ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

CPA 30
Methane Recovery and Power Generation Project

Ref. No. 5979-0021
CPA-30 Methane Recovery and Combustion with Renewable Energy Generation from Anaerobic Animal Manure Management Systems under the Land Bank of the Philippines' Carbon Finance Support Facility

June 2019

LIST OF ACRONYMS

BOD	Biological Oxygen Demand
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CFSF	Carbon Finance Support Facility
CMR	Compliance Monitoring Report
CPA	Component Project Activity
DECORP	Dagupan Electric Corporation
DENR	Department of Environment and Natural Resources
DNA	Designated National Authority
DP	Discharge Permit
ECC	Environmental Compliance Certificate
EMB	Environmental Management Bureau
EPMD	Environmental Program and Management Department
ESMP	Environmental and Social Management Plan
ESSF	Environmental and Social Safeguards Framework
LBP	Land Bank of the Philippines
MOA	Memorandum of Agreement
MRF	Methane Recovery Facility
MSDS	Materials Safety Data Sheet
PCO	Pollution Control Officer
P.D.	Presidential Decree
PoA	Program of Activity
PPE	Personal Protective Equipment
PTO	Permit to Operate
R.A.	Republic Act
SMR	Self-Monitoring Report
SPA	Subproject Agreement
TSD	Treatment, Storage, Disposal
TSS	Total Suspended Solids
WTF	Water Treatment Facility

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PURPOSE OF THE DOCUMENT

This Environmental and Social Management Plan (ESMP) is prepared as part of the requirements of the Safeguards Framework for Clean Development Mechanism (CDM) projects implemented under the Carbon Finance Support Facility (CFSF) of the Land Bank of the Philippines (LBP). The Environmental and Social Safeguards Framework (ESSF) was developed to ensure the establishment of protection, compliance, and mitigation measures for relevant environmental and social aspects of projects under the CDM program which covers the Methane Recovery and Power Generation Projects in pig farms.

Scope

Since the Project is a key component of Luke One Thirty Seven Agri Farm's wastewater treatment facility (WWTF) – which handles the primary waste the piggery produces (manure) – this ESMP will cover the operations of the entire pig farm described herein. It will, however, highlight the management of impacts attributable to or associated with the Project.

1 PROJECT SUMMARY

The Methane Recovery and Power Generation Project of Luke One Thirty Seven Agri Farm owned by Cristina V. Daniel is an initiative developed under LANDBANK's CFSF. Its goal is to capture greenhouse gases, particularly methane from piggery wastewaters that would otherwise dissipate into the atmosphere, and convert them into electrical energy.

1.1 Proponent Profile

Proponent:	Cristina V. Daniel / Luke One Thirty Seven Agri Farm
Business Address:	0302 Gulod St., Barangay Pinaod, San Ildefonso, Bulacan, Philippines
CEO:	Cristina V. Daniel
Farm Name:	Luke One Thirty Seven Agri Farm
Project Site:	Barangay Pala-pala, San Ildefonso, Bulacan, Philippines
Farm Coordinates:	15.047359, 120.959104
Project Type:	Livestock Project
Philippine Standard Industrial Classification:	0145 - Hog Farming

Contact Persons

Luke One Thirty Seven Agri Farm

Farm Manager Manager:	Russel M. Palacido
Telephone No.:	(63) 977 8257929
Pollution Control Officer:	Ramel B. Daniel
Telephone No.:	(63) 932 8914590

LANDBANK
Lending Programs

Management Group:	Emellie V. Tamayo
Designation:	Head / First Vice President
Telephone No.:	(632) 405-7309
Fax No.:	(632) 528-8542

Environmental Program

Management Department:	Prudencio E. Calado III
Designation:	Head / Assistant Vice President
Telephone No.:	(632) 405-7339
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1.2 Pig Farm Profile

Farm area:	20,440 m^2
Production:	Farrow-to-Finish
Housing type:	Conventional sheds, open-sided
Capacity :	6,000 heads
Average population:	5,890 heads
Start of operation:	2012
Number of employees:	37 (including the owners)

Luke One Thirty Seven Agri Farm is a small family-run business engaged in hog breeding and raising. It is currently able and licensed (as per its Environmental Compliance Certificate) to house a maximum of 6,000 heads.

The Farm is entirely powered by a grid of a local concessionaire, Manila Electric Company (MERALCO), but will soon utilize electricity from biogas through the Project. Water for its operations is sourced from five deep wells within and without its premises. The site layout in Figure 1 shows the basic facilities of the Farm.

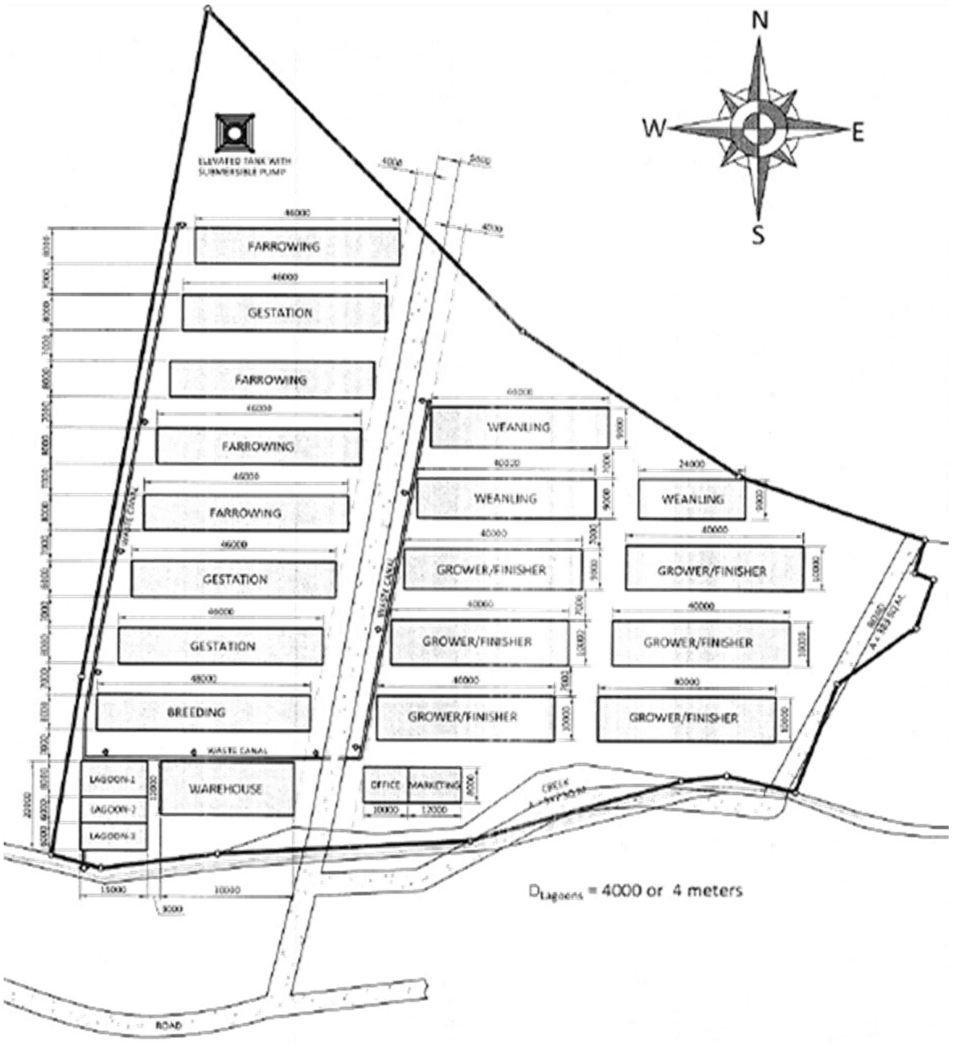

Figure 1. Site layout of Luke One Thirty Seven Agri Farm

1.3 Project Description

The Project covers the installation and operation of an anaerobic digester system and its ancillary facilities including post-treatment wastewater lagoons and a biogas-fueled electricity generation system. The biodigester and the power generation unit are collectively referred to herein as methane recovery facility (MRF).

1.3.1 Components and Design

Luke One Thirty Seven Agri Farm's wastewater treatment process features three phases:

- *Pre-Treatment*, which involves mechanical removal of indigestible materials from and the breaking down of relatively large digestible particles in wastewaters prior to entering the reactors;
- *Anaerobic digestion*, or the disintegration of biodegradable materials in the wastewaters through biological processes facilitated by microbes which thrive in the conditions promoted by the reactor; and
- *Post-Treatment* of biogas, effluent, and sludge resulting from anaerobic digestion.

In general, the WWTF is mainly composed of a collecting tank, a covered concrete lagoon (hybrid channel), and a series of earthen clarifying lagoons (see Image). The interior of the biodigester is similar to a scaled up sand trap. A biogas generator set basically consists the MRF.

Overall, the anaerobic digester have been intended to accommodate wastes generated by the farm's maximum pig population (6,000 heads) and capture enough biogas to run the project's facilities with a net energy requirement of zero. The design and layout of the WWTF are in the construction plans in Appendix A. Properties and specifications of the WWT-MRF, including capacities, outputs, and efficiencies, will be detailed in the succeeding version of this ESMP (see Section 4).

Table 1 presents the general aspects and technical features of each of these systems.

Table 1. Specifications of Luke One Thirty Seven Agri Farm's Wastewater Treatment Facility-Methane Recovery Facility

Phase		Process	Component	No. of Units	Description / Equipment
Pre-treatment		settling	pre-storage settling tank	2	concrete 2 x 3 x 5 m (height) ---
Anaerobic treatment		anaerobic digestion / fermentation	reactor	1	earthen lagoon, lined and covered with 1 mm HDPE 913 m^3
Post-treatment	Biogas	combustion	scrubber system	1	-
			generator set	1	125 kva
	Effluent	clarification (settling, aeration)	open lagoon	2	earthen lagoon lined with 1mm HDPE - 7 x 10 x 3m - 7 x 10 x 3m
	Sludge	drying	drying bed	1	earthen ditch lined with 1mm HDPE - 4 x 6 x 3m

1.3.2 **Operation**

The waste produced from the pig houses of the farm is treated in an enclosed anaerobic wastewater treatment facility consisting of a collection tank, a biogas digester and post treatment lagoons. The digester is covered by high-strength plastic material (HDPE) to collect the biogas and prevent atmospheric gases from leaking into the tank.

Inside the biodigester, wastewaters are continuously stirred by incoming and outgoing wastewaters, thus preventing sedimentation. This consequently results in minimal formation of sludge inside the chamber. Through hydraulic pressure created by influent, partially treated wastewaters exit the biodigester into the adjacent settling lagoon where they are stored indefinitely or until drawn to be used in the farm.

Biogas trapped in the biodigester is directed to gas collecting tank. When needed, gas from this tank is drawn to a gas conditioning equipment using a blower, and then to one of the generator sets that converts it to electrical energy used in the farm.

The biodigester has been designed to efficiently degrade organic solids in wastewaters. Hence, provision for sludge extraction and management will be established when the need arises.

Figure 2 illustrates the current processes involved and the project components employed in the wastewater treatment and power generation process in Luke One Thirty Seven Agri Farm.

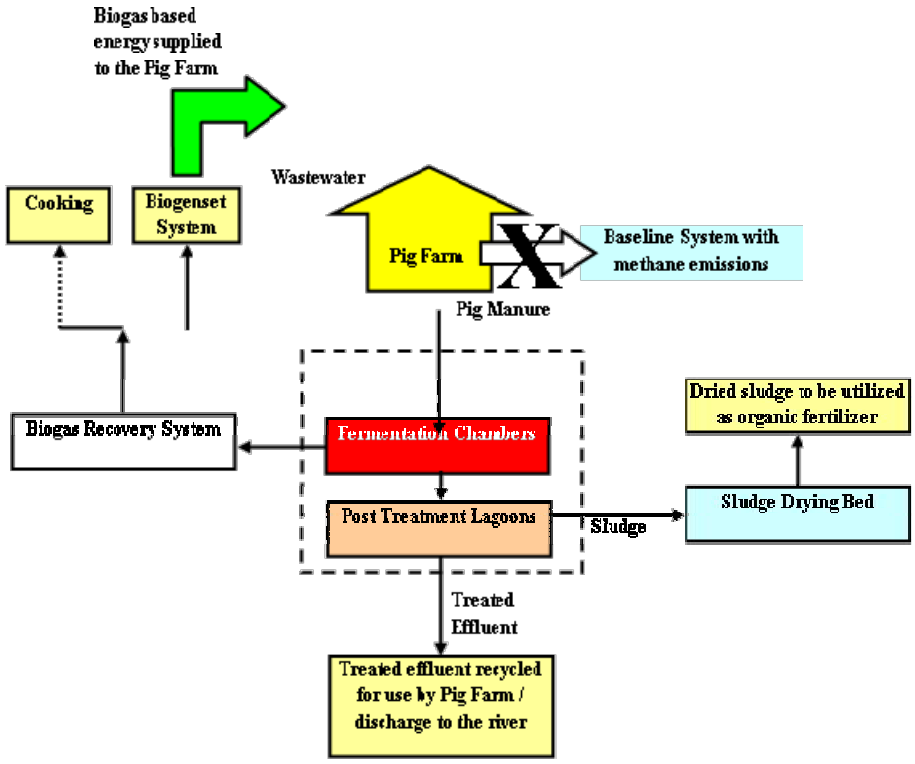

Figure 2. Wastewater treatment process of Luke One Thirty Seven Agri Farm

1.4 Existing Environmental Conditions

1.4.1 Project Site

The Project has been built inside the premises of Luke One Thirty Seven Agri Farm (15.047359, 120.959104), a 20,440-m^2 property in Barangay Pala-pala, San Ildefonso, Bulacan. Bulacan is in the island of Luzon, northern Philippines (see Map 1).

Map 1. Philippine map showing the location of the Province of Bulacan (Image from *Wikipedia*[a])

Map 2. Municipality of San Ildefonso, Bulacan (highlighted in red) showing the location of the project site

(Image generated using *Google Maps*[b])

1.4.2 **Land Classification and Use**

The Project's location is classified as agro-industrial [Zoning / Locational Clearance]. In its vicinity are croplands and quite a number of houses and churches (see Map 3).

Map 3. Satellite image of Luke One Thirty Seven Agri Farm (15.047359, 120.959104),) and its vicinity (Image generated using *Google Earth*)

Image 1. Satellite image of Luke One Thirty Seven Agri Farm showing areas (low: yellow; moderate: orange; high: red) at risk to flooding (Image generated using *NOAH website*[b])

1.4.3 **Climate**

San Ildefonso has a Tropical Monsoon climate in the Köppen-Geiger system. It has an average annual temperature of 27.0 °C and an average precipitation of 2284 mm, experiencing rain almost all year round. (climate-data.org) [1]

1.4.4 **Topography and Soil**

The Farm sits on a relatively flat land that slightly slopes from east to west and north to south (see Map 4). The soil type in this area is sandy loam.

1.4.5 **Water Resources**

The closest surface water to the property is Pala-pala Creek, a seasonal creek that borders the its southern perimeter (0 to 4 m from the Farm's fence at different points) (see Map 4). This water feature appears to drain into a stream that terminates in low-lying croplands towards the northwest of the farm. A regular water quality test is conducted to ensure the safety and the quality of the creek.

1.4.6 **Natural Hazards**

The area where the Farm is situated is frequented by typhoons (high typhoon incidence[1]).

Almost half the property's grounds, from its southern perimeter northward, is at risk to low to medium (0.5 m) flooding.[2]

Although the area is moderately prone to eartquakes with magnitudes ranging from 6.8 to 7.2[1], it is presently not vulnerable to earthquake-induced shallow landslides.[1]

1.4.7 **People and Communities**

There are a number of livestock farms and residential houses within the 500 m radius of the Farm.

2 ENVIRONMENTAL DUE DILIGENCE

2.1 Impact Assessment

2.1.1 Positive

Luke One Thirty Seven Agri Farm provides employment opportunities to residents of the Municipality of San Ildefonso and in the province of Bulacan and even to people from nearby provinces. It also generates significant revenue for the local government.

The project in particular improved the pig farm's method of handling manure and liquid waste. Compared to open lagoons, the biodigester has significantly amended the farm's wastewater treatment process, resulting in better effluent quality. Foul odors from effluents have also been greatly abated, improving the environment for both workers and livestock, as well as for neighboring communities.

Moreover, using biogas-generated electricity also reduces the farm's reliance on the grid (and on power from conventional fuels), translating to savings for the piggery business.

By providing a mechanism to capture methane and using it as a source of energy, the project has lowered Luke One Thirty Seven Agri Farm's overall carbon footprint. With inputs coming from about 5,890 hogs (current average), through the project, the farm is estimated to be capable of reducing greenhouse gas emissions equivalent to 2,139 tCO2e annually.

Finally, having been being registered as a component project activity (CPA) in the CDM Program, Luke One Thirty Seven Agri Farm has an opportunity to earn monetary incentives by selling carbon credits to World Bank. It may also opt to trade its carbon credits in the wider carbon market.

Economy

Using biogas-generated electricity lessens the Farm's reliance on the grid, translating to savings for the piggery business. Sludge on site eliminates the need to purchase fertilizer for the Farm's vegetation. Selling it as soil amendment presents an opportunity to generate additional income. Further savings is also gained from reusing treated effluent.

Moreover, having been being registered as a component project activity (CPA) in the CDM Program, Luke One Thirty Seven Agri Farm has an opportunity to earn monetary incentives by selling carbon credits to World Bank. It may also opt to trade its carbon credits in the wider carbon market after the Program.

Lastly, Luke One Thirty Seven Agri Farm provides employment opportunities to residents of Brgy. Pala-pala and generates revenue for the local government.

2.1.2 **Negative**

Certain aspects of the pig farms' and the project's operations inevitably result in potential harm to the environment, including generation wastewaters; hazardous and non-hazardous wastes; air pollutants; foul odors, noise, dust and other nuisance; and depletion of natural resources. These pose inherent risks to environmental quality and natural ecosystems and to health and safety of workers, communities, and livestock.

A. Wastewater Generation
Wastewaters saturated with dissolved manure and feed materials are primarily generated from raising around 5,890 pigs through intensive farming methods.

B. Solid Wastes Generation
Pig manure, sludge from treatment of wastewaters, and carcasses (non-infectious) make up the bulk of solid wastes generated in the Farm.

C. Hazardous Wastes Generation
Generation of potentially hazardous wastes mainly result from veterinary activities and use of various chemicals for cleaning and for maintenance of machineries. Biological materials from diseased pigs also pose significant risks to the health of workers and livestock.

D. Generation of Air Pollutants
Emissions from diesel- and biogas- fueled generator sets which supplement the grid for the Farm's power requirements are the main sources of air pollutants in the Farm.

E. Risks to Environmental Quality

- Pollution. The inadvertent release to the environment (through breaches and leaks) of the wastes listed above, especially of nutrient-rich materials, may cause serious damage to the quality of affected soil and aquatic resources.

- Global warming. Large amount of biogas, mostly composed of potent greenhouse gases, are produced during the anaerobic decomposition pig manure and other organic compounds. If allowed to escape to the atmosphere, these gases will contribute to the furthering of the deteriorating effects of global warming. Moreover, the use of power from the grid consumes non-renewable fuels which generate greenhouse gases when processed for electricity production.

- Resource depletion. Intensive farming demands for significant volume of freshwater. Neglectful sourcing and use of water in the Farm could deplete water resources.

- Site risks. The project site is a typhoon prone area. Strong winds may damage WWTF and MRF causing release of pollutants. Long periods of heavy rainfall could overtop wastewater lagoons and wash off sludge piles.

F. Health and Safety (Methane Recovery Facility)
Biogas is a mixture of gases produced during anaerobic digestion. It is mainly composed of methane and carbon dioxide, but other gases (nitrogen, hydrogen, hydrogen sulphide, ammonia, etc.) may also be present at lower concentrations.

- ¬ Fire and Explosion. The MRF presents a major fire and explosion hazard in the farm owing to the high concentrations of biogas (primarily consists of methane which is highly flammable and combustible) that it is designed to capture and process. Risk of explosion is elevated in areas where biogas is compressed in containers for storage.
- ¬ Asphyxiation and Poisoning. Methane and carbon dioxide are asphyxiants, substances that cause suffocation by displacing oxygen in the ambient air. Furthermore, carbon dioxide and hydrogen sulfide are considered poisonous when inhaled at high concentrations. In the farm, risks of asphyxiation and gas poisoning are high in the areas associated with the MRF and in confined spaces and poorly ventilated areas where fugitive biogas may collect.
- ¬ Infection and Infestation. Handling and processing of manure, wastewaters, and sludge exposes workers to various pathogens and parasites.

G. Health and Safety (General Operations)

- ¬ Odor, Noise, Dust

2.2 Due Diligence

Luke One Thirty Seven Agri Farm commits to undertake due diligence in its dealings and operations through compliance with relevant regulatory safeguards and implementation of the environmental management and monitoring plan in Table 2 and of other relevant provisions herein.

2.2.1 Compliance to Regulatory Instruments (Legal Framework)

The Farm operates in the context of laws prescribing the regulatory safeguards in the following tables. Table 2 lists relevant national legal instruments concerned with environmental protection, whereas Table 3 lists permits issued by local government agencies that mainly address health and safety aspects of the Farm and the Project.

Table 2. Environmental documents and statutory requirements regulating the operation of Luke One Thirty Seven Agri Farm

DOCUMENT	PARTICULARS / STATUS	
Environmental Compliance Certificate (ECC)	Reference No.	III-1303-0146 (amended)
	Issuing Agency	EMB Region 3
	Date of Issuance	January 25, 2017
	Valid Until	- no expiration -
	Conditions	• area of operation: 20,440 m^2 • maximum population: 6,000 heads • submission of SMR and CMR • register as Hazardous Waste Generator • creation of EMF
Discharge Permit (DP)	Reference No.	DP-18C-03BU-2215-R
	Issuing Agency	EMB Region 3
	Date of Issuance	March 20, 2018
	Valid Until	March 30, 2019
	Conditions	• effluent wastewater flow rate: 200 m^3/day • receiving body of water: Pala-pala Creek • submission of SMR and CMR
Permit to Operate (PTO) Air Pollution Source Control Installations	Reference No.	FLA-17C-03BU-144
	Issuing Agency	EMB Region 3
	Date of Issuance	February 2, 2017
	Valid Until	March 20, 2022
	Conditions	• For the following equipment: - (1 unit) 35 KVA stand by generator set - (1 unit) mixer, 05 ton/hr - (1 unit) hammer mill, 15 hp motor, 10 ton/day capacity submission of CMR
Water Permit	Reference No.	Application Process
	Issuing Agency	National Water Resources Board
	Date of Issuance	-
	Valid Until	- no expiration -
	Conditions	(P.D. 1067 Water Code)

Hazardous Waste Generator ID	Registration No.	GR-R3-14-00215
	Approving Agency	EMB Region 3
	Date of Approval	February 6, 2017
	Valid Until	- no expiration -
	Conditions	• For the following wastes: - wastes with inorganic chemicals (D407) - used or waste oil (I101) - miscellaneous wastes (pathological, infectious) (M501) submission of SMR
PCO (Pollution Control Officer) Accreditation Certificate	Accreditation No.	COA No. - 17F-03PA-0318
	Issuing Agency	EMB Region 3
	Date of Issuance	November 7, 2016
	Valid Until	November 7, 2019

CMR Compliance Monitoring Report
EMB Environmental Management Bureau
P.D. Presidential Decree

Table 3. Permits ensuring the safety of RDF Ayala III Farm's facilities and operation

DOCUMENT	**PARTICULARS**	
Business Permit	Permit No.	Available
	Issuing Agency	Office of the Mayor - Municipality of Magalang
	Date of Issuance	January 2019
	Valid Until	December 31, 2019
	Prerequisites	compliance with the requirements of the following: • Building Permit • Occupancy Permit • Locational / Zoning Clearance • Fire Safety Inspection Certificate • Health and Sanitary Certificate
Zoning Clearance	Registration No.	Available
	Approving Agency	Municipality Planning and Development Office
	Date of Approval	
Fire Clearance	Reference No.	Available
	Issuing Agency	Bureau of Fire Protection Regional Office 3
	Date of Issuance	
	Valid Until	
	Prerequisites	compliance with R.A. 9514 (Revised Fire Code)
Sanitary Permit	Permit No.	Available
	Issuing Agency	City Health Office – Municipality of San Ildefonso
	Date of Issuance	
	Valid Until	
	Prerequisites	▪ compliance with P.D. 522 ('Sanitation Requirements'), P.D. 856 (Code on Sanitation), and pertinent local ordinances

Environment and Natural Resources Office
Presidential Decree
Republic Act

2.2.2 **Environmental Management Plan**

Table 4 summarizes the measures intended to address the environmental impacts and risks identified in Section 2.1.2. Adequate training will be given to concerned employees to ensure that the content of this environmental management plan will be properly carried out.

Table 4. Environmental Management and Monitoring Plan of Luke One Thirty Seven Agri Farm

IMPACT	SOURCE / ACTIVITY	MANAGEMENT		MONITORING METHOD	FREQUENCY	PARAMETER / INDICATOR	RESPONSIBLE ENTITY	REPORTING TO	**Cost**, Php
A. Wastewater									
a.1 generation of wastewater	pig raising	water conservation strategies		quantify wastewater produced	monthly	volume of wastewater produced	Farm Manager	OWNER > reported in SMR	
		regular inspection and maintenance of water delivery system							
		wastewater treated in WWTF							
		treated effluent used as liquid fertilizer							
a.2 generation of domestic wastewater, gray water	general farm and domestic activities	water conservation strategies	-	check siphoning and hauling records	every 5 years	volume of sewage hauled	Farm Manager		
		regular inspection and maintenance of water delivery system							
		siphoning and hauling of sewage to a wastewater treatment facility							
B. Solid Waste									
b.1 generation of manure, sludge	pig raising, feed wastage, WTF	minimize feed wastage	,	quantify (dried) sludge produced	every harvesting / disposal	amount of sludge produced	Farm Manager	OWNER	
		regular inspection and maintenance of feed delivery system							
		manure treated in WWTF							
b.2 generation of (non-infectious) carcasses, blood	injuries, adverse environmental conditions, etc.	observe sound pig raising practices and biosecurity measures	-	weigh disposed materials	daily / every hauling	weight of materials disposed	Farm Manager	OWNER	
		regular inspection and maintenance of equipment that regulates pig environment							
		disposal through burial							
b.3 generation of general solid wastes	general farm and domestic activities	on-site segregation		quantify / weigh solid wastes disposed of (recyclables and residuals)	weekly / every disposal	quantity of and details on wastes generated, stored, and disposed of	Farm Manager	OWNER > reported in SMR	
		adequate collection bins, storage area							
		reduce, reuse, recycle / selling of recyclables							
		composting of biodegradable wastes							
		disposal through barangay collection							
C. Hazardous Materials									
c.1 generation of hazardous, toxic materials	facility and equipment operation and maintenance, pest control	monitor resource usage to avoid expiration of chemicals, etc.		quantify each type of hazardous waste produced / stored and disposed of (check hazardous waste manifests)	quarterly	quantity of each hazardous waste type stored and disposed	Farm Manager	OWNER > reported in SMR	
		will dispose through accredited TSD							
c.2 generation of infectious, pathological materials, carcasses	veterinary activities, outbreaks	disposal through burial							
D. Air pollution									
d.1 generation of biogas	WTF, anaerobic digestion	combustion using biogas-fueled engine	-	quantify power produced	daily	kWh produced	Farm Manager	OWNER	
d.2 generation of air pollutants	vehicles, stand-by generator sets (fossil fuel combustion)	operate equipment, machineries according to manufacturer's instruction		review inspection and maintenance record	monthly	number and details of machinery issues noted	Farm Manager	OWNER	
		regular inspection and maintenance of equipment							
E. Risk of Environmental Degradation									
e.1 (risk of) surface water and groundwater quality degradation, disruption of soil	e.1.1 wastewater collection, transport, treatment, disposal	prevention of leakage, overtopping, spillage,		effluent sampling and testing by an EMB-accredited laboratory	annually - more frequently during rainy season	effluent quality indicators: BOD, TSS, ammonia, phosphate (must meet standards for	farm technician	OWNER > reported in SMR	

properties, contamination						Class C^ effluent)			
		regular inspection and maintenance of WTF and equipment							
		provided adequate drainage for rainwater							
		maintain vegetation (serves as filter strips) around lagoons							
		operates WWTF- MRF according to designer /contractor's instruction							
		ensures effluents meet EMB standards							
	e.1.2pathological wastes, carcass disposal, leachate	regular inspection of disposal site		review inspection and maintenance record	monthly - more frequent during rainy season	number and details of leak / breach incidents	Farm Manager	OWNER	
	e.1.3handling, transport, storage, disposal of hazardous and infectious materials	use of suitable containers with labels		review inspection and maintenance record	monthly	number and details of leak / breach incidents	Farm Manager	OWNER	
		secured collection and storage area							
		will make MSDS available on-site for ready reference							
		uses of materials according to registered use / manufacturer's instruction							
		will develop and observe safety protocols safety							
		will install signage, warnings							
		will provide a spill kit on site							
		will prepare a contingency response plan							
		will provide adequate staff training on handling of hazardous materials							
e.2 (risk of) pollution from fugitive biogas	biogas collection, storage, combustion	constructed gas collection system with impermeable and durable materials		review inspection and maintenance record	monthly - more frequent during typhoon season	number and details of leak / breach incidents	farm technician	OWNER	
		operates WTF + MRF according to supplier/contractor's instruction							
		regular inspection and maintenance of MRF							
F, Health, Safety and Other Concerns									
f.1 odor - nuisance, discomfort, health issues	f.1.1 pig houses, manure	regular cleaning, disinfection of pig houses		review complaints register	every two weeks - more frequent during typhoon (windy) season	number and details of odor complaints	Farm Manager	OWNER	
		employs tunnel ventilated buildings							
		maintains vegetation that serves as natural buffer							
		provision and use of appropriate PPE							
	f.1.2 WTF, effluent, MRF	biogas trapped and combusted through MRF							
		will ensures adequate retention time of wastewaters in the biodigester							
		constructed gas collection system with impermeable and durable materials							
		regular inspection and maintenance of WWTF -MRF							
		prevent leakage, overtopping, spillage, (see e.1.1)							
		maintains vegetation that serve as natural buffer							
		provision and use of appropriate PPE							
	f.1.3decomposing materials (placental materials and carcasses)	disposal through burial							
		prevent leakage of leachate (see e.1.2)							
		provision and use of appropriate PPE							
f.2 noise - nuisance, discomfort	f.2.1 pigs	maintains vegetation that serve as natural buffers	-	review complaints register	monthly	number and details of noise complaints	Farm Manager	OWNER	
		provision and use of appropriate PPE							
	f.2.2 vehicles, machineries	operates equipment, machineries according to manufacturer's instruction							
		limit operation of loud equipment during day time (as much as it is practical)							
		regular inspection and maintenance of equipment and machineries							
		provision and use of appropriate PPE							
f.3 dust - nuisance, discomfort, health	f.2.1 pig houses, feed handling	cautious handling of dust-generating materials	-	review complaints register	monthly - more frequent	number and details of dust complaints	Farm Manager	OWNER	

issues					during typhoon (windy) season				
		use of appropriate containers, covers, barriers							
		employs mechanical / tunnel ventilation system in pig buildings							
		limit dust-generating activities during day time, low wind movement (as much as it is practical)							
		provision and use of appropriate PPE							
	f.2.2 composting areas, dried compost handling	use of appropriate containers, covers, barriers							
		cautious handling of dust-generating materials							
		limit dust-generating activities during day time and low wind movement (as much as it is practical)							
		provision and use of appropriate PPE							
f.4 pest and vermin proliferation / infestation - nuisance, health issues	decomposing materials and sources of odors	odor control measures (see f.1)	-	review inspection records and complaints register	monthly - more frequent during rainy season	number and details of incidents, complaints	Farm Manager	OWNER	
		pest, vermin control measures							
		regular inspection of farm facilities, surroundings							
f.5 health hazards, (risk of) contracting infectious diseases, sustaining injuries, livestock outbreak	handling, transport, storage of hazardous and infectious materials, movement of carrier pests and vermin, handling of ill pigs	will provide adequate training on handling of hazardous, infectious materials	-	review incident reports, inspection records and complaints register, results of employees' regular health checks	monthly	number and details of illness, injury incidents, complaints	OWNER	-	
		provision and use of appropriate equipment for handling and storage of hazardous, infectious materials, including PPE							
		enforces, practicesbiosecurity measures, health and safety protocols							
		measures for safe handling of hazardous and infectious materials (see e.1.2&e.1.3)							
		pest and vermin control measures (see f.4)							
		regular inspection of farm facilities, surroundings							
		pest and vermin control measures (see f.4)							
		regular inspection of farm facilities, surroundings							
		provides regular health checkups for employees							
		will report and record disease, injury incidents							
f.6 explosion, fire hazard	biogas collection, storage, combustion	constructed WTF + MRF with impermeable and durable materials	-	review inspection and maintenance records, incident reports	monthly	number and details of explosion, fire incidents	OWNER	-	
		operates WTF-MRF according to supplier/contractor's instruction							
		regular monitoring of pressure within the MRF system							
		regular inspection and maintenance of MRF							
		will prohibit ignition sources (smoking) near the MRF							
		will install signage and warnings							
		considering installing a flare							
		will report and record explosion, fire incidents							
f.7 drowning hazard	open ponds, lagoons, tanks	will install signage and warnings	-	review incident reports	monthly	number and details of drowning incidents	OWNER	-	
		will report and record drowning incidents							
f.8 freshwater depletion	farm activities	water conservation strategies (see a.1)	-	quantify volume of freshwater consumption	monthly	volume of freshwater consumed	bookkeeper	OWNER > reported in SMR	
		uses effluent as soil amendment							
f.9 consumption of non-renewable resource (fossil fuels for power)	pig raising and general farm activities	energy conservation strategies		quantify power consumed	monthly	kWh consumed	bookkeeper	OWNER > reported in SMR	
		using power generated using biogas through MRF							

BOD Biological Oxygen Demand
EMB Environmental Management Bureau
MSDS Materials Safety Data Sheet
PCO Pollution Control Officer
PPE Personal Protective Equipment
SMR Self-Monitoring Report
TSD Treatment, Storage, Disposal
TSS Total Suspended Solids

2.2.3 **Contingency Response**

Below is overview of Luke One Thirty Seven Agri Farm's current preparation and action plan in response to the following:

a. Fire
– Fire extinguishers are in strategic locations around the farm. Pig sheds have taps from which water for putting out fires can be sourced.

b. Earthquake
- The open grounds within the farm may serve as evacuation area for when an earthquake occurs.

c. Outbreak
- The farm's veterinarian or animal production specialist (provided by the integrator) is immediately notified to assess the situation and give instructions for the workers to carry out.

d. Power outage
- A standby diesel-fueled generator is able to supply the farm's electricity needs, in addition to the biogas genset.

e. Health emergencies
- A first aid kit is available at the site for minor health issues. Farm personnel have access to vehicles which can be used for transporting cases that may need more advanced medical care.

Most emergency services can be accessed in the Municipality of San Ildefonso proper after about a 25 to 30-min drive from the farm.

In the interim, Luke One Thirty Seven Agri Farm hereby commits to develop a more comprehensive contingency preparedness and response plan that will address incidents of fire; natural hazards (earthquake); outbreak; health emergencies; and environmental emergencies (leaks and spills of wastewaters and hazardous wastes, WWTF-MRF system breakdowns). This plan will be appended in the succeeding version of this ESMP.

2.2.4 **Occupational Health and Safety**

In addition to the health and safety measures presented in Table 3 Luke One Thirty Seven Agri Farm will develop a more comprehensive health and safety risk management plan which will deal with general occupational health and safety issues associated with work in the pig farms. Health complaints and accidents will be recorded in a register and will serve as indicators of the plans effectiveness, together with results of workers' annual health check-ups. This plan will be appended in the succeeding version of this ESMP.

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2.3 **Monitoring, Reporting and Auditing**

The proponent will perform the monitoring plan in Table 3 and conduct regular inspection of its facilities not only for internal purposes but also to satisfy the requirements of the EMB for periodic self-monitoring reports (SMR). In addition, assessments will also be initiated during or immediately after incidents that may have compromised the integrity of the farm's facilities, especially of WWTF-MRF, and caused the release of pollutants in the environment. A registry of such incidents and other environmental emergencies and accidents will be maintained in the farm and its details reported in the SMR.

The SMR will contain the results of audits on the Farm's environmental performance in terms of resource utilization, waste management, regulatory compliance, and fulfillment of environmental commitments among others. Copies of this document will be tendered to EMB quarterly, as well as to LBP-EPMD (Environmental Program and Management Department) for reference and review purposes.

The Owner, Ms. Cristina V. Daniel, has been tasked to ensure that the farm is compliant with pertinent environmental regulations, including those listed in Table 3, and is performing its environmental commitments, including the implementation of this ESMP.

During the implementation of the CDM Program, LBP-EPMD will conduct monitoring activities in the farm at least twice a year to help the Proponent execute, identify gaps in, and improve and update this management plan.

3 SOCIAL DUE DILIGENCE

Luke One Thirty Seven Agri Farm aims to operate in a manner that is not only environmentally sustainable but socially acceptable as well. Below are some of the Proponent's efforts towards achieving this goal.

3.1 Consultation and Participation

Stakeholders of the Project were identified and invited by the Proponent, together with LBP-EPMD, through letters and notices to the consultative meeting held on November 29, 2016, 2PM at Brgy. Pala-pala Basketball Court, San Ildefonso, Bulacan. The meeting was attended by at least 60 individuals from various institutions, including local officials and residents of communities near the project site.

All relevant information, especially those that pertain to the Project's environmental and social impacts, was communicated to the stakeholders during the consultations. The issues and queries they raised were all satisfactorily addressed by the Proponent and other presenters. Details of the points discussed in the meeting are in the minutes in Appendix B, as well as some photos documenting the event.

3.2 Grievance Redress Mechanism

The Farm Manager, Russel M. Palacido, is hereby designated as the main contact person for grievances, feedbacks, and queries related to the project. She is to ensure that the details of complaints and the actions made to address the same will be recorded completely and truthfully in a register. Such information shall be part of the regular monitoring report for the Project and will be made available to relevant stakeholders.

The proponent will make every effort to settle any concern at the project level. Should its attempts be unsuccessful, issues will be raised to the following third party institutions for arbitration and possible resolution:

Office of the Barangay Chairman
Complaints shall be entertained in the barangay where the farms are situated. The barangay office concerned will facilitate the negotiation process and LBP-EPMD will ensure that the complainant is properly represented.

Municipal Office
Should no agreement be reached at the barangay level, the matter will be elevated to a municipal government office. Depending on the nature of the complaint, grievances may be addressed to the Municipal Health Office, Agriculturist Office, Environment and Natural Resources Office, or other relevant municipal agencies.

LBP
LBP through EPMD will take part on the resolution process only after the aggravated party has gone through the previous levels and finds the decisions rendered there unacceptable. EPMD will coordinate with the proponent to ensure that issues regarding the latter's project are resolved to the best interest of the complainant.

To further ensure the proponent's accountability, contact details of the farms' management and LPB-EPMD shall be provided to stakeholders during consultations and through postings at public notice boards in Barangay San Agustin's community hall and at Luke One Thirty Seven Agri Farm's main gate. For this project, the following individuals will serve as grievance administrators:

Prudencio E. Calado III
Head/Assistant Vice President, LBP-EPMD
Telephone No.: (632) 405-7339
Fax No.: (632) 528-8484

Russel M. Palacido
Farm Manager: Luke One Thirty Seven Agri Farm
Telephone No.: (63) 977 8257929

3.3 Information Disclosure

This ESMP and other relevant information regarding the project will be published in LANDBANKS's website where it can be readily accessed by the public. Printed copies of this document will be submitted to EMB Region 3 and will also be available in Barangay Pala-pala's office, in LANDBANK's library (1598 M.H. Del Pilar cor Dr. J. Quintos St., Malate, Manila, Philippines), and in the World Banks InfoShop.

3.4 Equal Opportunity

Luke One Thirty Seven Agri Farm is an equal opportunity employer, not regarding gender, age, disability, and ethnicity in evaluating and hiring potential employees. Presently, the Farm's workforce is consisted of 32 males and 3 females (excluding the owners) with ages ranging from 20 to 60 years old. Most of the male workers take on manual, physically demanding work such as animal handling and facility maintenance. The females are assigned in the farrowing unit (supervisor and midwife) and canteen (cook).

3.5 Resettlement

The Project is located inside the premises of Luke One Thirty Seven Agri Farm, a private property. No individual was displaced for nor were there any indigenous peoples affected by the establishment of the Farm and the Project.

3.6 Others

Employees of Luke One Thirty Seven Agri Farm receive standard basic salary at the minimum, 13th month pay, and other regular statutory benefits, in addition to free meals and lodging at the Farm.

The Farm also partners with different schools every year, accommodating from 8 to 18 students for their on-the-job training. Each trainee works and learns in the Farm for about 300 hours and is provided with food allowance.

4 ESMP REVIEW AND UPDATING

This ESMP shall be reviewed annually and will be updated subject to the results of the semiannual monitoring activities conducted by Luke One Thirty Seven Agri Farm and LBP-EPMD. Reviews may be done more frequently or earlier than schedule, especially after events resulting in significant adverse effect to the environment.

In the first updated version of this ESMP, which will be published in the last quarter of this year (2019), the following information and documents will be provided:

- properties, specifications, and performance parameters of the WWT-MRFs;
- WWTF-MRF Operations Manual;
- cost of implementing the Environmental Management and Monitoring Plan;
- Contingency Preparedness and Response Plan; and
- Health and Safety Risk Management Plan
- Biosecurity protocol

5 INSTITUTIONAL ARRANGEMENTS

5.1 The Proponent

The proponent, Luke One Thirty Seven Agri Farm, will be responsible in all the aspects of the project, including the implementation of this ESMP. It will shoulder all costs associated with the construction and operation of the project, internal monitoring activities, and meeting various statutory requirements. Specifically, it shall / it shall cause the accomplishment of the following:

- exercise environmental and social due diligence in implementing the Project
- incorporate sound practices in environmental, health, and safety management
- comply with relevant national and local laws and satisfy regulatory obligations
- perform diligent environmental and system monitoring
- prepare and submit on schedule accurate monitoring reports to EMB and LBP
- cooperate with the LBP and other regulatory agencies by providing assistance and correct and relevant information regarding the Project and its environmental performance for reference, review, and monitoring purposes
- promote transparency by maintaining open lines of communication with project stakeholders and giving them access to relevant information
- initiate resolution of conflicts that may arise as a result of the Project's operation

The Proponent, in close coordination with LBP, shall implement the Project based on LBP's ESSF and on the agreed activities and timelines stipulated in the memorandum of agreement (MOA) and subproject agreement (SPA) between the said entities.

5.2 LANDBANK

LBP shall serve as the financial and technical intermediary for the CDM Program of Activity (PoA) under which the Project of Luke One Thirty Seven Agri Farm is being implemented. It shall provide the Proponent carbon and investment finance assistance for the installation of an anaerobic wastewater treatment facility equipped with a biodigester and methane-fueled power generator. Moreover, it shall act as the entity in charge of project validation and verification activities, and of collation of relevant information and monitoring data for the undertakings mentioned. Specifically, LANDBANK, through EPMD, shall:

- make available financing facilities to the Proponent, subject to existing lending policies of LBP
- coordinate and facilitate communications and transactions between the Proponent and World Bank or other Carbon Buyers, Designated Operational Entity, and when necessary, with other project partners
- administer the agreements (MOA, SPA) forged between LBP and the Proponent
- provide technical support and relevant trainings to farm owners and personnel in partnership with other institutions
- ensure compliance of the Project and its proponent with the rules governing PoAs and with its commitments in the MOA and SPA
- ensure compliance of the Project and its proponent with relevant standards and regulations and environmental commitments by conducting onsite monitoring and evaluation and desk reviews
- provide assistance to the Proponent in complying with statutory requirements for the Project
- ensure the Project's sustainability by monitoring the long-term implementation of the safeguards specified in this ESMP and its environmental performance in general
- gather, collate, and review pertinent information and documents (including safeguard instruments, reports, and permits and clearances) concerning the Project
- participate in conflict resolution initiated by the Proponent
- prepare and submit monitoring reports to World Bank regularly
- satisfy its obligations under the Emissions Reduction Purchase Agreement between LBP and World Bank

LBP shall assist the Proponent in its implementation of the Project based on LBP's Safeguards Framework and on the agreed activities and timelines stipulated in the MOA and SPA.

5.3 Department of Environment and Natural Resources

The Department of Environment and Natural Resources (DENR) is the primary government institution mandated to manage and protect the Philippines' environment and natural resources. It is also the Designated National Authority (DNA) of the CDM Program in the Philippines. As DNA, its main role is to review and endorse PoAs to the United Nations Framework Convention on Climate Change.

5.3.1 **Environmental Management Bureau**

Through the EMB, DENR sanctions and regulates the activities of the Project by means of various legal instruments. EMB also leads (whether or not as part of a Multi-partite Monitoring Team) the periodic monitoring of the Project's compliance and impacts, including the fulfillment of the commitments stated in this ESMP. Prior to construction, EMB was the agency tasked to review and evaluate the environmental soundness of the Project and authorize its establishment through the issuance of an Environmental Compliance Certificate.

5.4 **World Bank**

The World Bank is the main Carbon Buyer of the Project, but will also serve as an advisor to LPB in carrying out the latter's responsibilities as the coordinating and managing entity for CDM projects. The Bank will conduct regular monitoring, audits, and appraisals on the Project's safeguards performance against its established policies, as well as provide technical guidance to LBP and to the Proponent.

6 SUB-PROJECT ACCOUNTABILITY

In line with Section 3.02 on *Sub-Project Development and Operation by the Sub-Project Entity*, Item (q) of the Sub-Project Purchase Agreement (SPA) signed by the Farm Management, the Sub-Project Entity (Farm Management) agrees and undertakes to:

(q) implement and operate the Sub-Project in compliance with the World bank Operational Policies, including without limitation and as applicable, the Environmental Management Plan, Resettlement Plan, Indigenous Peoples Plan, and any other requirement resulting from the application of the World Bank Operational Policies.

Having signed the SPA, the Farm Management is accountable to comply with the commitments stated in this document.

REFERENCES

1 en.climate-data.org
2 vm.observatory.ph
3 dbmp.philrice.gov.ph/soils
4 noah.up.edu.ph (ESRI Base Map)

Maps and Images Sources

a https://en.wikipedia.org/wiki/File:Ph_locator_map_pangasinan.png
b https://www.google.com/maps
c Google Earth Pro
d http://noah.up.edu.ph/#/section/geoserver/flood25

APPENDICES

A Project Design, Plan and Specifications

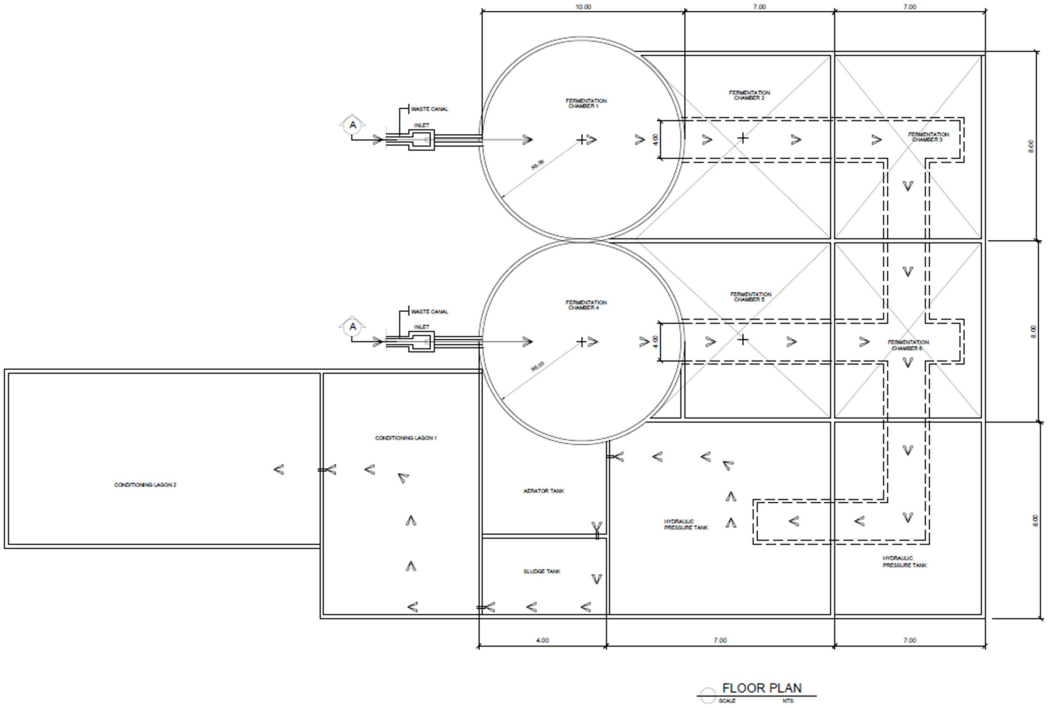
B Health and Safety Risks Management Plan of CPA 53 Pig Farm

C Public Consultation Records
- Notices
- Attendance
- Minutes

D. Site Evacuation Plan

APPENDIX A

Project Design, Plan and Specifications



FLOOR PLAN
SCALE NTS

APPENDIX B

Health and Safety Risks Management Plan of CPA 53 Pig Farm

Hazard	Possible Harm	Source / Cause	Prevention / Minimization*	Person/s Responsible
physical				
noise	discomfort, hearing damage	pig squeals	• wear appropriate PPE (ear protection)	Farm Personnel
		running machineries and vehicles	• install noise-control devices when applicable • regular equipment inspection and maintenance • equipment housed in enclosed structure, if applicable • schedule shifting duties • install signage and warnings • wear appropriate PPE (ear protection)	Farm Manager Farm Personnel
vibration	discomfort, ergonomic and nerve injuries, fatigue	running machineries	• ensure all loose equipment are securely placed • perform regular equipment inspection and maintenance • install signage and warnings	Farm Manager Farm Personnel
electricity	shock, electrocution, burns	faulty machineries and power lines	• get services of a licensed electrician • consult equipment manual • perform regular equipment inspection and maintenance	Farm Manager Farm Personnel
		improper use (or servicing) of electrical equipment	• restrict access to equipment • install signage and warnings • train staff (consult equipment manual) • wear appropriate PPE	
heat	burns	running machineries (hot surfaces, vapors, liquids)	• use insulation where possible • install machine guards • install signage and warnings • wear appropriate PPE (such as long sleeved shirts)	Farm Manager Farm Personnel
	discomfort, heat exhaustion, heat stroke	working in enclosed spaces with limited ventilation	• adequate hydration and rest breaks	Farm Manager
dust	irritation, respiratory distress / diseases	feeds, ambient dust	• calm work pacing to avoid exciting the pigs • thorough cleaning of indoor spaces • PPEs (mask)	Farm Personnel
poor lighting	eye strain, can't see hazards	unlit / inadequately lit areas	• install light sources • carry portable light sources • work during daytime whenever possible	Farm Manager Farm Personnel
chemical				
harmful gases, dust, vapors (inhalation)	discomfort (odor), asphyxiation, poisoning, respiratory distress / diseases	degrading organic wastes hazardous substances (cleaning and pest control chemicals,	• observe measures for odor control • install signage and warning labels • train staff (on handling hazardous substances and wastes and working in confined spaces; review MSDS / product information sheets)	TSMD Farm Manager Farm Personnel

		veterinary medicines, fuels, hazardous wastes, etc.)	• wear appropriate PPE (mask) • ensure first aid kits are readily available	
		fuel burning (machineries, vehicles)	• perform regular equipment inspection and maintenance	Farm Manager
		fugitive gases	• perform regular inspection and maintenance of biogas system	Farm Manager
hazardous substances (contact, ingestion)	irritation, burns, poisoning, skin problems	hazardous substances (cleaning and pest control chemicals, veterinary medicines, fuels, hazardous wastes, etc.)	• use proper labeling, containers, and storage • restrict access to chemical and hazardous waste storage • train staff (handling hazardous substances and wastes; review MSDS / product information sheets) • only competent staff should administer veterinary medicines • ensure first aid kits are readily available • PPEs (gloves, eye glasses)	TSMD Farm Manager
biological				
pathogens / infectious agents, toxins and other products	various infectious diseases, parasites, irritation	pathological materials / tissues sick animals animal excretions and fluids manure (wastewaters) sludge veterinary wastes (especially sharps) potential disease carriers (objects, people, dust)	• observe proper disposal of animal and veterinary wastes • implement quarantine measures • good housekeeping practices (disinfection) • practice hygienic practices (especially hand hygiene) • perform workers' regular health examination • train staff (on animal handling, proper waste handling and disposal) • wear appropriate PPE (gloves, mask, goggles)	TSMD Veterinarians Farm Manager
		insects, pests, vermin	• proper disposal of odorous wastes • good housekeeping practices • implement pest control measures	Farm Personnel
ergonomic				
ergonomic stress	ergonomic injuries	repetitive actions, forceful exertions, sustained awkward posture	• use aid of appropriate equipment for lifting/moving heavy objects • use of proper lifting techniques • implement buddy system at work • ensure job rotation / adequate rest (in between tasks)	Farm Manager Farm Personnel
		improper use of equipment	• train staff (consult manuals)	Farm Manager Farm Personnel
		use of faulty equipment	• repair or replace equipment	Farm Manager
other accidents and contingencies				
slips, trips, falls	injuries, wounds, contusions	spills (slips) various objects, debris (trips) heights, slips (falls)	• maintenance of walkways • daily safety briefings and regular trainings • barricading of work areas • wearing of appropriate PPE	Farm Manager Farm Personnel
entanglement	injuries, wounds, strangulation	machineries	• install machine guards • tie back long hair • wear long sleeve shirts • avoid wearing loose-fitting clothes and	Farm Personnel

			personal accessories • regular equipment inspection and maintenance	
blows, punctures	injuries, wounds, contusions	pig handling	• use animal restraints • ensure enough space to maneuver • train staff (animal handling techniques) • wear appropriate PPE (boots, gloves, etc.)	Farm Manager Farm Personnel
sharps	sharps injuries, wounds	veterinary activities, waste handling	• ensure only trained personnel conduct veterinary activities • wear appropriate PPE (gloves, goggles)	Farm Manager Farm Personnel
fires	burns	faulty electrical systems, explosions, fugitive gases, accidental ignition	• comply with requirements and regulations of fire authorities • provide adequate and proper (multipurpose) fire protection equipment • designate smoking areas away from digester, gas tanks, and electrical equipment and storage of combustible materials (compost, sludge, chemicals) • regular clearing of vegetation near farm structures • install signage and warnings • train staff (on contingency plan and proper equipment use) • perform regular inspection and maintenance of electrical systems and equipment	TSMD Lead Man
blast	blast injuries	excessive pressure in biodigester, fugitive gases, contained gases in confined spaces, fires	• keep sources of heat, including machineries, at a safe distance from biogas facility • prohibit smoking and use of cellphones around biogas system and gas storage facilities • perform regular inspection and maintenance of MRF • install signage and warnings	Farm Manager Farm Personnel

* Shaded rows / items applicable for Anaerobic Digestion System

APPENDIX C

Attendance

LUKE ONE THIRTY SEVEN AGRI-FARM
CLEAN DEVELOPMENT MECHANISM (CDM)
Methane Recovery and Combustion from Animal Waste Management System
Stakeholders' Consultation

BARANGAY HALL
Brgy. Pala-pala, San Ildefonso, Bulacan

November 29, 2016

Name	Organization / Affiliation	Address	Signature
1. Jean M. Villacruz	Brgy. Volunteer BHW	Pala² San Ild. Bul	[signature]
Rinee Granmana	Landbank	Makati, Manila	[signature]
MA. MARITA S. SAN DIEGO	LANDBANK	BULACAN LENDING CENTER	[signature]
[illegible]	LLN		[signature]
Oscar J. Cruz	Secretary	Palapala S/B	[signature]
Carly D. Abelitado	RAMDAN TRACKING	PINAO SN. ILDEFONSO	[signature]
Rosario P. Villanueva	BHW	Palapala SIB	[signature]
Ruben S. [illegible]	TANOD	" " "	[signature]
Teresita Vitangcol	Vending	Palapala S.I.B.	[signature]
Evelyn Dela Cruz	Farmer	" "	[signature]
[illegible] C. NOLASCO	BHW	" "	[signature]
[illegible]	[illegible]	[illegible]	[signature]
MJ VENERACION	MENRO	S.I.B	[signature]
JESUS [illegible]	BRGY. CAPTAIN	S.I.B	[signature]
[illegible]	[illegible]	[illegible]	[signature]

Land Bank of the Philippines

MINUTES OF THE MEETING

LUKE ONE THIRTY SEVEN AGRI-FARM

LUKE ONE THIRTY SEVEN AGRI-FARM
CLEAN DEVELOPMENT MECHANISM (CDM)
Methane Recovery and Combustion from Animal Waste Management System
Stakeholders' Consultation
<LOCATION OF CONSULTATION>
San Ildefonso, Bulacan
<Date of Stakeholder's Consultation>

	Name	Organization / Affiliation	Address	Signature / DATE
1	Romeo Villaceran	Brgy Police	Pala Pala	11/29/16
2	Alexis S. Alvarado	Brgy Police	Palapala	11/29/16
3	Roberto P. Escalante	Brgy. Kagawad Police	Pala-pala	11/29/16
4	Teresita Rodriguez	Brgy.	Pala Pala	T. Rodriguez 11/29/16

Land Bank of the Philippines

MINUTES OF THE MEETING

LUKE ONE THIRTY SEVEN AGRI-FARM

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CLEAN DEVELOPMENT MECHANISM (CDM)
Methane Recovery and Combustion from Animal Waste Management System
Stakeholders' Consultation
<LOCATION OF CONSULATION>
San Ildefonso, Bulacan
<Date of Stakeholder's Consultation>

Name	Organization / Affiliation	Address	Signature / DATE
1. Rowena C. Cruz	Barangay Volunteer ML	[illegible] S.I.B.	[illegible] 11-29-16
2. GIMILYN S. BACUAL	BARANGAY VOLUNTEER BHW	PALA - PALA S.I.B.	[illegible] 11-29-16
3. MARY ANN S. ALBERTO	BARANGAY VOLUNTEER ML	PALA - PALA S.I.B	[illegible] 11-29-16
4. NORITA Q. BAGAY	BARANGAY VOLUNTEER BHW	PALA - PALA S.I.B.	[illegible] 11-29-16
5 Marissa Cruz	Barangay Volunteer ML	Pala - Pala S.I.B.	[illegible] 11-29-16
6 Consolacion D. Torres	Barangay Volunteer BHW	Pala - Pala - S.I.B	[illegible] 11-29-16
7. Catalina L. Villanueva	Barangay Volunteer - BHW	Pala - pala - S.I.B	[illegible] 11-29-16
8 Marites Sayco	Barangay Volunteer BHW	Pala-pala - S.I.B	M. Sayco 11-29-16
9 Ma Cecilia A. Adan	Barangay [illegible] Farm	Pala-Pala S.I.B	[illegible] 11 29-16
10. REMISSA D. Lopez	Barangay [illegible]	Pala Pala S.I.B	[illegible] 11-29-16
11. SUSAN V. NOLASCO	Barangay Volunteer ML	Palapala, S.I.B.	[illegible] 11-29-16
12. Eugenia L. Villanos	Barangay Volunteer BHW	Palapala, S.I.B	[illegible] 11-29-16
13 MARIBEL V. GEMINA	BARANGAY VOLUNTEER ML	Palapala SIB	[illegible] 11-29-16
14 Luzviminda S. Palomo	Barangay	Palapala S.I.B	[illegible] 11 29 16
15. Teresita P.V. [illegible]	Brgy Volunteer - BHW	Palapala S.I.B	[illegible] 11-29-16
16. Jean M. Villanueva	Brgy. Volunteer BHW	Pala 2 S.I.B.	[illegible] 11/29/16

Land Bank of the Philippines

MINUTES OF THE MEETING

LUKE ONE THIRTY SEVEN AGRI-FARM

LUKE ONE THIRTY SEVEN AGRI-FARM
CLEAN DEVELOPMENT MECHANISM (CDM)
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<LOCATION OF CONSULTATION>
San Ildefonso, Bulacan
<Date of Stakeholder's Consultation>

Name	Organization / Affiliation	Address	Signature / DATE
GINA NOVASCO		PALA PALA	
LORENA DURAN	Barangay Health Worker	Pala - Pala S.I.B	
Claudia B. Villaceran	BHW	Palapala S.I.B.	
RITA SUAREZ	KAPITANA	Pala-pala S.I.B.	
BABYLYN CRUZ	LLD	Pala-pala S.I.B	
Sonny Cruz	BRGY POLICE	Pala-pala S.I.B	
Roberto Novasco		Pala-pala S.I.B	
Aida Francisco		Palapala S.I.B.	
Juana L Rivera		Pala-Pala S.I.B	
REYNALDO G. POLICARPIO		" "	
Laura B. Villaceran		" "	

MINUTES OF THE MEETING

LUKE ONE THIRTY SEVEN AGRI-FARM

LUKE ONE THIRTY SEVEN AGRI-FARM
CLEAN DEVELOPMENT MECHANISM (CDM)
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San Ildefonso, Bulacan
<Date of Stakeholder's Consultation>

Name	Organization / Affiliation	Address	Signature
[illegible]		[illegible]	[illegible]
Constancia D. Antonio		Pala Pala	cdantonio
MARIPOR CRUZ		PALA-PALA	[illegible]
LORINDA VILLANUEVA		PALA PALA	[illegible]
Rina C. Verde		Pala - Pala	RVerde
Evelyn D. Enerez		Palapala SJB	EEnerez
RUSSEL M. PLACINO		PALA-PALA SJB	[illegible]
REYMOND VALMADRID		PALA - PALA SJB	[illegible]
Jake MENDOZA		"	[illegible]
Angie Valmadrid		"	AValmadrid
[illegible] Valmadrid		"	[illegible]
Reynaldo Dela Rosa		"	[illegible]
Jane Dela Rosa		"	[illegible]
[illegible] V Batungbacal		"	[illegible] Batungbacal
[illegible] Leonardo		"	S Leonardo
Julita [illegible] Cruz		"	J Cruz

Minutes

MINUTES OF THE MEETING
LUKE ONE THIRTY SEVEN AGRI-FARM

She also mentioned that this project can be a pride of their town and a model to other commercial farms in the area because of the wastewater management system that they constructed.

Luke One Thirty Seven Agri-Farm's CDM Project Overview and Environmental Management Plan (EMP)

Dr. Orlando Anselmo, the biogas designer of the Department of Science and Technology (DOST), discussed the entire biogas system of Luke One Thirty Seven Agri-Farm. He also explained the technical description and rationale behind each component. He also mentioned the various types of biogas digester he designed for different capacities.

As part of the Environmental Management Plan of Luke One Thirty Seven Agri-Farm, he discussed in detail the processes involved and the impacts to be mitigated by the biogas digester.

Open Forum
The following are the set of questions raised related to the project activity during the open forum with the corresponding answers:

Issues Raised	Responses/ Recommended Measures to Address Response
Mr. MJ Veneracion of the Municipal Environmental and Natural Resources Office (MENRO) asked if the proponent plans to supply households nearby with the biogas and who will supply the equipment if they have plans.	Mrs. Cristina Daniel said that they will check the possibility of supplying the excess biogas with their contractor. Mrs. Daniel expressed that she is very much willing to share any excess biogas to the community
Barangay Captain Jesus Suarez asked about the safety of the biogas whether it will explode or not.	Dr. Anselmo explained in detail why the biogas will not explode and the durability of his design.
Mr. Reynaldo Policarpio, a neighbor, asked if there is a regulation/law requiring piggery farms to construct a biogas. Accordingly, the odor the piggeries produce is disturbing or a nuisance.	Ms. Granadino of LANDBANK said that there are regulations set by DENR and the MENRO depending on the location. In the case of San Ildefonso, Bulacan, Mr. Veneracion of MENRO said that they are about to pass or suggest to the municipality to have an ordinance requiring piggeries to have a biogas system.

There having no other matters to be discussed, the stakeholder's consultation meeting adjourned at 5:00pm.

Land Bank of the Philippines

MINUTES OF THE MEETING
LUKE ONE THIRTY SEVEN AGRI-FARM

The Stakeholders' Consultation was conducted at the Brgy. Pala-Pala Barangay Hall/Basketball court last November 29, 2016 at about 2:00 PM. Key stakeholders listed below include representatives of the people living in the vicinity and those that have administrative, social or political interest in the area are invited.

a) Community members from Brgy. Sinippil, Cauayan City, Isabela, including members of the Barangay Council and barangay health center;
b) Representatives of the Municipal Environmental and Natural Resources Officer of San Ildefonso, Bulacan; and
c) Land Bank of the Philippines Personnel

A copy of the attendance sheet is also attached.

Opening of the Consultation Meeting

The program started at 2:00 in the afternoon with a prayer led by Pastor Rolly Valmadrid. Ms. Marita S. San Diego, Account Officer of Bulacan Lending Center, opened the meeting. In her opening remarks, she welcomed and thanked Luke One Thirty Seven Agri-Farm and the participants in the meeting. She gave an overview on the current situation of our environment and mentioned LANDBANK's commitment to participate in the Global effort to reduce Greenhouse Gas (GHG) emissions and its role as a government financial institution.

Overview of Climate Change, Clean Development Mechanism (CDM), & LBP's Carbon Finance Support Facility

Ms. Renee Granadino of LANDBANK-EPMD presented the overview of Climate Change, Clean Development Mechanism, and LANDBANK's Carbon Finance Support Facility. The basics on climate change covered discussion on the greenhouse gases (GHG's) which absorb solar radiation into the surface of the earth. The global warming potential of the said gases were also discussed. Sources, effects and consequences of global warming of greenhouse gases were also illustrated in the presentation. Ms. Granadino further discussed the Kyoto Protocol and Clean Development Mechanism and its purpose: (1) to assist Parties not included in Annex I in achieving sustainable development and in contributing to the ultimate objective of the Convention and (2) to assist Parties included in Annex I in achieving compliance with their quantified emission limitation and reduction commitments.

Moreover, LANDBANK's Carbon Finance Support Facility (CFSF) was discussed. Ms. Granadino emphasized that the consultation was conducted as part of the requirements of Luke One Thirty Seven Agri-Farm to be an eligible project under the CDM. Under the CDM, Luke One Thirty Seven Agri-Farm will have good environmental practice mitigating the emission of Greenhouse Gases (GHGs). She also enumerated various benefits and services under the CFSF which includes financing support, annual revenue stream and other co-benefits.

APPENDIX D

Site Evacuation Plan

Luke One Thirty Seven Agri Farm Point Persons:
Farm Manager: Russel M. Palacido - (63) 977 8257929

Local Emergency Contact Details:

Municipality of Mabalacat City Police Station: 677-1928
Municipality of Magalang Fire Station: 677-1790

M.S.Magbitang Ospital Ng San Ildefonso: +63 943 493 0879