Fire Extinguishers