

ENVIRONMENTAL MANAGEMENT PLAN

FOR

GRANDEAST FISH PROCESSING INC.

Garden of Eden, East Bank Demerara, Guyana



November 4, 2019

Compiled by:

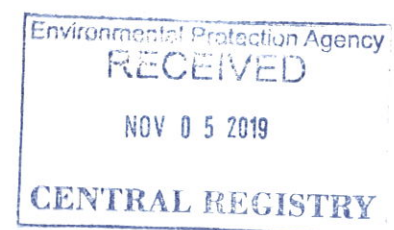
Grandeast Inc.
C/o Falls Gas Station
Parcel 75, block xxix
East Bank Demerara, Guyana
Ricky Chen
+592 608 3005
chenwh@fzhongdong.com

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Acronyms

CH&PA	Central Housing and Planning Authority
CWP	Construction Work Plan
CCP	Construction Communication Plan
EA	Environmental Assessment
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
ES	Environmental Specialist
ESM	Environmental and Social Manual
ETS	Environmental Technical Specifications
FAO	United Nations Food and Agricultural Organization
GD	Georgetown Datum
GA-FDD	Government Analyst – Food and Drugs Department
GNDS	Guyana National Bureau of Standards
GFA	Guyana Fisheries Authority
GoG	Government of Guyana
GWI	Guyana Water Incorporated
GLSC	Guyana Lands and Surveys Commission
LCDS	Low Carbon Development Strategy
NLUP	National Land Use Plan
GNDS	Guyana National Development Strategy
NDC	Neighborhood Democratic council
NEAP	National Environmental Action Plan

Executive Summary

Founded in 2018, Granded Inc is a wholly-owned subsidiary of Fuzhou Hongpu Aquatic Products Co., Ltd. (Fujian, China), a company specializing in processing and trading of fishery products. Fuzhou Hongpu Aquatic Products Co., Ltd. is the holding enterprise of Hong dong Fishery Co., Ltd. Established in 1999, Hong Dong Fisheries Co., Ltd. is a large-scale integrated fishing company in China.

The company's business involves ocean fishing, fishery base operations, cold chain logistics, fish processing, import and export trade, marine biology research, and aquatic product market operations management. The company currently has 170 professional fishing vessels and auxiliary vessels of various types and ocean fishing operations in the Mauritania Exclusive Economic Zone, the high seas of the Pacific, and the high seas of the Indian Ocean. It is the largest comprehensive fishery enterprise and has the largest number of fishing vessels in China, abundant product categories and a complete industrial chain.

The company plans to build a fishery industrial complex (Hereinafter referred to as “the project”) that integrates fishery products processing, cold storage, shrimp processing, and fishery products trading within Guyana and export markets. The project plans to construct the onshore processing infrastructure in Guyana. The project will be a large integrated fishery base in Guyana and the market network will span from neighboring countries to the rest of the world, improving the global reputation of Guyanese seafood. At the same time, the project will provide jobs and professional training for local residents regarding processing skills and technology; and enhance the overall development of the fishery industry.

Fishery is one of main food resources in Guyana. This project shall carry out infrastructure construction on the shore covering processing, inspection, storage, transportation and logistical support, etc., which can improve the development of fishery industry of Guyana and even the entire Caribbean area. By means of technology exporting and equipment and capital investment, local employees will be trained in regards to safe production, fish processing, ice making, refrigeration etc, to improve the production skills and employee quality. At the same time, through the implementation of the project, the development level of Guyana’s fishery resources can be improved, the international influence of Guyana’s seafood products can be improved, and Guyana can be established as a large center for the collection and distribution of fishery products in Caribbean and globally.

As the major part of Guyana’ agriculture, fisheries have long been highly valued by the Government of Guyana (GoG). The implementation of the project can give full advantages to Guyana’s fishery resources, effectively improve the employment status and income level of local fishermen, improve the production skills and the quality of employees, increase the influence of its fishery products in the world, and promote the healthy development of the fishery industry.

In general, the purpose of this EMP is to formulate mitigatory measures that will be made binding to all contractors during construction of the proposed development, as well as measures that will be implemented during the operational phase. The EMP is thus required to protect the natural, social and socioeconomic environment during construction and the management of the impacts and operation thereof which must be used on site during each phase of the development (planning, construction and operational phases). This document will be flexible so as to allow the contractor and Grandedast Inc. to ascertain management commitments without being prescriptive. The management commitments prove that the anticipated risks on the environment will be minimized if they are adhered to consistently. The onus set out in the EMP rests with Grandedast Inc., main Contractor and subcontractors, which promotes responsibility and commitment.

Legal, Policy and Institutional Framework

This EMP has been based on the findings of the on site assessment undertaken by the by Grandedast Inc. Team for this project all the Environmental specifications and the procedures discussed in this document were also developed in accordance with the relevant legislation applicable to the proposed development.

LEGAL

THE ENVIRONMENTAL PROTECTION ACT, 1996 (AS AMENDED BY THE ENVIRONMENTAL PROTECTION (AMENDMENT) ACT, 2005

The Environmental Protection Act, 1996, and the Environmental Protection Amendment Act 2005, establishes the basic institutional and regulatory framework within which all activities that may significantly impact on the natural, social, and cultural environments are assessed. The Act also provides that the EPA will be the central coordinating agency for environmental management in the relevant sectors in Guyana. Section 68 of the Act provides for the elaboration of regulations to articulate specific areas of environmental management, and of relevance are the Regulations on hazardous waste management, water quality, air quality, noise management and environmental authorization which were established under the Environmental Protection Act in 2000. These pollution management regulations were developed to regulate and control the activities of developmental projects during construction and operation. Standards establishing the permissible parameters under these regulations are being developed.

ENVIRONMENTAL PROTECTION (AIR QUALITY) REGULATIONS 2000

These Regulations were formulated to protect the air quality and provide the necessary infrastructure for controlling the amount of contaminants by stipulating specific allowable levels of emissions that are released into the atmosphere at any given time. Parameters are specified for several contaminants including smoke, solid particles and carbon monoxide.

ENVIRONMENTAL PROTECTION (WATER QUALITY) REGULATIONS 2000

These Regulations were developed to manage the discharge of waste matter into inland and coastal water bodies. They provide for minimizing the contamination of potential and existing water supply sources.

ENVIRONMENTAL PROTECTION (NOISE MANAGEMENT) REGULATIONS 2000

These regulations are concerned with the control and management of noise emission in Guyana. In practice, the EPA (Guyana) combines the Regulation with the GNBS Noise Standard into the atmosphere, since the Regulation is silent on measurements and parameters for ambient noise emission etc.

FOOD AND DRUG ACT – 12 1971

The Food and Drug act of 1971 provides for the establishment of the Government Analyst, Food and Drug Department (GA-FDD) with responsibilities to ensure that all foods are manufactured under hygienic conditions. An individual or Company shall apply for license to manufacture food as prescribe under the act.

THE LAND AND SURVEY COMMISSION ACT (1999)

The Land and Survey Commission Act provides for the establishment of the Land and Survey Commission as a statutory (semi autonomous) body. The main responsibilities of the Commission are to advise the Government of Guyana on land policies; for example- Ensure that the management of State and Government lands is done in accordance with Government legislation and policy; Issue land titles and leases for all purposes excluding forestry and mining; Co-ordinate with other agencies concerned with land-based resource management (i.e. the Guyana Geology and Mines Commission, Guyana Forestry Commission (GFC), Central Housing and Planning Authority, and Environmental Protection Agency, etc.) with the objective of ensuring orderly and sustainable occupancy and use of lands.

WATER AND SEWERAGE ACT 2002

The Water and Sewerage Act 2002 identifies the main objectives as to provide for the ownership, management, control, protection and conservation of water resources, the provision of safe water, sewerage services and advisory services, the regulations thereof and for matters connected therewith. The Act establishes and mandates the Guyana Water Incorporated (GWI) and the Hydro met Department (Ministry of Agriculture) the power to deal with ground water resources. For new wells individuals shall register the well with the Hydro met Department. Guyana National Development Strategy (NDS 2001-2010), addresses in Chapter 40 issues related to water management and flood control policies. This document indicates the commitment of the Government of Guyana to strengthen the capacity of key institutions responsibility for water management. For example, the strategy for the Hydro meteorological Service will lead to the upgrading of existing stations and the working environment, including improved communication links to data collection centers and automation of stations, plus the recruitment of qualified staff. Recently, the Government of Guyana has established a National Water

Council in Guyana to develop and/or review the national water policy and to oversee its management and coordination. The goal of the Policy is to provide a framework to maximize the contribution of the water sector to sustainable economic, social and environmental development in an efficient and equitable manner. Recently a National Integrated Water Resources Management Policy and a National Waste Water Management Strategy were developed.

POLICY AND INSTITUTIONAL FRAMEWORK

NATIONAL DEVELOPMENT STRATEGY (NDS) 2000-2010

The National Development Strategy (NDS) sets out priorities for our nation's economic and social development for the next decade. It presents us with an opportunity to work together to prepare Guyana for the challenges of the next century. In effect, the principal Agricultural sectoral sub-objectives are: "Large yield increases over the next four to five years, improvements in quality of the product and increases in the amount of domestic processing of the product".

THE NATIONAL ENVIRONMENTAL ACTION PLAN (NEAP), 1994

The National Environmental Action Plan (NEAP), 1994, is the 12-point National Environmental Policy outlined by the Government of Guyana reflecting the sound principles of environmental management inclusive of natural resources and the ideal of sustainable development. Those that are applicable to this project are; Ensure prior environmental assessment of proposed activities, which may significantly affect the environment; Ensure that conservation is treated as an integral part of the planning and implementation of development activities; Raise consciousness of the population on the environmental implications of economic and social activities through comprehensive education and public awareness programme. The implementation strategy for the NEAP involves the identification of programme area according to sectors, cross sectors and tools and actions for implementation.

THE GUYANA LOW CARBON DEVELOPMENT STRATEGY (LCDS)

As a direct mitigation response to global climate change, the GoG launched a National Low Carbon Development Strategy. The strategy seeks to provide insights on how to stimulate the creation of a low deforestation, low-carbon, climate-resilient economy. Guyana's LCDS identifies five strategic imperatives for Guyana to undertake in order to generate economic growth, while simultaneously eliminating approximately 30 percent of non-forestry emissions through the use of clean energy. These strategic goals are:

- Invest in strategic low carbon economic infrastructure, such as: Hydro power development; improved access to unused, non-forested land; and improved fiber optic bandwidth to facilitate the development of low-carbon business activities.
- Nurture investment in high-potential low-carbon sectors, such as fruits and vegetables, aquaculture, and sustainable forestry and wood processing.
- Invest in other low-carbon business development opportunities such as business process outsourcing and ecotourism.

- Expand access to services and new economic opportunity for indigenous peoples through improved social services (including health and education), low-carbon energy sources, clean water and employment which do not threaten the forest.
- Improve opportunities to Guyana society, including improving and expanding job prospects, promoting private sector entrepreneurship, and improving social services with a particular focus on health and education.

ABS POLICY

A national policy addressing Access and Benefit Sharing (ABS) has been finalised and endorsed by the GoG in 2007. The policy addresses ABS in the context of Guyana and the UNCBD and defines the mandates and the responsibilities of the national agencies directly involved in the implementation of the policy. Implementation of the ABS policy follows a draft ABS Regulations that addresses prior informed consent, sharing of benefits, genetic resources among other aspects

NATIONAL INTEGRATED WATER RESOURCES MANAGEMENT POLICY

A National Integrated Water Resources Management Policy and Road map was prepared in 2013 to ensure water resources are managed in a manner to safeguard the health, safety and welfare of Guyana's citizens and ecosystems and to ensure effective, efficient, and equitable use of water resources consistent with the sustainable development goals of the nation. This policy sets out the framework for the management of Guyana's water resources and presents a road map for the planning for integrated water resources management, which includes maintaining the integrity of the aquatic ecosystems.

NATIONAL LAND USE PLAN (NLUP)

The NLUP was developed in 2013 and provides support to decision making through looking at development options and constraints throughout the country. It was compiled by assessing current land use, potential, constraints and stakeholders' concerns. It provides a strategic framework to guide land development in Guyana. As such the NLUP is built upon a number of national policies and strategies that have a direct relevance for land use and land management. The NLUP seeks to enable financial resources to be targeted at optimal land uses at the regional level and to provide a spatial element to development planning.

GUYANA FOOD AND NUTRITION SECURITY STRATEGY FOR GUYANA (2011)

The overall goal of the Food and Nutrition Security Strategy is to improve the health and well-being of all persons living in Guyana through enhanced Food and Nutrition Security. It aims to improve the health and welfare of the inhabitants of the country, especially the most vulnerable, by ensuring food security and nutrition through; employment generation in order to increase the availability and accessibility of food; Promote information systems, education and dissemination, for the use and consumption of healthy foods for better nutrition; Promote greater institutional coordination for food security and nutrition. Specifically the strategy addresses the

facilitation of marketing (storage and distribution) of healthy and quality food for domestic consumption and for export.

A NATIONAL STRATEGY FOR AGRICULTURE IN GUYANA (2013-2020)

A National Strategy for Agriculture in Guyana (2013-2020) was developed in 2013 and outlines a road map to ensure that Guyana achieves its ambitions as a food and nutrition secure nation and as a major contributor to food and nutrition security within the Caribbean Region. Guyana has identified food security as a way to end poverty and hunger by 2025 and agriculture as the vehicle to achieve this. Guyana's vision for agriculture seeks to change the view that agriculture is for subsistence livelihood while promoting agriculture as a wealth generator and entrepreneurial enterprise, producing food and non-food commodities to meet local and export demands. The Strategy focuses on a wide range of activities including environmental sustainability, plant and animal health, agro diversity, land availability, agro energy and efficient infrastructure. The development of the rice industry is a key element in this strategy.

INTUITIONAL

THE ENVIRONMENTAL PROTECTION AGENCY (EPA)

The EPA is the institution that co-ordinates environmental management and provides for the management, conservation, protection and improvement of the environment, the prevention or control of pollution, and the assessment of the impacts of economic development activities on the environment. With respect to the proposed development an EPA permit is required.

THE CENTRAL HOUSING AND PLANNING AUTHORITY (CHPA)

The Central Housing and Planning Authority under the Ministry of Housing and Water are responsible for physical planning and housing development. The Authority keeps a close liaison with statutory authorities, including the Sea and River Defense Board, for the supply and maintenance of certain essential urban services. The CHPA permit is required for the construction of the proposed rice milling and storage operation.

THE GOVERNMENT ANALYST FOOD AND DRUG DEPARTMENT (GA-FDD)

After the old "Sale of Food and Drugs" Ordinance, Cap. 144 was repealed, the new Food and Drugs Act was enacted in 1971. This new Act has considerable flexibility and gives the Minister extensive authority to make Regulations. The Act make provisions for the Government Analyst Food and drug Department to control the manufacture, importation, sale, advertising, labeling, packaging, and distribution of food and drugs in Guyana. With respect to the proposed project the GA-FAA certifies the employees are healthy and fit to be handling food.

THE GUYANA NATIONAL BUREAU OF STANDARDS (GNBS)

The Guyana National Bureau of Standards (GNBS) was established in March of the year 1984 under Act No. 11 of Parliament in the same year. Since then, the Bureau has functioned as a key agency that supports trade and enhances business competitiveness through standards. It also provides services which are geared to protect consumers. As

the National Standard Body, the Bureau has the legal status of a statutory corporation and a semi-autonomous agency. It is governed by the National Standards Council, whose members are appointed by the Minister of Business. Technical Committees established by the National Standards Council are responsible for the development of standards. Apart from standards development, the Bureau promotes and implements standards in key sectors of the local economy through the many services it provides. With the respect to the proposed operation the GNBS inspects and certifies the scales and weights used in the purchasing of paddy from farmers.

MINISTRY OF AGRICULTURE FISHERIES DEPARTMENT

The Fisheries Department is responsible for managing, regulating and promoting the sustainable development of the nation's fishery resources for the benefit of the participants in the sector and the national economy. The Fisheries sector is made up of three primary components: Marine Fishery, Aquaculture and Inland Fishery. To ensure the observance of all legal and administrative requirements by all entities in the fishery sub-sector and recommended appropriate charges to existing regulations which govern the Sector. The key responsibilities include: Registration and Licensing of fishing vessels, License and inspect fish processing plant, Conduct enforcement and surveillance activities of fishing vessels, Monitor the industrial fleet/artisanal compliance with license conditions, Monitor and conciliate complaints and disputes at the centre and the regions, Issue export licenses for fish and fish products, Ensure the collection of revenue under the Fisheries Act 2002 and Maritime Act of 1977, etc.

Summary of Natural Environmental and Social Baseline Conditions

Physical Environment

Guyana

Population: 782,766 people

Capital: Georgetown

Area: 215,000 km²

Currency: Guyanese dollar

GNI per capital: US\$1,450

Main exports: Sugar, gold, bauxite/alumina, rice, shrimp,

Molasses, rum, timber

Language: English, Guyanese Creole

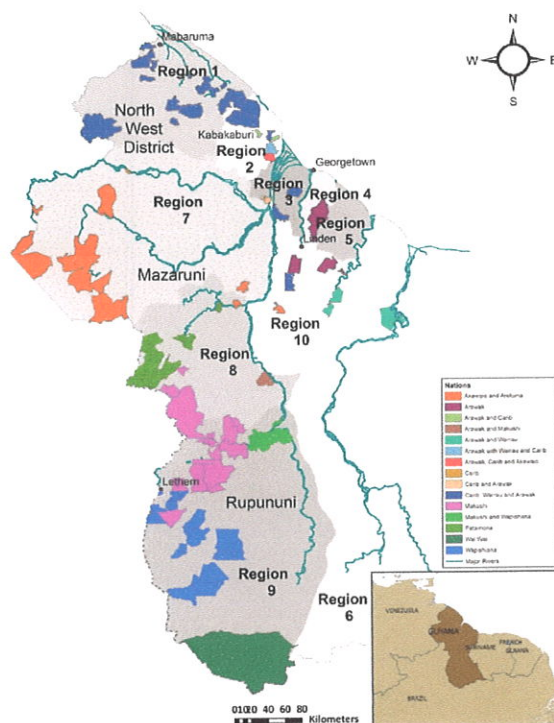
Religion: Christian (57%), Hindu (23.4%)

Life expectancy: 67 years

Guyana is a low-lying country situated in the Northern part of South America, bordering the North Atlantic Ocean, and with Suriname, Venezuela and Brazil as neighbors. It is the third smallest country in South America after Suriname and Uruguay, and with a population of less than a million (mainly of



East Indian, African, mixed, and Amerindian descent), it has one of the lowest population densities in the world. Guyana is well endowed with natural resources including bauxite and gold, fertile agricultural lands, and large tropical forests. Ninety percent of the inhabitants live on the narrow coastal plain, which represents 10 percent of the country's area and lies largely below sea level. With 77.2% percent of the country (152,050 km²) covered by forests, Guyana has one of the world's highest forest cover per capital ratios.



Geomorphology of Guyana's Coast

The country is divided into four (4) natural regions; for the purposes of this project, the focus will remain on the low lying coastal belt. Guyana is located on one of the 3 cartons of the South American Plate which is a 1.7 billion year old Precambrian geological formation the newer formation of the coast is underlain by what is known as the Demerara Formation from the Holocene Period while the older coastal plain was formed by Coropina Formation in the Pleistocene Period. The Demerara Formation, which is mainly clay like soil, does not rise more than 2.5 meters while the Coropina Formation rises some 3-8 meters. The coast lies under sediments from the young Crustaceous to present day deposits (NEDECO v.1, 19672). The stretch of the coast runs about 1600km between the deltas of the Amazon and Orinoco Rivers with a width varying from 16km in the west and running to up to 64 km in the east. The young Coastal Plain does not rise more than 2.4 m above the mean sea level and where the study areas are located it is about 1.5 m below sea level.

Climate

Guyana has a tropical climate with almost uniformly high temperatures and humidity, and much rainfall, modified slightly by trade winds along coast. Air temperature usually ranges between 16 °C and 34 °C with the lower temperature experienced in the highland regions. The temperature in Georgetown is quite constant, ranging from 24 °C to 32 °C. Humidity averages 70 percent year-round. The interior, away from the moderating influence of the ocean, experiences slightly wider variations in daily temperature. Humidity in the interior is also slightly lower, averaging around 60 percent. Guyana lies south of the path of Caribbean hurricanes and none are known to have hit the country. Guyana has an annual average rainfall of 1 500 - 3 000 mm, with the higher amounts being experienced in the southern highland and forested regions and the lower amounts in the southeast and interior. Annual averages are near 2 500 mm on the coast near the Venezuelan border and 1 500 mm in southern Guyana's Rupununi Savannah. Although rain falls throughout the year, there is a rainy season that extends from May to the end of July along the coast and from April through September further inland. Coastal areas have a second rainy season from December through February. There are two dry seasons from March to April and from September to November. This is influenced by the movement of the Inter Tropical Convergence Zone (ITCZ) across the equator and the Southern Oscillation Index (SOI): high positive values cause reduced rainfall in the secondary rainy season while high negative values result in prolonged and extensive rainfall, leading to flooding in low-lying areas with poor drainage. Rain generally falls in heavy afternoon showers or thunderstorms.

Population

The total population was estimated at 800 000 inhabitants in 2016, of which 72 percent were rural. During the period 2005-2016 the annual population growth rate was estimated at 0.6 percent. There is a low population density of about 4 inhabitants/km² but with 90 percent of the population residing in the coastal regions.

Ground and Surface Water Sources

The hydro-geology of the coast, including Georgetown, consists of three main sand layers, typically referred to as the A, B, and C sands. Each layer is separated by clay layers. These layers trend downwards from east to west. The A sands occur at a depth of 500 feet, the B sands at a depth of 800 feet. The natural water table is expected to be located at approximately 1m below ground surface. The local population is generally reliant on supply from tube wells and dug wells. The water is supplied by Guyana Water Inc. from groundwater. The developer has a private well. The protection of these sources of water will continue to be critical during construction.

Land Cover/Land Use

In terms of major land cover/land uses classes, it is notable that the main land use type is that of Natural Vegetation which occupies some 60% of the total area and is located in the central part of the area – occupying most of the land within the area on the East Bank Demerara and Demerara River and also an appreciable area within Garden of Eden on the east bank Demerara. Cropped Land is the next most extensive cover at 18% and this is located in a broad arc in the north-east of the area. It is interesting to note that the gross area of cropped land is just over 130,000 acres –the limit of land irrigable

from the Georgetown. Abandoned Land is the next most extensive, covering some 15% of the total area or just over 109,000 acres. Other Land, mainly urban areas and pasture land make up the remainder, though it must be noted that large areas of natural vegetation, abandoned land and cropped land are used for pasture at certain times of the year.

PROJECT LOCATION/SITE DESCRIPTION

The proposed project will be located at Garden of Eden, Parcel 75, Block XXIX, in the vicinity of the Guyana Defense Force farm, East Bank Demerara on an area of 6.818 acres or 27,075 square meters (Figure 1). Land is bounded north and south by drainage canals originating from the east Demerara conservancy and leading to the Demerara River. The land is approximately 3000 feet from the Demerara River and 2000 feet or 0.6 kilometer from East Bank Public Road. Surrounding land uses comprise a mix of residential to the south and east as well as agricultural, and poultry farming east and south of the project location (Figure 2). The poultry land uses range from 1000 feet to 5000 feet in distance from the proposed location. Closest residence is approximately 100 feet to the west, and 300 feet to the south. The land is primarily clayey soil with grassy and shrub vegetation.



Figure 1: Location of Propose Project



Figure 2: Project Location and Surrounding Land Use

THE PROJECT DESIGN

The project plans to invest a total of USD\$20 million to build an integrated fishery complex in Guyana. The project will build an integrated fishery industrial park with supporting facilities. The Facility will comprise manufacturing/processing plant, Logistics and warehouse, and supporting infrastructure and facilities (table 1) Site Plan and processing plant plan are provided in figures 3 and 4 respectively.

Site Plan/ Layout

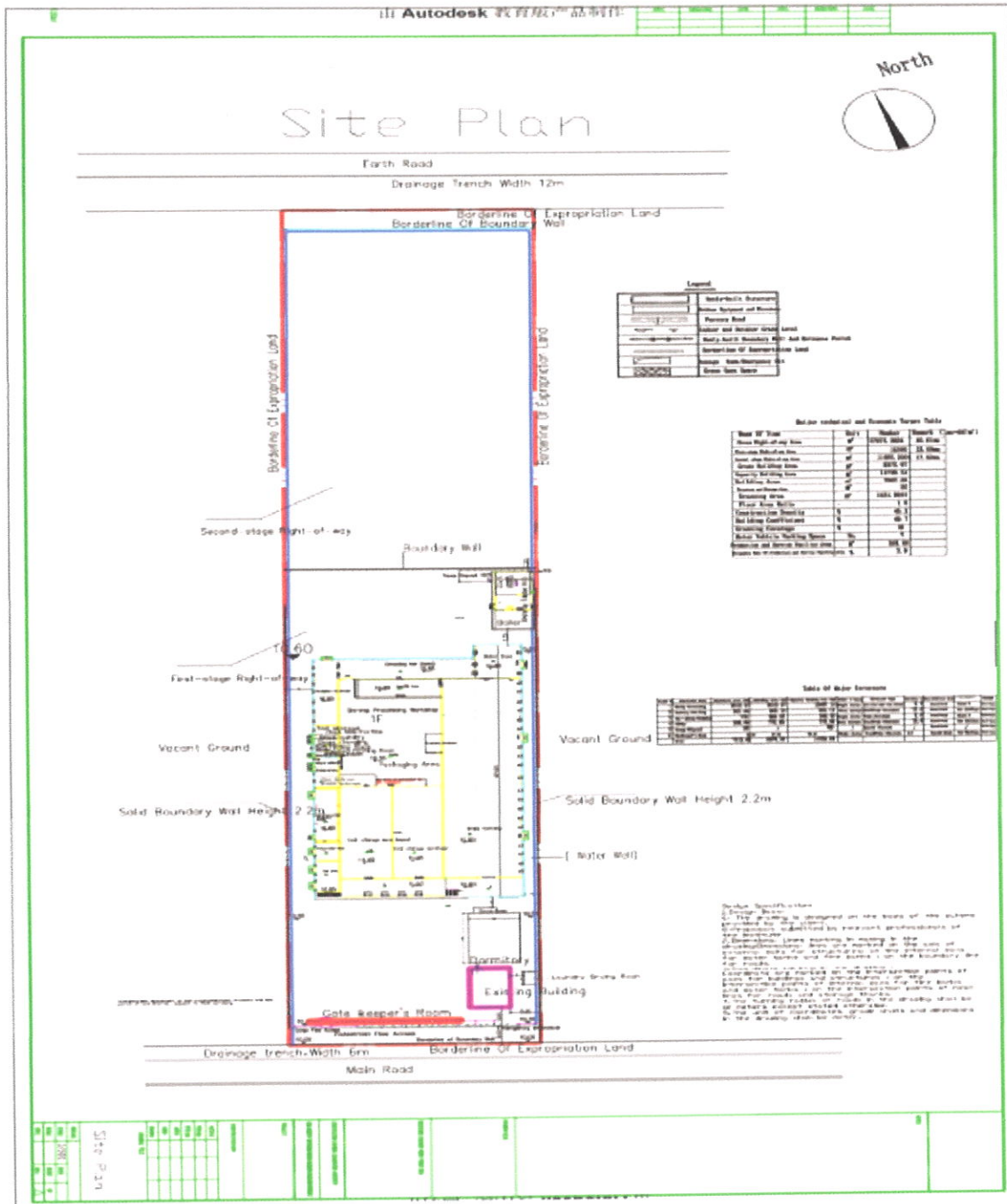


Figure 3.

Processing plant

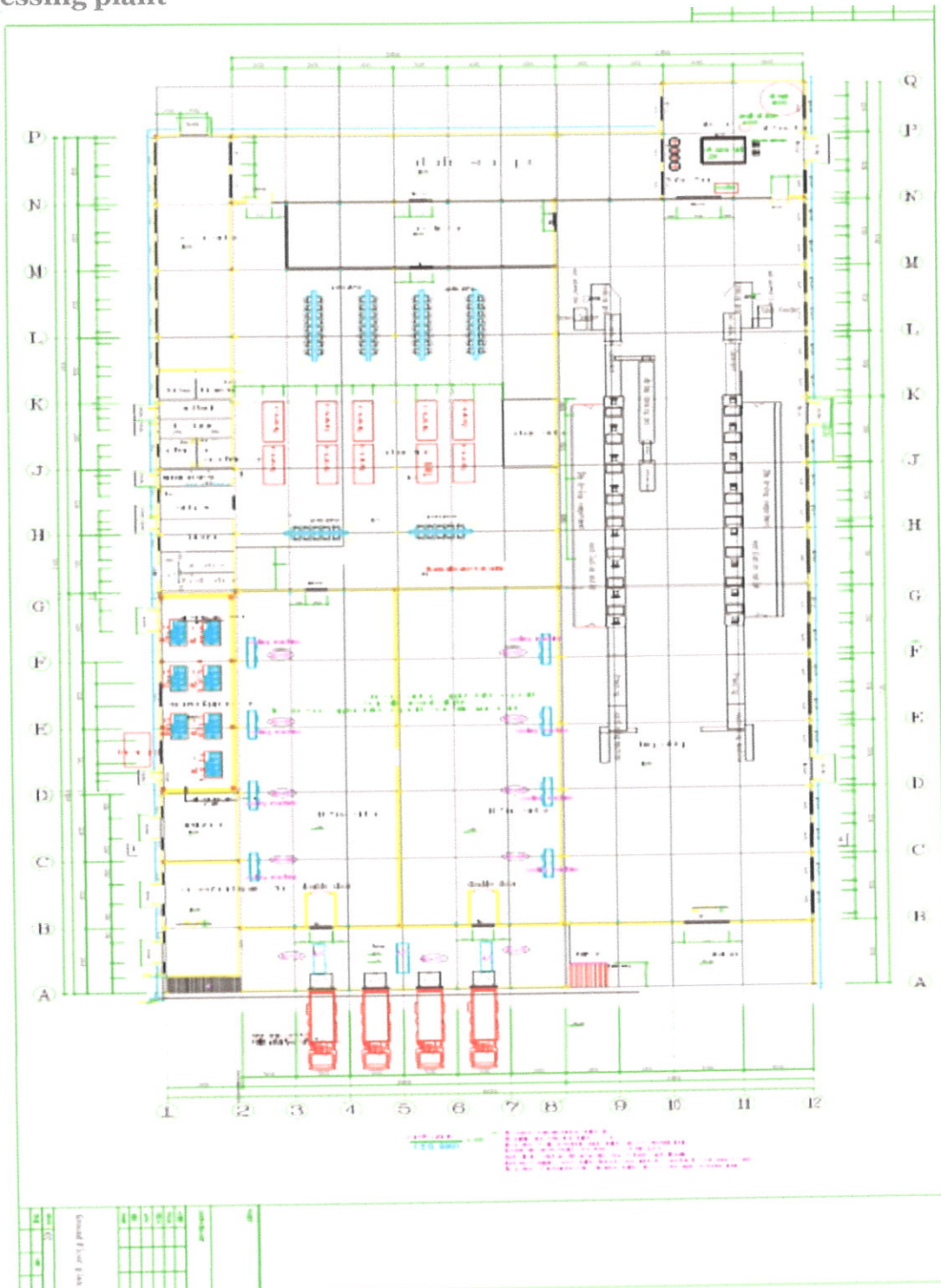


Figure 4.

PROJECT COMPONENTS

The project will source fish and shrimp from fishermen throughout the country and transport in refrigerated trucks to the processing plant, then processed and sold on export market in China Taiwan, Hong Kong, Europe, and United States etc.

Category	Description
Processing Plant	<ul style="list-style-type: none">• Fish (45 tons/day) and shrimp (60 tons/day)• processing plant with freezing and packaging• Pre-cooling workshop• Ice-making and storage (50 tons/day)
Logistics and warehouse	<ul style="list-style-type: none">• Cold Storage of 1500 tons• Loading and unloading plaza• Materials warehouse
Infrastructure	<ul style="list-style-type: none">• Emergency power house/Generator• Boiler House• Water sewage treatment with 100 tons/day capacity• Water storage reservoir
Support Facilities	<ul style="list-style-type: none">• Office building• Staff dormitory and recreation and canteen• Security

Table 1

FISH PROCESSING

Figure 5: Below outlines the fish processing stages.

Filleting involves a number of unit operations: pretreatment, fish filleting, trimming of fillets, packing and storage. These processes generally take place within separate departments of the fish processing plant. On arrival at the plant, fish will be iced and placed in chilled storage until required for further processing. Pretreatment of the fish involves the removal of ice, washing, grading according to size and de-heading, if this has not been done previously. Large fish may also scale before further processing.

Filleting and Trimming is the next step in the process. The filleting department is generally separated from the pretreatment area by a wall, to prevent workers and goods passing from the non-sterile pretreatment area to the sterile filleting area. The filleting will involve cutting of the fillets from the backbone and remove the collarbone. Some fish fillets may also be skinned at this stage.

In the trimming department, pin bones are removed and operators inspect the fillets, removing defects and any parts that are of inferior quality. Off cuts are collected and minced. Depending on the final product, the fillets may be cut into portions according to weight or divided into parts such as loin, tail and belly flap. As a final step before packaging, the fillets are inspected to ensure they meet product standard.

Fresh products are packaged in boxes with ice, the ice being separated from the products by a layer of plastic. Frozen products can be packed in a number of ways. Fillets or pieces can be individually frozen and wrapped in plastic, but the most common method is for them to be packed as 6–11 kg blocks in waxed cartons. The blocks are typically frozen and then kept in cold storage.

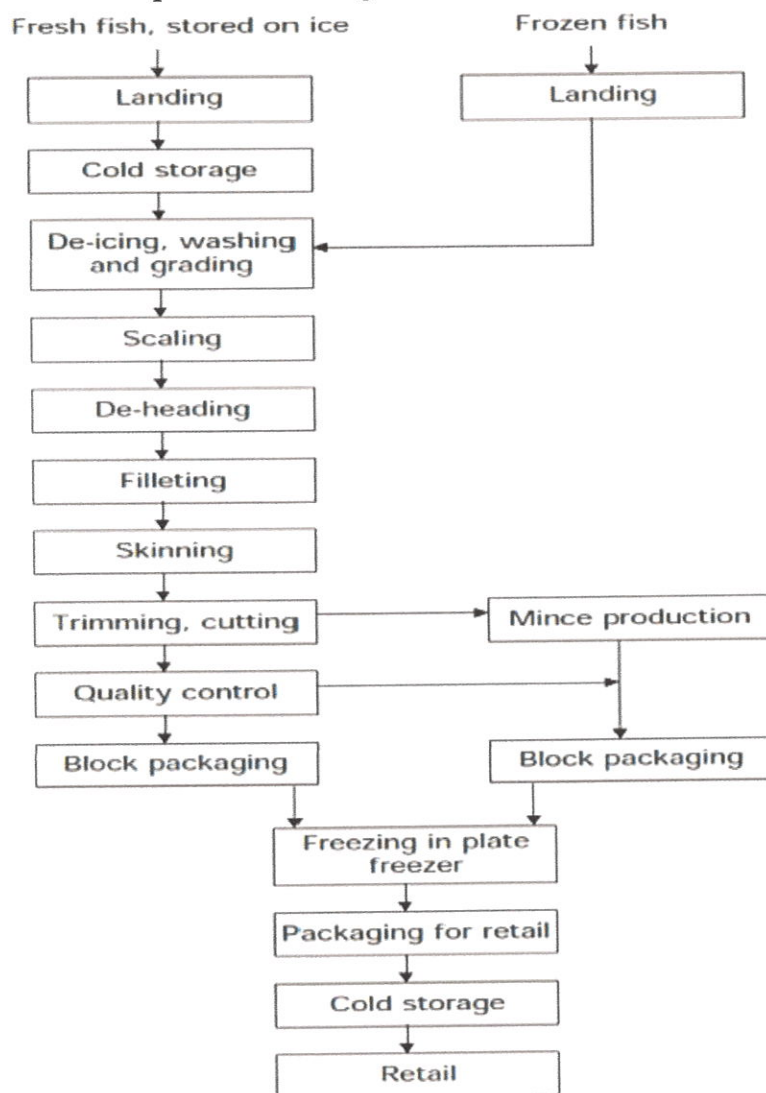


Figure 5: Fish Processing and Flow Diagram

SHRIMP PROCESSING

Figure 6 below outlines the stages in the shrimp processing.

Receiving: shrimp is delivered to and received by the shrimp processor plant in wooden crates aboard refrigerated trucks. Shrimp is removed by hand from the crates into an automated wash receiving tank. Shrimp is washed and transferred to a conveyor belt to the breaking table.

Breaking: shrimp head is removed. Removal of the head is most often a manual process.

Grading: shrimp is sorted according to a preset size category and deposited down side shoots into perforated plastic baskets.

Peeling & Deveining: legs, shell and vein are removed by using automated machinery.

Packing: separated and sized shrimp are weighted according to size and packaged in either 1 pound bags or 5 pound boxes in accordance to end customers' preferences. Packaged shrimp product are placed onto a master carton and loaded onto freezer carts. Packaging is generally done by hand labor.

Blast Freezing: processed shrimp is kept overnight in a Freon-activated blast freezer, where as many as 22,000 lbs of shrimp can be exposed to -40F temperature. Freezing can occur at different points of the processing cycle to help reduce spoilage.

Glazing: frozen shrimp is removed from the blast freezer and coated with a thin layer of water, which is immediately turned into a moisture sealing gaze.

Storing: Frozen and glazed shrimp is stored for temporary or long term storage to prevent premature thawing.

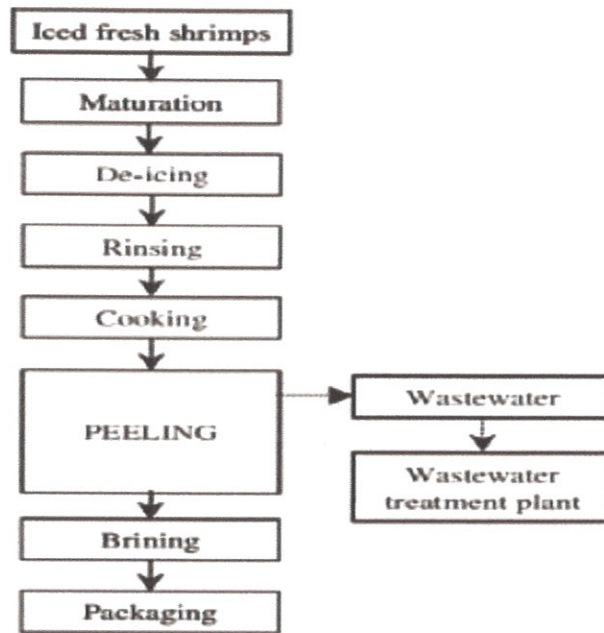


Figure 6: Shrimp Processing Flow Diagram

The project size, e.g. capital investment, number of employees projected for each stage of the project, rates of production, etc.

The total project investment is expected to be approximately US\$20million (20,000,000 USD). Further investment in the industry chain may be increased accordingly depending on project operations and market conditions.

Investment in the processing plant and supporting infrastructure is approximately USD\$15million, accounting for 75% of the total investment. 25% of investment will be liquidity and used for production material purchasing, employee payment and their compensation and benefits.

Total number of workers will reach approximately 200. Employment will be as set out in Table 2. Recruitment of skilled technicians and management from China and other countries will be 10%. Local managers and technicians will also be recruited. Technical training will be provided for local employees, including fishing recognition, processing, refrigeration, ice making, drying, and quality management.

Table 2

Employee Level	Number
Management	10
Professional	10
Supervisory	10
Skilled	20
Semi-skilled	200

In order to promote the implementation of the project as soon as possible, promote the development of local fishery, and lay the foundation for the later project construction priority will be given to construction of the processing plant and supporting facilities. The overall project is carried out in two phases to ensure feasible implementation of the project. After obtaining the official approval from the government of Guyana and completing the preliminary regulatory procedures, the company will activate the construction of the onshore comprehensive fishery industrial park within six months. The project is scheduled to commence before December 2019 and be completed in approximately 3 years.

When the project is completed, it will become an integrated industry base in Guyana. After being processed, the fishes will be exported to neighboring countries by air, road, and sea transport, which will increase Guyana's foreign exchange earnings and expand Guyana's economy. Driven by the project, the entire fishery industry chain can be continuously extended, and relevant supporting enterprises will be attracted and introduced to invest in the local area, which will greatly amplify the investment effect of the project, and increase the total fishery production value of Guyana.

Positive Impacts

This project is expected to have numerous positive impacts, such as:

- Strengthened policy and regulatory framework
- Improved livelihoods of fishers and fish farmers
- Increased income generation
- Increased source of good protein
- Improved food security
- Increased economic security for fisher folk
- Improved resilience to climate change

- Improved ecosystem health
- Enhanced agricultural competitiveness
- Increased skill sets for fishers
- Reduced vulnerability to climate change

Potential effects on the environment which may result from the existence of the project i.e. land, soil, water, air, the use of natural resources, etc. and proposed plans to mitigate environmental impacts.

The main environmental impacts associated with fish processing activities are the high consumption of water, and the discharge of effluent with a high organic content. Noise, odour and solid wastes may also be of concern.

A characteristic of fish that has a bearing on the waste loads generated, is its highly perishable nature compared with other food products. If not properly refrigerated it spoils rapidly, the flesh becomes soft and loose, and pieces are easily lost. As the quality of the fish deteriorates over time, product yield decreases and product losses contribute to the waste loads. These losses often find their way into the effluent stream.

Fish processing plants often have little direct control over the handling of the fish catch before it arrives at the plant, except where the fishing vessels are owned by the processing company. In this case, the processor can set quality standards and expect certain handling practices.

The following is a preliminary assessment of possible impacts to environment and Human Health. Apart from the precautionary measures put in place as indicated above the following mitigation measures will be implemented.

Summary of Impacts

The potential negative environmental and social impacts identified are localized and temporary with possibility of mitigation actions. The projected environmental and social impacts and proposed mitigation measures for the various stages of the Grandeast Inc. Facility is presented in Table 2.

Environmental Impacts

The projected environmental impacts for the various phases of the program are summarized below.

Pre-construction Phase

No negative impacts are expected during the preconstruction phase. Preconstruction activities include the acquisition of required permits, definition of alignments, and layout of construction limits, location and establishment of equipment storage of staging areas. This phase also includes public consultation and communication with stakeholders and the general public on the scope, and possible impacts and proposed mitigation measures of Grandeast Inc. Facility.

Construction Phase

The expected negative environmental impacts and risks are generally the same risks encountered in the execution construction project involving the site, linear alignments, and extended durations in urbanized and rural settings. The environmental impacts and risks are also compounded by those (risks) associated with the heavy construction, as in Foundation and Storage Facility.

The projected impacts and risks include:

- *Air quality and noise problems,*
- *Management of materials and construction wastes, and storage of chemicals.*
- *Environmental risks due to water pumping and discharge*

Air quality problems: smoke emissions from the use of machines and dust production while grading excavating, could result in annoyance to the site workers, nearby residents and activities and the pedestrians.

Noise generation: the use of excavation machines and construction equipment could potentially impact on workers and neighborhood residents.

Construction materials and waste management: the construction activities will necessitate temporary on-site storage of construction materials and excavated materials; poor management of the stored materials and wastes can result in dispersion of materials in the nearby drainage systems and creeks, streets and adjacent properties. Appropriate disposal of construction wastes could minimize similar issues at the final disposal site.

Storing of fuels and lubricants on site: the Contractor will need to store some fuel, oils and lubricants on site for the machines activities. This can create a risk of water and soil contamination in case of a spill.

Construction Safety: Excavations and other construction site activities such as the use of cranes and elevated working environments must be effectively managed to prevent injury to workers and disruption of the project;

Pumping and discharging of storm water and off-site: The Contractor may need to extract storm waters from the trenches and other construction works to insure working conditions; the discharge of the pumped water can impact surface waters and drainage systems and cause erosion.

Operations Phase

There are no projected major negative environmental impacts during the operation phase. The impacts are projected to be minor, most of which can be readily mitigated. The Impacts are related to storage of Fish, Shrimp and storing.

SOCIAL IMPACTS

There are no major negative social impacts in any phase of the Grandeast Inc. fish processing Facility. The facility will not necessitate resettlement or will there be any conversion of agricultural lands. It is projected that there will be an influx of workers which can result in increased employment.

Management of Environmental Parameters

Table 3:

Project Activity, Aspects	Potential Environmental Impacts	Proposed Mitigation/Control Measures	Institutional Responsibilities to Implement Mitigation Measures
Construction Phase			
	Air quality problems: smoke emissions from the use of machines and dust production while grading excavating, could result in annoyance to the site workers, nearby residents and activities.	Dust masks and eye Protection against dust, Splinters, debris etc. Dust suppression methods such as wetting materials or slowing work will be employed as needed to avoid visible dust Gas masks / respirators when working in closed areas such as access manholes, etc.	Grandeast Inc. Contractor
	Noise generation: the use of excavation machines and construction equipment could potentially impact on workers and neighborhood residents	Limiting working hours according to the EPA requirements Maintain vehicles and machinery according maintenance requirements Consider noise suppression capability in the procurement of vehicle and equipment	Grandeast Inc. Contractor
	Construction materials and waste management: the construction activities will necessitate temporary on-site storage of construction materials and excavated materials; poor management of the stored materials and wastes can result in dispersion of materials in the nearby drainage systems and creeks, streets and adjacent properties. Appropriate disposal of construction	The contractor shall handle construction materials and waste in accordance with approved procedures. Sites for temporary piles will be agreed with Grandeast Inc. and local authorities. The community will be made aware of constraints imposed on the contractor for waste collection, storage and disposal.	Grandeast Inc. Contractor

	wastes could minimize similar issues at the final disposal site.		
	Storing of fuels and lubricants on site: the contractor will need to store some fuel, oils and lubricants on site for the machines and pipe laying activities. This can create a risk of water and soil contamination in case of a spill.	Secondary containment for fuels to avoid spill contamination and inspection during operation Some training in fuel and waste handling will be part of the orientation for workers Maintain the MSDS Sheets for hazardous materials on site.	Grandeast Inc. Contractor
	Construction Safety: Excavations and other construction site activities such as the use of cranes and elevated working environments must be effectively managed to prevent injury to workers and disruption of the project;	Safe access and thoroughfare must be Provided on site at all times. Dangerous areas shall be clearly identified with appropriate signs	Grandeast Inc. Contractor
	Pumping and discharging of storm water and off-site: The Contractor may need to extract storm waters from the trenches and other construction works to insure working conditions; the discharge of the pumped water can impact surface waters and drainage systems and cause erosion.	Storm water will be pumped from pipe trenches and foundations to the ditches, waterways and creeks existing beside the roads. These are the natural recipients currently used for rainwater drainage (Drainage control) Storm water will be pumped from pipe trenches to the ditches, and creeks	Grandeast Inc. Contractor
	Noise generation: the use of excavation machines and equipment could potentially impact on workers.	Adequate noise reduction and duct collection system in Place.	Grandeast Inc. Contractor
	Erosion and sediment control, and storm water control: Soil erosion and sedimentation could result from earth works such as construction activities, storage of excavated materials and stockpiles and ancillary facilities and staging areas.	Monitor areas of exposed soil during periods of heavy rainfall for signs of erosion; consider the weather pattern before starting major earthworks. Locating materials stock- piles in a designated area, away from water bodies.	Grandeast Inc. Contractor
	Domestic Waste	The waste stream would include waste such as empty	Grandeast Inc. Contractor

		plastic bottles, used food boxes, paper and cardboard. A collection bin should be provided onsite to utilize by workers. This bin should be emptied as necessary.	
	Liquid waste: Sewage	Portable Toilet facilities will be provided for workers will be weekly serviced by Cevon's Waste Management Services.	Grandeast Inc. Contractor
	Hazardous Waste: Waste Oil	Waste oil from the servicing of equipment and machinery should be collected and remove from site. The oil should be collected in drums and stored for suitable reusable options as far as possible.	Grandeast Inc. Contractor
	Hazardous Waste: Used Batteries	Used batteries should be safely stored for recycling. Some distributors of batteries are also in the business of recollecting the batteries after use for recycling.	Grandeast Inc. Contractor
	Hazardous Waste: Oily Rags/ Filters, inter alia, oil and fuel filters, asbestos containing break- pad liners, mineral and or oil contaminated soil, oily waste water, oil/ mineral based used containers, oily rags, used tyres, etc.	Hazardous waste materials can be reused to the extent as possible, e.g. waste oil can be reused by chain saw operators. However, other hazardous waste will be safely disposed at the Haag Bosch Landfill Facility.	Grandeast Inc. Contractor

Table 4

Operational Phase			
Environmental Component	Nature of Impact	Impact significance	Mitigation measures by Grandeast Inc.
Water consumption	Fish filleting processes consume very large quantities of fresh water. Water is used for transporting fish and offal around the plant in flume systems, for cleaning plant and equipment, for	Insignificant, avoidable, negligible, mitigable	Small spray nozzles and water pressure can be maintained at optimum rates. Sprays will be operated intermittently (e.g. 3 seconds on, 3 seconds off), instead of constantly. Stop valves will be used to stop water flow when water is not

	washing raw materials and product, and for deicing and thawing.		required.
Water/Effluent	<p>Effluent streams generated from fish processing contain high loads of organic matter due to the presence of proteins and suspended solids. They can also contain high levels of phosphates and nitrates. Sources of effluent from fish processing include the handling and storage of raw fish prior to processing, fluming of fish and product around the plant, defrosting, gutting, scaling, portioning and filleting of fish and the washing of fish products. For operations where skinning is carried out, the effluent can have a high pH due to the presence of caustic.</p> <p>In fish meal and fish oil production, sources of effluent are blood water from unloading the vessels, blood water from intermediate storage of fish, stick water from the centrifuges, condensate from the evaporators and cleaning in general. If the effluent stream is discharged without treatment into water bodies, the pollutants they contain can cause eutrophication and oxygen depletion.</p>	Insignificant, mitigable	<p>Separate cooling water, storm water, and process effluents in the production line to permit appropriate treatment options.</p> <p>Conduct a dry pre-cleaning of equipment and production areas before wet cleaning (e.g. rubber scraping of work tables and plant floor before hosing).</p> <p>Sweep and collect solid materials in hopper, instead of washing them down the drain.</p> <p>Clean dressed fish with vacuum hoses and collect the blood and offal in an offal hopper rather than the effluent system.</p> <p>Fit drains with screens and/or traps to prevent solid materials from entering the effluent system.</p> <p>Avoid submersion of open products (e.g. fillets) in water, as soluble protein may leak out and enter the wastewater effluent Stream</p> <p>Use of cleaning agents that do not have adverse impacts on the environment in general, or on wastewater treatment processes. Optimize their use through correct dosage and application. Avoid cleaners that contain active chlorine.</p> <p>Installation and operation of water effluent treatment plant</p> <p>Treatment of wastewater will</p>

			include a combination of grease traps, skimmers/ oil water separators for separation of floatable solids; sedimentation for suspended solids reduction using clarifiers or settling ponds; anaerobic treatment, followed by aerobic treatment, for reduction of soluble organic matter (BOD); biological nutrient removal for reduction in nitrogen and phosphorus; chlorination of effluent when disinfection is required; dewatering and disposal of
Waste	<p>Fish parts and offal from skinning and filleting</p> <p>Waste generated during operation that is generally domestic in nature.</p>	<p>Insignificant, mitigable</p> <p>Localized, Short term, mitigable, insignificant, reversible</p>	<p>Transport in refrigerated trucks and disposal at Haags Bosch Landfill. Sold to feed/fish meal producers where applicable.</p> <p>Where feasible, waste will be reprocessed into commercial byproducts. Off-cuts and wastes will be recovered and handled and stored to prevent product deterioration. Internal organs, blood, bones may be reprocessed into fish meal or production of fish silage. Fish silage is a product derived from the liquefaction of whole fish or parts of fish through the action of enzymes in the fish and additional acids. Silage can be used for applications similar to those of fishmeal.</p> <p>Recovery, recycle as far as practical. Garbage receptacles placed at appropriate locations on site and covered. Regular collection and disposal by authorized disposal services for disposal at Haags Bosch landfill.</p>
Air Quality	Odour generation can be an important environmental issue. The main causes are	Insignificant, mitigable	Avoid processing batches of raw material that are of considerably lower than average quality to

	<p>the storage and handling of putrescible waste materials and odorous emissions during the cooking and drying processes used in the production of fish meal.</p>		<p>reduce the odour components.</p> <p>Reduce the stock of raw materials, waste, and by-products and store this stock for short periods of time only in a cold, closed, well-ventilated place.</p> <p>Seal by-products in covered, leak-proof containers.</p> <p>Keep all working and storage areas clean and remove waste products immediately from the production line.</p> <p>Empty and clean fat traps on a regular basis.</p> <p>Cover all transfer systems, wastewater canals, and wastewater treatment facilities to reduce the escape of foul odours.</p> <p>Install cyclones and filtration (fabric filters) to remove particulates.</p> <p>Reduce fugitive odour sources from open doors, open windows, and general room ventilation through the use of negative pressure-controlled ventilation systems.</p>
	Noise from vehicular traffic	Localised, Shortterm, mitigable, insignificant, reversible	<p>Maintain appropriate working hours between 7 am to 17:00 hrs.</p>

Waste Management/ Dangerous Goods Management Plan

General Waste

All wastes which can be recycled would be reuse. All other would be disposed of in an approved landfill, or shipped to an approved disposal facility via a private disposal contractor. Construction debris will not be allowed to accumulate on the construction site but will be collected promptly and regularly removed from the site.

Transportation and Handling

Petroleum products and/or dangerous goods will be transported using equipment and containers in good condition. To reduce the risk of a spill during transport, all potentially dangerous goods will be transported to and from the site by an experienced or certified contractor.

The following measures will be employed to minimize the potential of a spill or accident:

1. All employees who handle fuel or other dangerous goods on the project will be experienced in the handling of dangerous goods prior to working on the project;
2. All fuel will be transported to the project in containers that are safely transporting petroleum products and/or hazardous material in compliance with Government regulations.
3. Other dangerous goods will be locally transported in a shop truck to specific areas on the project as required.

HAZARDOUS WASTE

- ✓ Hazardous Waste including used batteries could be sold to EPA authorised battery dealers. Waste oil and used filters collected and stored and disposed of by an acceptable method approved by the EPA.
- ✓ Hazardous materials Management Workers will receive training from the Contractor's Environmental Manager on waste classification for segregation purposes.
- ✓ Fuel/ Lubricant will be contained by absorbent materials such as sand or saw dust and will be stored in garbage bags or drums (depending on quantity) for transport to the Haag Bosch Landfill Facility.

FUEL STORAGE

Fuel storage will be located within 30 meters of a watercourse, within a watercourse floodplain, or where there is a potential for any spilled fuel to enter a watercourse or groundwater. Fuel storage facilities will be located on flat or gently sloping ground and be dyked to contain at least 125% of the total capacity of the storage containers. Dykes will be constructed of impermeable material or lined to ensure that petroleum products cannot escape. All large fuel storage tanks must be locked and secured when not in use. Automatic shut-off nozzles will be installed on all dispensing units over 250-litre capacity. All small fuel storage containers, such as 45 gallon (200 litres) used as a fuel

cache will be installed on a stable storage rack, within an impermeable containment device capable of capturing at least 125% of the total capacity of the storage containers. A cover, such as a tarp, must be placed over the top of the fuel cache to prevent accumulation of precipitation in the containment device. The small fuel storage containers will be contain a metal spigot with a padlock placed on the container when not use.

HANDLING AND DISPOSAL

All dangerous goods will be handled by persons having experience and training in these products. All non-toxic or non-hazardous wastes that are not designated as combustible will be either recycled or disposed of in an approved landfill. Construction debris will be appropriately stored on site until removed. Refuse generated during the servicing of equipment will be stored and removed from the site and disposed of in an appropriate manner. Solids, sludge and other pollutants generated as a result of construction or removed during the course of treatment or control of waste water will be disposed of in a manner that prevents their direct or indirect discharge to any watercourse or groundwater.

The following general housekeeping measures will be implemented to reduce environmental impacts

- Keep work areas tidy and uncluttered to avoid accidents.
- Maintain good inventory control of raw ingredients.
- Ensure that employees are aware of the environmental aspects of the company's operations and their personal responsibilities.
- Train staff in good cleaning practices.
- Schedule maintenance activities on a regular basis to avoid inefficiencies and breakdowns.
- Optimize and standardize equipment settings for each shift.
- Identify and mark all valves and equipment settings to reduce the risk that they will be set incorrectly by inexperienced staff.
- Improve start-up and shut-down procedures.
- Segregate waste for reuse and recycling.
- Install drip pans or trays to collect drips and spills.

OCCUPATIONAL HEALTH AND SAFETY MEASURES

- Provide workers with training in the proper use and maintenance of cutting equipment (including the use of machine safety devices, handling / storage and upkeep of knives, and emergency shutoff procedures) and personal protective equipment (e.g. metallic gloves and leather aprons for cutting activities, and protective footwear with rubber soles);
- Design the plant so that different activities and the flow of processes do not cross. In addition, clearly demarcate transport corridors and working areas; ensure that

handrails are provided on platforms, ladders, and stairs; and use non-slip floor surfacing;

- Wear gloves to protect hands from exposure to products, especially when working with seafood that is known to create allergic reactions (e.g. shrimp). Provide food-approved shielding hand creams;

Environmental Monitoring

Environmental monitoring programs will be implemented to address all activities that have been identified to have potential impacts on the environment during normal operations and upset conditions. Environmental monitoring activities would be based on direct or indirect indicators of emissions, effluents, and resource use as applicable.

Emergency Response Plan Objectives

The aim of these procedures is to ensure that personnel are capable of coping with any emergency situation. The primary concern is for the safety of workers, visitors, contractors and the community. Vital records, property and other assets should also be protected.

Supervisors must ensure that these procedures are kept in a prominent position and that all personnel are made aware of the contents. It is also essential that this document is amended when there are site or personnel changes that impact on the procedures herein.

All personnel must make themselves aware of the location of all emergency alarms, exits and fire appliances within or near their work area and location of the external Safe Assembly Areas.

The effectiveness of these procedures depends on the willingness of all personnel to make themselves aware of the immediate actions they must take in an emergency so that they are capable of acting promptly, calmly and efficiently.

Emergency and Incident Management

- i. Emergency procedures take precedent in the event of an emergency. The
- ii. Environmental implications will be assessed and managed only when the emergency has been contained and it is safe to access the site.
- iii. If an incident takes place that has environmental implications, an incident reporting form will be completed, including implementation of any corrective actions.
- iv. If the emergency or incident has caused or may cause material harm the Contractor must notify Grandeast Inc.

In the event of an emergency the process to follow shall include:

- Contact Immediately HOD (Head of Department) Environmental

Safety/Control Room – either via dialing phone or radio

- Activate the nearest emergency alarm if necessary
- Without putting one's self in the line of fire, making the area safe
- If safe to do so, provide assistance to injured persons
- Notify site manager/supervisor
- Await further instructions.

Access for External Services

In the event that external emergency services require access to the site, escorts and direction guides will need to be dispatched.

Fire and Smoke

Fire and Smoke – Action Plan If you discover fire or smoke on site, follow the steps below immediately.

Step 1: Activate the nearest emergency alarm. Advise the Area Supervisor immediately of the fire or smoke and its location on the site.

Step 2: Area Supervisor is to move any people in immediate danger to the Safe Assembly Area, and advise the HOD Environmental Safety immediately of the fire or smoke and its location on site.

Step 3: HOD Environmental Safety will assess the situation and, if deemed appropriate, evacuate the site and notify emergency services.

Evacuation

The Control Room will use the Public Address (PA) system to alert all workers and visitors of the evacuation. Supervisors will instruct all personnel to evacuate.

1. Supervisors must ensure that their designated areas are free of all personnel. If safe to do so, Supervisors will switch off power to machines and other equipment, and close doors. Do not turn off the lights. If safe to do so, the fire may be extinguished.
2. For evacuation, all personnel must assemble at the designated Assembly points and remain with their Supervisor at all times.
3. Each Supervisor will ensure a roll call is conducted to account for all workers and visitors.
4. First Aid Attendants will treat any injured personnel at the Assembly Point.
5. Await further instructions.

Do not re-enter the site until the HOD Environmental Safety gives the “all clear”.

Fire and Smoke – Hod Environmental Safety Responsibilities

When notified of emergency and location:

- If safe to do so, the HOD Environmental Safety shall make his way to the site of the emergency, take control of the emergency response and determine the response required.
- Where deemed necessary, evacuate the personnel from the site.
- For evacuation, confirm that all personnel are being moved to the Safe Assembly Points.
- Advise the emergency services, as necessary.
- Ensure that all other immediate and follow-up actions have been taken or are in progress.
- Dispatch a worker in a vehicle to the main plant entrance to control incoming traffic and to escort emergency services through the site
- Ensure that ‘NO ENTRY’ signs are positioned at gates
- Liaise with emergency personnel
- Hand the situation over to the Chief Fire Officer on arrival, and advise them of;
 - Any unaccounted-for personnel
 - The latest situation and actions taken.
- Await instructions from the Chief Fire Officer.

Fire and Smoke – Supervisor’s Responsibilities (Within the Emergency Area)

- Advise the Supervisor of any smoke or fire you have been alerted to, and its location.
- Ensure a ‘sweep’ of your designated area is completed and that all personnel are moved to the Safe Assembly Point.

- Confirm that all doors, windows and hatches have been closed to contain fire and block off smoke.
- Confirm that the alarm has been activated and that emergency services have been advised of details and location.
- Ensure that 'NO ENTRY' signs are positioned at gates.
- Report any personnel not accounted for to the HOD Environmental Safety.

If Safe To Do So and As Directed By HOD Environmental Safety

- Assist in extinguishing fires.
- Shut down or switch off gas, air conditioning, machines and appliances. Leave lights on
- Try to limit contaminated emissions.

Fire and Smoke – First Aid Attendant Responsibilities

- Collect the nearest First Aid Kit.
- If safe to do so, provide first aid.
- Act under instructions from the Supervisor /HOD Environmental Safety
- Be prepared to render first aid at the closest assembly point.

Dust Discharge / Solid Material Spill

The main concern is the safeguarding of life and immediate treatment of injured people. If safe to do so, equipment should also be protected.

The Immediate Response Is:

- Shut down or switch off equipment. **LEAVE LIGHTS ON.**
- If safe to do so, assist and care for injured personnel and call for first aid assistance.
- Report details to the Supervisor /HOD Environmental Safety.
- If necessary, contact Emergency Services on 913
- Restrict access to the area.
- Await instructions from the Supervisor or HOD Environmental Safety
- Stand by to provide assistance, and await further instructions.

Spill Emergency – Hod Environmental Safety Responsibilities

When notified of the emergency and location:

1. Proceed to site and assess
2. If necessary, contact emergency services on 913
3. Contact Site Management who will assess whether reporting to the Regulatory Authorities is warranted. If yes, then immediate notifications are to be made to Regulatory Authorities.

Spill Emergency – Supervisor Responsibilities

When notified of the emergency and location:

- Move people in immediate danger to safety, and ensure their continued safety and care.
- Ensure emergency services have been contacted.
- Restrict access to the area.
- Ensure HOD Environmental Safety has been notified.

Additional Reporting

If the incident has the potential to affect the community the following must also be contacted:

1. Guyana Fire Service
2. Local Neighborhood Democratic Council
3. Public Health Unit

Medical Emergency

The Immediate Response Is:

- Make area safe (e.g. shut down hazardous equipment).
- Care for injured personnel.
- Call for first aid assistance.
- Report details to the Supervisor or HOD Environmental Safety.
- Await instructions from the Supervisor, HOD Environmental Safety or First Aider.
- Stand by to provide assistance, and await further instructions.

Electric Shock

The main concern is the safeguarding of life and immediate treatment of injured people.

The Immediate Response Is:

- Shut off the electricity. Do not enter the area until the electricity has been turned off.
- Move people in immediate danger to safety, and ensure their continued safety and care.
- Care for injured personnel.
- Call for first aid assistance, including defibrillator.
- Report details to the Supervisor or HOD Environmental Safety.
- Call for an ambulance on 913.
- Await instructions from the Supervisor, HOD Environmental Safety or First Aider.
- Stand by to provide assistance, and await further instructions.

Electric Shock – Hod Environmental Safety Responsibilities

When notified of the emergency and location:

- Ensure ambulance has been contacted.
- Proceed to site and assess

Electric Shock – Supervisor's Responsibilities

When notified of the emergency and location:

- Ensure first aid, with defibrillator, has been called.
- Ensure ambulance has been contacted.
- Restrict access to the area.
- Ensure HOD Environmental Safety has been notified, if necessary.

The Immediate Response Is:

- Shut down or switch off equipment. **LEAVE LIGHTS ON.**
- If safe to do so, assist and care for injured personnel.
- Call for first aid assistance.
- Report details to the Supervisor or HOD Environmental Safety– who will

contact emergency services.

- Restrict access to the area.
- Await instructions from the Supervisor or HOD Environmental Safety
- Stand by to provide assistance, and await further instructions.

Structural Emergency – Hod Environmental Safety Responsibilities

When notified of the emergency and location:

- Proceed to site and assess
- If necessary, initiate an evacuation.
- If necessary, contact emergency services on 913.

Structural Emergency – Supervisor's Responsibilities

When notified of the emergency and location:

- Move people in immediate danger to safety, and ensure their continued safety and care.
- Ensure emergency services have been contacted.
- Restrict access to the area.
- Ensure HOD Environmental Safety has been notified.

Armed Holdup or Intrusion

The main concern is the safeguarding of life and immediate treatment of injured people. Do not protect money, information or equipment.

The Immediate Response Is:

- If safe to do so, report suspicious activity to Supervisor or HOD Environmental Safety immediately upon noticing it.
- Do not confront the intruder(s). Try and remain calm. Do not make any sudden movements or take any action to excite or agitate the intruder(s).
- Be courteous, answer questions and obey all directions.
- After the incident, do not touch any items in the incident scene.

Armed Holdup or Intrusion – Hod Environmental Safety Responsibilities

When notified of the emergency and location:

- If safe to do so, restrict movements on site.

- Contact emergency services on 911

Armed Holdup or Intrusion – Supervisor’s Responsibilities

When notified of the emergency and location:

- If safe to do so, move people in immediate danger to safety, and ensure their continued safety and care.
- If safe to do so, restrict access to the area.
- Ensure HOD Environmental Safety has been notified.
- After the incident, restrict access to the incident site and ensure it is not disturbed.

Fire or Explosion

The main concern is the safeguarding of life and immediate treatment of injured people. Do not attempt to shut down or isolate equipment if it is not safe to do so.

The Immediate Response Is:

- Activate the nearest alarm.
- Do not enter the area if it is not safe to do so.
- If safe to do so, assist and care for injured personnel and call for first aid assistance.
- Contact Emergency Services on 912/913.
- Report details to the Supervisor or HOD Environmental Safety.
- Restrict access to the area.
- Await instructions from the Supervisor or HOD Environmental Safety.
- Stand by to provide assistance, and await further instructions.

Fire or Explosion – Hod Environmental Safety Responsibilities

When notified of the emergency and location:

- Proceed to site and assess
- Initiate an evacuation.
- Ensure emergency services have been contacted.

Fire or Explosion – Supervisor’s Responsibilities

When notified of the emergency and location:

- Move people in immediate danger to safety, and ensure their continued safety and care.
- Ensure emergency services have been contacted.
- Restrict access to the area.
- Ensure HOD Environmental Safety has been notified.

Additional Reporting

As these types of incidents have the potential to affect the community the following must also be contacted:

- Guyana Fire Services
- Public Health Unit
- Local Neighborhood Democratic Council

Performance Objectives and Goals

The following performance objectives and goals are established to guide the environmental control measures and mitigation actions for the Bengal Rice Milling and Storage Facility:

Performance Objectives

- i. Responsible environmental management in all phases of Bengal Rice Milling and Storage Facility.
- ii. Facilitate open communication and consultation with between the various groups including Grandeast Inc. Management Team, the fisheries department, the EPA and other agencies as well as employees and the general public.
- iii. Conduct regular audits and inspections of the project activities during construction and operation.
- iv. Minimize the number outstanding corrective actions.

Goals

- i. All personnel inducted prior to commencing work.
- ii. All personnel aware of their environmental responsibility.
- iii. Record all non-conformance and evidence of corrective actions taken.
- iv. No adverse environmental impact resulting from any incidents or emergencies on site.
- v. No cessation of works due to environmental incidents or breaches

Mitigation Measures

Training and Awareness

- i. All personnel must be provided training or orientation to carry out their respective duties relating to the implementation of this EPM.
- ii. A register of training certificates for Contractor or other staff approved for specific tasks will be maintained.
- iii. All Contractor personnel will be inducted prior to commencing work on the Grandedast Fish Processing Facility and Storage Facility. The induction will include the environmental values and concerns, operating constraints and protocols in relation to environmental protection, the respective CEMP and its core content, and other environmental awareness and management issues. Sub-contractors will be inducted on site prior to carrying out their work to ensure they understand the core values, and environmental issues and management practices of the Bengal Rice Milling and Storage Facility.
- iv. A targeted orientation, providing relevant site/project information and responsibilities, will be provided for external suppliers and visitors who are projected to be repeated or continuous presence on work sites.

Communication and Consultation

- i. Internal communication will occur on site through normal daily, weekly and monthly meetings where environmental issues will be discussed as part of each meeting. In addition environmental briefings, site inspection reports, reports of project activities include accident reports, etc.
- ii. Consultation and communication with external bodies including the EPA and identified stakeholders will be undertaken as required. This will be the responsibility of the Grandedast Inc Fish processing and Storage Facility and the Contractor.

Performance Measures

- i. Environmental management of the site proceeds within the parameters of this EMP, and non-conformances are addressed in accordance with the guidelines identified and within timelines specified.
- ii. Only 2 (per contractor) or fewer environmental incidents of sufficient seriousness to require the cessation of work on the respective program area occur during the course of the construction works.
- iii. All required records are complete and up-to-date.

Monitoring / Auditing /Reporting

The following records/registers will be maintained as part of the auditing reporting program:

- i. Training and Induction Register.
- ii. Formal consultation and communication records.
- iii. Audit and Inspection Reports, including completed site Inspection Checklists. Environmental Complaints, Non-conformances and Corrective Actions Register Incident Report Forms.
- iv. Waste generation and disposal records.
- v. Photographic records or training, work practices, implementation of mitigation measures, corrective actions, spills and other environmental emergencies.

Corrective Action

- i. Investigations/corrective actions undertaken as a result of a complaint, audit, inspection or incident will be documented and compiled within the Environmental Complaints, Non-conformances and Corrective Actions Register.
- ii. The Contractor, according to an agreed responsibility and timescale, will assign or closeout correction actions,
- iii. If 3 or more environmental incidents that result in or require a “stop work” on the respective program area site occur during the entire duration of the construction works, then a full review of work practices and operating procedures - as well as the provisions of this EMP and environmental guidelines – will be carried out jointly by Bengal Rice Milling and Storage Facility and the respective Contractor

APPENDIX

GRANEAST INC.			
EVACUATION ATTENDANCE CHECKLIST			
Area:			
Supervisor:			
Date:		Time:	
	Employee	Present (✓)	Note/Comment (When/where last seen etc.)
1			
2			
3			
4			
5			
6			