

Lafito Global – Port, Industrial Free Zone, and Power Plant Environmental and Social Impact Assessment

This study was commissioned by GB Group SA and was conducted by:

Gone Native, LLC

Natural Resources Engineering Company,

AMI Consulting Engineers PA, and

Earthtech Engineering, LTD

Preface

Gone Native LLC (Gone Native) has compiled the Lafito Project – Port, Industrial Free Zone, and Power Plant Social and Environmental and Social Impact Assessment (ESIA) based solely on information contained in the reference documents cited in Chapter 9, information provided by Gilbert Bigio Group (GB Group) representatives and its contractors, and on direct observations made on-site by Project team members. Gone Native was also involved in a number of discussions with GB Group and IFC staff during second quarter 2015.

Gone Native has not conducted technical reviews of the engineering designs nor has any new information or data been generated by Gone Native in compiling this ESIA report outside of the climate baseline. However, in a number of instances with regard to health, safety, environment, and community issues, Gone Native has interpreted the data that were developed and provided by others and has drawn conclusions independent of the original authors. These conclusions are predicated on the accuracy and suitability of the basic information presented in the referenced documents, on which Gone Native relied for accuracy without verification beyond cursory visual inspection. The conclusions are also based on Gone Native's substantial experience with similar development projects completed to international best practice throughout the world.

Some of the information presented in this document has been imported *verbatim* from the referenced reports. Because all of the basic information presented herein is the work product of others, nearly all sections require at least some credit being assigned to original authors. For ease of reading, Gone Native has not included quotations when direct quotes have been used, nor have we included all references where the information was generated by others. Virtually all of the substantive information presented in this document is the work product of those listed in the References cited in Chapter 9.

This report titled "Lafito Project – Port, Industrial Free Zone, and Power Plant Environmental and Social Impact Assessment" has been prepared for the exclusive use of GB Group. No third party shall be entitled to use this report without written consent of GB Group and Gone Native. The use of this report and information

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The analyses presented in the “Lafito Project – Port, Industrial Free Zone, and Power Plant Environmental and Social Impact Assessment” have been completed to the level of detail and within the limits presented in the reference documents. The content of this report has been reviewed by GB Group and Gone Native for completeness, accuracy, and appropriateness of conclusions. To the best of our knowledge, the information presented in this report is accurate to the limits specified herein.



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19 August 2015

Date

Lafito Global – Port, Industrial Free Zone, and Power Plant

Environmental and Social Impact Assessment

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List of Abbreviations and Acronyms

°C	degrees Celsius
µg/m ³	micrograms per cubic meter
µm	micrometer
AMR	Annual Monitoring Report
AOI	area of Influence
APN	National Ports Authority
APU	auxiliary power unit
ASCE	American Society of Civil Engineers
BNC	<i>Banque Nationale de Credit</i>
BOD	biological oxygen demand
CO	carbon monoxide
COD	chemical oxygen demand
dB(A)	decibels A-weighted
DFO	distillate fuel oil
DO	diesel oil
DWT	dead weight tons
EHS	environment, health, and safety
EIA	Environmental Impact Assessment
ESAP	Environmental and Social Action Plan
ESIA	Environmental and Social Impact Assessment

List of Abbreviations and Acronyms (Continued)

ESPO	European Sea Ports Organization
ETEL	Earthtech Engineering Ltd.
FDI	<i>Fonds du Développement Industriel</i>
GIIP	Good International Industry Practice (GIIP)
GoH	Government of Haiti
hr	hour
ha	hectare
ha/yr	hectares per year
HDPE	high-density polyethylene
HFO	heavy fuel oil
HSE	health, safety, and environmental
HSSE	health, safety, social, and environment
Hz	hertz
ICNIRP	International Commission on Non-Ionizing Radiation Protection
IFC	International Finance Corporation
IHSI	<i>Institut Haïtien de Statistique et d'Informatique</i>
IISD	International Institute for Sustainable Development
ILO	International Labour Organization
IMO	International Maritime Organization
ISPS	International Ship and Port Facility Security Code

List of Abbreviations and Acronyms (Continued)

IUCN	International Union for Conservation of Nature
kg/t	kilograms per tonne
km	kilometer
kV	kilovolt
LIFZ	Lafito Industrial Free Zone
LO	lubricating oil
m	meter
m ³	cubic meter
m ³ /h	cubic meters per hour
MBMA	Metal Building Manufacturer's Association
MDE	Ministry of the Environment
MENFP	Ministry of National Education and Professional Development
mg/l	milligrams per liter
ml	milliliter
Mt	million metric tons
MW	megawatt
NRE	Natural Resources Engineering Company
NO ₂	nitrogen dioxide
NO _x	nitrogen oxides (including NO and NO ₂)
O ₂	oxygen

List of Abbreviations and Acronyms (Continued)

OAS	Organization of American States
OECD	Organization for Economic Cooperation and Development
OHS	occupational health and safety
OSHA	Occupational Safety and Health Administration of the United States
PM	particulate matter
PM ₁₀	particulate matter less than 10 microns in diameter
PM _{2.5}	particulate matter less than 2.5 microns in diameter
PPAH	Pollution Prevention and Abatement Handbook
SEI	Seismic Engineering Institute
SEMANAH	<i>Service Maritime et de Navigation d’Haiti</i>
SMEs	small and medium private enterprises
SO ₂	sulfur dioxide
SU	standard unit (pH)
TEU	twenty-foot (container) equivalent unit
TOS	terminal operating system
UN	United Nations
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific, and Cultural Organization
USEPA	United States Environmental Protection Agency
USGS OFR	United States Geological Survey, Open File Report

List of Abbreviations and Acronyms (Continued)

VOC	volatile organic compound
WBG	World Bank Group
WHO	World Health Organization

Lafito Global – Port, Industrial Free Zone, and Power Plant

Environmental and Social Impact Assessment

1.0 Introduction

The Lafito Project is comprised of an integrated private marine port and cargo terminal, duty-free industrial zone with associated ancillary facilities, and dedicated 25 MW power plant located in the West Department of the Republic of Haiti (Haiti), as shown in Figure 1.1. The project site is located about 20 kilometers (km) due northwest of the national capital of Port-au-Prince, and is roughly bordered on the east by National Route 1, by Port-au-Prince Bay to the west, by the community of Simonette to the north, and by the community of Lafiteau to the south.

The Lafito Project sponsor is the Gilbert Bigio Group S.A. (GB Group). GB Group is a diversified group of industrial and trading companies operating in the agricultural, construction, consumer goods, energy, infrastructure, logistics, and trading sectors. The Lafito Project falls under the GB Group's Industrial Division, and is being developed in phases. The ultimate project will include the development of a port and associated cargo terminal, adjacent duty-free industrial zone for light manufacturing, and outside of the free zone limits, an industrial park with commercial and residential components. The entire project is aimed at providing critical infrastructure, attracting foreign investment, and providing substantial employment opportunities to the region outside of the immediate Port-au-Prince area. The decentralization of Haiti's industrial capacity away from Port-au-Prince is a key goal in the post-2010-earthquake development plans of the Government of Haiti (GoH), World Bank, United States, and European Union.

The following main components, with associated GB Group Industrial Division subsidiaries, make up the ultimate Lafito Project; it should be noted that only the Port, Industrial Free Zone, and power plant are within the scope of the current Environmental and Social Impact Assessment (ESIA):

- Port and quay-side terminal: Port Lafito
- Industrial duty-free zone with integrated utilities: Lafito Industrial Free Zone
- Dedicated 25 MW power plant to supply project components and some off-site industrial customers
- Industrial park with manufacturing facilities: Industrial Park
- Residential area, hotel, club, and golf course: Cabrit/Magik Island

GB Group is developing the Lafito Project in multiple phases. This ESIA covers the infrastructure components being developed within Port Lafito, the Lafito Industrial Free Zone (LIFZ) and the 25 MW power plant. Port Lafito, the LIFZ, and the power plant are hereafter known together as “the Project” and are described in more detail below; the Project Description (Chapter 3) presents a full technical description of Project components.

Project Objective

The primary objective of the Project is to serve as a self-contained private marine port with associated duty-free industrial zone and dedicated 24-hour electrical power supply. The Project is being developed with due consideration for the economic, social, and environmental risks of the project and with a commitment to the sustainable development of the communities that the project will affect.

Port Lafito will be Haiti’s deepest port and its first port capable of receiving Panamax-class vessels. It is designed to provide much needed container-handling capacity to Haiti and to help reduce transport bottlenecks and costs. The port will provide 12 meters (m) of safe draft to docked vessels, and will provide mooring and un-mooring services.

The Port Lafito project consists of:

- **Quay** – Vessel mooring and cargo handling facilities will be accommodated via a 450 m-long concrete and steel quay.
- **Quay-side terminal** – Short-term cargo storage will be accommodated at a 130,000 m² (13 ha) terminal located shoreward of the mooring area on the quay. The quay-side terminal is projected to have an annual capacity of 14,442 20-foot container equivalent units (TEUs) over the

next five years and annual bulk cargo volume of 240,000 metric tons. The terminal will also have the ability to handle temperature-controlled (“reefer”) cargo.

- **Cargo offloading/loading facilities** – The port is designed to process 28,884 twenty-foot container equivalents units (TEUs) and 240,000 metric tons of bulk cargo annually, including refrigerated containers. Cargo handling cranes and container handlers will be controlled via a Tideworks terminal operating system (TOS).
- **Administrative and security office**– a 830 m² three-story building on the eastern edge of the port will house port Administration and Security offices and a Customs office.
- **Water supply** – a 45,425 m³ (12 M gallon) water retention pond will be located on Project land to the east of the port to supply feed water for the water treatment plant for the Project. Water will be transported from an existing low-head dam in the adjacent community of Simonette via a buried pipeline to the water retention pond. A water treatment plant located near the water retention pond will provide potable water that will be piped to Power Plant and LIFZ restrooms for use in hand washing. Potable water will also supply the cafeterias in the LIFZ. Port water usage shall be minimal.
- **Waste management facilities** – Restroom facilities will be located in the Administration building; a package wastewater treatment plant will treat wastewater from the restrooms; separate, designated areas will be provided for temporary storage of solid non-hazardous and hazardous wastes prior to collection and removal to registered and permitted disposal facilities.
- **Access roads** – Approximately 2 km of paved access roads will be constructed to provide light vehicle and semi-trailer access to Port Lafito from National Route 1 and within the port area.

The LIFZ is designed to provide industrial space for low water-use, light-manufacturing tenants (such as garment manufacturers) who will import raw materials and export finished product through Port Lafito, on a duty-free basis. It is expected that at full build-out and full occupancy, up to 20,000 workers will be employed at the LIFZ, the majority of whom will be employed by LIFZ tenants rather than directly by GB Group. LIFZ tenants will be mandated via tenant contract to comply with Haitian law, International Labor Organization (ILO)

conventions, and the principles of IFC PS2 – Labor and Working Conditions, as well as with the commitments of this ESIA.

Main components of the LIFZ include:

- **Industrial Space** – The LIFZ will include a total indoor light-manufacturing capacity of 100,000 m², currently envisioned as being configured as four, 10,000 m² buildings and 3, 20,000 m² buildings.
- **Cafeterias** - Two 10,000 m² cafeterias will be provide food service and dining areas to Project workers and LIFZ tenants.
- **Administration and Security office**– an 830 m² building located near the LIFZ entrance will house LIFZ Administration and Security offices, as well as Haitian Customs.
- **Access roads and parking lots** – Approximately 3 km of paved roads will connect the LIFZ with the access road network constructed for Port Lafito, including an employee transfer area for employees traveling by local transport services.

The Project also includes a dedicated power plant that will supply electrical power to both Phase 1 and Phase 2 infrastructure. Main components of the power plant include:

- **Engine/Generator Sets** - Energy required for operations of Port Lafito and the LIFZ will be provided by a series of ten heavy fuel oil-fired engine/generator sets, producing approximately 25 MW of electric power.
- **Above-ground Storage Tanks** – Fuel and lubricating oil for the power plant will be stored in steel above-ground storage tanks, set within concrete containment bunds; tanks will include two 2,981 m³ (25,000 barrel) tanks for heavy fuel oil (HFO) and three 190 m³ (50,000 gallon) tanks for HFO maintenance activities and diesel fuel storage.
- **Power Distribution Lines** – Electrical power will be distributed to the various Project components and to select offsite industrial customers via 16.8 kV, single overhead lines suspended on concrete poles installed along existing road right-of-ways. Approximately 13,000 km of distribution line is anticipated to be installed, with the majority (approximately 10,000 km) installed offsite to clients outside of the Project footprint.

Future continued expansion phases of the Lafito project include the development of an industrial park with a fertilizer bulk blending, storage, and bagging facility and a cement bulk loading and bagging facility, for export via Port Lafito; as well as residential and recreational complexes both on the mainland and on the approximately 24 ha Goat Island (*Île de Cabrit*) under a 50-year lease from the State to GB Group, 1.3 km to the west of Port Lafito, in Port-au-Prince Bay. It should be noted that these expansion phases are only considered in a broad sense in the cumulative impacts section (Section 5.3) of this current Lafito Project ESIA. GB Group has committed to including all components of the Lafito Global Project to comply with the current Project's Environmental and Safety Management System, which will be updated as a living document as necessary.

Background and Need

The Lafito Project will provide a marine port, cargo offloading/loading and storage facilities, and development of an associated duty-free light-industrial/manufacturing zone with dedicated electrical power, potable water, and fire water supplies. The Project is a greenfield development on 300 ha of privately held land formerly occupied by a sisal (*Agave sisalana*) plantation, and purchased by GB Group in September, 2011. An environmental study of conditions document was developed for the construction of the port in July 2012 by Amilcar and Amilcar, and submitted to the Government of Haiti (GoH) for review. Based on this document, the GoH gave GB Group its approval to begin construction of Port Lafito, with financial backing from the GoH's *Fonds de Développement Industriel* (FDI), the State bank *Banque Nationale de Crédit* (BNC), and the IFC.

Late in 2013, , GB Group sought funding assistance for the overall Lafito Project from the International Finance Corporation (IFC), the private lending arm of the World Bank Group (WBG). IFC signed off on a loan for Port Lafito provided that the Project developed an ESIA compliant with IFC's Performance Standards on Social and Environmental Sustainability (the Performance Standards) and its Environmental, Health, and Safety (EHS) Guidelines. A team of consultants lead by Natural Resources Engineering Company (NRE) of Superior, Wisconsin, USA compiled an ESIA covering construction of Port Lafito in October 2014. The 2014 ESIA team included technical and engineering input from AMI Consulting Engineers PA (AMI) – also from Superior, WI. Earthtech Engineering Limited (Earthtech),

based in Santo Domingo, Dominican Republic provided the social and community relations aspects of the ESIA.

GB Group's development plans call for start of operations of Port Lafito in 2Q2015, and construction of the LIFZ and power plant both commenced in 4Q2014. To support the Project, IFC is considering a second investment in the LIFZ, power plant, and relevant infrastructure. One of the deliverables as a condition of a second IFC loan is the upgrading, updating, integration, and finalization of the original ESIA for the port to include the LIFZ, power plant, and relevant infrastructure, . The updated ESIA would be developed to IFC's 2012 Performance Standards on Environmental and Social Sustainability (the Performance Standards - <http://www.ifc.org>). With this intent, IFC reviewed the 2014 ESIA, and noted a number of compliance gaps between the document's content and the Performance Standards. To bridge those gaps, it was decided to repackage the 2014 ESIA to not only provide compliance with the Performance Standards, but to also include consideration of the operational phase of the port, as well as construction and operations of the LIFZ and power plant.

This repackaged ESIA is presented in the current document, and is based on available information for the Project through June 2015, including the regulatory framework, project plans, environmental and social baselines, predicted impacts and mitigation measures, and the framework systems for environmental and social management and monitoring. Additional and expanded social baseline data were provided by EarthTech for this ESIA; this ESIA also includes supplemental air quality baseline data, and emissions and noise modeling conducted by AECOM Environment (Chelmsford, MA and New York, NY, respectively).

With IFC as shareholder and involved with the financing, GB Group has agreed to revise and repackage the original ESIA documentation to conform to current international best practices as exemplified by the Performance Standards. This document, the current ESIA, complies with the Performance Standards and includes the LIFZ, the power plant, and operations of Port Lafito, as well as Project advances and design changes that have occurred since the preparation of the 2014 ESIA.

Significant Outcomes

Continuing with the development of the Project will inevitably result in social and environmental impacts, both positive and adverse. These impacts are presented in more detail in Chapter 6 of this ESIA.

The key impacts and mitigation actions that are required to reduce health, safety, environment, and community impacts to acceptable levels follow; they are grouped by significant major topic to focus implementation efforts on specific actions.

- **Nearby Neighbors** – The Project is located near the communities of Lafiteau (to the southeast) and Simonette (to the north). It will be important to effectively manage and control potential impacts to these nearby neighbors by implementing specific safety programs, mitigating affected water supplies (if needed), and controlling noise, dust, vibration, and night time illumination as practical. The community of Simonette is located at the intake for the main pipeline to the water retention pond, and the community of Lafiteau is adjacent to Port Lafito and portions of the LIFZ on the southeast. The urban center of Cabaret is expected to be a primary source of Project workers, being the largest community near the Project.
- **Water Resources Impacts** – Surface water resources in the Project region are limited and under-developed. Reliable and safe public water sources do not exist, and surface water resources are not well-controlled. While the population density in the area is not high, water for domestic and agricultural use is provided by generally free-flowing streams and by direct rainfall. The Project will utilize surface water to avoid affecting groundwater resources. The Project will capture and pump up to 450 gallons per minute of water from an existing low-head dam on the Simonette stream for transport to the water retention pond within the Project boundary; this diversion of water from the community stream is expected to be offset by improvements to the dam and another existing low-head dam upstream of the water intake by increasing storage capacity behind the currently leaking dams and by slowing runoff of surface water to Port-au-Prince Bay. Water take will also be offset by the provision of a potable water plant for the use of the residents of Simonette that will be installed and maintained at the water intake by the Project. The Project will also address the potential for mosquito-vector disease transmission from the waters impounded by the improved low-head dam in Simonette and the water retention pond.

- **Local Communities** – The Project will promote benefits from employment by implementing a local hiring program and vocational mentoring for Project employees, as well as providing for the right of freedom of association and prohibition of discriminatory hiring practices for Project employees and LIFZ tenants. Job skills and vocational training will be made available to residents of the communities within the Project's area of influence (including Simonette, Lafiteau, Titanyen, and Cabaret); residents of these communities will be preferentially considered for hiring. The presence of a new port and industrial complex in the area is expected to result in an influx of job-seekers into local communities. Although the Project is designed to be self-contained with regards to water and electrical supply, security, and health care services, secondary effects associated with influx from the employment of up to 20,000 workers at the LIFZ are expected to increase the demand and/or require the development of housing, health care, water supplies, waste disposal systems, power supplies, law enforcement, and a variety of other infrastructure and services in neighboring communities. GB Group will work with the GoH and local communities to limit and/or offset impacts to local communities by controlling job-seeker influx via a central recruit center and requiring proof of established residency for consideration in preferential training and hiring programs and by limiting physical hazards and the effects of social ills in local communities to the extent practical.
- **Worker Health and Safety** – Working around heavy equipment and machinery poses certain safety risks to Project employees and visitors that must be effectively managed. GB Group will reduce potential impacts to Project employees and visitors by promoting worker health and safety and maintaining a clean and safe work environment; limiting occupational exposure to risks; and adequately managing wastes and responding to emergency situations.

Artisanal Fishermen – Social baseline surveys have identified that approximately three percent of residents in nearby communities conduct artisanal fishing activities to supplement their incomes. Restriction of access to fishing areas is not currently occurring, however expansion of the Project will be carefully managed to control any adverse impacts to affected households by implementing livelihood restoration programs, restoring food security, preferentially training and hiring affected fishermen, and providing safe passage around the port. These potential impacts and mitigation actions are described further in Chapter 6 as well as in the Environmental and Social Management Plan (Chapter 7)

Project implementation will bring significant local, regional, and national benefits to Haiti and to the communities who will be directly and indirectly affected by the Project. It will provide Haiti with critical cargo handling and industrial infrastructure and aid in diversifying industrial facilities away from the congested Port-au-Prince area, as well as serving to attract foreign investment to the country. The capital investment and operating financial base will stimulate the local, regional, and national economies in terms of taxes and royalties paid and monies paid for goods and services that are purchased from within the country.

The Project is expected to employ at peak approximately 170 workers during the phased 3-year construction period. During operations, GB Group is expecting to directly employ approximately 140 people, while the LIFZ tenants are expected to employ approximately 20,000 workers at full build-out and occupancy of the LIFZ. GB Group has mentoring programs in place to provide vocational and technical training to maximize the percentage of Haitian nationals who will be employed by the Project, and will contractually obligate LIFZ tenants to comply with the labor and employment practices and all commitments contained in this ESIA. During operations, workers will receive wages that are competitive with other industrial projects in the region and that exceed the income levels of traditional subsistence farmers and fishermen in the area. Project employees will therefore likely contribute more in taxes and other payroll-related withholdings because of their higher-paying industrial jobs, and will have more disposable income and purchasing power than typical wage earners, which in turn will stimulate secondary and tertiary economies for other goods and services in the region.

In addition to the favorable economic impact, GB Group is also making a significant contribution to the capacity of the local workforce and community residents. Education and training programs that teach marketable skills and trades as well as promote a culture of safe and healthy work habits and lifestyles are a benefit not only to Project operations but also to the local communities both during active operations and long after the Project is closed. Initiatives such as those that teach local residents how to limit their personal exposure to communicable and vector-transmitted diseases and the appropriate management of wastes can go a long way toward reducing the environmental and human health effects of certain everyday activities. The net result will be a world-class Project that not only provides

sustainable benefits to stakeholders, but also makes a positive contribution to the development and prosperity of the Haitian people.

Report Organization

This ESIA was developed to demonstrate GB Group's commitment to presenting an integrated assessment of social and environmental impacts, risks, and opportunities for the Laifto Project, including consulting with affected communities through effective stakeholder engagement and managing social and environmental performance throughout the life of the Project. These commitments are presented in the document as follows:

- **Executive Summary** – The Executive Summary presents a concise non-technical overview of the Project and its effect on the social and environmental baseline conditions and presents the significant findings, recommendations, and actions contained in each of main ESIA document's chapters.
- **Impact Assessment (Chapters 2-6)** – The Impact Assessment identifies the regulatory framework under which the Project will operate (Chapter 2). It also describes GB Group's development and operating plans (Chapter 3), documents the current site conditions (Chapter 4), identifies main Project alternatives (Chapter 5), identifies engineering and environmental systems that will be used to control environmental impacts, presents mitigation measures to limit social impacts, and identifies the Project effects and residual impacts on both environmental and social resources (Chapter 6). Chapter 6 also addresses the cumulative effects of Project development.
- **Environmental and Social Management Plan (Chapter 7)** – The Framework ESMP defines the management, mitigation, monitoring, and institutional measures that are needed to mitigate, offset, or reduce the environmental and social impacts of the project to acceptable levels during both the construction and operations phases of the Project. It defines the actions that must be undertaken and identifies who is responsible to undertake them to implement mitigation required by the Impact Assessment. Discipline-specific management plans are included in the ESMP to address specific risks, impacts, mitigation, and management areas.
- **Stakeholder Engagement and Consultation Summary (Chapter 8)** – The Stakeholder Engagement Plan is not included in this ESIA, however a summary of key Plan commitments is presented in Chapter 8. The

Stakeholder Engagement Plan defines how GB Group will collect and disseminate information among people who may affect, are affected by, or who have a legitimate interest in the Project. The program aims to provide real opportunities for stakeholders to meaningfully participate in Project decisions and actions and to establish the basis for a determination of broad community support for the Project.

This ESIA document presents what GB Group believes is the appropriate level of health, safety, social, and environmental responsibility for the Lafito Project. The Environmental and Social Management Plan and Stakeholder Engagement Plan should be considered living documents that will be updated from time to time to reflect the current situation and knowledge base for the Project. Effective implementation and regular improvement of the plans and actions defined in the Framework ESMP will align the Project's social and environmental performance with leading industry practice.

Additional information on the Lafito Project is available on the GB Group's website at www.gbgroup.com, including a copy of this ESIA, which will allow visitors to directly send/lodge comments on this document. A Note about Units

Both imperial and metric (SI) system units are used in this ESIA, based on technical information provided by the Project team and its consultants, listed in Section 1.2. Care should be taken when reading the document to verify the units used for any particular measurement. Where compliance to international standards is an issue, every effort has been taken to standardize units within a particular table, graphic, or chart to comply with the international (SI) standard units for ease of review. Where technical information such as flow rates and tank sizes has been provided by the Project team in imperial units, those units have been converted to metric units, while the original imperial units are included in parentheses to maintain consistency with Project plans and drawings.

2.0 Policy, Legal, and Administrative Framework

In July 2012, GB Group presented an Environmental Impact Study for the construction of a cargo terminal at Lafiteau (*Etude d'Impact Environnemental de l'Implantation d'un Terminal a Lafiteau pour le GB Group SA*), prepared by Amilcar and Amilcar, for presentation to the Haitian Ministry of the Environment. The 2012 EIA was the only document required for submission to the GoH for Project development. Based on the information presented in the 2012 document, GB Group received authorization to proceed with construction of the Project.

As a condition of providing financing to the Project, the IFC required the preparation of an ESIA. The Lafito Global – Phase 1 Port Lafito ESIA (October 2014) summarized the available information for the Project through the time of its preparation and a Environmental and Social Management System that obliged implementation of the mitigation actions called for in the ESIA document. Since this document was prepared, GB Group has engaged in discussions with the IFC regarding its participation in the Project. This current ESIA has been developed to repackage the information contained in the 2014 ESIA document, update the original information to reflect the current Project conditions, and organize the repackaged document to conform to IFC Performance Standards and EHS Guidelines.

GB Group, through its application to construct and operate the Project, has committed to meeting the spirit and intent of a number of international, national, and provincial policies, guidelines, laws, and regulations. These include:

- Internal corporate mandates, policies, and best practice commitments
- Haitian legislation and approvals
- IFC Performance Standards
- Good International Industry Practice (GIIP) that helps to define leading industry practice

This regulatory and administrative framework is described in the following sections, along with the targets for environmental and regulatory compliance and a summary of the current status of Project permitting.

Corporate Commitments

GB Group is committed to the sustainable development and long-term involvement in protecting the environmental quality and human interests in Haiti, including the health and safety of its people. GB Group's social and environmental programs aim to continually improve environmental and safety performance in the workplace, maintain multi-directional communication among the Company, local communities, and interested stakeholders, and to limit local community dependence on the Project.

GB Group intends to implement leading industry practice and business-based health, safety, environment, and community management systems in all areas of operation. To that end, the company has developed its General Business Principles (Appendix A) that govern how each of the companies involved with the Project will conduct its affairs. Key elements of each of the eight General Business Principles are:

- **Principle 1 – Economics:** Environmental and social sustainable development considerations will be factored into economic decision-making.
- **Principle 2 – Competition:** Economic competition will be conducted in a fair and ethical manner, in compliance with all applicable legislation.
- **Principle 3 – Business Integrity:** Transparency of business activities will be promoted; unethical practices will not be tolerated.
- **Principle 4 – Health, Safety, Security, and Environment (HSSE):** Compliance with HSSE management measures is a critical part of business activity, with integrated standards included for monitoring, measuring, and continually improving HSSE performance.
- **Principle 5 – Local Communities:** Social impacts from projects will be managed to enhance project benefits and mitigate adverse impacts to local communities and nearby neighbors.
- **Principle 6 – Communication and Engagement:** Regular and stakeholder engagement is an essential component of project implementation.
- **Principle 7 – Compliance:** Compliance with all applicable national laws and regulations, and with applicable international standards, is mandatory.

- **Principle 8 – Living by our Principles:** The Business Principles apply to all transactions in which the Company and its employees are engaged.

Social and environmental management of the Project will be administered through a chain of command that includes corporate oversight, site management, local employees, contractors, and subcontractors who will be responsible for:

- Complying with local, national, international, and financial lending institution laws, regulations, policies, and performance standards, as appropriate;
- Providing adequate staff and resources at each Project location to implement and maintain the social and environmental management systems; and
- Reporting on the effectiveness of such activities to executive management and the GB Group Board of Directors for review and corrective action, as necessary.

GB Group will develop the capabilities and support mechanisms necessary to administer its social and environmental management programs. Implementation will be based on raising the level of company-wide awareness of social and environmental requirements, expectations, and benefits. Health, safety, environmental, and community protection and development are among the highest Project priorities.

GB Group has committed to developing the Project in a manner that strives to achieve leading industry practices. This includes practices, procedures, and technical innovation for promoting sustainable development, limiting long-term environmental and socioeconomic risks, and encouraging “good governance” within Haiti. Leading industry practices must be tailored to the site-specific conditions of the Project, and must include meaningful engagement and participation of community stakeholders through all stages of the Project.

Republic of Haiti – Applicable Environmental Laws

The environmental and social regulatory climate in Haiti is still under development. The main environmental law for the country is the Environmental Decree Law of January 26, 2002 that promulgates sustainable land management, in general

terminology. The Ministry of the Environment (MDE) has not yet established a regulatory EIA process for Haiti.

Republic of Haiti – Applicable Land Tenure Laws

Haitian legal codes applicable to the Project with relevance to land tenure, and expropriation are the following:

- *Civil Code (1825)* – Laws on property, use, habitation, servitude, acquisition, transference, transactions, leases, mortgages, expropriation and adverse possession;
- *Rural Code (1962)* – Laws of rural goods (including property), agricultural goods, soil, water (including irrigation and drainage), forests, surveying in rural areas and the proof of ownership;
- *Constitution of 1987* – Articles 36-39, Section H address property in general and Articles 53-57 establishes limited foreign ownership;
- *Presidential Decree of 2010* – Expropriation of land and Law of State of Emergency;
- *Loi du 29 mai* – City control on agricultural lands
- *Decree of September 22, 1964* – Responsibility for state private lands
- *1996 Article 24 of the Loi du 28 Mars* – State departmental responsibility to administer state private lands in his/her section under the supervision of the Municipal Counsel.

2.1.1 Land Ownership in Haiti

Land ownership in Haiti is classified in three ways: (i) state public land, (ii) state private land or (iii) private land. State private land may be sold and rented by the government; rent is paid to the General Directorate of Taxation (DGI) or through a procurer. Ownership is formally noted through a legal land title (*Certificat d’Immatriculation Cadastrale*), although claims through oral or community history can also play a role. The transfer of title is undertaken when there is a purchase or sale of private land. However, land ownership is often claimed with unofficial or forged documents, a widespread issue which negatively impacts the land tenure system. Land survey documents and the *Sou en prive* (person-to-person non-binding contracts) are also often used to claim land.

2.1.2 Customary Land Tenure

Historically, land tenure issues in Haiti are considered to have severely hampered the development of commercial and industrial projects and of marginalized informal settlements in both urban and rural areas. These communities have typically become historically disenfranchised and excluded from access to basic planning and services, which further increases their vulnerability.

In rural contexts, such as the Port Lafito project area, land is typically bought, sold, and inherited without official documentation (no government has ever carried out a cadastral survey). Although there are few land titles, there are informal tenure rules accepted by farmers and residents of these communities.

Land tenure insecurity has also led to regular conflict in rural Haitian communities, which is heightened through the weaknesses of the current Haitian land tenure dispute resolution system.

Considering the current conditions in the project area, it is anticipated that the expected intensification of industrial activity in the locations surrounding the Port Lafito project will only increase pressure on the land. This could stem from a number of factors, including population growth and an escalation of property value.

2.1.3 Haiti Land Transaction Manual

As discussed above, the overall weak public policy context for land has contributed significantly to the insecurity of tenure in Haiti. The Haiti Property Law Working Group was formed to address these concerns. It has developed the Haiti Land Transaction Manual which has been endorsed by the Haitian Government. The manual is intended to serve as an immediate tool to assist the business and reconstruction communities by clarifying the current legal and customary procedures and standardizing, in writing, the legal procedures necessary to transact and assemble land in Haiti.

The Haiti Land Transaction Manual can be accessed here:
http://www.habitat.org/sites/default/files/haiti_english_manual-web.pdf.

2.1.4 Civil Code

The Haitian Civil Code recognizes the rights of both public and private property ownership. It divides property into three classifications: common, public, and private. Ownership is defined as the right of “use, enjoyment, and disposition” of property.

2.1.5 Rural Code

The Rural Code, amended in 1986, includes provisions applicable to rural land. Topics covered include: administration of rural areas; land classification, use rights, and easements; soil protection; livestock; irrigation and drainage; forests, including their classification and protection; land surveying; evidence of ownership; and land consolidation.

2.1.6 The Labor Code

The Labor Code establishes and regulates work relationships between management and workers. The Ministry of Social Affairs and Labor (MAST) is responsible for enforcing the provisions of this legislation. The social protection of workers includes pension insurance, health insurance, and maternity insurance, insurance against accidents at work, health card, and legal benefits in cases of unfair dismissal. Article 96 of the Labor Code established legal working hours of 8 hours per day, for a total of 48 hours per week. Exceptions to these hours for industry and the calculation of overtime are provided in Article 97 of the Labor Code, in compliance with ILO Hours of Work (Industry) Convention, ratified by Haiti on March 31, 1952 (Table 2.1). Articles 334, 335, and 336 of the Labor Code establish the minimum age of employment as 15.

International Conventions and Treaties

Haiti is party to a number of international environmental, cultural heritage, and labor conventions, as summarized in the following table. The signing of a convention is a first step. Ratification (including accession) is the step where the country takes specific legal steps to implement the convention. The table also provides a brief description of the relevance of the signed and ratified conventions to the Project. Haiti’s 1987 Constitution mandates that all ratified treaties are part

of the law of the Country and provides for the repeal of all laws that contradict provisions of a ratified conventions and treaties; legislative and regulatory oversight to assure compliance with ratified conventions and treaties is not enforced.

Table 2.1 – International Conventions and Treaties to which Haiti is Party

International Convention - Year of Adoption, Purpose, and Relevance to the Project	Action by Haiti
Convention on the Law of the Sea (UN, 1982) The United Nations Convention on the Law of the Sea (full text) comprises 320 articles and nine annexes, governing all aspects of ocean space, such as delimitation, environmental control, marine scientific research, economic and commercial activities, transfer of technology and the settlement of disputes relating to ocean matters.	Ratified 1996
Vienna Convention for the Protection of Ozone Layer (UN, 1985) Realizing the dangers of ozone layer depletion, the Vienna Convention on Protection of Ozone Layer (1985) was adopted. Through this convention, nations agreed to take "appropriate measures...to protect human health and the environment against adverse effects resulting or likely to result from human activities which modify or are likely to modify the Ozone Layer".	Accession 1992
Montreal Protocol on Substances that Deplete the Ozone Layer (UN, 1987) An international agreement designed to protect the stratospheric ozone layer.	Accession 2000

International Convention - Year of Adoption, Purpose, and Relevance to the Project	Action by Haiti
Convention on Biological Diversity (UN, 1992) This convention was an agreement on developing nation strategies for the conservation and sustainable use of biological diversity.	Ratification 1996
Convention on Climate Change (UN, 1992) The United Nations Framework Convention on Climate Changes has been the centerpiece of global efforts to combat global warming. It also has been one of the international community's essential tools in its efforts to promote sustainable development.	Ratification 1996
Kyoto Protocol to UN Framework Convention on Climate Change (UN, 1997) - The Protocol was adopted in December 1997 in Kyoto (Japan) to achieve quantified emission limitations and reduction commitments of greenhouse gases (GHG) in developed countries and countries that are undergoing the process of transition to a market economy. - At this stage, Haiti should maintain an inventory of the GHG emissions from the country.	Ratification 2005

International Convention - Year of Adoption, Purpose, and Relevance to the Project	Action by Haiti
Convention to Combat Desertification (UN, 1992) - Combating desertification is essential to ensuring the long-term productivity of inhabited dry lands. Unfortunately, past efforts have too often failed, and around the world the problem of land degradation continues to worsen. Recognizing the need for a fresh approach, governments have signed the United Nations Convention to Combat Desertification. This Convention aims to promote effective action through innovative local programs and supportive international partnerships. - The project will not degrade land and/or contribute significantly to desertification.	Ratification 1996
Convention on Nature Protection and Wild Life Preservation in the Western Hemisphere (OAS, 1940) Aims to protect and preserve the natural habitat representatives of all species and genera of native flora and fauna, including migratory birds, in sufficient numbers and over areas extensive enough to assure them from becoming extinct through any agency in man's control.	Ratification 1942
Stockholm Convention on Persistent Organic Pollutants (UN, 2004) Restricts or eliminates the production and use of persistent organic pollutants.	Signatory 2001

International Convention - Year of Adoption, Purpose, and Relevance to the Project	Action by Haiti
Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (IMO, 1975; Protocol 1996)) - Prohibits the deliberate disposal at sea of wastes or other matter from vessels, platforms, or other man-made structures, as well as the deliberate disposal of these vessels or platforms themselves. - Annexes list wastes which cannot be dumped and others for which a special dumping permit is required, including dredged material, inert inorganic geological material, organic material of natural origina, and sewage sludge.	Ratification
World Heritage Convention (UNESCO, 1972) - Links nature conservation with the preservation of cultural properties, recognizing the way in which people interact with nature and the fundamental need to preserve the balance between the two. - Defines the kind of natural or cultural sites which can be considered for inscription on the World Heritage List.	Ratification 1980
Convention on the Protection of Underwater Cultural Heritage (UNESCO, 2001) Enables states to better protect their submerged cultural heritage.	Ratification 2009

International Convention - Year of Adoption, Purpose, and Relevance to the Project	Action by Haiti
Convention for the Safeguarding of Intangible Cultural Heritage (UNESCO, 2003) Provides for the safeguard of intangible cultural heritage, including the practices, representations, expressions, knowledge, skills, as well as the instruments, objects, artefacts and cultural spaces associated therewith – that communities, groups, and individuals recognize as part of their cultural heritage.	Signatory
Forced Labour Convention (ILO, 1930) Promotes the suppression of forced or compulsory labour in all its forms within the shortest possible period.	Ratification 1958
Freedom of Association and Collective Bargaining, Conventions 87 (ILO, 1948) and 98 (ILO, 1949) Deals with workers and employers being able to freely exercise the right to organize (to defend their interests). Workers shall also Workers shall enjoy adequate protection against acts of anti-union discrimination in respect of their employment.	Ratification 1979, 1957 respectively
Right to Organise and Collective Bargaining Convention (ILO, 1949, No. 98) Provides workers with the right to enjoy adequate protection against acts of anti-union discrimination.	Ratification 1957
Equal Remuneration Convention (ILO, 1951, No. 100) Establishes the principle of equal remuneration for men and women workers for work of equal value without discrimination based on sex.	Ratification 1958

International Convention - Year of Adoption, Purpose, and Relevance to the Project	Action by Haiti
Abolition of Forced Labour Convention (ILO, 1957, No. 105) Ratifying countries agree to suppress and not make use of any form of forced or compulsory labour: as a means of political coercion; for purposes of economic development; for labour discipline; as punishment for having participated in strikes; or for racial, social, national, or religious discrimination.	Ratification 1958
Elimination of Discrimination in Respect of Employment and Occupation (ILO, 1958, No. 111) Deals with equality of opportunity and treatment in respect of employment and occupation, with a view to eliminating any discrimination.	Ratification 1976
Minimum Age Convention (ILO, 1973, No. 138) Specifies 14 as the minimum age for admission to employment.	Ratification 2009
Worst Forms of Child Labour Convention (ILO, 1999, No. 182) Prohibits and calls for immediate action to eliminate the worst forms of child labour, including slavery, forced or compulsory labour, and work which by its nature or the circumstances in which it is carried out is likely to harm the health, safety, or morals of children.	Ratification 2007

International Convention - Year of Adoption, Purpose, and Relevance to the Project	Action by Haiti
Hours of Work Conventions (ILO 1919, No. 1; ILO 1930, No. 30) ▪ Limit the hours of work in industrial undertakings to 8 hours per day and 48 hours per week.	Ratification 1952
Inter-American Convention on the Elimination of all Forms of Discrimination Against Persons with Disabilities (OAS, 1999) ▪ Reaffirms that persons with disabilities have the same human rights and fundamental freedoms as other persons, including freedom from discrimination based on disability.	Ratification 2009
Equality of Treatment (Accident Compensation) Convention (ILO, 1925 No. 19) ▪ Establishes the equality of treatment for national and foreign workers as regards workmen's compensation for accidents.	Ratified 1955
Labour Inspection Convention (ILO, 1947 No. 81) ▪ Establishes a system of labour inspection in industrial workplaces with legal provisions relating to conditions of work. ▪ Establishes the protection of workers while engaged in their work to be enforceable by labour inspectors.	Ratified 1952

IFC Performance Standards

The International Finance Corporation (IFC) is the private-lending arm of the World Bank Group. IFC has developed its own best practice standards which apply specifically to projects in which IFC invests, and on a broader level, are also widely interpreted to define best international practice with regards to social and environmental sustainability. These include the Performance Standards for Social

and Environmental Sustainability (“the Performance Standards”); Guidance Notes; Environmental, Health, and Safety (EHS) Guidelines; and best practice materials.

The Performance Standards define a project’s role and responsibilities for managing health, safety, environmental, and community issues to receive and retain IFC and/or Equator-participating lender support. The Performance Standards are summarized below, followed by more detailed content definitions:

- **Performance Standard 1 – Assessment and Management of Environmental and Social Risks and Impacts:** This standard seeks to identify and assess the social and environmental impacts of the Project, including cumulative and/or sectoral impacts and technically and financially feasible alternatives, and to avoid, minimize, and manage any unavoidable adverse impacts to people, their communities, and their environment. It mandates that communities be appropriately engaged in the process and promotes improved environmental and social performance through effective management systems;
- **Performance Standard 2 – Labor and Working Conditions:** This standard seeks to establish, maintain, and improve the working relationship between workers and management. It mandates equal opportunity and fair treatment of workers and protects against child and/or forced labor practices. It demands that the workplace offer safe and healthy working conditions that promote the health and welfare of the employees. This Social and Environmental Assessment gives due consideration to the protection of workers, provides detail on the Project’s human resources management system, and promotes the health and safety of workers and local communities;
- **Performance Standard 3 – Resource Efficiency and Pollution Prevention:** This standard is intended to minimize adverse impacts on human health and the environment by minimizing pollution and reducing emissions that contribute to climate change. The 2007 EHS Guidelines give guidance for evaluating and selecting pollution prevention and control techniques for projects. These Guidelines contain the performance levels and measures that are normally acceptable and applicable to projects. When host country regulations differ from the levels and measures presented in the EHS Guidelines, project proponents will achieve whichever is more stringent. If less stringent levels or measures are appropriate in view of specific project circumstances, the proponent will provide full and detailed justification for any proposed alternatives. This justification will demonstrate that the choice for any alternate performance levels is consistent with the overall requirements of this PS;

- **Performance Standard 4 – Community Health, Safety, and Security:** This standard limits risks and impacts to the local communities associated with all phases of the Project, including unusual conditions. It requires that the health and safety risks be evaluated during all phases of the Project and that preventative measures be implemented to a level that is commensurate with the risk. It also gives consideration for the risks posed by security arrangements. Security arrangements must be guided by the principles of proportionality, good international practices in terms of hiring, rules of conduct, training, equipping and monitoring of such personnel, and applicable law. The use of force is typically not sanctioned and a grievance process must be established to allow affected communities to express concerns about the security arrangements and acts of security personnel;
- **Performance Standard 5 – Land Acquisition and Involuntary Resettlement:** This standard seeks to avoid and minimize involuntary resettlement and to mitigate unavoidable adverse impacts through compensation for loss of economic assets and economic and standard of living restoration measures. Resettlement measures are intended to aim at improving economic and livelihood conditions. Land for the Project was acquired on a willing buyer-willing seller basis from private land owners and there was no involuntary land acquisition, hence PS 5 is not considered applicable to the current Project; however this ESIA document includes a Land Acquisition Policy Framework ;
- **Performance Standard 6 – Biodiversity Conservation and Sustainable Management of Living Natural Resources:** This standard calls for the balancing of conservation of biodiversity and the promotion of sustainable management of natural resources. The Project site is located in an abandoned sisal plantation (*Agave sisalana*) that was used for fiber production; the coastal environment in the Project vicinity is severely degraded through the overexploitation of coastal resources, erosion, and pollution. Although some sporadic mangroves were located along the shoreline, the biodiversity value of the Project area is low; thus PS 6 is not considered to be applicable to the current Project;
- **Performance Standard 7 – Indigenous Peoples:** This standard ensures that Project development respects the dignity, human rights, and cultures of indigenous peoples and avoids adverse impacts to their traditions and values. It seeks to establish and maintain ongoing relationships and to foster good faith and informed participation of indigenous peoples when projects are located on traditional or customary lands and to respect and preserve those cultures and practices. There are no indigenous peoples in the vicinity of the Project, thus PS 7 is not considered applicable to the current Project; and

- **Performance Standard 8 – Cultural Heritage:** This standard protects cultural heritage sites from Project-related impacts and promotes the equitable sharing of benefits from the use of cultural heritage in business activities. Given previous land use of the Project site, it is considered unlikely that Project development will affect cultural heritage, thus PS 8 is not considered applicable to the current Project.

These Performance Standards, and all IFC reference documents, are included at <http://www.ifc.org> and are supported by Guidance Notes for each Performance Standard. Guidance Notes are companion documents to the Performance Standards that provide additional information on roles, responsibilities and fulfilling IFC expectations.

Documents relevant to various aspects of Project implementation include, but are not limited to, the following IFC and WBG publications:

- Good Practice Handbook: Cumulative Impact Assessment and Management: Guidance for the Private Sector in Emerging Markets (2013)
- Investing in People: Sustaining Communities through Improved Business Practice (2001)
- Good Practice Note: HIV/AIDS in the Workplace (2002)
- Good Practice Note: Addressing Social Dimensions of Private Sector Projects (2003)
- Good Practice Note: Non-Discrimination and Equal Opportunity (2006)
- Stakeholder Engagement: A Good Practice Handbook for Companies doing Business in Emerging Markets (2007).

The EHS Guidelines are technical reference documents designed to assist a wide range of users including project proponents, financiers, facility managers, and other decision makers by providing relevant industry background and technical information. This information supports actions aimed at avoiding, minimizing, and controlling environmental, health, and safety impacts during the construction, operation, and decommissioning phases of a project or facility.

The General EHS Guidelines are organized to capture common themes which are applicable to any industry sector and project. The General EHS Guidelines and the

Industry Sector EHS Guidelines are designed to be used jointly; the following EHS guidelines are applicable to the Lafito Project:

- Environmental, Health, and Safety Guidelines General Guidelines (April 2007)
- Environmental, Health, and Safety Guidelines for Ports, Harbors and Terminals (April 2007)
- Environmental, Health, and Safety Guidelines for Electric Power and Distribution (April 2007)
- Environmental, Health, and Safety Guidelines for Thermal Power Plants (December 2008)

The EHS Guidelines contain the performance levels and measures that are generally considered to be achievable in new facilities at reasonable costs by existing technology. Application of the EHS Guidelines to existing facilities may involve the establishment of site-specific targets with an appropriate timetable for achieving them. The applicability of the EHS Guidelines may need to be established for each project based on the results of an environmental assessment where site-specific variables, such as host country context, assimilative capacity of the environment, and other project factors, are taken into account. The applicability of specific technical recommendations should be based on the professional opinion of qualified and experienced persons.

Stakeholder engagement is an important part of complying with IFC Performance Standards (PS 1). The purpose of stakeholder engagement is to build and maintain a constructive relationship with affected communities. The nature and frequency of engagement should be in-line with the risks to and adverse impacts on the communities. Engagement must be free of external manipulation, interference, or coercion, and intimidation, and conducted on the basis of timely, relevant, understandable and accessible information.

Disclosure of relevant project information helps affected communities understand the risks, impacts and opportunities of the project. If communities may be affected by risks or adverse impacts from the project, the project proponent must provide such communities with access to information on the purpose, nature and scale of the project, the duration of proposed project activities, and any risks to and potential impacts on such communities.

If affected communities may be subject to risks or adverse impacts from a project, consultation must be undertaken in a manner that affords affected communities the opportunity to express their views on project risks, impacts, and mitigation measures and have due consideration given to that input in project decision-making. This consultation should begin early in the ESIA process, focus on the risks and adverse impacts and the measures and actions envisaged for their mitigation, and be carried out in a manner that is inclusive and culturally appropriate.

The Stakeholder Engagement Plan (summarized in Chapter 8) elaborates the stakeholder engagement activities for the Project.

IFC Performance Standards (PS 1) also oblige an evaluation of cumulative and sectorial impacts where projects are likely to have potentially significant adverse social or environmental impacts that are sensitive, diverse, or unprecedented. Evaluations should normally cover the cumulative impacts of other regionally relevant proposed developments and for reasonably foreseeable expansions to relevant existing developments. The analysis considers the combined effects the relevant activities as they accumulate over time and space.

WBG/IFC General EHS Guidelines

WBG/IFC's EHS General Guidelines (2007) provide guidance for projects in defining target performance levels for atmospheric emissions and ambient air quality, energy conservation, waste and ambient water quality, water conservation, hazardous materials management, waste management, ambient noise, and contaminated land. The Guidelines include performance levels that can generally be achieved in new facilities using reasonable-cost available control technologies. IFC's EHS General Guidelines are designed to be used together with the appropriate industry sector EHS guidelines; in the case of the current Project, sector-specific EHS guidelines include:

- EHS Guidelines for Ports, Harbors, and Terminals
- EHS Guidelines for Thermal Power Plants
- EHS Guidelines for Electric Transmission and Distribution

Additional or more stringent guidance provided by these sector-specific WBG/IFC EHS guidelines beyond the General EHS Guidelines is discussed in Sections 2.7, 2.8, and 2.9, respectively.

There are no established national discharge standards in the Republic of Haiti. In the absence of general and numeric compliance targets having been established by the GoH, the guidelines established by the IFC and other groups (such as the World Health Organization - WHO) that may generally be viewed as providing guidance on leading industry practice will be used.

In applying the WBG/IFC General EHS Guidelines to projects, due consideration should always be given to the hazards and risks associated with the project, the host country requirements, and site-specific environmental and social conditions. When host country requirements are less than the guidance contained in the General EHS Guidelines (or do not exist, as is the case with this Project), the IFC levels should be used, providing they are applicable to the site-specific project conditions. If compliance targets are established at levels less than those required by IFC, full and detailed justification must be presented establishing the basis for using alternate performance levels and demonstrating that the alternate levels are sufficiently protective of human health and the environment.

2.1.7 Air Quality

IFC's air quality guidelines General EHS Guidelines for ambient air quality (2007) for projects are presented in the following table and are taken directly from the Ambient Air Guidelines promulgated by the World Health Organization (WHO). These guidelines seek to limit ambient exposure to sulfur dioxide (SO₂), nitrogen dioxide (NO₂), ozone (O₃), and particulate matter (PM) as PM_{2.5} and PM₁₀ (PM less than 2.5 and 10 microns, respectively, in diameter). Additional guidance for emissions from thermal power plants is provided in the WBG/IFC EHS Guidelines for Thermal Power Plants (p. 50).

The IFC stipulates that concentrations of contaminants emitted reciprocating engine thermal power plants with a heat input capacity of between 50 megawatt thermal (MWth) and 300 MWth and utilizing liquid fuels (should not exceed the limits

presented in the table below. These guidelines are applicable to new facilities; units are mg/Nm^3 unless otherwise indicated.

Table 2.2 – WHO Ambient Air Quality Guidelines

Parameter	Averaging Period	Guideline Value in $\mu\text{g}/\text{m}^3$
Sulfur dioxide (SO_2)	24-hour	125 (interim target-1) 50 (interim target-2) 20 (guideline)
	10-minute	500 (guideline)
Nitrogen dioxide (NO_2)	1-year	40 (guideline)
	1-hour	200 (guideline)
Particulate Matter – PM_{10}	1-year	70 (interim target-1) 50 (interim target-2) 30 (interim target-3) 20 (guideline)
	24-hour	150 (interim target-1) 100 (interim target-2) 75 (interim target-3) 50 (guideline)
Particulate Matter – $\text{PM}_{2.5}$	1-year	35 (interim target-1) 25 (interim target-2) 15 (interim target-3) 10 (guideline)
	24-hour	75 (interim target-1)

		50 (interim target-2) 37.5 (interim target-3) 25 (guideline)
Ozone	8-hour daily maximum	160 (interim target-1) 100 (guideline)

Notes: Interim targets are provided in recognition of the need for a staged approach to achieving the recommended guidelines.

Source: WBG/IFC General EHS Guidelines, 2007.

The IFC guidance expects facilities and projects to avoid, minimize, and control adverse impacts to human health, safety, and the environment from emissions to air but goes on to acknowledge that in some instances this is not possible. The generation and release of emissions of any type should be managed through a combination of energy use efficiency, process modification, and selection of fuels or other materials, the processing of which may result in less polluting emissions and the application of emissions control techniques. Due consideration for the regulatory requirements, significance of the source, location of the emitting facility relative to other sources, location of sensitive receptors, existing ambient air quality, and potential for degradation of the airshed from a proposed project and the technical feasibility and cost effectiveness of the available options for prevention, control, and release of emissions should be taken into account in project design and implementation. The EHS Guidelines for Thermal Power Plants also provide guidance for monitoring requirements based on assessed impacts for typical air emissions monitoring parameters, but note that detailed monitoring programs for these parameters should be determined based on the results of the project's ESIA.

2.1.8 Noise

Noise abatement measures should achieve either: (i) the levels given in following table titled Ambient Noise Guidelines; or (ii) a maximum increase in background levels of 3 decibels A-weighted (dB(A)) (2007) with measurements taken at noise receptors located outside the Project property boundary.

Table 2.3 - Ambient Noise Guidelines

Receptor Type	Maximum allowable equivalent level (Leq in dB(A), hourly measurement)	
	Daytime [07:00 – 22:00]	Nighttime [22:00 – 07:00]
Residential, institutional, educational	55	45
Industrial, commercial	70	70

Source: WBG/IFC General EHS Guidelines, 2007.

2.1.9 Liquid Effluent

Guideline parameters for direct discharges of treated liquid effluents to surface waters are included in both the General EHS Guidelines and in the EHS Guidelines for Thermal Power Plants (p. 50). EHS Guidelines for other treated process water (including domestic sewage) discharged to surface waters are presented in the table below.

Table 2.4 - General Limits for Process Discharges to Surface Waters

Parameter	Maximum value (mg/L except for pH, bacteria, and temperature)
pH	6 – 9
BOD ₅	30
COD	125
TSS	50
Oil and grease	10
Heavy Metals, total	10
Metals, specific	
Arsenic (As)	0.1
Cadmium (Cd)	0.1
Chromium (hexavalent) (Cr 6+)	0.1
Chromium (total) (Cr)	0.5
Iron (Fe)	3.5

Parameter	Maximum value (mg/L except for pH, bacteria, and temperature)
Lead (Pb)	0.1
Mercury (Hg)	0.01
Nickel (Ni)	0.5
Selenium (Se)	0.1
Copper (Cu)	0.5
Zinc (Zn)	2.0
Ammonia	2.0
Chlorine, total residual	0.2
Cyanide, free	0.1
Cyanide, total	1.0
Fluoride	20
Phenols	0.5
Phosphorous	2.0
Sulfide	1.0
Coliform	Less than ⁽¹⁾ 400 MPN/100 ml
Temperature increase ⁽²⁾	< or equal to 3°C

Source: WBG/IFC General EHS Guidelines, 2007

Notes:

(1) MPN: Most Probable Number.

(2) The effluent should result in a temperature increase of no more than 3 °C at the edge of the zone where initial mixing and dilution takes place. Where the zone is not defined, use 100 m from the point of discharge provided there are no sensitive ecosystems within this range. The temperature shall not exceed 40 °C in any section of the stream within 15 m downstream from the effluent outlet.

2.1.10 Water Conservation

Water conservation programs should be implemented commensurate with the magnitude and cost of water use. These programs should promote the continuous reduction in water consumption and achieve savings in the water pumping, treatment, and disposal cost. Water conservation measures may include water monitoring and management techniques; process and cooling/heating water recycling, reuse, and other techniques; and sanitary water conservation techniques. General recommendations include:

- Storm/rainwater harvesting and use

- Zero discharge design/use of treated waste water to be included in project design processes
- Use of localized recirculation systems in plant/facility/shops, with provision only for makeup water
- Process water system pressure management
- Project design to have measures for adequate water collect, spill control, and leakage control system

2.1.11 Waste Management

Project wastes should be managed using the following practices:

- Establish waste management priorities at the outset of activities based on an understanding of potential risks and impacts and considering waste generation and its consequences
- Establish a waste management hierarchy that considers prevention, reduction, reuse, recovery, recycling, removal and finally disposal of wastes
- Avoid or minimize the generation of waste materials, as far as practicable
- Where waste generation cannot be avoided but has been minimized, recover and reuse waste
- Where waste cannot be recovered or reused, treat, destroy, and dispose of it in an environmentally sound manner and in compliance with local laws and regulations
- Segregate of hazardous waste from non-hazardous waste; if generation of hazardous waste cannot be prevented through the implementation of the above general waste management practices, its management should focus on the prevention of harm to health, safety, and the environment

2.1.12 Hazardous Materials Management

Projects that manufacture, handle, use, or store hazardous materials should establish management programs that are commensurate with the potential risks. The main objectives of projects involving hazardous materials should be the protection of the workforce and the prevention and control of releases and accidents. These objectives should be addressed by integrating prevention and control measures, management actions, and procedures into day-to-day business activities.

Potentially applicable elements of a management program include the following:

- Establish the level of risk of the hazard through on-going assessment
- Define the management actions commensurate with the level of potential risk associated with the production, handling, storage, and use of hazardous material
- Design the preventative measures for hazardous materials spills, overfills, reactions, fires, and explosions
- Include control measures for secondary containment (liquids) and storage tank and piping leak detection

2.1.13 Contaminated Land

Contaminated lands should be managed to avoid the risk to human health and ecological receptors. The preferred strategy for land decontamination is to reduce the level of contamination at the site while preventing the human exposure to contamination. If risk management actions are warranted, the following steps should be taken:

- Conduct a screening of the environmental risks where there is potential evidence of contamination at a site
- Implement risk management at any phase of the project life cycle if the presence of land contamination poses an “imminent hazard”
- Consider detailed assessment of contaminate risks in the context of current and future land use, and development scenarios, which yields acceptable health risks, while achieving low level contamination on-site
- Provide permanent risk reduction measures as a basis for managing and mitigating environmental contaminant health risks

2.1.14 Monitoring

The general environmental guidelines require that the liquid effluents be sampled and measured weekly for common parameters such as suspended solids, BOD, pH, oils and grease, and flow. Leachate from solid waste disposal sites should also be sampled and tested monthly.

Project proponents are required to maintain records of air emissions, effluents, and hazardous wastes sent off site, as well as significant environmental events, such as

spills, fires, and other emergencies that may have an impact on the environment. The information requires review and evaluation for improving the effectiveness of the environmental protection plan.

2.1.15 Life and Fire Safety

The WBG/IFC General EHS Guidelines include specific guidance for design and construction of new buildings to include measures to provide for life and fire safety. All new buildings accessible to the public should be designed, constructed, and operated in full compliance with local building codes, local fire department regulations, local insurance/legal requirements, and in accordance with an internationally recognized life and fire safety standard. Life and fire safety guidelines apply to publicly accessible new buildings, including:

- Health and education (including training) facilities
- Hotels and leisure facilities
- Retail and commercial facilities
- Public transport terminals and transfer facilities

For each project, a suitable qualified professional should be prepare a Master Plan that adequately address the following issues, in addition to all other required issues:

- Fire prevention
- Means of egress
- Detection and alarm systems
- Compartmentation
- Fire suppression and control

Life and fire safety measures must be included in the project's Emergency Response Plan, including an assessment of local fire prevention and suppression capabilities. Regular maintenance and testing of life and fire safety sytems is a mandatory part of project operations for all mechanical, electrical, and civil structures and systems.

Life and fire safety requirements also take into consideration other hazards, including:

- Situating facilities, buildings, plants, and structures to minimize potential risks from forces of nature (including earthquakes, windstorms, and hurricanes)
- Design of structures in accordance with situation-, climatic-, and geology specific location risks (e.g. seismic activity, wind loading, and other dynamic loads)
- Certification of the validity of criteria employed in the design of facilities, buildings, plants, and structures by responsible structural engineers and architects

2.1.16 Occupational Health and Safety Guidelines

Occupational health and safety (OHS) GIIP related to the current Project is provided in the following main areas of the EHS Guidelines:

- General facility design and operation
- Communication and training
- Physical hazards
- Use of Personal Protective Equipment (PPE)

Employers are obligated to implement all reasonable precautions to protect the health and safety of their workers, during project construction and operations. Emphasis should be on the elimination of hazards from the work process, and where hazards cannot be eliminated, on their control and minimization through training, institution of safety procedures, and the provision of appropriate PPE and training in its use to workers.

2.1.16.1 General Facility Design and Operation

Facilities should be designed and equipped to protect OHS under normal working and reasonably foreseeable severe weather conditions, in keeping with expected elements for the project region. Life and fire safety design and construction conditions should apply to new buildings. Standard operating procedures should be developed to promote OHS and to handle severe weather or temporary shutdown conditions. Workers should be provided with adequate safe space in which to

conduct their activities, including transport to/from job site and passage to clearly marked and maintained emergency exits.

Additional general OHS considerations include provision of:

- Adequate lavatories facilities
- Potable water supply
- Clean eating area
- Adequate lighting
- Safe access to/from and around work locations
- First aid
- Air supply
- Appropriate work environment temperature

2.1.16.2 Communication and Training

All new employees should participate in OHS orientation training that provides an overview of the basic site safety and safe working rules, emergency procedures, and in the use of job-specific PPE. Prior to the commencement of new assignments, contractors and workers should be provided additional training specific to the new task or work area. Communication and training should address signage and equipment labeling and hazard codes.

2.1.16.3 Physical Hazards and Noise

Elimination or minimization of physical hazards is important in reducing OHS accidents and injuries. Special protective measures should be developed to address risks associated with working around rotating and moving equipment, noisy or vibrating environments, electrical equipment, eye hazards, welding/hot work, confined spaces, and industrial vehicle driving and site traffic. Specific guidelines are provided for OHS noise limits in various working environments as shown in the table below.

Table 2.5 – OHS Noise Limits for Various Working Environments, in dB(A)

Location/Activity	Equivalent level $LA_{eq,8h}$	Maximum $LA_{max,fast}$
Heavy industry (no demand for oral communication)	85	110
Light industry (decreasing demand for oral communication)	50-65	110
Open offices, control rooms, service counters, or similar	45-50	--
Individual offices (no disturbing noise)	40-45	--

Source: WBG/IFC General EHS Guidelines, 2007

Guidelines are also provided for maintaining an environment conducive to work, including addressing such areas as working environment temperature; ergonomics, repetitive motion, and manual handling; working at heights; and workplace illumination (as per the table below).

Table 2.6 – Minimum Limits for Workplace Illumination Intensity, in lux

Location/Activity	Light Intensity
Emergency light	10
Outdoor non-working areas	20
Simple orientation and temporary visits (machine storage, garage, warehouse)	50
Workspace with occasional visual tasks only (corridors, stairways, lobby, elevator, auditorium, etc.)	100
Medium-precision work (simple assembly, rough machine works, welding, packing,	200

etc.)	
Precision work (reading, moderately difficult assembly, sorting, checking, medium bench and machine works, etc.), offices	500
High-precision work (difficult assembly, sewing, color inspection, fine sorting, etc.)	1,000 – 3,000

Source: WBG/IFC General EHS Guidelines, 2007

2.1.16.4 Chemical Hazards

Guidance is provided to protect workers against potential chemical hazards that could result in illness or injury from single acute exposure or chronic, repetitive exposure. Chemical hazard mitigation and protection measures include consideration of air quality impacts (e.g. from exhaust, dusts, vapors, and gases); fires and explosions; corrosive, oxidizing, and reactive chemicals; and asbestos-containing materials.

2.1.16.5 Personal Protective Equipment

In addition to the steps that should be taken to avoid, eliminate, and minimize OSH risks, PPE provides an additional level of protection to workers exposed to workplace hazards.

2.1.17 Community Health, and Safety Guidelines

Community health, safety, and security guidance for covered in the General EHS Guidelines includes:

- Water quality and availability
- Structural safety of project infrastructure
- Life and fire safety Traffic safety
- Transport of hazardous materials
- Disease prevention
- Emergency preparedness and response

Specific requirements for these areas that affect the current Project are discussed below.

2.1.17.1 Water Quality and Availability

The General EHS Guidelines provide for the protection at all times of public and private drinking water sources so that they meet or exceed applicable national or (in the absence of national guidelines) the current edition of the WHO Drinking Water Guidelines. All project wastes and emissions should be managed to protect soil and water resources. Water supplied by the Project to users of facility infrastructure and that may be used for drinking, cooking, washing, or bathing should comply with drinking water guidelines. Water used in food production may require more stringent, industry-specific guidelines or standards, as applicable.

Surface water or groundwater abstraction to supply Project activities should be properly assessed through a combination of field testing and modeling techniques, accounting for seasonal variability and projected changes in demand in the Project area. Project activities should not compromise the availability of water for personal hygiene needs and should take account of potential future increases in demand. The overall target should be the availability of 100 liters per person per day.

2.1.17.2 Structural Safety of Project Infrastructure

Guidance to reduce hazards for new construction is focused primarily on the design phase. Buffer strips or other methods of physical separation around Project sites to protect the public should be incorporated into Project design. Project design should incorporate siting and safety engineering criteria, including appropriate international codes, to reduce risks from natural hazards such as earthquakes, tsunamis, wind, flooding, landslides, and fire. Project structures should be designed in accordance with engineering and design criteria mandated by site-specific risks, including but not limited to seismic activity, slope stability, wind loading, and other dynamic loads.

2.1.17.3 Traffic Safety

Safety measures to prevent and control traffic-related injuries should be adopted to protect Project workers and road users. Such measures should be proportional to the scope and nature of Project activities, and should include:

- Adopting best transport safety practices across all aspects of Project operations, with measures to include:
 - Emphasizing safety aspects among drivers
 - Improving driving skills and requiring licensing of drivers
 - Avoiding dangerous routes/times of day to reduce the risk of accidents
- Regular vehicle maintenance and use of manufacturer-approved replacement parts in vehicle repairs
- Minimizing pedestrian interaction with construction vehicles
- Collaboration with local communities and responsible authorities to provide traffic and pedestrian safety education and to improve signage, visibility, and overall safety of roads particularly near schools or other locations where children may be present
- Use of locally sourced materials as possible to reduce transport distances

2.1.17.4 Transport of Hazardous Materials

Procedures must be in place to ensure compliance with all local and international requirements applicable to the transport of hazardous materials, including proper labeling and packaging, shipping and chain-of-custody documentation, training of employees involved in the transportation of hazardous materials including emergency procedures, and providing 24 hours/day emergency response capacity, including community notification if appropriate.

2.1.17.5 Disease Prevention

Implementation of large projects can increase the risk to local communities of communicable diseases, including sexually transmitted and vector-borne infections. To safeguard community health, projects should implement disease-prevention initiatives that combine behavioral and environmental modifications, such as

education initiatives, worker immunization programs, and working with local authorities to improve health care services.

Reducing the impact of vector-borne disease on the long-term health of workers is best accomplished through implementation of diverse interventions aimed at eliminating the factors that lead to disease. Integrated control strategies for mosquito and other arthropodo-borne diseases may involve such control strategies as elimination of breeding habitats close to human settlements and increasing water velocity in natural and artificial channels, among other recommendations.

2.1.17.6 Emergency Preparedness and Response

Community notification procedures should be incorporated into the Project's Emergency Preparedness and Response Plan, as appropriate to the situation.

WBG/IFC EHS Guidelines for Ports, Harbors, and Terminals

The WBG/IFC has developed EHS Guidelines for Ports, Harbors, and Terminals (2007) that include criteria for the design, construction, and use of commercial ports, harbors, and terminals for cargo and passenger transfer. The guidelines incorporate the general provisions of IFC guidance for water, resources management, international waterways, cultural properties, indigenous peoples, involuntary resettlement, biodiversity, and wild lands.

The guidelines detail environmental requirements in port and terminal construction and operation. The guideline also outlines the requirements for port occupational health and safety and community health and safety. The guideline then details performance indicators and environmental monitoring requirements.

2.1.18 Air Emissions

The most significant sources of air pollutants from port operations include combustion emissions from ships' propulsion and auxiliary engines and boilers, followed by combustion source emissions from vehicles and land-based engines and boilers contributing similar pollutants. Operators should develop air quality

management procedures in accordance with international and local regulations to reduce their air emissions.

2.1.19 Liquid Effluent

Hazards associated with port sewage and stormwater can be mitigated with the installation of filter mechanisms and proper placement of storm drains. Port operators should provide collection, storage, and transfer and/or treatment services, and facilities of sufficient capacity and type for all wastewater generated by vessels at the port in accordance with international and national regulations.

2.1.20 Waste Management

Port facilities should provide adequate means of receiving and managing effluents and wastes to meet its own needs and those of visiting ships and for which the port is designed to service. Information should be available for ship captains to identify solid waste reception facilities and acceptable handling procedures at ports. Waste from ships should also be managed in accordance with all national and international regulations. If necessary, more stringent restrictions should be considered to protect the port environment.

2.1.21 Hazardous Materials and Oil Management

Ports should take the proper measures to prevent hazardous material spills, including secondary containment for above ground liquid storage tanks and tanker truck loading and unloading areas. Port operators should prepare a spill prevention, control, and countermeasure plan consistent with the International Maritime Organization (IMO) Manual on Oil Pollution Section II – Contingency Planning, and should implement systems for the proper screening, acceptance, and transport of dangerous cargo based on local and international standards and regulations.

2.1.22 Dredged Materials Management

Construction and maintenance dredging, and dredge spoil disposal, may impact habitats and pose a significant hazard to human health and the environment. The

following recommendations should be adopted to avoid, minimize, or control impacts from dredged materials:

- Dredging should only be conducted if necessary, and based on an environmental assessment. Prior to dredging activities, materials should be analyzed to determine the dredge materials reuse or disposal options
- Excavation and dredging methods should be selected to minimize their environmental impact. Sensitive environmental areas should be identified and if sensitive species are present, dredging should be conducted in a manner so as to avoid disturbing their habitat
- Dredged material should be analyzed to select appropriate disposal options. Contaminated dredge material should be properly disposed of in appropriate confined disposal facilities. Port managers should work with the national and local authorities, as well as facility owners and operators in the watershed, to reduce sources of key contaminants

2.1.23 Biodiversity

The construction and maintenance of a port facility may have adverse short and long-term effects on the local flora, fauna, and habitat. Recommended measures to prevent and control these impacts include the following:

- Potential impact to shoreline flora, fauna, and habitat should be fully assessed during port construction and operation
- Port facilities that conduct cleaning or repair of ballast tanks should be equipped with adequate reception facilities able to prevent the introduction of invasive species
- Ports should provide ship operators with details on the port, state, or port authority ballast water management requirements

2.1.24 Community Health, Safety, and Security

Community health, safety, and security guidance for port facilities covered in the sector-specific EHS Guidelines includes:

- Port marine safety: Port operators should implement a Safety Management System (SMS) able to effectively identify and correct unsafe conditions;

- Port security: Port operators should have a clear understanding of their responsibilities, including international legal and technical obligations to provide security to passengers, crews, and personnel in port; and
- Visual impacts: Excessive background illumination should be prevented during the port planning or managed during operations through the installation of natural visual barriers.

2.1.25 Performance Indicators and Monitoring

Environmental monitoring should be implemented to address those activities that have been identified to have potentially significant impacts on the environment during normal operations and upset conditions.

- Monitoring frequency should be sufficient to provide representative data for the parameter being monitored; and
- Additional monitoring approaches include the European Sea Ports Organization's (ESPO) Self Diagnosis Methodology that ports can use to audit their environmental strengths and weakness (ESPO 2003). ESPO recommends that ports carry out the assessment annually.
-

WBG/IFC EHS Guidelines for Thermal Power Plants

In 2008, IFC published the EHS Guidelines for Thermal Power Plants, which set forth GIIP for power plants with a total rated heat input capacity above 50 Mw thermal input. The Thermal Power Plant EHS Guidelines are used in conjunction with the General EHS Guidelines to provide additional, power plant-specific guidelines for power plant emissions, ambient air quality, noise, and certain liquid effluents beyond what is provided in the General EHS Guidelines. Guidance is also provided for:

- Energy Conservation
- Greenhouse Gas Emissions
- Solid and hazardous waste management
- Noise

2.1.26 Air Emissions

IFC stipulates that concentrations of contaminants emitted reciprocating engine thermal power plants with a heat input capacity of between 50 megawatt thermal (MWth) and 300 MWth and utilizing liquid fuels (should not exceed the limits presented in the table below. These guidelines are applicable to new facilities; units are mg/Nm³ unless otherwise indicated.

Table 2.7 – Emissions Guidelines for Reciprocating Engine Thermal Power Plants in Non-Degraded Airsheds

Particulate Matter (PM)	Sulfur Dioxide (SO ₂)	Nitrogen Oxides (NO _x)	Dry Gas, Excess O ₂ Content (%)
50	1,170 or use of 2% or less S fuel	1,460	15%

Source: WBG/IFC EHS Guidelines for Thermal Power Plants, 2008.

2.1.27 Liquid Effluent and Cooling Water

The table below presents guidelines for treated effluent streams specific to thermal power plants, including oil-separated water, site drainage, and cooling water. Guideline values should be achieved without dilution (i.e., as measured in the discharge stream upstream of receiving surface waters) at least 95 percent of the time that the power plant is operational, calculated as a portion of annual operating hours. The applicability of heavy metal effluent guidelines is based on evaluation from the project's ESIA.

Table 2.8 – Effluent Guidelines for Thermal Power Plants

Parameter	Guideline (mg/L, except pH and temperature)
pH	6 – 9
TSS	50
Oil and grease	10
Total residual chlorine	0.2
Chromium – total (Cr)	0.5

Copper (Cu)	0.5
Iron (Fe)	1.0
Zinc (Zn)	1.0
Lead (Pb)	0.5
Cadmium (Cd)	0.1
Mercury (Hg)	0.005
Arsenic (As)	0.5
Temperature increase by thermal discharge from cooling system	Site-specific values to be determined by the ESIA depending on receiving aquatic ecosystem sensitivity

Source: WBG/IFC EHS Guidelines for Thermal Power Plants, 2008

2.1.28 Energy Conservation

WBG/IFC's EHS Guidelines for Thermal Power Plants state that facilities or projects should manage and evaluate opportunities to improve energy conservation if they consume energy in: (i) process heating and cooling; (ii) process and auxiliary systems, such as motors, pumps, and fans; (iii) compressed air systems and heating, ventilation and air conditioning systems; and (iv) lighting systems. Facilities and projects can manage and evaluate opportunities to improve energy conservation by using the following:

- Energy Management Programs
- Energy Efficiency
- Process Heating
- Heating Load Reduction
- Heat Distribution Systems
- Energy Conversion System Efficiency Improvements
- Process Cooling
- Load Reduction
- Energy Conversion
- Refrigerant Compression Efficiency
- Refrigeration System Auxiliaries

- Compressed Air Systems

2.1.29 Greenhouse Gases (GHGs)

WBG/IFC's EHS Guidelines for Thermal Power Plants state that projects can produce GHGs directly from on-site facilities or from off-site energy production and that projects should reduce and control their production of GHGs. The recommendations include:

- Use of less carbon-intensive fossil fuels
- Carbon financing
- Enhancement of energy efficiency
- Protection and enhancement of sinks and reservoirs of greenhouse gases
- Promotion, development, and increased use of renewable forms of energy
- Carbon capture and/or reduction in methane emissions
- Limitation and/or reduction of methane emissions through recovery and use in waste management, as well as in the production, transportation, and distribution of energy (coal, oil, and gas)

WBG/IFC EHS Guidelines for Electric Transmission and Distribution

IFC's sector-specific guidelines for electric transmission and distribution provide information relevant to power transmission between an generation facility and a substation located within the electricity grid and to power distribution from a substation to consumers in residential, commercial, and industrial areas. As such, guidance relevant to the current Project is provided for:

- Right-of-way impact mitigation
- Sector-specific occupational health and safety issues
- Sector-specific community health and safety issues

- Safe working distances

2.1.30 Right-of-Way Impact Mitigation

Best practice actions to avoid or reduce potential impacts associated with construction and maintenance of power distribution lines include:

- Siting distribution lines within existing utility corridors
- Siting new distribution lines to avoid or minimize exposure to the public
- Regular maintenance of vegetation within the right-of-way; if herbicides are used, impacts to off-site land or water resources should be avoided

2.1.31 Sector-Specific Occupational Health and Safety

OHS issues specific to electric power transmission and distribution include:

- Live power lines
- Working at height
- Exposure to electric and magnetic fields
- Safe working distances

2.1.31.1 Live Power Lines

Measures to prevent and control exposure to live power lines during construction, maintenance, or operation activities include:

- Only allowing trained and certified workers to install, maintain, or repair electrical equipment
- Deactivating and properly grounding live power distribution lines before work is performed on or in close proximity to the lines
- Ensuring that live-wire work is conducted by trained workers with strict adherence to GIIP safety and insulation standards
- Controlling properly trained worker approach to exposed energized or conductive part only under conditions when:
 - The worker is properly insulated from the energized part

- The energized part is properly insulated from the worker and any other conductive object
- The worker is properly isolated and insulated from any other conductive object
- Including minimum set-back distances, specific training, safety measures, personal safety devices, and other precautions in the project's health and safety plan
- Ensuring that workers not directly associated with power transmission and distribution activities and who are operating around power lines or power substations observe minimum approach distances for excavations, tools, vehicles, pruning, and other activities

2.1.31.2 Working at Height on Poles and Structures

Prevention and control measures for avoiding occupational hazards associated with working at height during construction, operations, and maintenance include:

- Testing structures for integrity prior to undertaking work
- Implementation of a fall protection program, including training, use of appropriate PPE, and emergency response
- Use of a second (backup) safety strap when operating power tools at height
- Proper rating and maintenance of hoisting equipment and training of hoist operators
- Removal of signs and other obstructions from poles or structures prior to undertaking work
- Use of an approved tool bag for raising or lowering tools or materials to workers on structures

2.1.31.3 Exposure to Electric and Magnetic Fields

Electric and magnetic field occupational exposure limits for Project workers promulgated by ICNIRP are presented in the table below.

Table 2.9 – ICNIRP Limits for Occupational Exposure to Electric and Magnetic Fields

Frequency	Electric Field (V/m)	Magnetic Field (μ T)
50 Hz	10,000	500
60 Hz	8,300	415

Source: WBG/IFC EHS Guidelines for Electric Power Transmission and Distribution

2.1.32 Safe Working Distances

The table below lists minimum safe working distances for trained employees as developed by the Occupational Safety and Health Administration of the United States (OSHA).

Table 2.10 – Alternating Current – Minimum Working Distances for Trained Employees (a)

Voltage Range (phase to phase – kv)	Minimum Working and Clear Hot Stick Distance (m)
2.1 - 15	0.6
15.1 - 35	0.71
35.1 - 46	0.76
46.1 - 72.5	0.91
72.6 - 121	1.01
138 - 145	1.06
161 - 169	1.11
230 - 242	1.5
345 - 362	2.13 (b)
500 - 552	3.35 (b)
700 - 765	4.5 (b)

Notes: (a) OSHA

(b) From 345 – 362 kv and 700-765 kv, the minimum working distance and the minimum clear hot stick distance may be reduced provided that such distances are not less than the shortest distance between the energized part and a grounded surface

Source: WBG/IFC EHS Guidelines for Electric Power Transmission and Distribution

Minimum hot stick distances may only be reduced provided that the distance remaining is greater than the distance between the energized part and a grounded surface.

2.1.33 Sector-Specific Community Health and Safety

The Project will include power distribution lines to offsite consumers. Community health and safety issues specific to electric power distribution include:

- Electrocution
- Visual impact
- Exposure to electric and magnetic fields

2.1.33.1 Electrocution

Hazards most directly related to power distribution lines and facilities occur as a result of electrocution from direct contact with high-voltage electricity or from contact with tools, vehicles, ladders, or other devices that are in contact with high-voltage electricity. Recommended techniques to prevent these hazards include:

- Use of signs, barriers, and education/public outreach to prevent public contact with potentially dangerous electrical equipment
- Grounding conducting objects installed near power lines, to prevent shock

2.1.33.2 Visual impacts

Power distribution lines may be visually intrusive and undesirable to local residents; to mitigate the visual impact of power distribution projects, the following mitigation measures should be implemented:

- Public consultation during the planning of power line and power line right-of-way locations
- Accurate assessment of changes in property values due to power line proximity

- Siting power lines and designing substations with due consideration to landscape views and important environmental and community features, including livelihood aspects (mature fruit trees, e.g.)
- Location of distribution lines in less populated areas, where possible
- Burying distribution lines when power must be transported through dense residential or commercial areas

2.1.33.3 Electric and Magnetic Fields

Exposure limits for general public exposure to electric and magnetic fields published by the International Commission on Non-Ionizing Radiation Protection (ICNIRP) are shown in the table below.

Table 2.11 – ICNIRP Limits for General Public Exposure to Electric and Magnetic Fields

Frequency	Electric Field (V/m)	Magnetic Field (μT)
50 Hz	5,000	100
60 Hz	4,150	83

Source: WBG/IFC EHS Guidelines for Electric Power Transmission and Distribution

2.10 Voluntary Principles on Security and Human Rights

The Voluntary Principles on Security and Human Rights (the Voluntary Principles - <http://www.voluntaryprinciples.org>) is cooperative initiative that launched in December 2000 between the governments of the United States and the United Kingdom, extractives-sector multinationals, and sector NGOs. The aim of the Voluntary Principles is to provide an operating framework for companies to safeguard their facilities and workforces while protecting and promoting human rights. Particular emphasis is placed on protecting private citizens, local communities, and workers from potential impacts related to the deployment of public and private security forces, especially armed forces, at project sites.

Adherence to the Voluntary Principles should begin with a risk assessment that is conducted to:

- Identify potential security risks from political, economic, civil, and social factors
- Identify the potential for violence from such risks
- Assess the human rights records of public and (if utilized) private security forces, including their abilities to respond to situations of violence in a lawful manner
- Consider the capacity of the local legal system to hold accountable violators of human rights
- Analyze conflict in terms of identifying and understanding the root causes and nature of local conflicts
- Consider the consequences of transfer of lethal and non-lethal equipment to public or private security forces, including controls to prevent the misappropriation or diversion of equipment which could lead to human rights abuses.

The Voluntary Principles govern interactions between companies and public security, and include guidance for:

- Security arrangements, including consultation between host governments and local communities regarding the potential impacts of security arrangements on those communities
- Deployment and conduct of public and private security forces, including use of force only when strictly necessary and to an extent proportional to the threat, and the provision of medical aid to injured persons (including offenders) when force is used
- Interactions between companies and private security forces, including verifying high levels of technical and professional proficiency, particularly with regard to the local use of force and firearms, specifying rules of engagement, and provision of independent or third-party monitoring of the conduct of private forces.

Where appropriate, companies should include compliance with the Voluntary Principles as contractual provisions in agreements with private security providers.

International Ship and Port Facility Security Code.

The International Maritime Organization (IMO) is the UN's specialized agency tasked with overseeing the safety and security of shipping and with the prevention of pollution to the marine environment. As part of its Strategic Plan, the IMO develops instruments to promulgate international cooperation in shipping safety and security, such as the International Ship and Port Facility Security Code (ISPS Code, IMO 2002). The ISPS Code provides a standardized framework through which governments, ships, and port facilities can co-operate to deter, detect, and assess threats to security in the maritime transport sector. The ISPS Code applies to ships engaged in international voyages and the port facilities that service such ships. Main tenants of the ISPS code include:

- Exchange and evaluation of information between Contracting Governments, companies, port facilities, and ships
- The right of the State to impose control and compliance measures on ships in or intending to visit its ports
- Provision for Contracting Governments to take further action when relevant requirements are not met or when clear ground for taking such action exist

Rather than provide specific measures for individual ports and ships, the ISPS Code provides a standardized framework to evaluate risk, which can be consistently implemented across the maritime transport sector. This framework includes requirements for both ships and port facilities to monitor and control access, monitor the activities of people and cargo, and to ensure ready availability of secure communication. Additional requirements also exist for both ships and port facilities:

- Ships: security plans, shipboard and Company security officers, certain onboard security equipment
- Port Facilities: security plans, security officers, certain security equipment

Other International Organization Guidelines

Guidelines and standards of other international organizations relevant to leading industry practice standards may include WHO, United Nations Environment Program

(UNEP), the International Institute for Sustainable Development (IISD), and the Organization for Economic Cooperation and Development (OECD). These guidelines are typically incorporated into leading industry practice considerations as appropriate based on site-specific conditions and national context.

3.0 Project Description

Introduction

GB Group is constructing a marine port (Port Lafito) with associated quay-side cargo terminal and an adjacent duty-free zone (known as the Lafito Industrial Free Zone or LIFZ) featuring 100,000 m² of industrial space, along with a dedicated 25 MW power plant to provide dedicated electrical power to the port and free zone. The power plant, LIFZ, and Port Lafito together are known as the Lafito Project (the Project).

The Project is located adjacent and to the north of the Lafiteau community, on Haiti's west coast, approximately 20 km in a direct line (30 minutes by road) northwest of the national capital of Port-au-Prince. Port Lafito is being constructed in part to reduce congestion resulting from earthquake-related damage sustained in 2010 by the main Port-au-Prince port, run by the Haitian National Port Authority (APN). Port Lafito will also provide additional cargo handling capacity and the ability to accommodate Panamax-size vessels, something neither the APN Port nor Port-au-Prince's smaller private Terminal Varreux, can currently accommodate.

This chapter describes the current Project schedule and status; Project components for Port Lafito, the LIFZ, and the power plant; construction and operations activities for Port Lafito, the LIFZ, and the power plant; provision of utilities and services such as waste management; labor projections for construction and operations; and how the Project will handle employee housing and transportation arrangements.

The information in this chapter is taken from a variety of source documents, the majority of which were provided by GB Group and are not a matter of public record or available in the public domain. Therefore, this Project Description provides the most comprehensive publicly available documentation of the Lafito Project, as of the date of this ESIA.

Project Location

The Lafito Project is located adjacent to the community of Lafiteau, Source-Matelas Communal Section, Cabaret Commune, Arcahaie Arrondissement, in Haiti's West

Department. Figure 1.1 shows the general Project location. Land access to the Project site is via National Route 1 northwest from Port-au-Prince to the intersection with road to Lafiteau community, then west approximately 200 m to the newly-constructed paved access road leading through the Project site. The Project site is bordered to the west by the waters of Port-au-Prince Bay, a broad inlet of the Gulf of Gonâve that defines the western coast of Haiti. The Gulf of Gonâve provides routes for international shipping and access to international ports via the Caribbean Sea.

Main Project Components and Footprint

Figure 3.1a provides a general layout of Project components: Port Lafito, the LIFZ, and the power plant. Figure 3.1b shows the planned power distribution line network on- and off-site. Major infrastructure components associated with each of the main Project areas and shared Project utilities are:

- Port Lafito
 - Quay
 - Cargo terminal
 - Administration, Security, and Customs building
 - Perimeter concrete wall with guard shack
- LIFZ
 - Seven buildings providing 100,000 m² of industrial space
 - Two employee/tenant cafeterias
- Power Plant
 - Ten diesel generators and accompanying emissions stacks
 - Freshwater and seawater cooling systems
 - Power plant control room
 - Administration, warehouse, and workshop buildings
 - Concrete perimeter wall with guard shack
 - Four fuel and oil storage tanks
 - Concrete power poles and electrical distribution lines

- Shared Utilities:
 - Water retention pond and water pipeline and distribution system
 - Access roads
 - Truck idling and parking areas
 - Employee transfer area
 - Wastewater treatment system
 - Solid waste collection and temporary storage areas
 - Replacement low-head dams

GB Group has also constructed a dry terminal located in Chancerelles (Figure 3.2). The dry terminal is currently operational, and is not considered part of the current Project for the purposes of this ESIA.

The Project will directly affect approximately 61 hectares (ha) of land, as shown in Table 3.1 below.

Table 3.1 - Approximate Area of Project Components

Project Component	Approximate Area, ha
Port Lafito	14.6
Water retention pond	0.5
LIFZ	33
Power Plant	1.6

Total Area: 49.7 ha

Source: GB Group

Planned Project footprint areas are shown in greater detail on Figure 3.3 (Port Lafito), Figure 3.5 (LIFZ), and Figure 3.7 (power plant).

Project Schedule

GB Group started construction of Phase 1 Project components in November of 2013, with port operations forecast to begin in 2Q2015, with the arrival of the first vessel scheduled for Second Quarter 2015. An overview of the current Project schedule for key phases (construction and operations start dates) is shown below in Graphic 3.1.

Graphic 3.1 – Summary Project Schedule

Project Phase	2013	2014				2015				2016				2017
	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1
Port Lafito														
Construction														
Operations Start														
Lafito Industrial Free Zone														
<i>Phase 1 - Buildings C, F, G</i>														
Construction														
Operations Start														
<i>Phase 2 - Buildings A, B, D, E</i>														
Construction														
Operations Start														
Power Plant														
Construction														
Commissioning														
Operations Start														

Source: Modified from GB Group

Construction activities at the LIFZ are divided into two stages, Phase 1 and Phase 2, defined by tenant occupancy contracts. Construction of the power plant and Phase 1 of the LIFZ began in December, 2014. The entire Project is expected to be fully operational by 4Q2018.

Engineering Design

AMI Consulting Engineers (AMI) of Superior, Wisconsin, United States was contracted to complete the engineering design for the Project, CLARIFY EXACTLY WHAT – DEAN DOESN'T DO FOUNDATIONS – WILL AMI, FOR LIFZ BUILDINGS?

WHAT ABOUT FIRE SAFETY? including Port Lafito, the LIFZ, and civil design (foundations, structures) for the power plant.

AMI applied the following codes, standards, and design criteria:

- International Code Council - 2006 International Building Code
- American Society of Civil Engineers (ASCE) and Structural Engineering Institute (SEI) - Minimum Design Loads for Buildings and Other Structures (ASCE/SEI 7-05)
- Documentation for Initial Seismic Hazard Maps for Haiti, United States Geological Survey Open File Report 1067, 2010 (USGS OFR 2010-1067)
- Wind loads:
 - Basic wind speed: 233.4 km/hour (145 mph)
 - Exposure category: D
- Seismic loads in accordance with ASCE/SEI 7-05 and USGS OFR 2010-1067:
 - Soils site class: E
 - S_S : 2.25 (per USGS OFR 2010-1067)
 - S_1 : 0.75 (per 2010 USGS OFR 1067)
 - S_{DS} : 1.35 (per ASCE/SEI 7-05)
 - S_{D1} : 1.20 (per ASCE/SEI 7-05)

The design and construction of the power plant will be in general accordance with the latest versions of the following codes and standards, as deemed applicable:

- ANSI – American National Standards Institute
- DIN – Deutsches Institut für Normung, e.V.
- NEMA – National Electrical Manufacturer's Association (USA)
- IEEE – Institute for Electrical and Electronic Engineers (USA)
- IEC – International Electric Code
- ISO – International Standards Organization
- NEC – National Electric Code (USA)
- ASTM – American Society for Testing and Materials
- VDE – Information Technologies (Germany)

- ASME – American Society of Mechanical Engineers
- ACI – American Concrete Institute
- AISC – American Institute of Steel Construction
- ICBO – International Conference of Building Officials
- AWWA – American Water Works Association
- IAPMO/UPC – International Association of Plumbing and Mechanical Officials/ Uniform Plumbing Code
- API – American Petroleum Institute
- AWS – American Welding Society
- UL – Underwriter’s Laboratories (USA)
- ISA – Instrument Society of America
- SSPC – Steel Structures Painting Council (USA)
- HEI – Heat Exchanger Institute (IEC)
- CIMAC – International Council on Combustion Engines

The large structures (warehouses, cafeterias) and smaller administration buildings in the LIFZ buildings will be metal buildings constructed from modular components from Dean Steel Buildings, Incorporated (Dean Steel) of Fort Myers, Florida. Dean Steel designs its buildings to adhere to the policies of the Metal Building Manufacturer’s Association (MBMA) Low Rise Building System Manual (1996 edition). Designs shall include the building dead load; roof live load; wind, snow, and seismic load in accordance with Dean Steel’s interpretation of the building code.

At the time of the writing of this report, the port is operational and construction is in progress for other Project components. As construction progresses, minor modifications to Project designs are expected, which will be communicated as required and in a timely manner to any appropriate regulatory entities. The ESIA documentation incorporates the Project’s engineering design and component layout as of April 2015, which is not expected to change substantially with Project implementation.

Current Project Status

GB Group has engaged REPSA as the principal construction contractor for the Project and Seaboard has been contracted to complete the electromechanical works for the power plant. REPSA is a marine construction and dredging company, and part of the GB Group. As of August 2015, REPSA has completed the following construction activities at the Project site:

- Port Area:
 - Dredging
 - Infilling, compaction, and bulk earthworks
 - Quay construction
 - Pouring concrete caps and decks
 - Electromechanical installation, including shiploader cranes on quay
 - Installation of chain-link temporary perimeter fence
 - Commissioning
- LIFZ Area:
 - Bulk earthworks for Phase 1 buildings
 - Installation of chain-link temporary perimeter fence
- Power Plant Area:
 - Bulk earthworks
 - Engine hall foundation
 - Generator pedestal concrete works
- Shared Utilities:
 - Water retention pond excavation and geosynthetic liner installation
 - Access road construction (constructed by GoH)

Construction activities currently in progress include:

- LIFZ Area:
 - Bulk earthworks (grading and levelling)
 - Foundation preparation for Phase 1 Buildings
- Power Plant Area:

- Electromechanical works
- Erection of superstructure for engine hall
- Concrete casting along seawater discharge canal
- Grading and site improvements

Port Lafito

Project implementation involved construction of a new private port including a quay and cargo terminal near the community of Lafiteau. Figure 3.3 provides a detailed layout of the Port Lafito project components. Conceptual renderings of the completed port are shown in Figure 3.4.

Major components of the port include:

- A 450 m-long quay capable of berthing two Panamax-class vessels simultaneously, in 12 m of water
- Two 420 ton mobile Leibherr harbor cranes
- Quay-side cargo terminal, with areas for unrefrigerated and refrigerated container storage and for bulk cargo storage and transport
- Mobile truck chassis beds and/or “bomb carts” for container transport
- An Administrative/Security/Customs building
- 12’-tall concrete panel perimeter fence with guard shack
- Access roads and parking
- Packaged water treatment plant for handling domestic wastewater and sewage from Administration building restrooms

It is anticipated that most of the equipment, supplies, and materials necessary to construct the Project will be delivered to the Project site via truck transport from other areas within Haiti.

Port Lafito has an associated inland (dry) terminal in the northern Port-au-Prince suburb of Chancerelles (Figure 3.2). The dry terminal will allow importers to pick up their cargo in a location nearer Port-au-Prince than the Project area. The Chancerelles terminal covers 50,000 m² (5 ha) and will have Customs-clearing

capabilities. The Chancerelles terminal is not considered part of the current Project, and thus is not included in this ESIA.

3.1.1 Existing Regional Port Facilities

The existing facilities in Port-au-Prince consist of the State-run ANP port and private Terminal Larreux, both located on Port-au-Prince Bay, the southeastern-most extension of the Gulf of Gonâve, adjacent to the city. The APN port was damaged in the 2010 earthquake that ravaged Haiti, and is currently using barges as floating docks to house its two lattice boom cranes for loading/unloading ships. In addition, access to the APN port is difficult, and with no nighttime lighting, only daytime operations are possible. The maximum depth at the APN port is 9.7 m, too shallow to accommodate Panamax-class vessels. The port is located in a congested area, and its location provides for no room for expansion.

In comparison, the private Terminal Varreux has sub-standard dock and pier facilities, is located in the high-crime district of Cité Soleil. Its limited cargo handling capacity is further hampered by its lack of license to process container vessels due to issues in obtaining underwriting for cargo insurance. Like the APN port, Terminal Varreux cannot accommodate Panamax-class vessels.

Recent container volumes reporting to the two existing Port-au-Prince ports were 81,881 twenty-foot equivalent units (or TEUs, defined as a 20x8x8 foot volume) inbound and 82,835 TEUs outbound (2012 statistics). Bulk cargo volumes for the year ending in September 2013 were 429,941 metric tons for the APN port and 2,224,735 tonnes for Terminal Larreux.

3.1.2 Port Cargo Projections

GB Group has designed Port Lafito to handle an average of 14,442 TEUs inbound and 14,442 TEUs outbound annually. Design bulk cargo handling capacity is 240,000 metric tons annually over the same period.

The Project assumes that approximately 50% of offloaded cargo at Port Lafito will go directly to the importer for pick-up at the port with the remainder transported to the dry terminal at Chancerelles. In-bond cargo will be transported between the

port and the LIFZ and between the port and the Chancerelles terminal via GB'Group's trucking division.

3.1.3 Port Construction

The construction phase for the port was completed in mid-2Q2015. Key construction-phase activities included:

- Dredging of the quay area to provide a berthed depth of 12 m at mean low tide
- On-shore disposal of dredge spoils for use as fill material
- Stripping of vegetation and existing soil cover
- Quarrying of limestone rock, rock placement, earthmoving, and levelling activities
- Steel pile driving and quay wall construction
- Concrete form erection and concrete works
- Steel erection and construction of buildings
- Piping installation
- Electromechanical system installation
- Installation of package wastewater treatment plant
- Installation of security fencing
- Construction of stormwater retention infrastructure

Project construction required the use of a variety of materials and equipment. A series of small limestone hills within the GB Group property boundary were leveled and the rock quarried from these hills was crushed and used as compacted fill in the port area, along with suitable material dredged from the quay area of the harbor. Concrete, block, and aggregate were being provided by local supplier Topline in Titanyen. Dredge spoil consisted of generally coarse-grained material and were disposed of onshore where it was utilized as fill material. Other construction materials such as structural steel and steel pilings were sourced from vendors within Haiti and transported via truck to the port construction site.

Construction materials and equipment sourced from overseas were offloaded via temporary ramps, until the cargo cranes were installed.

3.1.4 Port Operations

Port Lafito is designed to ship and receive containerized and bulk cargo, and will be an ISPS certified facility. The port is designed to accommodate cargo vessels up to a maximum of Panamax class, and can provide berth to two Panamax-class vessels simultaneously along 450 m of quay. The quay has a minimum depth of 12 m at mean low water, providing sufficient safe draft for loaded Panamax-class vessels. The port is designed primarily for daytime operations, although sufficient overhead lighting is provided for security lighting and to assure safe nighttime operations if required.

Port Lafito began operations in July 2015, following receipt of its temporary accreditation from the government's port accreditation center. After a probationary period of up to one year, the facility will receive its full accreditation, renewable on a yearly basis.

3.1.4.1 Port Services

The Port Lafito harbor master will provide traffic control at the port. The local stevedore union will provide vessel mooring and unmooring services. In the Project area tidal fluctuation is very low, typically less than 0.3 m in height, therefore vessel's arrival and departure will not be tied to the tidal cycle. Because water depth increases rapidly offshore of the quay (to approximately 20 m within 80 m distance offshore), pilot service for arriving and departing vessels will not be required; however a third-party piloting service will be available on vessel request.

3.1.4.2 Inbound Cargo

Once docked, inbound container cargo will be unloaded via the port's two Liebherr LHMN420 mobile harbor cranes onto truck chassis or "bomb carts". A diesel-powered off-road vehicle called a top handler will transport the loaded chassis/bomb carts to the stacks area of the quay for storage. Temperature-sensitive refrigerated containers, called "reefers", will be accommodated at Port Lafito via a designated area for reefer storage, with capacity for up to 72 standard

(20 foot) containers. A shore-power connection provides temperature control for the reefer containers.

Bulk cargo, currently forecast to include Portland cement and various fertilizer components, can also be handled at Port Lafito. The bulk cargo transport system will pneumatically remove bulk cargo from a docked vessel, transport it safely without exposure to the atmosphere through a sealed piping system running along the western edge of the quay, then deposit the bulk material in sealed storage silos located immediately to the north of the port.

Limited amounts of liquid cargo for use at Port Lafito and by the power plant can also be handled by the port. A pipeline system for pumping and transporting liquid cargo, primarily heavy fuel oil (HFO), is located on the northwestern side of the cargo terminal. A small tank farm at the power plant will store HFO and lubricating oil. The bulk and liquid cargo transport systems are located within a 25 m-wide easement along the quay's northwestern side.

Inbound cargo destined for use by any of the LIFZ manufacturing/industrial facilities is considered to be "in bond" and thus not subjected to customs duties. The bonded cargo will receive a transit authorization from the Customs office at the port, and can then be transported via truck to the LIFZ or the bonded terminal at Chancerelles. Customs records maintained at Port Lafito for inbound bonded cargo will be cross-checked with the Chancerelles and LIFZ terminal customs office to verify compliance.

Inbound cargo that is destined for delivery outside of the LIFZ will be subjected to customs duties and clearance by Haitian Customs officials; there will be a Customs office located in the Administration Building at the port (Figure 3.3). Once the cargo has cleared Customs, top handlers will transfer containers onto truck chassis for transport outside of the LIFZ and dry terminals. Trucks will pick up their designated chassis in the Imported Cargo Loading Area, along with documentation of Customs clearance. Truck drivers transporting cleared cargo to destinations outside of Port Lafito and the LIFZ must present complete and appropriate documentation for all transported cargo in order to exit from the access-controlled Project area.

3.1.4.3 Cargo for Export

Port Lafito will also function as a facility for exporting cargo from LIFZ tenants and from other sources across Haiti for transport to international markets. Only containerized cargo will be accepted for export.

For export cargo materials coming into the port from outside of the LIFZ, incoming truck traffic will be held at the truck staging area on the east side of the Project site (Figure 3.3) outside of the Port Lafito and LIFZ security perimeter. Port Lafito security will inspect each truck and its cargo individually to assure compliance with ISPS protocol and to verify cargo against provided cargo manifests. Trucks will only gain access to Project facilities after receiving a specific work order and clearance to approach. Once inside the Port Lafito gates, trucks will proceed to the container unloading area, where a top handler will remove the container from the truck and place it on a bomb cart, for transport to the Export Cargo Loading Area.

Cargo destined for export that was produced by manufacturing tenants within the LIFZ will not be subjected to Customs duties, and will be loaded into containers at the LIFZ production facility and transported to the port via truck.

GB Group has contracted with a GB Group trucking company to provide licensed and trained professional truck drivers to transport cargo to and from the Port Lafito facilities.

3.1.5 Port Infrastructure

3.1.5.1 Quay

Phase 1 of the Project includes the construction of a 450 m-long quay that will contain at least 350 m of dockage capable of mooring two Panamax-class vessels simultaneously. The front wall (seaward side) of the quay has been constructed from 90' long steel sheet pilings driven vertically into the sediments of Port-au-Prince Bay. The back wall of the quay lies 30 m landward of the front wall, and was constructed from 60' long sheet piles. Two layers of steel tie rods interconnect the front and back walls of the quay, inter-filled with marine-specification concrete, to a

depth of approximately 11' (3' below mean water line to 8' above mean water line). An 18" thick poured-in-place concrete cap forms the operating surface of the quay.

The quay is fitted with bollards and rubber fenders for mooring multiple vessels. Quay-side systems will include gangplanks and a fire protection system. The fire protection system will use fresh water sourced from the Project's 45,424 m³ (12 M gallon) water retention pond, in order to reduce equipment corrosion that would occur if seawater was used in place of fresh water in the system.

Moored vessels will not be permitted to discharge wastes of any type into the marine environment or into Project facilities while they are docked at the port. Ships crews will be expected to remain on board their ships, and will utilize their own on-board sleeping, eating, and sanitation facilities. Port security will staff and maintain a motorized inflatable craft (Zodiac or similar) to assist with security, spill response, and rescue.

3.1.5.2 Cargo Terminal

The cargo terminal is located landward of the highline area in which the ships dock and the mobile harbor cranes operate loading and unloading cargo. Top handlers will transport loaded bomb carts to the stacks area of the cargo terminal, where the containers will be off-loaded and stacked up to 10 containers high while they await transport to their final destination. A section of the container stacks is designated for reefer container storage, with a maximum storage capacity of 72 reefer containers at any given time.

3.1.5.3 Port Administrative Facilities

An 830 m² steel-shell building located inside the Port Lafito perimeter fence near the main entry gates will house port Administration, Security, and Haitian Customs offices. This three-story building will also have restroom facilities on each floor. Bottled water will be provided for drinking purposes; washrooms sinks will use potable water for proper sanitation while toilets will use minimally treated freshwater (fresh water with total suspended solids removed only), to minimize the

use of potable water to the extent practical. The expected use is ≤ 100 gallons per day.

A separate, Quonset-style pre-fabricated metal building will be erected opposite the Administration building on the northwest side of the entry gates, to house port maintenance activities such as chassis repair and crane and tophandler maintenance.

The entire land-side port facilities will be surrounded by a concrete perimeter wall, constructed from concrete soldier piles driven into the ground every 6' with concrete panels fitted between each soldier pile. The wall will have an average height of 12'. Eight guard shacks will be located at key points around the facility perimeter.

Nighttime illumination will be provided by a number of concrete light poles that will produce sufficient illumination for security purposes and for occasional nighttime port operations. Port Lafito is currently envisioned for primarily daytime operations.

Motor vehicle access to Port Lafito is via an approximately 2.5 km-long asphalt-paved road connecting the port's entry gate to National Route 1 (Figure 3.3). The access roads from National Route 1 and the through the Project to the border of Simonette community were constructed by the GoH and donated to the Project, with the intent for their continued use as public roads. All Project roads (including the GoH-built access roads) are crowned for runoff, and have drainage canals on either side. Stormwater collected in the drainage canals is routed through a series of sediment retention ponds, then through an open concrete culvert that runs through a rock revetment adjacent to the northwest side of the port, prior to discharge to the sea. Average road width is 9 m. Access to the facilities will be controlled at the gatehouse.

3.1.6 Dredging

Bathymetric contours decrease rapidly seaward from the coast in the Port Lafito area. There is a steady 0.5 knot longshore current moving up the coast from the southeast to the northwest. GB Group estimates that the front wall mooring area

of the quay will require maintenance dredging on average of every 15-20 years, to maintain a depth of 12 m at mean low water. Dredge spoils will be deposited off the rock revetment area (land) to the northwest of the quay (Figure 3.3).

Lafito Industrial Free Zone

In addition to Port Lafito, the Project includes the construction and operation of an industrial free zone with 100,000 m² of indoor manufacturing space designated for light industry. The intent of the LIFZ is to provide space to companies engaged in light industrial and manufacturing activities, with emphasis on low-water-use processes, to minimize Project water use and to maintain impacts to local water resources as low as possible. Materials used by LIFZ tenants will be imported duty-free from Port Lafito; finished products will then be exported duty-free directly to overseas markets via Port Lafito. Figure 3.5 provides a detailed layout of LIFZ project components; conceptual renderings of the completed LIFZ are shown in Figure 3.6.

Major components of the LIFZ include:

- Twenty 5,000 m² “building blocks” arranged as larger buildings in various configurations based on tenant request, providing a total of 100,000 m² of light manufacturing space across the LIFZ
- Two 10,000 m² employee cafeterias
- Data Center
- Administration/Security/Customs Office
- Wastewater treatment plant/s
- Stormwater retention ponds
- Local transport staging area
- Parking and truck bays
- Interior and access roads

The LIFZ will have a phased buildout and operations start, reflecting tenant occupancy commitments. Phase 1 of the LIFZ includes:

- Construction of Buildings C, G, F

- Foundation construction for Building B
- Construction of the first cafeteria

Phase 2 of the LIFZ currently includes:

- Construction of Buildings A, B, D, and E
- Construction of the second cafeteria

3.1.7 LIFZ Construction

The LIFZ is currently being constructed in two phases, with Phase 1 construction in progress since December 2014 (see Graphic 3.1). Key construction-phase activities for Phase 1 of the LIFZ have included:

- Ground leveling and bulk earthworks across the site
- Foundation construction for Buildings B, C, F, and G
- Installation of piping for potable and fire protection water supplies and wastewater treatment
- Installation of security (chain-link) fencing

Phase 2 construction is planned to start in 2Q2016, but is contingent upon tenant occupancy contracts and thus could potentially change in the future, should tenant commitments change. Construction activities currently planned for Phase 2 of the LIFZ include:

- Foundation construction for Buildings A, D, and E
- Erection of steel superstructure for Buildings A, B, D, and E
- Construction of the second employee cafeteria
- Electromechanical installation for Phase 2 buildings
- Piping installation for Phase 2 buildings

3.1.8 LIFZ Operations

As its name implies, the LIFZ is designed to provide light-industrial tenants with the ability to import raw materials and export finished products free of customs duties, via Port Lafito. Inbound bonded container cargo will be transported from Port Lafito via truck to its destination at one of the LIFZ buildings.

At full build-out and complete occupancy, the LIFZ is capable of employing up to 20,000 workers, the majority of who will be employed by LIFZ tenants and not by GB Group/the Project. The LIFZ is currently expected to operate Monday through Friday from 7:00 a.m. to 5:00 p.m. (daylight hours only). It is expected that GB Group employees will arrive via private or public communal bus transport. An employee transfer station will be located adjacent and immediately outside the main entry gate to the LIFZ, on its eastern border (Figure 3.1a).

Employees arriving by public/private bus will enter the LIFZ through a community electronic portal. Employees arriving via personal private transportation (car/light truck), along with any deliveries from outside of the Project, will enter through the main gate, with parking for private light vehicles in front of the LIFZ Administration building and surrounding various LIFZ buildings and cafeterias.

3.1.9 LIFZ Infrastructure

3.1.9.1 Manufacturing Space

The LIFZ consists of 100,000 m² of indoor light-industrial space, subdivided generally into “building blocks” of single 5,000 m² areas that can be combined to create larger buildings. As currently envisioned, the LIFZ consists of seven large metal buildings, each with varying area, divided into two phases of construction based on tenant contracts and occupancy. The table below describes the current LIFZ building configurations assigned to each construction phase.

Table 3.2 – Planned LIFZ Building Configurations

LIFZ Phase	Building Name	Area (m ²)
Phase 1	C	10,000
	G	20,000

	F	20,000
Phase 2	A	10,000
	B*	10,000
	D	10,000
	E	20,000

Note: Foundation only for Building B is being constructed as part of Phase 1.

Phase 1 construction is in progress, with completion of the superstructure for Buildings C, G, and F scheduled for 2Q2016. GB Group is currently in the process of locating and contracting clients for the LIFZ.

GB Group is in the process of negotiating contracts with various garment manufacturers for Phase 1 building tenancy.

3.1.9.2 Cafeterias

At full build-out, the LIFZ will feature two 10,000 m² (each) cafeterias which will provide workers in the LIFZ with the opportunity to purchase a mid-day meal, Monday-Friday, and will provide eating areas for all workers. Workers will also be able to leave the Project site if they wish to eat lunch in nearby communities. Each cafeteria building will include kitchen and food preparation areas, serving areas, and dining areas, with seating for up to 900 people at any given time. The cafeteria buildings will also include men's and women's restroom facilities, and potable water drinking fountains. Each cafeteria is sized for a staff of approximately 35 people including food preparation staff, cooks, servers, and sanitation teams. Cafeterias are expected to be open during typical lunch hours, and will be closed on observed holidays. Cafeteria locations for Phase 1 and Phase 2 are shown on Figure 3.5.

3.1.9.3 Administration Building

A 100 m² Administration building for the LIFZ will be located just inside the perimeter fence of the LIFZ past the main vehicle entry gates (Figure 3.5); this building will house LIFZ administration, LIFZ security, and another Haitian Customs office. The building will contain potable drinking water fountains and restrooms.

3.1.9.4 Data Center

The Project's Data Center will include be located in the LIFZ, and will include hard-lined fiber-optic connections for telephone and internet service, leading to the main utility grid network. The Data Center will provide landline telephone and internet service to Project components.

Power Plant

Haiti's national grid is currently an unreliable source of electrical power and does not currently extend to the Project area; therefore the Project includes a secure, dedicated power source that will provide electricity to Port Lafito and the LIFZ 24 hours per day, 365 days per year. A dedicated power plant will be constructed in the southeast corner of the Project property, between Port Lafito and the LIFZ (Figure 3.7). The power plant will provide electric power to the port and LIFZ and to other ancillary facilities. A conceptual drawing of the completed power plant is shown in Figure 3.8. Power plant components will include:

- Ten Daihatsu HFO-burning engines, each rated for 2.55 MW output
- Ten Nishishiba generators with fresh water cooling systems, each located on a common rail with one of the Daihatsu engines, forming 10 engine-generator sets
- Ten 24.4 m (80') tall emissions stacks, one stack per generator, with exhaust silencers
- Seawater secondary cooling water system for power area
- Supporting systems including fuel and fire protection systems
- Two exhaust gas boilers
- Service water system;
- Wastewater collection and neutralization
- Startup "black start" diesel power
- Electrical power distribution
- HFO, diesel, and lubricating oil storage and distribution systems

The power plant will operate as an “islanded” power system, with no interconnecting power system or generation facilities, and was designed to meet all operating conditions for the current Project design configuration.

All required electrical power, approximately 30,000 KVA, will be generated on site using HFO-fired engine-electrical generator generators. Primary power distribution will be via 16.8kV feeders, with step-down transformers provided at unit substations placed at key locations throughout the site.

3.1.10 Electricity Generation

Ten Daihatsu/Nishishiba combination generators form the core of the power plant. Each generator has the ability to provide a maximum of 2.55 MW of electrical power; at full operation of all 10 generators simultaneously, the power plant will have a total capacity of 25.5 MW of electrical energy. Using a group of individual generators allows the Project the flexibility to operate the generators independently or in series, to deliver power at various MW levels based on demand. The current operating scenario is as follows:

- Daytime (7 a.m. to 5 p.m.): eight generators, each operating at 80% load
- Nighttime (5 p.m. to 7 a.m. – three generators, each operating at 80% load
- During any operation day or night, a single generator will only operate at 80% capacity

The above operating scenario was used as the base case/Scenario 1 for the air emissions monitoring conducted for the Project. Low-sulfur heavy fuel oil (HFO) will be required for the power plant to meet applicable IFC emissions guidelines. HFO characteristics are shown below:

- Sulfur: 1.0 % wt
- Ash: 0.06 % wt
- Micro carbon residue: 16 % wt
- Asphaltenes: 12 % wt

The electrical generators use two cooling systems: a fresh water (high-temperature) system and a seawater (low temperature) system. Potable water from the RO plant will not be used in power generation. Feed water coming from the water retention pond will have TSS removed prior to addition to the high-temperature cooling system. The fresh water cooling water is recirculated in a closed system within the generators, with an expected annual average demand of 80 m³/hr.

The low-temperature secondary cooling system uses seawater to continuously circulate over the plate heat exchangers in the generators. The intake for the seawater cooling system is along the eastern edge of the Port Lafito quay (Figure 3.7), and consists of a series of four submersible pumps located in approximately 5 m of water. Projected flow-through of seawater for the secondary cooling system is 1,200 m³/hour (5,280 gpm), via a network of four submersible pumps, three of which will be in operation at any time.

The seawater cooling water will only circulate between the heat exchange plates, and is thus considered to be “non-contact” water in terms of suitability for discharge to the environment. Used seawater from the cooling system will be routed into an open concrete culvert through the rock revetment along the western edge of the quay (Figure 3.7), to allow additional cooling of the water prior to its return to the sea. The table below shows projected seawater temperature changes associated with the cooling water system.

Table 3.3 –Seawater Cooling Water Projected Temperatures

Seasonal Seawater Temperature Range (= T at Heat Exchanger Inlet)	Seasonal Projected Temperature Range at Heat Exchanger Outlet / Stormwater Canal Entry	Maximum ΔT at Heat Exchanger Outlet / Stormwater Canal Entry	Maximum ΔT at Stormwater Canal Exit / Seawater Return Point
25–32 °C	33–45 °C	8–13 °C	≤3°C

Source: GB Group

As shown in the table above, it is expected that returning seawater from the cooling system will have a minimal increase in temperature above ambient (incoming) seawater temperature, and thus is not expected to significantly affect the marine environment.

The estimated daytime power generation scenario has eight generators running simultaneously. This runtime configuration provides for programmed downtime to servicing other generators as needed and a buffer capacity should the demand load increase. During nighttime hours, electrical demand is expected to be much lower, thus a maximum of 3 generators is anticipated to be running simultaneously.

In the extreme event of total loss of primary power systems, backup generators and batteries will provide power for critical process system loads and the data center.

3.1.11 Power Distribution

The power plant will supply electrical power to the port; moored vessels are expected to use their own on-board power supplies while in port. Electrical power for lighting and industrial use at the LIFZ will be provided by the Project's dedicated power plant. Electricity will be available around the clock, seven days/week, and electrical use by tenants will be monitored via meters installed in each of the industrial space buildings. Tenants will be billed monthly for their electrical use.

Nighttime security lighting will also be provided via a street light system of concrete light poles placed at strategic locations around the port and LIFZ.

GB Group intends to sell excess electrical power to offsite consumers. To that end, GB Group has entered into long-term power supply contracts with several nearby industries, including Citadelle (adjacent to Port Lafito), LMH in Lafiteau, Topline in Titanyen, and CINA in Fond Mombin. The Project currently estimates that these two clients will demand 4.5 Mw of power annually, or approximately 18 % of Project power plant output. The table below presents estimated power demands by Project component.

Table 3.4 – Estimated Electrical Power Demands by Project Component/User

Component/User	Electrical Demand, MW
Port Lafito	1.5 (peak load)
LIFZ	6 – 7 (average expected load)
Citadelle	4.5 (average)
LMH	3.5 (average load)
Topline	1 (average load)
CINA	3.5 (peak load)
Local utilities	<0.5
Estimated Total:	21.5

Source: GB Group

A system of medium-voltage 13.8 kV power lines will be installed in the right-of-way along existing paths and roads to provide power from the power plant to these industries. Power distribution poles will be made from pre-stressed concrete, and will be 12.2 m (40') tall, with metal cross arms. The size and type of cabling used in the power distribution network will be determined based on consumer demand and location. Figure 3.1b shows the currently envisioned power distribution network within the Project perimeter and off site.

Shared Utilities

3.1.12 Water Supply and Distribution

The Project will use surface water resources to supply industrial and domestic water needs. Water will be pumped from two nearby perennial streams in Simonette and Source-Matelas and transported via pipeline to the water retention pond. Water from the perennial stream in the nearby community of Simonette is impounded by an existing low-head dam in the community, which the Project is improving to maximize water retention. Up to 28.4 liters per second (450 gallons per minute - gpm) of water impounded by the downstream low-head dam will be pumped over

an approximately 2.5 km-long pipeline from Simonette Stream to the water retention pond, where the water will be stored until needed by the Project. The port alone will use ≤ 100 gallons per day.

The Project is also in the process of negotiating an agreement with CINA that will allow future withdrawal of water from the stream running through Source-Matelas; both streams are shown in Figure 3.1a. The planned intake on this stream is at the downstream outlet of the concrete basin CINA has already installed on the stream and which CINA is currently using to supply operations water to its Portland cement facility. There are currently no water users located downstream of the planned water intake on the Source-Matelas stream – the water flows from the CINA-constructed basin downstream for approximately 400 m directly into the sea. Additional details about the existing surface water retention structures on both streams are presented in Section 4.1.6.1 (surface water resources baseline).

Water supply pipelines from both surface water intake locations are expected to be constructed from 15 cm (6") diameter HDPE pipe. Pipelines will be buried and are expected to run along existing road right-of-ways.

The 45,425 m³ (12 million gallon) water retention pond will supply the Project with potable water, sanitation water, and fire protection water, and is lined with 60 mil high-density polyethylene (HDPE) with a concrete overlay. Currently the water retention pond is storing stormwater runoff and direct precipitation; this water is being used for dust control activities during construction.

The table below provides the calculations used by GB Group to determine estimated water needs for full Project occupancy. Process water needs are assumed to be negligible as the freshwater used in the high-temperature cooling circuit for the power plant is make-up water only, and fresh water for the fire water system will be pumped as required from the water retention pond.

Table 3.5 – Project Water Supply Assumptions

Activity	Activity Water Use Assumptions	Estimated Daily Water Demand
Commode use	6.8 L/flush, 3 visits/shift	408 m ³
Hand washing	1.9 L wash, 3 visits/shift	114 m ³
Drinking water fountain	2.8 L/visit, 1 visit/shift	56 m ³
Food preparation	Daily	19 m ³
Cooking cleanup	Daily	38 m ³
	Total daily water demand	635 m³
	Daily demand as flow rate per 8-hr shift	1.32 m ³ /min (22.1 L/sec)
	Pump rate to fill tank (24-hour)	7.3 L/sec (22.2 gpm)

Source: GB Group

Potable water for Project needs will be produced via reverse osmosis (RO) treatment at a small RO plant located adjacent to the water retention pond. Treated potable water will be stored in a 757 m³ (200,000 gal) steel tank, and delivered via buried pipeline from the potable water tank located next to the water retention pond. Potable water will be available in drinking water fountains in all LIFZ buildings, in the LIFZ cafeterias for cooking and dishwashing use, and in restroom sinks.

Water for the fire protection system and for use in Project toilets will be provided by a separate water treatment system, also drawing from the water retention pond. This second system will only remove Total Suspended Solids (TSS) from the water, producing a non-potable product that will not foul equipment such as pumps during use. The non-potable and fire protection water supply system is capable of delivering up to 0.06L/sec (8 gpm) of minimally treated water on demand.

3.1.13 Wastewater Treatment System

The Project's wastewater treatment system is built around an expandable package wastewater treatment plant system. Wastewater from restrooms will report to a

package wastewater treatment plant. At full build-out and occupancy of the LIFZ, the Project envisions installation of five package wastewater treatment plants located near the shoreline to the southeast of Port Lafito, along a strip of land owned by GB Group and earmarked for potential future quay expansion. Siting the wastewater treatment plants in this location allows wastewater to be conducted to the treatment plants via gravity flow. Treated wastewater produced by the package plants will be used for irrigation of Project landscaping while inert septic system sludge will be vacuum-extracted and disposed of in a suitable nearby landfill.

3.1.14 Solid Waste Collection

To the extent practical, the Project will reduce the generation of waste materials and byproducts. Any waste materials generated will be considered for recycling prior to disposal. Posted waste storage and recycling areas for non-hazardous and hazardous waste materials will be designated in various locations around the Project site. Hazardous waste generation is expected to be minimal, and restricted to common types of industrially generated hazardous waste, such as fluorescent light bulbs, oil-based paint containers, lead-acid vehicle batteries, decreasing and chlorinated solvents, and vehicle fluids (engine oil, spent antifreeze, etc.). Section 3.1.20-3.1.21 provides details on projected waste streams and off-site disposal.

3.1.15 Stormwater Management

Stormwater will be collected in sedimentation basins and discharged to the ocean via drainage swales.

3.1.16 Fire Protection System

Water for the fire protection system will be sourced from the potable water tank at the RO plant located adjacent to the water retention pond. The fire protection system will be capable of providing up to 63 l/s (1000 gpm) of water at 8 bars of pressure (approximately 100 psi) over a period of 10 hours, via a buried pipeline network connecting the potable water tank to port, LIFZ, and power plant infrastructure components. In addition, fire detection with embedded alarms systems will be installed at the engine hall, switchgear room, control room, Administration building, warehouse, and workshop. These systems will be powered

by battery packs and inverter systems. A primary electric motor-driven firefighting pump located in the engine hall will be supplemented by a diesel engine firefighting pump for additional capacity or as a contingency system in the event of loss of electrical power.

Additional fire-suppressant systems are also included including foam units installed throughout the engine hall, a CO₂ extinguisher for the power plants switchgear and control rooms. Fire hydrants, hoses, and nozzles will be located strategically across the Project. Fire extinguishers appropriate to the working environment at each location will be located in all Project buildings according to NFPA code.

3.1.17 Health Services

Health clinics to serve the workers at the power plant and the LIFZ are currently in the planning stages. Clinics will be sized per Haitian labor laws that dictate the number of healthcare workers required based on number of employees:

- 50-200 employees: 1 nurse
- 200-500 employees: 2 nurses
- 500+ employees: 3 nurses

Mancamp

During construction, single-status expatriate employees of GB Group and power plant workers will be housed in the Project's mancamp. The mancamp is located adjacent to the water retention pond (Figure 3.1a) and will have a total capacity of 35 people.

The mancamp has a large attached kitchen with capacity to feed in excess of 100 people, open to mancamp residents and other Project workers on a pay per meal basis, seven days per week.

A separate potable water filtration system will be installed to provide drinking water, cooking water, and personal hygiene (bathing, handwashing) water to the mancamp. Prior to installation of the water filtration system, water for the

mancamp is being trucked in and bottled water is being supplied to the kitchen for cooking.

Wastewater from mancamp restrooms and from the cafeteria and kitchen is currently being captured in septic tanks which are periodically vacuum-extracted for disposal in an appropriate landfill by a licensed contractor. Prior to the completion of construction phase, a package wastewater treatment plant will be installed at the mancamp.

To the extent practical, generation of solid and organic wastes is minimized, and any produced wastes are attempted to be recycled; any remaining wastes are collected by a local provider and transported to a nearby licensed landfill.

Supply, Handling, and Storage of HFO, Diesel, and Lubricating Oil

Materials and consumables used by the power plant will be imported through Port Lafito and transported to the power plant via truck from suppliers in other parts of Haiti and the Dominican Republic. The table below presents the annual consumption of raw materials that will be used at the power plant at its current design capacity.

Table 3.6 – Estimated Annual Consumption and Storage of Raw Materials

Material	Use	Physical State	Annual Quantity	Storage	Transport Mode
Diesel	Fueling, power plant generator start-up	Liquid	900 barrels	1,600 barrels (tank)	Truck
Heavy Fuel Oil (HFO)	Power plant generators	Liquid	100,000 barrels	22,000 barrels	Ship
Lubricating Oil (LO)	Generator and heavy equipment maintenance	Liquid	51,000 gal	10,000 gal (tank)	Truck

Source: GB Group

Depending on the commodity, the storage capacity on site ranges from one to three months.

Two above-ground storage tanks with a total capacity of 2,981 m³ (25,000 barrels) will provide more than one month of fuel at full power plant capacity. Two additional 190m³ (50,000 gallon) tanks will be heated and used for HFO settling and for HFO daily service. All tanks will be located in the tank farm at the power plant (Figure 3.7).

Diesel fuel oil will be required for the emergency (black start) generators, vehicles, and LIFZ mobile equipment. One storage tank of approximately 190m³ (50,000 gallon) will be located in the power plant tank farm area, equivalent to approximately 4 months of operations.

Lubricating oil will be stored in a 38 m³ (10,000 gallon) above-ground storage tank located in the tank farm.

All tanks will be of conventional design, contained within a confined concrete banded area capable of storing at least 110% of the volume of the largest tank, and will include fire protection facilities.

Aggregate/Rock Source

Several small hills within the property boundary were leveled as part of general earthmoving activities required for Project construction. The limestone rock from these hills was used for construction and aggregate at various Project components.

Environmental Discharges during Operations

The following subsections present information on the environmental discharged produced by the Project during operations. For significant sources of air emissions, the proposed controls are also discussed.

3.1.18 Power Plant Emissions

Under the operating scenario presented in Section 5.1.3, main stack emissions gasses are expected to be NO₂, SO₂, PM_{2.5}, and PM₁₀. Based on preliminary emissions modeling results, the Project increased stack height from the originally planned 12.2 m (40') to 24.4 m (80'). GB Group has also committed to using 1% S HFO, the lowest sulfur content HFO locally available. Emissions monitoring will be via periodic monitoring at nearest receptors using portable equipment; no emissions controls or monitoring systems will be installed in the stacks. Results of the emissions modeling are discussed in the air quality impact assessment, Section 5.1.3.

3.1.19 Noise

The Project is designed to operate primarily during daylight hours, on standard workweek days; the exception is the port, which could operate at night if a ship arrived. The power plant will operate 24 hours per day, 365 days per year, but the maximum number of generators in use at any given time is expected to be eight in the daytime and three at nighttime. Therefore, the Project is generally expected to generate less noise during nighttime and weekend hours.

Major sources of noise are as follows: cargo unloading, loading, and transfer activities at the port; and manufacturing activities at the LIFZ; and generator engines in the power plant. Most of the noise sources are continuous and stable, except for those associated with cargo handling at the port. Noise modeling was conducted for the port and power plant, assuming harbor cranes were running 50% of the time and auxiliary power units for docked ships were running 24 hours/day; power plant noise assumptions were based on the operating scenario presented in Section 5.1.3. Noise modeling results are discussed in the noise impact assessment in Section 5.1.4.

3.1.20 Liquid Effluents

Process effluents from the Project will include primarily treated sanitary wastewater. The Project will recycle or reuse as much of this effluent as possible as or landscape irrigation water. The treated wastewater will be disinfected and used

for irrigation of the landscaping in and around the Project. Stormwater will be routed to the stormwater collection system, where it will pass through a series of stilling basins prior to discharge to the sea. Runoff from the maintenance buildings in the power plant area will be routed through an oil-water separator prior to joining the main stormwater collection system. Thermal discharges are discussed associated with seawater use in the low-temperature cooling system for the power plant, as discussed in Section 5.1.3.

3.1.21 Solid Wastes

Waste management will be provided for Project operations waste as well as non-process waste. Other waste materials include industrial/construction waste, domestic/office waste, and hazardous waste. Waste materials will be classified based on their need for special handling, and specific handling and management strategies for wastes will be detailed in the Project's Waste Management and Disposal Plan. The following presents a summary of the waste management plans and concepts for the Project. The waste management at the Project will seek to:

- Reduce waste generation at source
- Maximize re-use within the Project and recycling
- Practice safe management of non-reusable and non-recyclable wastes

These goals will be accomplished by:

- Incorporating specific design criteria into the planning of the Project and prior to commencement of construction activities
- Incorporating waste management requirements in equipment specifications
- Reusing/recycling excess and waste materials
- Storing and disposing of waste materials in an appropriate manner
- Instituting management controls for these programs

3.1.21.1 Identification of Waste Streams

The Waste Management Plan will cover waste streams that may be generated during the construction and operational phases of the Project. These waste streams include:

- Industrial wastes (inert wastes such as plastic, glass, and construction materials)
- Domestic (organic) wastes (kitchen wastes, food and plant material, decomposable refuse)
- Hazardous wastes (e.g., waste oils, used automotive fluids, fluorescent light bulbs, oil-based paint containers, chemical containers, and medical wastes)

Management of each waste stream is discussed in the Waste Management Plan.

3.1.21.2 Solid and Hazardous Waste Management

Waste disposal facilities at the Project will include the following:

- Industrial waste facility
- Recycling areas
- Domestic (organic) facility

Waste reduction, recycling, and reuse of materials will be done to minimize refuse volumes for disposal in waste facilities.

The Project's Waste Management and Disposal Plan describes procedures, systems, equipment, and structures specific to waste management and disposal. Waste generation should be limited at all levels of Project management and operations to decrease the volume of waste generated and make waste disposal more manageable. The plan also defines who is responsible for developing and implementing the plan and what records and reporting will be required. Adjustments will need to be made to this plan as changes occur during Project operations. GB Group will consider appropriate national and international legislation in the design and management of all waste facilities.

Non-processing wastes generated onsite will include general kitchen and accommodations waste, office debris, industrial wastes from LIFZ and port facilities and the maintenance shop, and other wastes. Recycling of non-organic and office debris will be practiced to the extent practical, including working with local small and medium enterprises (SMEs) to develop recycling opportunities. Office and

domestic-type waste will be disposed of in an appropriate landfill such as the Trutier landfill. Treated and inert sewage sludge from the wastewater treatment plants will be disposed of in an appropriate landfill such as the STP landfill.

A temporary on-site storage area will be developed for potentially hazardous wastes. Hazardous waste is a waste that is ignitable, corrosive, reactive, toxic, acutely hazardous, or otherwise regulated as a special category of waste. Hazardous wastes will likely include batteries, oil, greases, engine coolant, solvents, empty petroleum and reagent drums, carboys, and pails. Hazardous waste materials will be handled and temporarily stored in a dedicated, secure facility to be described in the Waste Management Plan consistent with the WBG/IFC EHS guidelines. Hazardous materials will be transported to a designated and duly permitted hazardous waste landfill in Haiti.

Workforce

GB Group employees are categorized based on their permanent residence, according to the following structure:

- Expatriates – Non-Haitian employees – skilled labor
- Regional-locals– Employees who live outside of the Source-Matelas Communal Section
- Local-locals – Employees who live within the Source-Matelas Communal Section

Expatriate employees will work a rotation of 6 weeks on and 1 week off. All expatriates will be accommodated in single persons' quarters in the mancamp while on-site. GB Group is committed to maximizing the number of local employees hired by the Project, both as direct GB Group hires and by LIFZ tenants. To that end, people living within the social Areas of Influence (AOI) will be given preference for consideration of employment, with the goal of hiring as many unskilled labor as is practicable based upon ability. Where special skills are required for a particular job which are not available within local-local applicant pool, consideration will be extended to first regional-local applicants, then to expatriates.

During the construction phase, the Project will require at peak a workforce of approximately 169 people; of this total, 25% (43 workers) are skilled expatriates. The remaining 75% (126) are Haitian workers, 31% (40 workers) are from the Source-Matelas Communal Section communities, representing about 24% of the total construction workforce. GB Group's Human Resources department maintains detailed records of these employment (and other) statistics.

Table 3.7 - Peak Construction Employment

	Expatriate Workforce (skilled)	Regional Local Workforce	Local Workforce	Total Workforce
Project Total	43	86	40	169

Source: GB Group

During operations, GB Group plans on directly employing a workforce of about 143 across the Project. To the degree practical, GB Group will preferentially hire Haitians, with first preferences going to people in the communities included in the Source-Matelas Communal Section (Aubry, Lafiteau, Simonette, Source-Matelas, St. Gerard, and Titanyen) then moving increasingly farther from the Project site to include people in the rest of Cabaret Commune, then expanding to include Port-au-Prince and the rest of Haiti as applicable for specific job requirements. The table below summarizes GB Group's forecasted operational employment for positions directly within its control.

Table 3.8 – Forecasted Operational Employment – GB Group Employees

Project Component	Expatriate Workforce (skilled)	Haitian Workforce	Total Workforce
Port Lafito	17	31	48
LIFZ	0	65	65

Power Plant	10	20	30
Totals:	<i>27</i>	<i>116</i>	143

Source: GB Group

The average work week in Haiti (Monday to Saturday) is 44 hours, consisting of five 9-hour days Monday-Friday including a 1 hour lunch break, and half a day on Saturday (4 hours) with no break. By law, the hours of actual work may not exceed 10 hours per day or 48 hours per week.

4.0 Environmental and Social Baseline

A survey of the existing conditions in the Project area was conducted to define the environmental and social baselines. Data were compiled for the following components:

- Climate and meteorology
- Air quality and noise
- Topography
- Geology
- Soil
- Water resources
- Terrestrial flora and fauna
- Marine environment
- Demographics
- Living conditions
- Education and productive undertakings
- Services
- Agriculture and land tenure
- Socio-political organizations

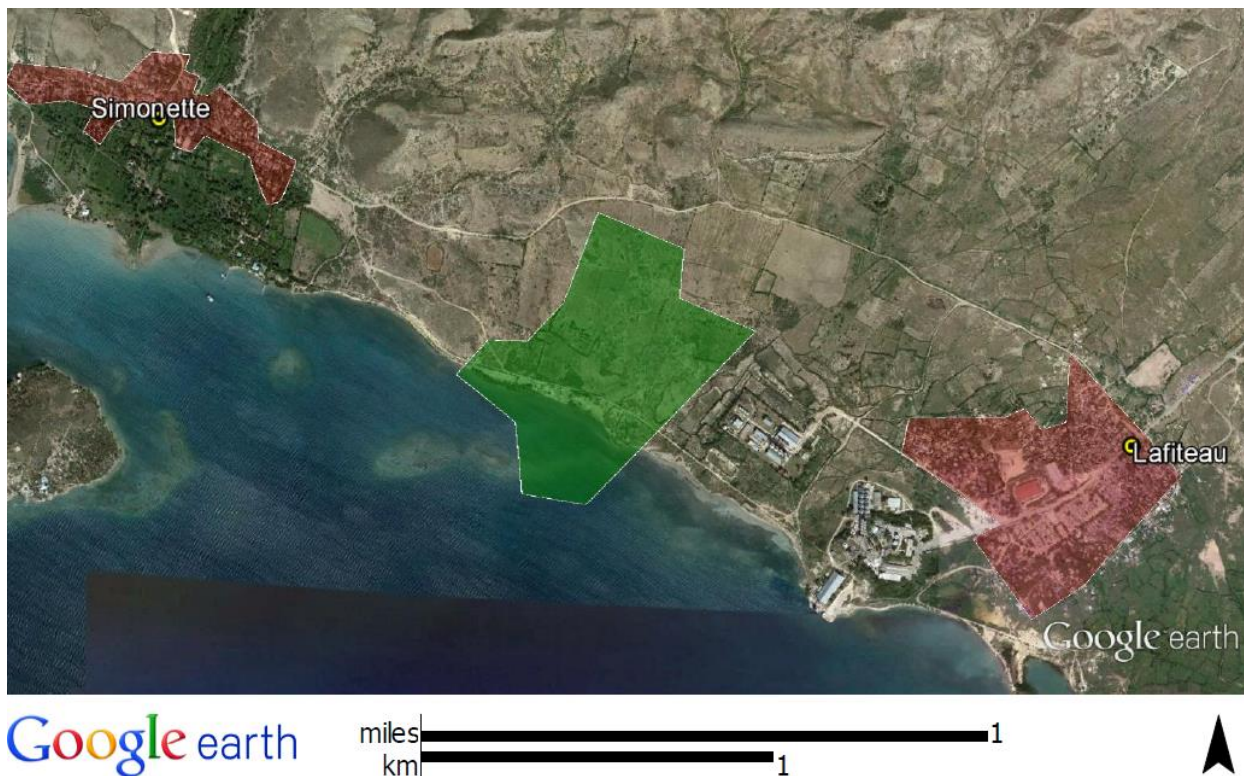
The environmental portion of the field research was conducted by Natural Resources Engineering Company (NRE) from June 24 - 30, 2014, primarily via quantitative methods. AECOM Environment has completed a supplemental air quality baseline assessment in June 2015. A marine assessment was completed in October of 2014, also by Earthtech Engineering Limited (ETEL). The social portion of the field research was conducted by ETEL from June 9 - 30, 2014, utilizing both quantitative and qualitative research methods to collect data from surrounding communities. A supplemental study of artisanal fishermen was completed by ETEL in May of 2015 as part of this ESIA.

Field investigations included noise monitoring, water quality sampling, and biological field studies, as well as stakeholder consultation activities, primarily associated with questionnaires and opinion censuses. Figure 4.1 (in the Figures

section of this ESIA) shows the environmental baseline sampling points from the 2014 NRE study.

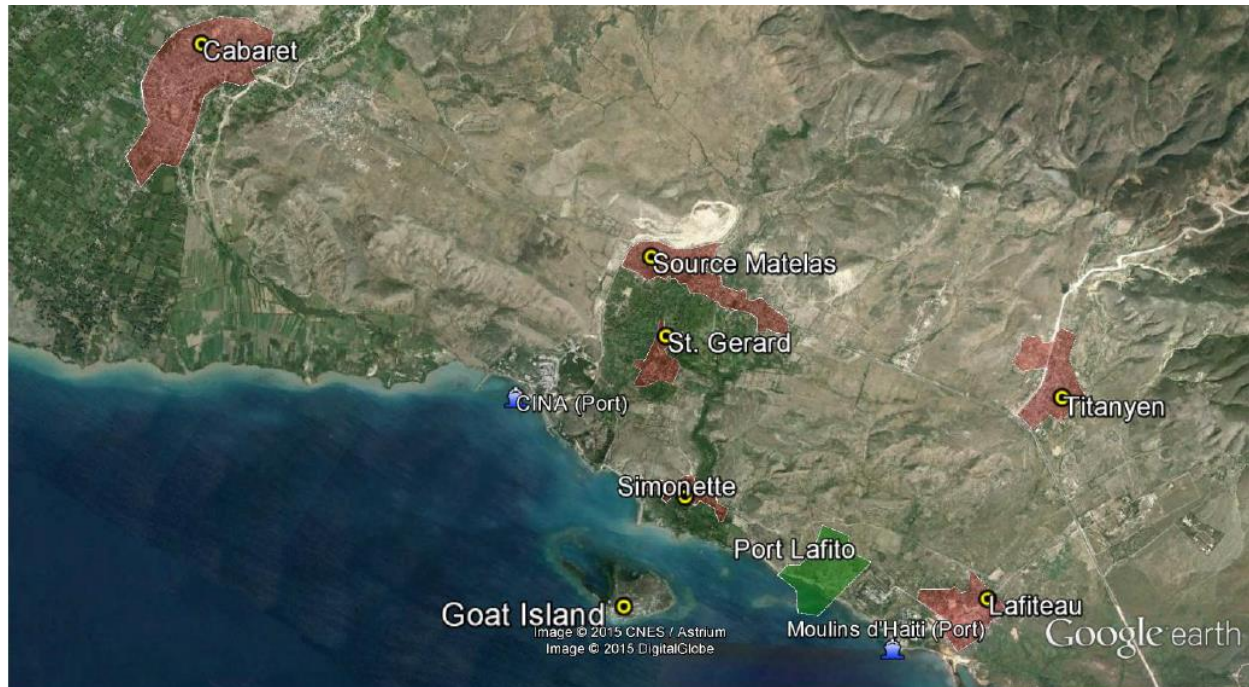
The Project's original baseline study area for all environmental parameters included the Port Lafito project footprint area, extending along the Port-au-Prince Bay coastline and inland as shown by the green area in Graphic 4.1, below.

Graphic 4.1 – Environmental Baseline Study Area



The social baseline study area focused on the neighboring communities of Simonette, St. Gerard, and Lafiteau and extended inland to the towns of Titanyen and Cabaret on National Route 1 – see Graphic 4.2 below.

Graphic 4.2 – Communities in Social Baseline Study Area



Google earth

miles
km3
5

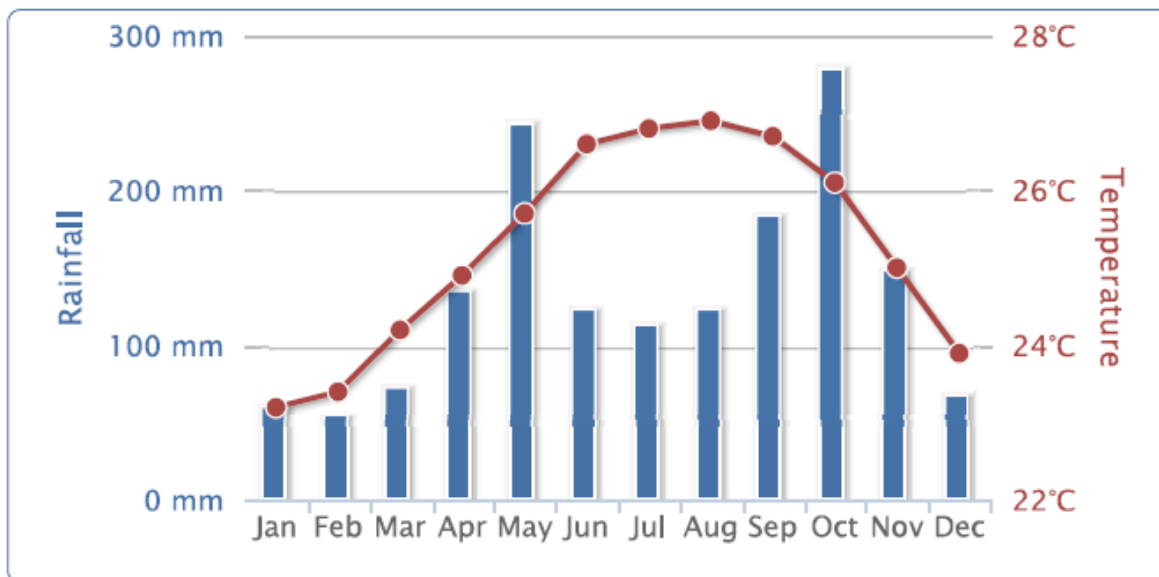
Source: Modified from NRE, 2014

Environmental Baseline

4.1.1 Climate and Meteorology

Haiti's climate is characterized as tropical savannah, with pronounced wet and dry seasons and sustained high temperatures. In contrast to the rest of the country, western Haiti has a semi-arid tropical climate, due to mountains in the eastern part of the country intercepting northeasterly moisture-bearing winds. The country has two rainy seasons, lasting from approximately April-May and from September-November, interspersed with drier months. Graphic 4.3 presents average monthly temperatures and rainfall calculated over a 19-year period from 1990-2009 for the country as a whole. The two rainy seasons can be clearly distinguished in the graphic.

Graphic 4.3 – Average Monthly Temperature and Rainfall for Haiti, 1990 - 2009

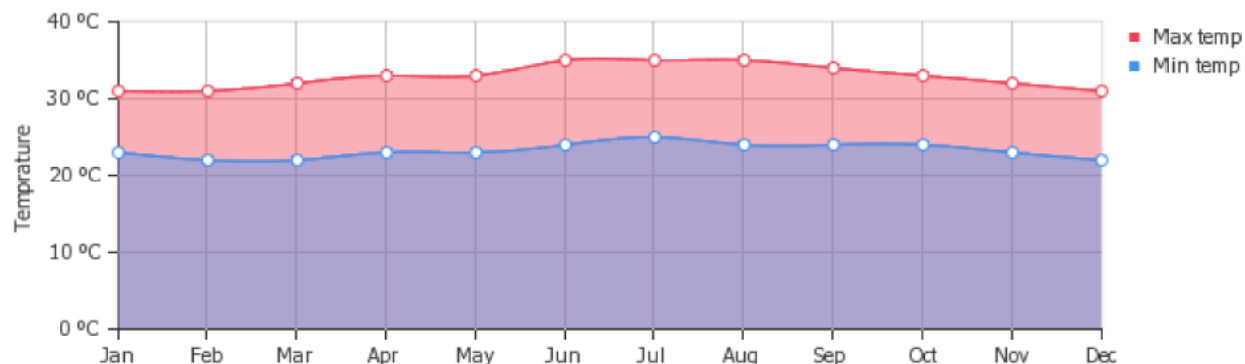


Source: World Bank Climate Change Knowledge Portal; data from Climate Research Unit, University of East Anglia

The Ouest Department (which includes the Project area and the capital city of Port-au-Prince) has high temperatures year-round (Graphic 4.4) and receives some of the lowest precipitation levels in Haiti, with Port-au-Prince receiving an average of 1370 mm of rainfall per year (Graphic 4.5).

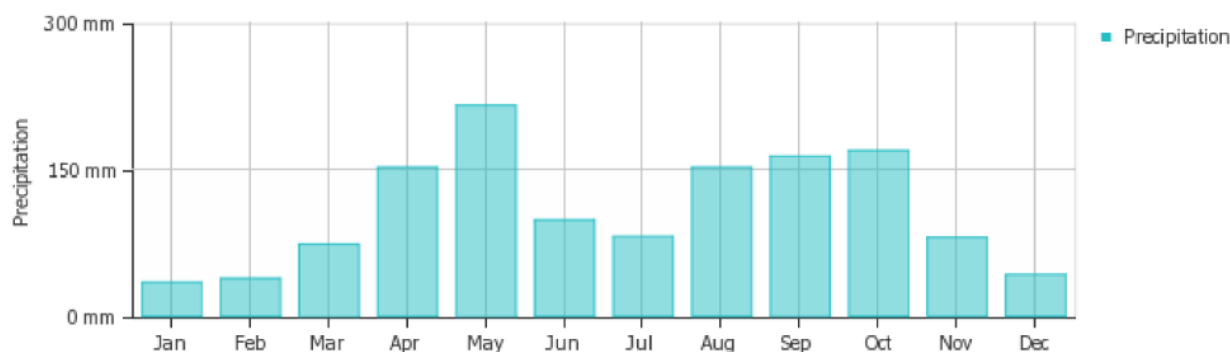


Graphic 4.4 – Average Minimum and Maximum Temperatures, Port-au-Prince



Source: weather-and-climate.com

Graphic 4.5 – Average Monthly Precipitation, Port-au-Prince

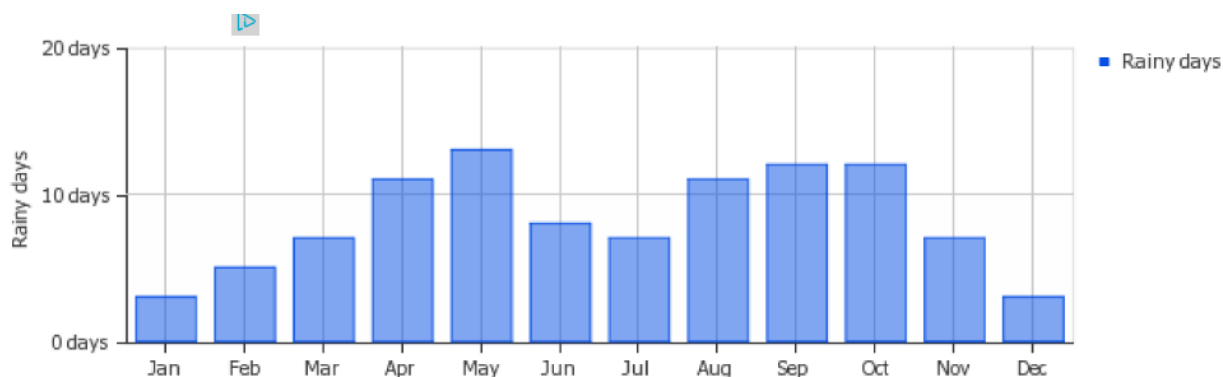


Source: weather-and-climate.com

Graphic 4.6 presents the average number of days with rain per month, with May being having the highest number of rainy days, followed by September and October. Mean monthly relative humidity for the general Project region remains over 40% year-round, and peaks during the months of the two rainy seasons (Graphic 4.7).

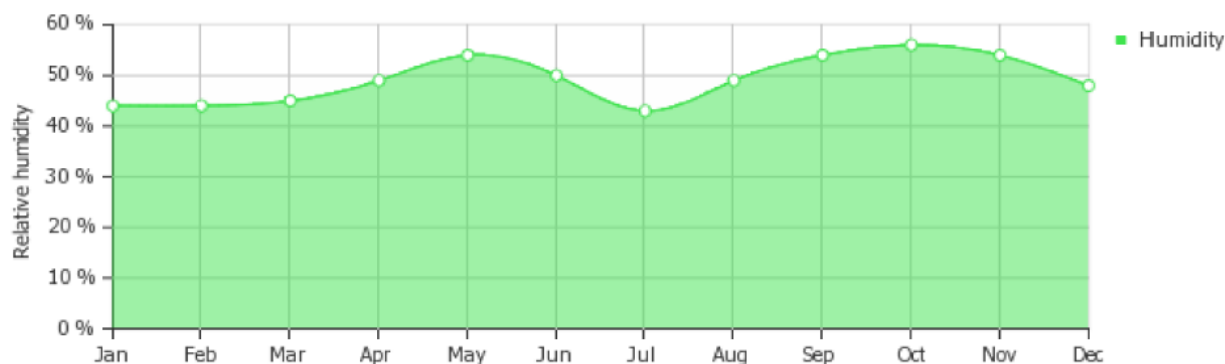


Graphic 4.6 – Average Number of Days with Rain per Month, Port-au-Prince



Source: weather-and-climate.com

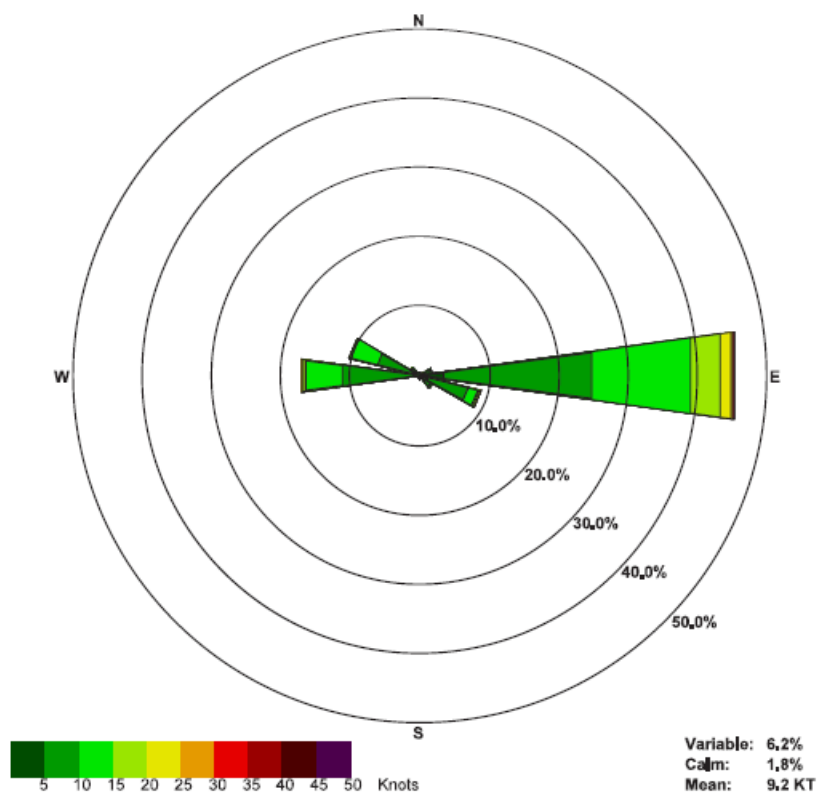
Graphic 4.7 – Mean Monthly Relative Humidity, Port-au-Prince



Source: weather-and-climate.com

Trade winds in the tropics of the northern hemisphere (latitudes between 23.5° N and the equator) blow consistently year-round from the northeast, generally at a speed of between 15-25 knots. Graphic 4.8a presents a wind rose showing the average direction of origin, frequency, and speed of winds for the Port-au-Prince area during the 10-year period of 2000-2009.

Graphic 4.8a – Average Annual Wind Speed and Direction, Port-Au-Prince, 2000-2009

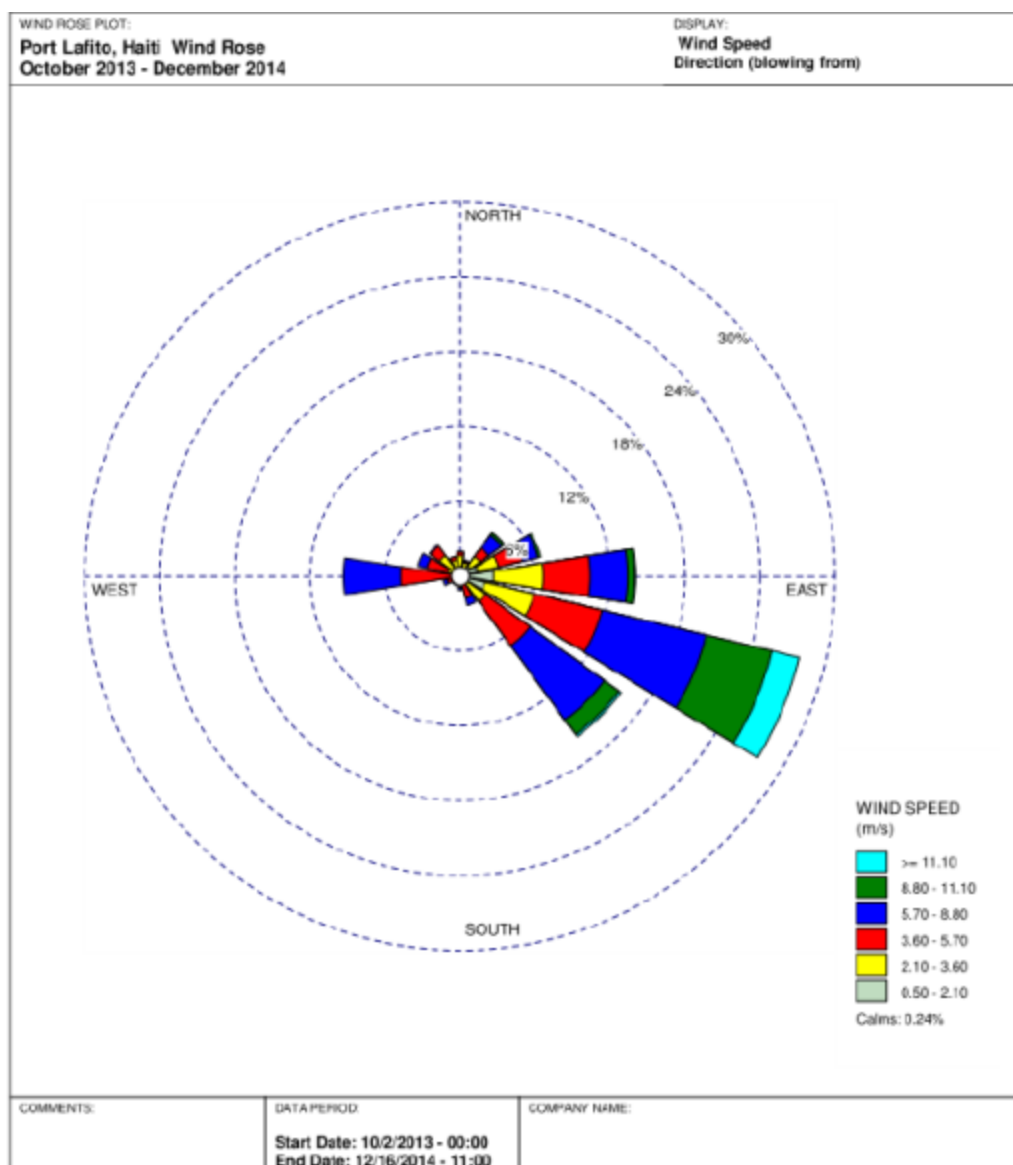


Source: <http://www.ncdc.noaa.gov/oa/haiti/784390-wind.pdf>

Graphic 4.8b presents a site-specific wind rose showing the average direction of origin, frequency, and speed of winds in the port area prepared as part of a supplemental air quality baseline report for the current ESIA.



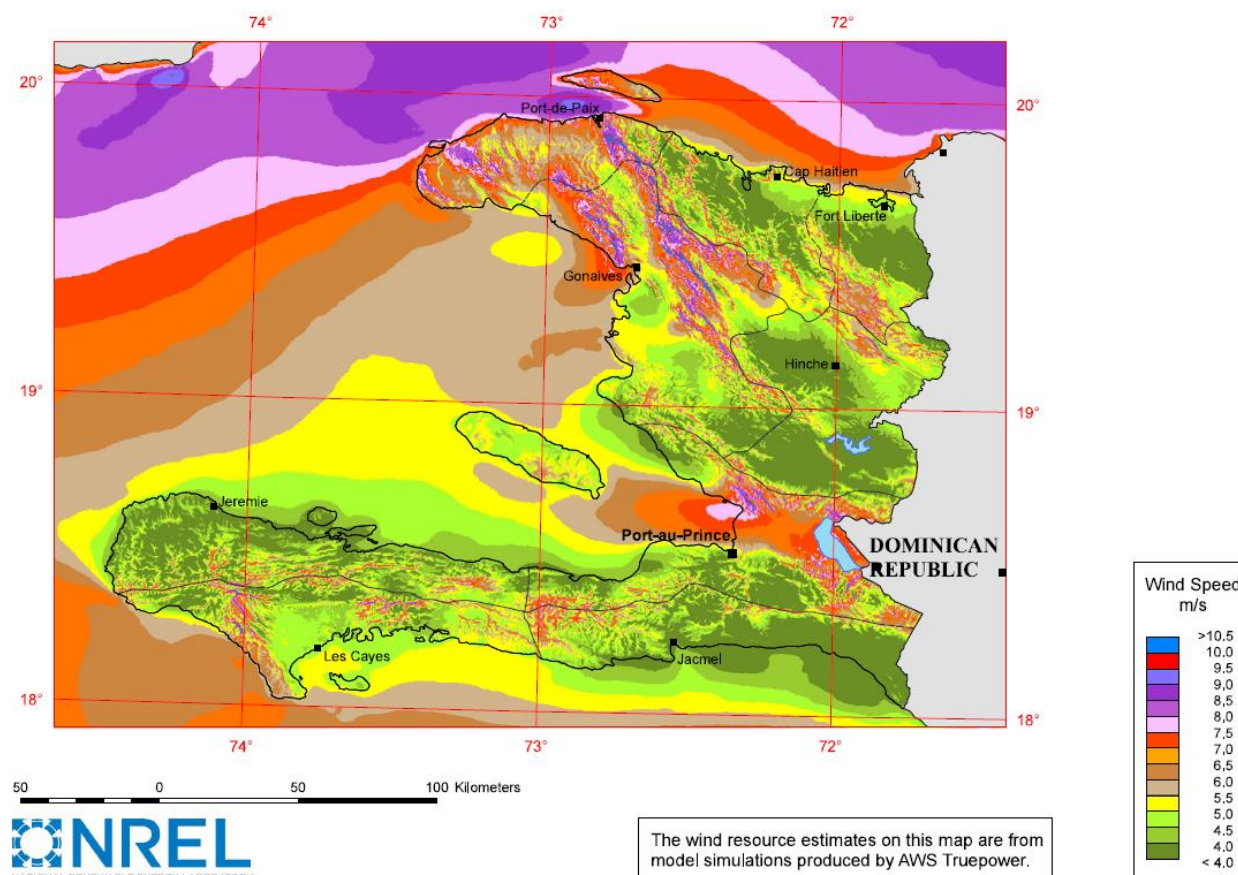
Graphic 4.8b –Wind Speed and Direction, Port Lafito



Source: AECOM, 2015a

In Haiti, mountain ranges in the eastern part of the country tend to block the flow of the trade winds, as can be seen in Graphic 4.9. Areas of lower wind speed are shown in yellow and green in the graphic, whereas areas where the trade winds' flow is unimpeded are in blue, red, and orange.

Graphic 4.9 – Annual Average Wind Speed at 80 m, Haiti



Source: National Renewable Energy Laboratory

Periodic droughts and tropical storms are common in the country. During the 20th century (GoH, 2010) indicates droughts occurring in 1923-24, 1946-47, 1958-59, 1966-68, 1974-1977, 1981-1985. Prolonged droughts have resulted in significant attendant declines in agricultural productivity, with resulting impacts to food security and periods of famine.

Hurricane season lasts from approximately June through November. Between 1900 and 2009, 15 hurricanes made landfall over Haiti. 2008 was a particularly devastating year as 4 successive storms (Fay, Gustav, Hanna, and Ike) hit the country, causing widespread loss of life, property, and crops. The Caribbean region

in general is subjected to alternating “active” and “quiet” phases of 25 to 40 years each for tropical storms and hurricanes; according to the U.S. National Hurricane Center, Haiti is currently 15 years into an “active” phase.

4.1.2 Air Quality and Noise

2014 Baseline Program

Baseline air quality and noise measurements were taken by NRE from June 23rd to June 27th, 2014 at two different locations: PLA-1 and PLA-2 (see Figure 4.1). PLA-1 is near the center of the Phase 1 construction site and was selected to measure potential impacts to ambient air and sound quality from construction-related activities. PLA-2 was chosen to measure the background air and sound quality and used as a comparison to the data obtained from PLA-1. Because the monitoring equipment needed to be set up in a secure location, PLA-2 was sited on Lafito Global property 800 m north of the port adjacent to the water retention pond, and thus was expected to be relatively unaffected by the construction in the port area.

Test parameters were selected based on the IFC’s EHS Guidelines (p. 31), and included ambient noise levels, sulfur dioxide (SO₂), nitrogen dioxide (NO₂), particulate matter, carbon monoxide (CO), and ozone (O₃). Particulate matter was further subdivided to measure inhalable coarse particles (PM₁₀ - defined as particles with a diameter of < 2.5 microns but > 10 microns) and fine particles (PM_{2.5} - particles with a diameter of < 2.5 microns).

Air particulate matter was measured with a data logging TSI Dust Trak II air sampler. The meter measured the particulate matter in the ambient air every 60 seconds for the duration of each test. A total of 2,593 data points were collected during the four days of recording.

Measurements were recorded in milligrams per cubic meter (mg/m³) for PM₁, PM_{2.5}, PM₁₀, and Total PM size fractions. Figures 4.2a and 4.2b show PM levels measured during the 2014 sampling for points PLA-1 and PLA-2, respectively. Raw sampling data is in the Expanded Analytical Report included in the 2014 ESIA Appendices.

NRE also measured CO, SO₂, and NO₂ levels using a data logging Rae VRae meter. The machine was set up to measure the ambient air every 60 seconds for the duration of each test. Over the course of four tests covering four days a total of 1,863 data points were recorded, however no concentrations of CO, SO₂, or NO₂ were detected (Table 4.1).

Table 4.1 –2014 Baseline Air Quality Data, µg/m³

Parameter	WHO Guideline, µg/m ³	PLA-1	PLA-2
PM ₁	n/a	3	15
PM _{2.5}	10 (1-year)	5	17
PM ₁₀	20 (1-year)	7	18
CO	10,000	0.0	0.0
NO ₂	40 (1-year)	0.0	0.0
O ₃	100 (8-hour daily max)	0.02-0.05	0.02-0.05
SO ₂	20 (24-hour)	0.0	0.0

Note: PM values in table are 8-hour time-weighted averages

Source: Adapted from NRE, 2014

2015 Supplemental Baseline Program

AECOM was contracted by the Project to provide a supplemental air quality baseline, and had a team on site conducting PM, NO₂, and SO₂ measurements at four locations across the Project site from May 9th – 16th, 2015 (Graphic 4.10). The data from the supplemental baseline are included in this baseline section and were used in the Dispersion Model (Appendix B, also completed by AECOM) for impact assessment and mitigation/management planning. Unlike the 2014 baseline, the 2015 supplemental baseline used continuous air monitoring devices to record data for particulate matter, NO₂, and SO₂.

Graphic 4.10 – 2015 Supplemental Air Quality Monitoring Locations



Source: AECOM Environment, 2015b

In general, daily ambient particulate concentrations were slightly elevated above night time concentrations throughout the monitoring program, potentially due to a combination of site activity (construction vehicles), lack of ground cover and local weather (i.e. high temperature, moderate wind speeds, and lack of precipitation during the monitoring period).

A review of the 24-hour average particulate data revealed that there were several daily averages that exceeded the World Health Organization (WHO) standards for PM_{10} and $PM_{2.5}$. However, these averages could potentially be biased high given that they were calculated using less than 24 values worth of data due to the program startup/shutdown times; calibration checks; and instrument maintenance. In addition, the WHO standards for PM_{10} and $PM_{2.5}$ are the 99th percentile value per year. That is, 99 percent of the PM_{10} and $PM_{2.5}$ concentrations are to be below their respective standard over the course of one year. Since this was a short-term

program, the calculated 24-hour averages are not directly comparable to the WHO standards.

During the monitoring program there were samples that had measured results for SO₂ and NO₂ concentrations above the laboratory reporting limit for several of the measurement days. However, a review of the measured concentrations indicated that none of the SO₂ or NO₂ measurements exceeded the World Health Organization (WHO) standards.

The results of the 2014 and 2015 air quality analysis indicate that for the parameters that were able to be measured, air quality in the Project area is generally good, with levels of parameters of concern below guideline values.

Noise Monitoring

On-site noise monitoring was done using a SoundPro DL data logging machine as part of the 2014 baseline; it should be noted that both of these monitoring points are within the Project's footprint (Figure 4.2) and thus are not indicative of noise conditions at offsite receptors. Noise Monitoring Test 1 was conducted at PLA-1 between 18:00, Monday, June 23 and 17:00, Tuesday, June 24. Noise levels ranged between 42 and 70 dB with a 90% exceedance level of 49.0 dB, a 10% exceedance of 58.8 dB, and a median level of 55.2 dB. Noise Monitoring Test 2 was conducted at PLA-2 between 8:00 and 15:00 on Thursday, June 26. Noise levels ranged between 49 and 68 dB with a 90% exceedance level of 54.0 dB, a 10% exceedance of 59.6 dB and a median reading of 56.2 dB. According to the IFC's Noise Level Guidelines for industrial and commercial areas, daytime (07:00 – 22:00) and evening (22:00 – 07:00) One Hour LA_{eq} should not exceed 70 dB(A).

Table 4.2 –Baseline Noise Data, in dB(A)

Sampling Time	IFC EHS Guideline Industrial Areas	PLA-1	PLA-2
18:00 – 17:00 (23 hours)	70	42 - 70	n/a
08:00 – 15:00 (7 hours)	70	n/a	49 -68

Source: Adapted from NRE, 2014

No information was available regarding sound sources encountered during the baseline noise monitoring events.

4.1.3 Topography and Landforms

Haiti is a mountainous country that occupies the western one-third of the island of Hispaniola. Haiti's area encompasses 27,750 square km, of which 99.3% is land and the remaining 0.7% is surface water resources, primarily the country's largest lake, Lac Azuei. To the east, Haiti shares a 376 km-long border with the Dominican Republic; to the south and north the country is bounded by the waters of the Caribbean Sea and by the Gulf of Gonâve to the west. Haiti has approximately 1171 km of coastline, including the large Île de la Gonâve off its west coast. Haiti recognizes a territorial limit of 12 nautical miles offshore, with an exclusive economic zone extending to 200 nautical miles offshore.

More than 75% of the country is mountainous, with elevations greater than 700 masl. The highest point in Haiti is Pic le Selle with an elevation of 2,680 masl, located in the *Chain de la Selle* mountain range, southeast of Port-au-Prince.

Graphic 4.11 – Haiti Topography



Source: Wikipedia 2015

There are two distinct landform types in the immediate Project area: the low-lying, primarily flat coastal plain bordering Port-au-Prince Bay in the Port Lafito area; and small, rounded foothills in the LIFZ area, increasing in elevation towards the *Chaîne de Matheux* mountain range located to the north of Cabaret and Titanyen (Graphic 4.11). Elevations in the Project area range from sea level at the port to approximately 62 masl at the LIFZ.

4.1.4 Geology and Seismicity

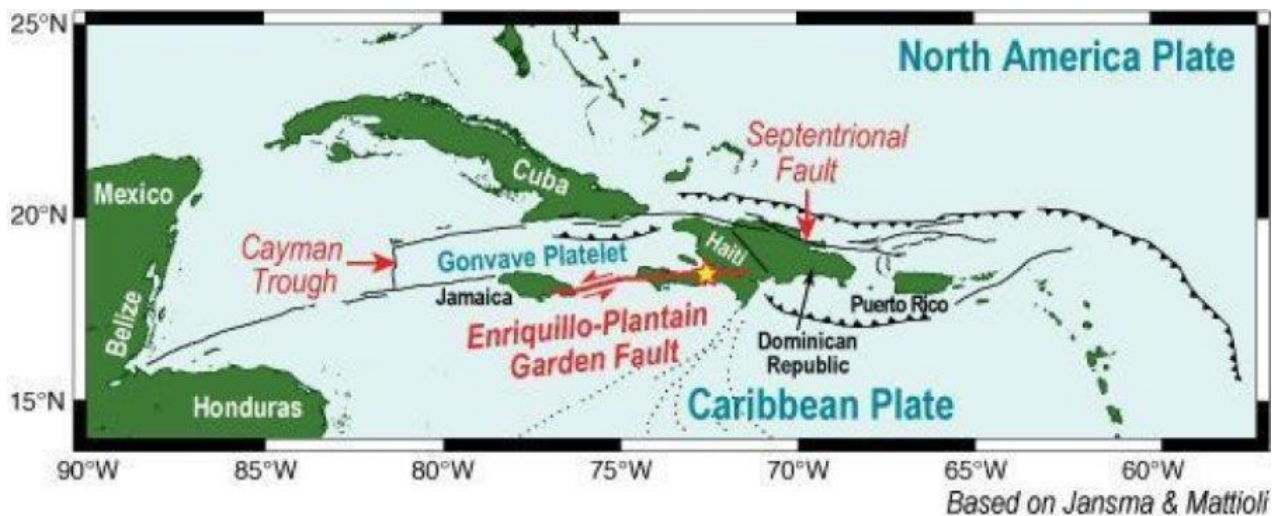
Above the high tide line, the coastal plain area of the Project is characterized by salt flats (sabhkas) containing carbonate deposits formed by evaporation of brines

and seawater, typical of arid coastal environments. Farther inland, the foothills are formed of Middle-Miocene age (approximately 10 million year old) clastic carbonate rocks, predominantly limestone marls with pockets of limey sand. These limestone hills were quarried in places within the Project for use as a source of construction material during earth-leveling activities.

Haiti lies in an area of the Caribbean prone to high seismic activity, due to the intersection of a number of faults and lithospheric plates, as shown in Graphic 4.12. The relative movements of these plates and faults are responsible for earthquakes in the region, including the 2010 earthquake in Haiti. As shown in the graphic, the small Goniave Platelet is pressed between the larger North American and Caribbean plates; the North American plate is being subducted under the Caribbean plate at a rate of approximately 2 cm/year.

In addition, a number of regionally extensive faults run through Haiti, including the Septentrional Fault along the country's northern coast and the E-W Enriquillo-Plantain Garden Fault along the southern peninsula and extending through Port-au-Prince. The 2010 earthquake was a result of sudden movement along this latter fault; the epicenter of the quake is marked by a star in the graphic. The Project area lies within this seismically active region.

Graphic 4.12 – Tectonic Setting of Haiti



Source: Jansma and Mattioli, 2005

4.1.5 Soils

NRE collected a number of soil samples at eight locations across the Project Site on June 25, 2014 (Figure 4.1). Three samples (PLCIT MS, PLCIT NS, PLCIT SS) were collected in the future Citadelle section of the Project site (located adjacent to the northwest corner of the port) and the remaining five samples were collected from other locations spaced across the Project site, to determine the presence or absence of existing soil contamination in the area. The samples were collected in accordance with the United States Environmental Protection Agency (USEPA) Standard Operating Procedure for sampling surficial soils.

Soil samples were sent to Pace Analytics laboratory in Ormond Beach, Florida for analysis; chain of custody documentation and the complete analytical reports are presented in the appendices to the 2014 ESIA. Summaries of the data are provided in Tables 4.3 and 4.4.

Concentration of the eight USEPA priority metals/metalloids arsenic, barium, cadmium, total chromium, lead, selenium, silver, and mercury were analyzed; results are shown in Table 4.3 below. Because neither Haiti nor the United States have soil quality guidelines, samples were compared to the Canadian Environmental Quality Guidelines (CEQG) for soil, promulgated by the Canadian Council of Ministers of the Environment (CCME). Because the Project area was previously utilized as a sisal plantation, soil samples were compared to CEQG for agricultural soils. All eight soil samples collected from the Project area reported metals concentrations below the CEQG agricultural guideline values, or below method detection limits (as for selenium).

Table 4.3 – Metals in Soils, mg/kg (ppm)

Metal	CCME Guideline* mg/kg	PLCIT MS	PLCIT NS	PLCIT SS	PLQ1. 1S	PLQ2. 1S	PLQ3. 1S	PLQ4. 1S	PLSS
As	12	2.3	1.8	1.9	2	1.7	2.3	1.9	2.1

Ba	750	47.1	78.1	64.4	79.6	68.2	80.8	78.9	55.6
Cd	1.4	0.2	0.23	0.23	0.33	0.3	0.33	0.36	0.28
Cr	64	27.5	31.3	20.5	21	19	23.3	23.9	16.5
Pb	70	1.7	1.9	1.6	1.9	0.9	1.8	1.7	1.3
Se	1	ND	ND	ND	ND	0.61**	ND	0.43**	ND
Ag	20	1.1	1.1	0.73	0.66	0.59	0.69	0.72	0.53
Hg	6.6	0.008	0.009	0.007	0.02	0.013	0.01	0.016	0.012

Note: CCME Guidelines for Agricultural Soils

Source: adapted from NRE 2014

The soil samples were also analyzed for volatile organic compound (VOC) and semi-volatile organic compound (SVOC) content. VOC content was analyzed via USEPA Method 8260; SVOC content was analyzed via USEPA Method 8270. Results of these analyses are summarized in Table 4.4.

Table 4.4 – Organic Compounds in Soils

Parameter	PLCIT MS	PLCIT SS	PLCIT NS	PLQ1. 1S	PLQ2. 1S	PLQ3. 1S	PLQ4. 1S	PLSS
Headspace (ppm)	18.3	11.4	8.1	18.9	32.6	19.4	31.9	21.1
VOCs (mg/kg)	ND	ND	ND	Acetone, 2-Butanone	ND	ND	ND	ND
SVOCs (mg/kg)	ND	ND	ND	**	ND	**	ND	ND

Notes: ** indicates SVOC compound detected at estimated levels (see text)

Source: NRE, 2014

Pentachlorophenol, an SVOC, was detected in soil sample PLQ3.1S at an estimated level of 0.62 mg/kg. This level was estimated because the concentration is above the Adjusted Method Detection Limit (MDL) of 0.069 mg/kg but was below the Practical Quantization Limit (PQL) of 2.1mg/kg. In practical terms, this compound

was present in the soil sample, but at very low concentration. Pentachlorophenol has been used as an herbicide, insecticide, and disinfectant but its use in the United States and many other countries has been restricted and the USEPA classifies it in Group 2B, as a probable human carcinogen.

Benzyl Alcohol, another SVOC, was found in soil sample PLQ1.1S at an estimated level of 0.25 mg/kg (above the MDL of 0.068 mg/kg but below the PQL of 0.39 mg/kg). Benzyl Alcohol is produced naturally by many plants and is used as a solvent and a preservative.

Also in soil sample PLQ1.1S, Acetone was detected at 0.81 mg/kg (above the PQL of 0.023 mg/kg) and 2-Butanone was detected at a level of 0.34 mg/kg (above the PQL of .0057 mg/kg). Both of these VOCs are commonly used as solvents and in the manufacturing of plastics and resins; the compounds are eye and nose irritants with and a relatively low toxicity. The reason for their presence in the sample from PLQ1.1S is unclear, but could be related to small pieces of plastic or other debris present in the soil sample.

In general, soil samples collected from across the Project area indicated soils with low concentrations of USEPA priority metals, VOCs, and SVOCs.

4.1.6 Water Resources

4.1.6.1 Surface Water Resources

There are no surface water sources located within the Project border; the closest surface water body is the stream that runs through the community of Simonette, approximately 650 m northwest of the Project's western boundary (Figure 4.1). This stream appears to originate in the vicinity of National Route 1 and flows generally unconfined southwest through Simonette into the sea. The stream is currently partially impounded by at least two informally constructed dams in Simonette (upper photo, Figure 4.3); the upstream dam is constructed of pikes and sticks; its function appears to be to impound water to feed dirt irrigation canals on either side of the stream that lead to fields and homes in Simonette. About 500 m downstream, a leaking low-head concrete dam impounds water on the stream at the point where the main road through the community crosses the stream on a

concrete bridge (lower photo, Figure 4.3). Water collected behind the low-head dam is used by the community for bathing and domestic use; below the low-head dam water flows freely to the coast and into Port-au-Prince Bay, with no further diversions. GB Group has been negotiating with the community of Simonette to replace both dams to provide better water retention on the stream. The Project is anticipating withdrawing water impounded by this dam via a submersible pump, for filling the water retention pond near the LIFZ via a buried pipeline.

A second stream runs through the communities of Source-Matelas and St. Gerard, located approximately 1.5 km northwest of the Project's western boundary (700 m beyond the Simonette stream) – see Figure 4.1. Like the Simonette stream, the Source-Matelas stream flows generally unhindered through the communities and into the sea. Diversion ditches are dug into the sandy soil in the upper parts of the stream's course to supply homes, fields, and garden plots with water for domestic and agricultural use. Approximately 400 m from its outlet with the sea, in a deep gorge, the Source-Matelas stream is impounded by Portland cement manufacturer CINA, who has constructed an open-air concrete basin to contain the stream's flow (Figure 4.4). The basin has a notched outlet for overflow and an outflow pipe on the downstream end of the basin; in this manner the basin serves as a simple dam to impound water from the stream that would otherwise flow directly into the stream. The Project has entered into negotiations with CINA to use a portion of the stream flow downstream of the basin to supply the Project and the water retention pond. Because of the depth of the gorge at this point, a generator with a pump would be required to increase the head in the pipeline sufficiently to pump the water out of the stream and over to the Project's water retention pond.

To provide a stream flow baseline for the two streams, Project staff used a portable v-notch weir to collect periodic surface water flow measurements as shown in Table 4.5, below. The portable weir was installed at the outlet for the existing low-head concrete dam in Simonette and immediately downstream of CINA's extraction point on the Source-Matelas stream. Stream flow was measured at both locations on the same date only in July 2014 and March 2015. There are no documented data on local or CINA industrial water usage volumes.

Table 4.5 - Point-Source Stream Flow Data

Date	Simonette Stream, L/s (gpm)	Date	Source-Matelas Stream, L/s (gpm)
-----	-----	9 December 2013	36.8 (584)
8 July 2014	25.1 (397)	8 July 2014	35.6 (564)
21 September 2014	19.2 (305)	-----	-----
8 December 2014	21.9 (347)	-----	-----
4 March 2015	31.0 (491)	4 March 2015	32.1 (509)

Source: Data from GB Group, 2015

Prior to the start of LIFZ operations, GB Group has committed to a hydrological investigation to better refine preliminary assessment of impacts to local surface water resources and water users as presented in this ESIA. Basic terms of reference for the hydrological assessment are provided in Section 5.2.5.2.

As part of the 2014 baseline, two samples of surface water were collected on 26 June 2014, one from each of the two streams slated for use as Project water supply – the Simonette stream and the Source-Matelas stream. Stream sampling locations are shown on Figure 4.2. No duplicate samples were collected. Samples were sent to Pace Analytics laboratory in Ormond Beach, FL for analysis of a limited number of parameters, as shown in Table 4.6.

Table 4.6 – 2014 Surface Water Quality Data

Parameter, Units	WHO Guideline	SW-1 (Simonette)	SW-2 (Source-Matelas)
pH, S.U.	--	7.60	8.35
Temp, deg. C	--	27.2	28.5
Conductivity, μ S/cm	--	1017	970
Salt, ppm	--	512	498
TDS, ppm	--	721	689
Coliforms, cfu/100 ml	--	300	1600

As, µg/l	10	ND	ND
Ba, µg/L	700	107	126
Cd, µg/L	3	ND	ND
Cr (Tot), µg/L	50	ND	ND
Pb, µg/L	10	ND	ND
Se, µg/L	10	ND	ND
Ag, µg/L	--	ND	ND
Hg, µg/L	6	ND	ND
VOCs, µg/L	--	ND	ND
PAHs, µg/L	--	ND	ND
BOD5, mg/L	--	ND	ND
COD5, mg/L	--	13.4	ND
Nitrate, mg/L	50	0.9	1.7

Note: ND = not detected

Source: Modified from NRE, 2014

As can be seen in Table 4.6, within the range of parameters analyzed, surface water appeared somewhat briny, with elevated concentrations salts and total dissolved solids, high electrical conductivities, and high coliform values, and generally low concentrations of analyzed metals.

4.1.6.2 Groundwater Resources

In the 2014 ESIA, the Project's water supply was intended to be provided by a deep (75 m) well that would be installed within the Project area. To investigate groundwater resources, groundwater samples were collected from a number of existing public and private wells in the area surrounding the Project and from within the Project boundary, and a short-term pumping test was conducted on a nest of existing wells near the center of the Project site. Partially as a result of a groundwater modeling effort performed in support of the 2014 ESIA, the Project decided to focus instead on surface water resources, as discussed in Section 4.7.1.

Prior to collecting samples of groundwater in 2014, each well was pumped and field parameters including pH, temperature, conductivity, and TSS were monitored until results stabilized, at which point a water quality sample was collected. This ensured that the groundwater being analyzed was coming from the aquifer, rather than stagnant water that had been present in the well. The surface elevation of the well collar and depth to groundwater were also recorded at each well.

Shallow groundwater supplies the potable water needs of the people in the community of Lafiteau via a network of 11 hand pump water supply wells (Figure 4.5). No construction data were available for these wells, which appear to date from the 1990s and are all a nominal 6" in diameter, with a surface casing made from galvanized steel, approximate depth of 100 to 200', with hand pumps installed at the surface for water supply. Graphic 4.13 below shows a typical domestic water supply well in Lafiteau.

**Graphic 4.13 – Domestic Water Well in Lafiteau (PLLAFDW-8)****Source:**

2014

AMI

NRE



collected two water samples from streams and seven samples of groundwater from existing public and private wells in areas surrounding the Project (see the sampling sites in Figure 4.1). Samples were sent to Pace Analytics laboratory in Ormond Beach, FL for analysis. Table 4.7 below summarizes groundwater sampling locations and location selection rationale.

Table 4.7 – Groundwater Sampling Locations

Sampling Location	Type of Well	Rationale for Selection
PLGBGGW1	Monitoring	In Project footprint
PLGBGGW2	Monitoring	In Project footprint
PLLAFDW1	Community water supply	Lafiteau, near LIFZ
PLLAFDW2	Community water supply	Lafiteau, near LIFZ

PLLAFDW3	Community water supply	Lafiteau, near LIFZ
PLLAFDW7	Community water supply	Closest community well to LIFZ
PLLAFDW8	Community water supply	Lafiteau, in-town

The surface water and groundwater sampling locations are shown on Figure 4.1.

Depth to groundwater was assessed at two existing monitoring wells installed within the Project's property limits, wells PLGBGGW-1 and PLGBGGW-2. Depth to groundwater was about 14-15 m below ground surface in the Project area.

Table 4.8 – Depth to Groundwater at Project Site, m

Well	Date	Top of Inner Casing	Depth to Groundwater	Head
PLGBGGW-1	24-Jun-14	17.1	14.0	3.1
	25-Jun-14	17.1	14.0	3.1
	26-Jun-14	17.1	14.0	3.1
PLGBGGW-2	24-Jun-14	18.0	14.8	3.2
	25-Jun-14	18.0	14.8	3.2
	26-Jun-14	18.0	14.8	3.2

Source: AMI, 2014

Table 4.9 (in the Tables section of this ESIA) presents the data for the seven wells sampled. As can be seen in the table, within the range of parameters analyzed, groundwater is very similar to surface water from the two streams: somewhat briny, with high concentrations of salts and total dissolved solids, and elevated conductivities, and with low concentrations of analyzed metals; concentrations of coliforms were much lower in the groundwater samples than in the surface water samples. Some focus group participants (Appendix F) remarked on the poor quality

of local groundwater, saying for example “The water from the pumps, you can’t drink it – people use it to bathe, wash, prepare food, but they don’t drink it.”

4.1.7 Terrestrial Habitats, Land Use, and Protected Areas

Two distinct terrestrial biological habitats were identified by NRE in the environmental baseline study area: scrubland and subtropical riparian forest. Scrubland is present throughout the entire Project footprint area shown in Figure 3.1a, and consists of areas where the native habitat was modified via anthropogenic disturbance. According to the Convention on Biological Diversity (<https://www.cbd.int/>), most of Haiti’s land has been extensively modified by anthropogenic disturbance, with less than 2% of the original forest cover remaining. Previous to GB Group’s purchase, the land in the Project site had been deforested and converted into an agave plantation, then abandoned and left for use for livestock grazing.

The second habitat type identified in the Project area is subtropical riparian forest, located in a narrow corridor on either side of the streams in Simonette and to a lesser extent in Source-Matelas, where the vegetation is left undisturbed by human activities. The intake for the water retention pond is generally located within this habitat type on the Simonette stream; however the location of the water intake is in an area of the stream that is developed by the local community, with a bridge crossing and concrete block and masonry homes on either side of the stream.

There are no UNESCO World Heritage Sites, Key Biodiversity Areas (Société Audubon Haiti), Important Bird Areas (Bird Life International), or other nationally or internationally protected areas within or near the Project site. Table 4.10 below summarizes the distance in a straight line from the nearest protected areas in various classes to the Project site.

Table 4.10 – Protected Areas Nearest to the Lafito Project

<i>Type</i>	<i>Name</i>	<i>Distance from the Project, in a straight line</i>
<i>World Heritage Site</i>	<i>National History Park</i>	<i>90 km</i>

<i>Key Biodiversity Areas</i>	<i>Les Arcadins</i>	<i>35 km</i>
	<i>Massif de la Selle</i>	<i>25 km</i>
<i>Important Bird Areas</i>	<i>HT005</i>	<i>30 km</i>
	<i>HT007/8</i>	<i>45 km</i>
<i>National Protected Areas</i>	<i>Fort Alexandre</i>	<i>27 km</i>
	<i>Fort Jacques</i>	<i>26 km</i>
	<i>Fort Mercredi</i>	<i>19 km</i>

Source: Modified from NRE, 2014

4.1.8 Terrestrial Flora

4.1.8.1 Flora Sampling Methodology and Results

The island of Hispaniola is host to one of the most diverse flora assemblages in the Caribbean. The Haitian Botanical Foundation, a non-profit organization registered with the Haitian government, states that of the estimated 4,500 – 5,000 species of flowering plants and conifers on Hispaniola about 30-33% are endemic species. In Haiti, little work has been done to date to identify and categorize flora; additionally, deforestation and subsequent erosion of original land cover are serious threats to biodiversity of flora species.

Due to the mass deforestation of the country, there are only a few small regions with dense biodiversity. The Project site is not one of them. The vegetation sampling undertaken for the 2014 ESIA at the Project site identified 30 species of plants from 19 families; of this total, five species were invasive, none were endemic, and none were protected. Much of the vegetation found growing on the Project site is known for thriving in disturbed areas.

Vegetation was randomly sampled at four representative locations across the Project Site, using the Line-Intercept method. Figure 4.2 shows the vegetation sampling locations, including an area in the previously graded LIFZ area where vegetation re-colonization had already begun and in three areas undisturbed by construction activities at the time of sampling: one north of the proposed man camp, one west of the Citadelle, and one north of the LIFZ. The randomly sampled



areas were determined by superimposing a 100m x 100m grid over the georeferenced Project site, assigning each grid square a numeric value, and then using a random number generator to select the sample square. A line was strung 50m from the center of each grid square, and the orientation (bearing) of the line was also randomly selected from 0-360 degrees; this established a 50 m-long transect within each selected grid square. All vegetation crown and root system diameters intersecting the transect line were noted and photographed.

Table 4.11 below lists the flora species identified at the Project site during the baseline sampling. The table provides the family and genus/species, where identification was possible to that level, along with status of protection as listed by the International Union for the Conservation of Nature (IUCN) for each plant. Photographs of the plants identified during the baseline sampling are included in Graphic 4.14 immediately following the table.

Table 4.11 – Terrestrial Flora Species Identified in the Project Area

Photo ID#	Scientific Name	English Common Name	IUCN Category	Origin	Growth Type
1	<i>Comocladia dodonaea</i>	Poison Ash	N/A	Native	Shrub
2	<i>Calotropis procera</i>	Milkweed	N/A	Exotic/Naturalized	Tree
3	<i>Agave antillarum</i>	Mottled Spurge	N/A	Native	Succulent
4	<i>Agave sisalana</i>	Sisal	N/A	Invasive	Succulent
5	<i>Consolea moniliformis</i>		Least Concern	Native	Succulent
6	<i>Cylindropuntia caribaea</i>		Least Concern	Native	Cactus
7	<i>Cleome sp.</i>	Cleome	N/A	Native	Herb
8	sterile <i>Cyperaceae</i>	Various	N/A	Native	Herb
9	<i>Helicteres trapezifolia</i>	Borage Family	N/A	Exotic	Shrub
10	<i>Chamaesyce berteroaana</i>		N/A	Native	Herb
11	<i>Croton discolor</i>	Lechecillo	N/A	Native	Shrub
12	<i>Euphorbia lactea</i>		N/A	Exotic	Shrub
13	<i>Euphorbia tirucalli</i>	Aveloz	Least Concern	Exotic	Shrub
14	<i>Jatropha gossypifolia</i>	Physicnut	N/A	Invasive	Shrub
15	<i>Pictetia spinifolia</i>		N/A	Native	Tree
16	<i>Prosopis juliflora</i>		N/A	Native	Shrub
17	<i>Rhynchosia sp.</i>		N/A	Native	Herb
18	unknown		N/A	Native	Herb

Photo ID#	Scientific Name	English Common Name	IUCN Category	Origin	Growth Type
19	<i>Stigmaphyllon sagraeanum</i>	Alabrillo	N/A	Exotic	Shrub
20	<i>Malvaceae(family)</i>	Various	N/A	Native	Herb
21	<i>Waltheria indica</i>	Sleepy Morning	N/A	Native	Shrub
22	<i>Melia azederach</i>	White Cedar	N/A	Invasive	Tree
23	<i>Moringa oleifera</i>	Moringa	N/A	Exotic	Tree
24	<i>Musa acuminata</i>	Wild Banana	N/A	Exotic	Tree
25	sterile - unknown		N/A	Native	Grass
26	unknown		N/A	Native	Grass
27	<i>Cardiospermum sp.</i>	Heartseed Vine	N/A	Invasive	Herbaceous Vine
28	<i>Datura Inoxia/ Datura stramonium</i>	Thorn Apple	N/A	Invasive	Herb
29	<i>Solanum bahamense</i>	Nightshade	N/A	Invasive	Herb
30	<i>Corchorus hirsutus</i>		N/A	Native	Shrub

Source: Modified from Lafito Global Phase 1 – Port Lafito Environmental and Social Impact Assessment, 2014



Graphic 4.14 – Plant Species Identified at the Project Site



1 Comocladia dodonaea



#2 Calotropis procera



#3 Agave antillarum



#4 Agave sisalana



#5 *Consolea moniliformis*



#6 *Cylindropuntia caribaea*



#7 *Cleome* sp.



#8 sterile *Cyperaceae*, genus unknown



#9 *Helicteres trapezifolia*



#10 *Chamaesyce berteroana*



#11 *Croton discolor*



#12 *Euphorbia lactea*



#13 Euphorbia tirucalli



#14 Jatropha gossypifolia



#15 Pictetia spinifolia



#16 Prosopis juliflora



#17 *Rhynchosia* sp.



#18 *Heliotropium* genus unknown



#19 *Stigmaphyllon sagraeanum*



#20 *Malvaceae*, genus unknown



#21 *Waltheria indica*



#22 *Melia azederach*



#23 *Moringa oleifera*



#24 *Musa acuminata*



#25 sterile *Poaceae*, genus unknown



#26 *Poaceae*, genus unknown



#27 *Cardiospermum* sp.



#28 *Datura inoxia*/*Datura stramonium*

#29 *Solanum bahamense*#30 *Corchorus hirsutus*

Source: FoProBiM, 2014

4.1.8.2 Floral Species with Special Classification Status

The five flora species identified at the Project site that are considered to be invasive are: *Datura inoxia/Datura stramonium*, *Solanum bahamense*, *Jatropha gossypifolia*, *Melia azederach*, and *Agave sisalana*. None of the flora species identified in the Project site are considered to be protected species by the IUCN.

4.1.9 Terrestrial Fauna

Data for terrestrial fauna occurrences in the Project area were obtained by querying the Global Biodiversity Information Facility online database (www.gbif.org) in support of the 2014 ESIA. Terrestrial fauna identified were all reptiles, and include four individuals of Cochran's gianthead anole (*Anolis caudalis*), one Large-headed anole (*Anolis cybotes*), 23 Yellow-headed geckos (*Gonatodes albogularis notatus*), and one Hispaniola curlytail lizard (*Leiocephalus schreibersi schreibersi*). The Hispaniola curlytail lizard is categorized as "Least Concern" by the IUCN, meaning that it has been listed by IUCN to provide more data on the species/taxon but that it is not considered to be a protected species.

A separate search of the GBIF database in support of the current ESIA identified six bird species that have been observed in the immediate Project area, five of which are considered “Least Concern” by IUCN; the birds and terrestrial fauna are included in Table 4.12 below.

Table 4.12 – Terrestrial Fauna Species Identified in the Project Area

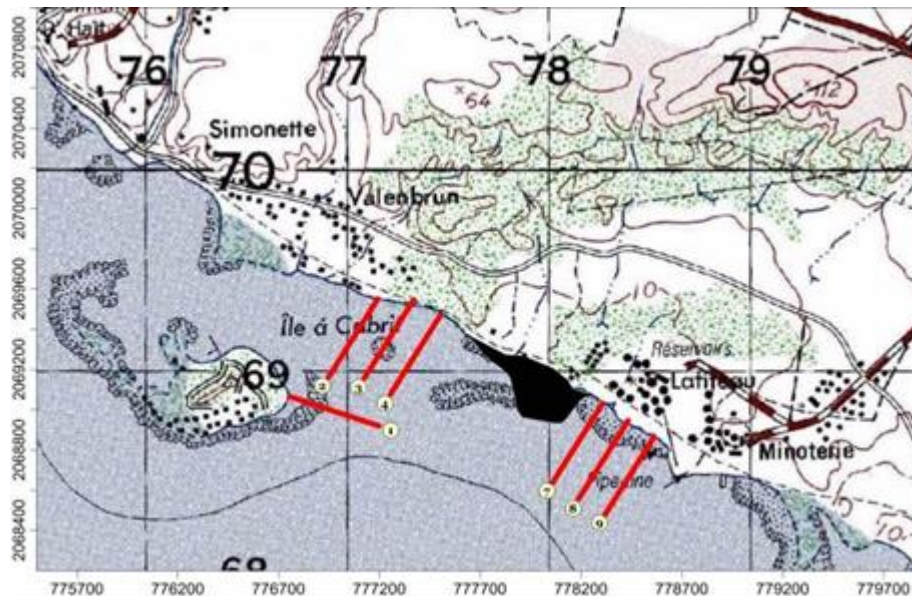
Family	Scientific Name	IUCN Listing
Reptiles		
Polychrotidae	<i>Anolis caudalis</i>	N/A
Polychrotidae	<i>Anolis cybotes</i>	N/A
Gekkonidae	<i>Gonatodes albogularis notatus</i>	N/A
Tropiduridae	<i>Leiocephalus schreibersi schreibersi</i>	Least Concern
Birds		
Columbidae	<i>Columbina passerina</i>	Least Concern
Parulidae	<i>Setophaga petechia</i>	N/A
Cuculidae	<i>Crotophaga ani</i>	Least Concern
Falconidae	<i>Falco sparverius</i>	Least Concern
Tyrannidae	<i>Tyrannus dominicensis</i>	Least Concern
Columbidae	<i>Zenaida macroura</i>	Least Concern

Sources: Fauna modified from NRE, 2014; bird data from www.gbif.org

4.1.10 Marine Ecosystem

Dr. Alejandro Herrera-Moreno, consultant to ETEL, performed an assessment of the benthic zone in the general Port Lafito area in support of the 2014 ESIA. The description of the marine environment was carried out via a literature search in combination with the interpretation of recordings from an underwater video camera run by a diver who walked along the bottom. Nearly nine hours of video was recorded as the underwater camera recorded along seven track lines. Each track line was approximately 460 m long; track lines are shown on Graphic 4.16 below.

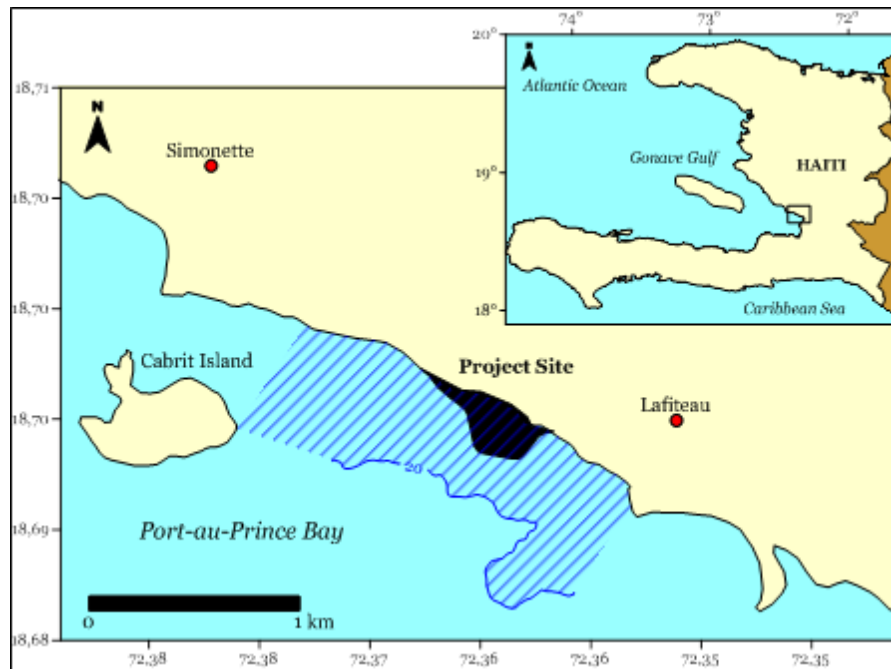
Graphic 4.16 –Location of Marine Assessment Track Lines (in red)



Source: Figure 2, Earthtech Engineering, 2014b

The study area included the marine seabed from the intertidal zone to a depth of 20 m offshore, as shown in Graphic 4.17 below.

Graphic 4.17 – Marine Assessment Baseline Study Area



Source: Earthtech Engineering, 2014b

The marine assessment study included the following scope:

- Bathymetric mapping
- Benthic surface classification
- Identification of marine flora
- Identification of marine fauna

The complete report, titled “General Ecological Assessment of the Marine Component, Lafiteau, West Department – Haiti” is presented in Appendix D of this ESIA.

4.1.10.1 Regional Threats to the Marine Environment

Uncontrolled over-exploitation of terrestrial resources in Haiti has led to high rates of erosion, especially in deforested areas, with corresponding sedimentation in

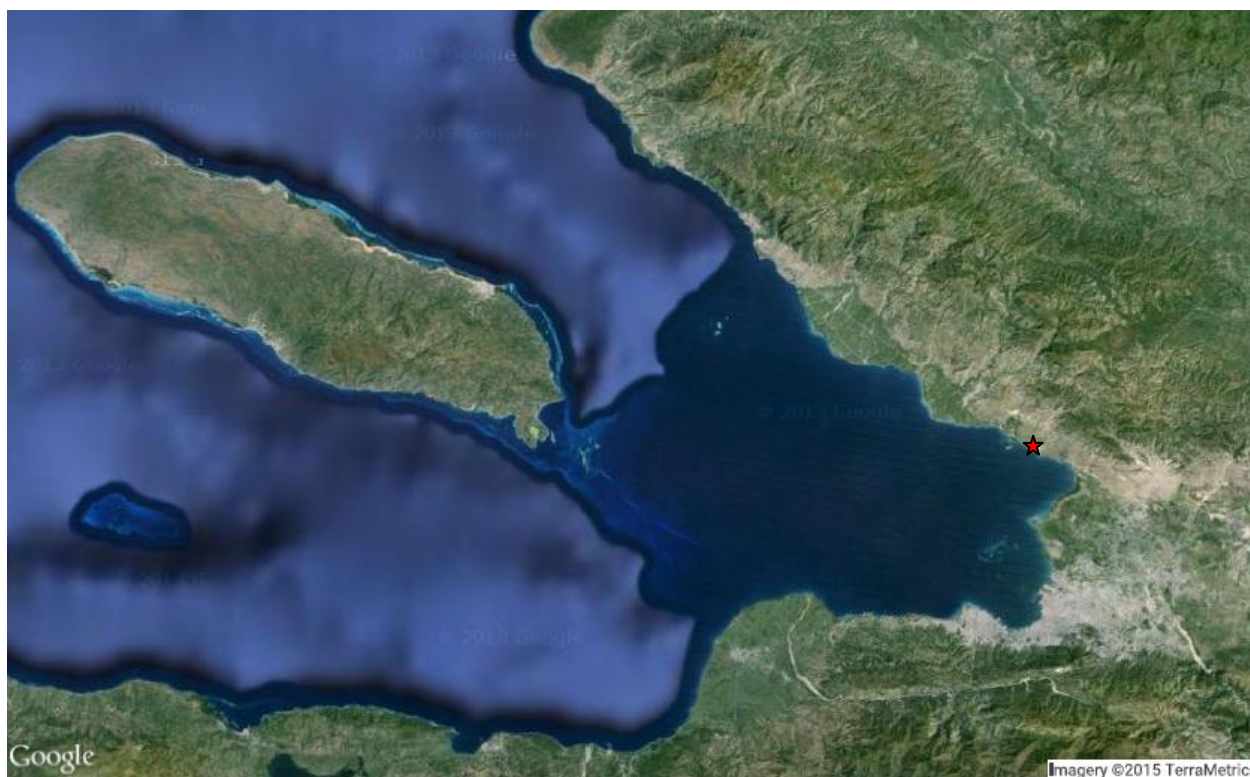
watersheds and along the coast, where it affects the sustainability of coastal resources, in particular coral reefs. Marine ecosystems have also been significantly affected by overfishing over the long term. Port-au-Prince Bay receives the ultimate runoff from much of the country's industrial activities, including sea ports, loading docks, fuel storage facilities, food processing, cement manufacturing, and metal processing, in combination with the contaminant load from major urban areas.

4.1.10.2 Tides and Currents

The tides along the Haitian coasts are semi-diurnal, with two high tides and two low tides per lunar day. The average tidal range for the Port-au-Prince Bay area is 0.3 m (1 foot). A longshore current is responsible for movement of nearshore sediment along the coastline of the bay, running from southeast to northwest at approximately 0,5 m/s (1 knot).

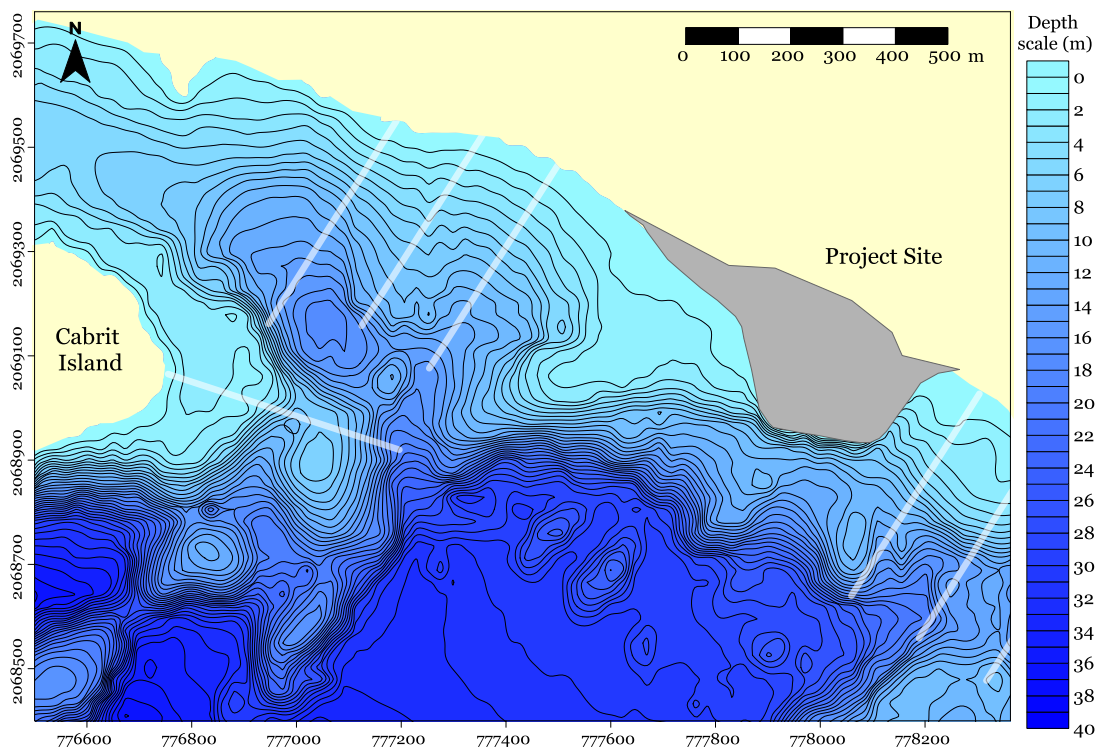
4.1.10.3 Bathymetry and Benthic Features

Haiti's offshore coast is characterized by a generally narrow shelf; along the central western coast, this shelf extends westward to include the Port-au-Prince Bay and Gonâve Island areas. In the Port-au-Prince Bay area, the shelf is bordered by a shallower zone with depths of 20-30 m; water depth increases to about 140 m in the center of the Bay– see Graphic 4.18, below (the red star marks the Project area).

Graphic 4.18 – General Bathymetry of Project Region

Source: Maphill, 2015

The digital bathymetric model developed by GB Group for the Project area shows that a shallow shelf (with depths of about 2 m) extending about 380 m to the southwest in the Project area, creating a low terrace. The shallow shelf surrounding Cabrit Island also extends outwards about 160 m to the southeast, creating a second terrace of about 2 m depth. A small basin is defined between these two terrace areas, in which depth increase rapidly to around 18 m. To the west-southwest and south of the port, depths increase rapidly to around 30 m.

Graphic 4.19 – Bathymetric Map of Study Area

Source: GB Group data; Earthtech Engineering, 2014b, Figure 5a

The underwater video surveyed at an average depth of 15 m, therefore the marine assessment report focuses on describing the marine environment up to about 22 m in depth. Fringing reefs are typical along the Haitian coast, and patch reefs have been identified surrounding Cabrit Island. In this coral reef environment, there are different types of benthos present, including:

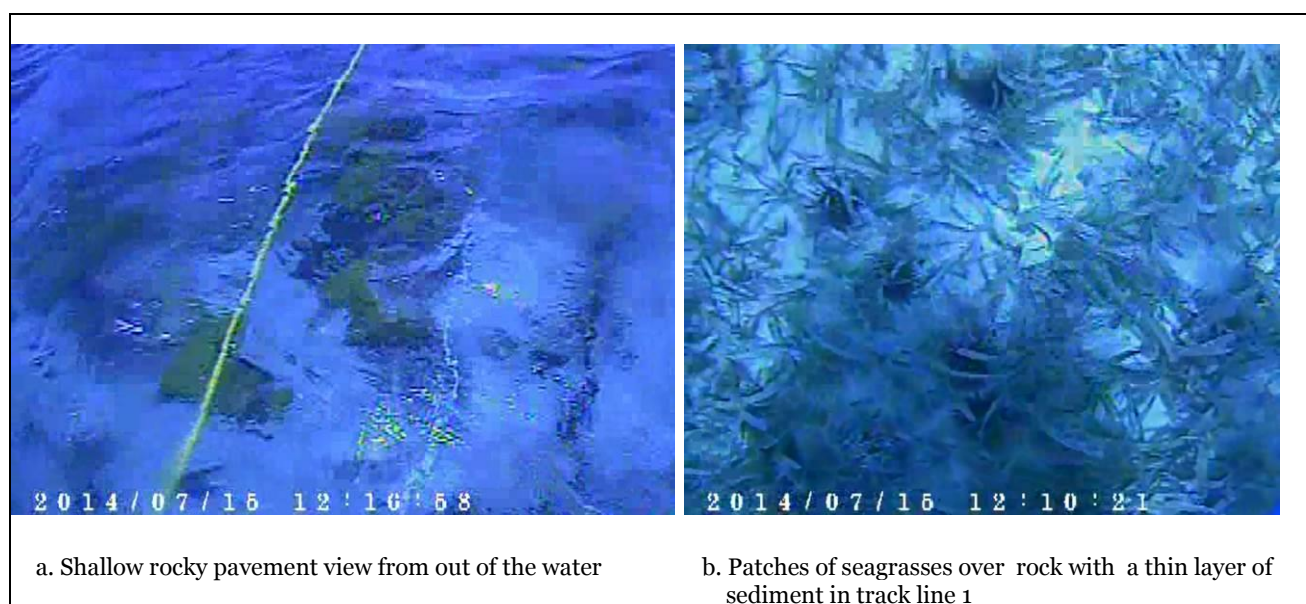
- Shallow rocky pavement with seagrasses (and macroalgae)
- Sandy-muddy bottom with seagrasses (and macroalgae)
- Sandy-muddy bottom with rocky patches
- Sandy-muddy bottoms

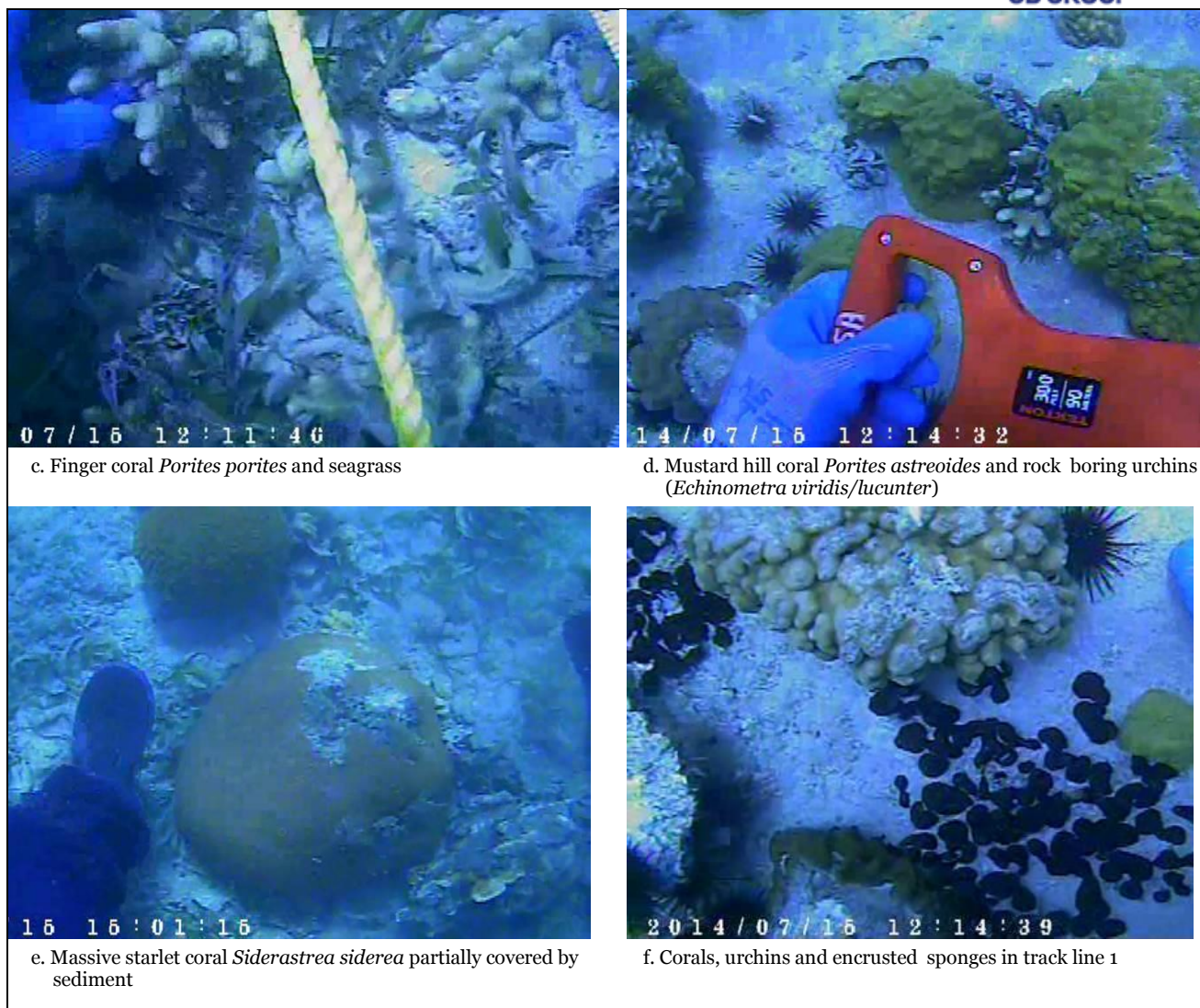
Each of these benthos types is described below, based on interpretation of the video footage and existing scientific literature.

Shallow rocky pavement with seagrasses (and macroalgae)

In this benthos type, the highest cover corresponds to rock, coralline rubble, and stony corals. There is a high dominance of coral colonies of genus *Porites* (thin finger coral *Porites divaricata*, finger coral *Porites porites* and mustard hill coral *Porites astreoides*) as well as the massive starlet coral *Siderastrea siderea* (Graphic 4.20 below). Colonies of the rose coral *Manicina areolata* and the fire coral *Millepora complanata* were also seen in the videos, as well as the slimy sea plume *Pseudopterogorgia americana*, among the octocorals and the chicken liver sponge *Chondrilla caribensis*. The hard substrate is colonized by the rock boring urchins (*Echinometra viridis* and *Echinometra lucunter*). Seagrasses, composed of turtle grass *Thalassia testudinum*, grow over the rocky floor, in some points patchy and more concentrated in others, especially in sites of accumulation of fine sediments. Seagrasses mix or alternate with macroalgae patches. The shallow rocky pavement with seagrasses typified practically all the Project area, from the coast to until approximately 3 m depth.

Graphic 4.20 – Seascapes and Marine Life in the Shallow Rocky Pavement with Seagrasses (and Macroalgae)





Source: Earthtech Engineering, 2014b, Figure 11

Sandy-muddy bottom with seagrasses (and macroalgae)

Between approximately 4 to 10 m of depth, seagrasses bed with predominance of the turtle grass *Thalassia testudinum* (and macroalgae), growing on a sandy-muddy substrate of variable thickness, cover the bottom. Several macroalgae species were identified growing among the seagrasses (*Avrainvillea*, *Caulerpa*, *Udotea*, *Penicillus* and *Halimeda*). Particularly, some species of *Halimeda* (very probably *Halimeda incrassata*), occasionally occupy all the substrate making an important contribution

to the marine biogenic sediment. One of the species identified in seagrass was the long-spine sea urchin *Diadema antillarum* (Graphic 4.21). It is considered likely that a number of other marine organisms are present in the seagrass but were hidden from the video.

Seagrasses play many important roles in the marine ecosystem. As habitat, seagrasses offer food, shelter, and essential nursery areas to commercial and recreational fishery species; to invertebrates that are produced within, or migrate to seagrasses; and protection from digging predators to infaunal organisms living within the substratum. Seagrass meadows help dampen the effects of strong currents, providing protection to fish and invertebrates, while also preventing the scouring of bottom areas. Seagrass canopies reduce the resuspension of particles by decrease flow velocity and reducing turbulence, promoting particle settling. Seagrasses also provide attachment sites to small macroalgae and epiphytic organisms such as sponges, bryozoans, forams, and other taxa that use seagrasses as habitat.

Seagrasses maintain a high density in shallow areas where the sediment thickness is greater, and decrease in density in areas where sediment thickness is reduced. Benthos areas with dense seagrass foliage have a more stable substrate which helps to create environments of low energy, one of the main ecological functions of seagrass meadows. As bottom sediment thickness decreases, seagrasses become scarce, related to growing in small patches in pockets in the seafloor where fine sediment particles accumulate.



Graphic 4.21 - Seascapes and Marine Life in the Sandy-Muddy Bottom with Seagrasses (and Macroalgae)

	
a. Dense seagrasses in track line 2	b. Dense seagrasses in track line 9
	
c. Dense seagrasses in track line 8	d. <i>Seagrasses and macroalgae</i> in track line 3



	
e. Long-spined sea urchin <i>Diadema antillarum</i> on seagrass in track line 8	f. Dense seagrasses in track line 7

Source: Earthtech Engineering, 2014b, Figure 14

Sandy-muddy bottom with rocky patches

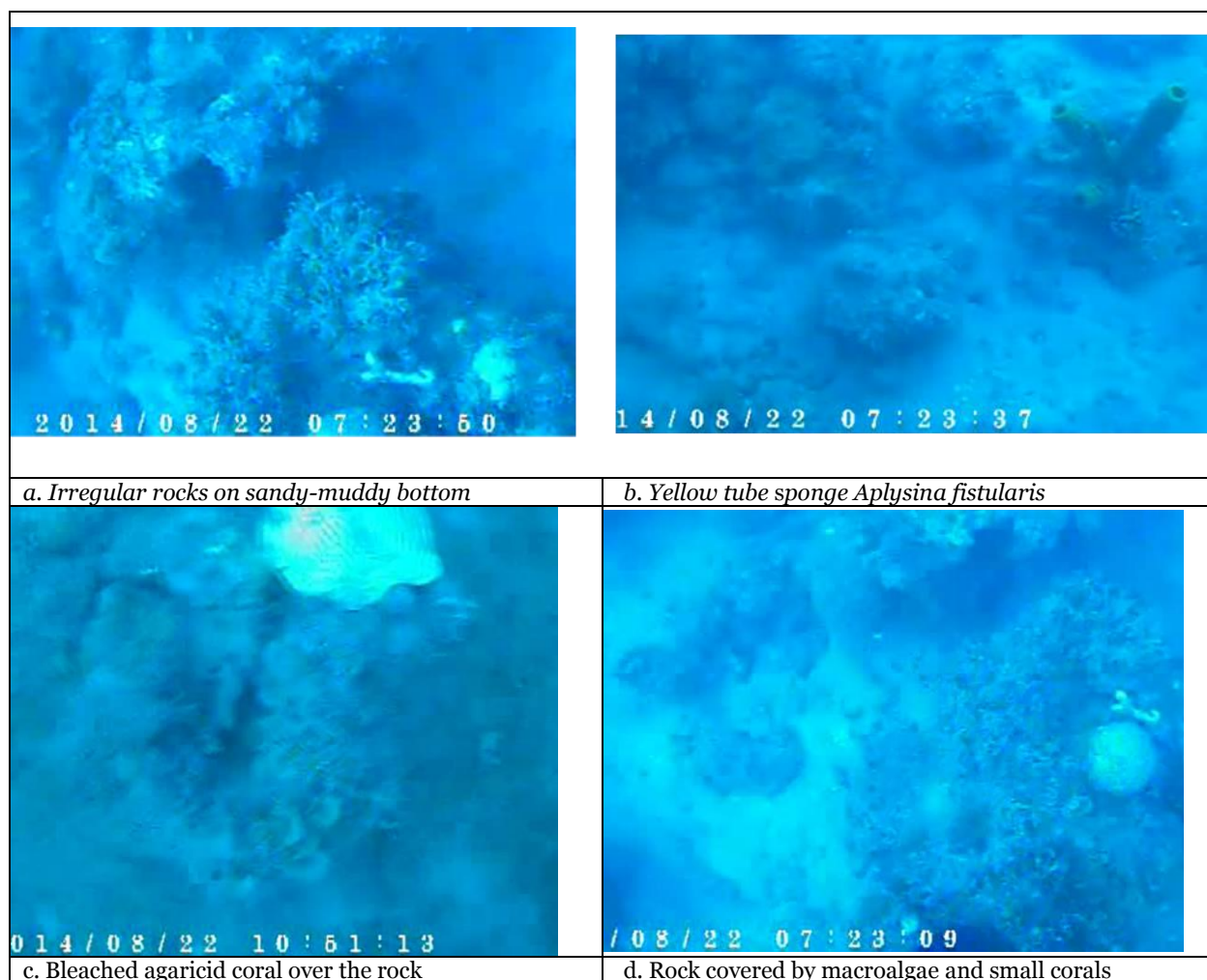
From depths of about 10-12 m, seagrass populations begin to thin out, and the sandy-muddy benthos type coverage increases. Bottom sediments are thin, easily re-suspended, and show bioturbation structures such as tracks, trails, and burrows. Irregular and isolated to sometimes more or less continuous rocky promontories rise to different heights from the bottom. This benthos type characterizes the Project area to about 22 m in depth. The presence of rocky outcrops and deeper waters preferentially favor the abundance and diversity of sessile fauna. In the videos, relatively small colonies of several stony coral species were identified, including the massive starlet coral *Siderastrea siderea*, lesser starlet coral *Siderastraea radians*, blushing star coral *Stephanocoenia intercepta*, fragile lettuce-leaf coral *Agaricia agaricites*, the pineapple coral *Dichocoenia stokesi* and the knobby brain coral *Diploria clivosa*. Among the octocorals, the corky sea finger *Briareum asbestinum*, the bent sea rod *Plexaura flexuosa*, and the slimy sea plume *Pseudopterogorgia americana* were identified; as were the sponges yellow tube sponge *Aplysina fistularis*, the black ball sponge *Ircinia strobilina*, and the rope sponge *Aplysina cauliformis* (Graphic 4.22).

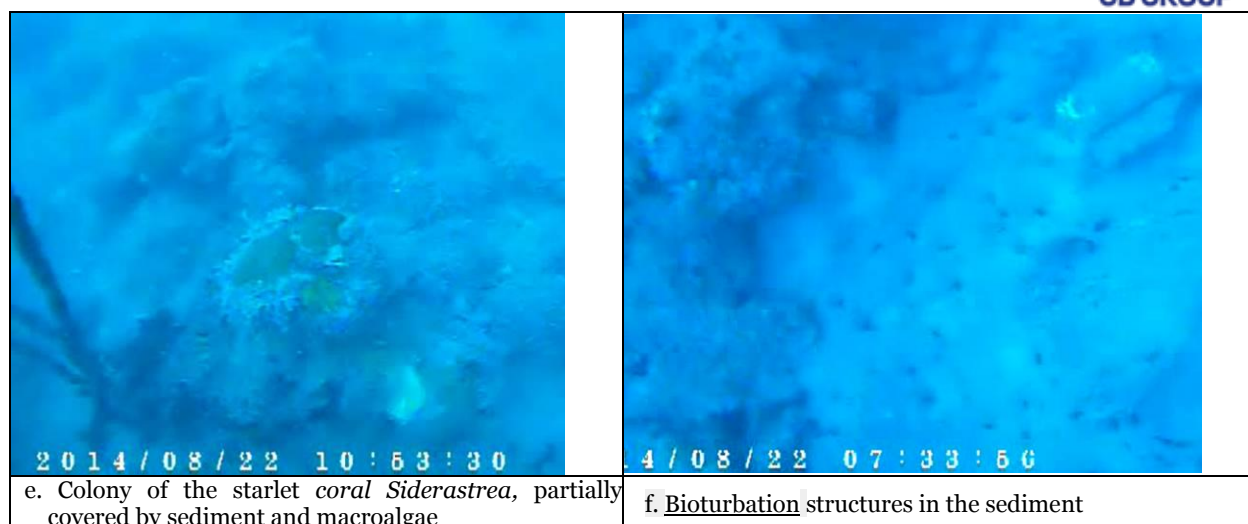
Although many other species could not be distinguished in the video, either by virtue of their small size or by their cryptic habits (e.g. polychaetes or anemones), it was quite clear that the level of coral reef development and the increase of diversity typically expected in this benthos type were not evident in the Project area. Instead, a high coverage of sediment and algae over the rocks and corals prevail. The species identification of the algae cover is quite difficult. Reef Check (2011) pointed out that generally in the coral reefs of Haiti live coral coverage is less than 10%, due to the invasion of algae that occupy more than 50% of the substrate.

The level of reef development and reef components are determined by several factors, including the quality of the seawater and the availability of hard substrate. In the Project region, both of these factors are affected by turbidity and sedimentation from terrestrial sources; accumulation of fine sediments that can be easily re-suspended; and the excessive growth of algae on the substrate due to the oversupply of nutrients and the absence of herbivorous fishes. Reefbase (2014) classifies the coral reefs in the Project area as very highly threatened by coastal development, marine pollution, overfishing and destructive fishing, and watershed-based pollution. The characteristics of this benthos type and the ecological structure of its communities are consistent with those observed in other reefs of the Greater Antilles region that are impacted by coastal development and pollution.



Graphic 4.22 - Seascapes and Marine Life in the Sandy-Muddy Bottom with Rocky Patches





Source: Earthtech Engineering, 2014b, Figure 15

Sandy-muddy bottoms

In the deepest region of the study area, below 22 m (out of the reach of the video footage), the submarine slope is reduced and the sandy-muddy bottom seems to dominate. This bottom type appears at the end of the recordings on track lines 7, 8, and 9 and appears to extend to the south to depths of 30 - 32 m. Sandy-muddy bottoms do not support a high diversity of species, because the absence of a firm substrate prevents the colonization of coral fauna.

4.1.10.4 Marine Biota

Approximately 40 different species of marine biota (flora and fauna) were identified in the marine assessment study area from review of the video footage. Tables 4.12 and 4.13 present these marine flora and fauna, respectively, and include their protection status from the IUCN; no internationally protected species were identified. Sedimentation-tolerant species tended to dominate all benthos regions, including:

- Mustard hill coral (*Porites astreoides*) – shallow rocky pavement with seagrasses
- Rope sponge (*Aplysina cauliformis*) – sandy-muddy bottom with rocky patches

Dominance by a few species implies a low biodiversity in a given ecosystem, typically as a result of natural factors such as wind and waves and/or anthropogenic influences such as pollution, disturbance, or sedimentation.

One key observation from the video interpretation was the virtual absence of fishes in all video tracks. The study area is considered to have a very low abundance of fishes and a near total absence of commercial species such as *Serranidae* (sea bass, grouper) and *Lutjanidae* (snapper). According to the observations noted in the track line log, in nearly 9 hours of underwater video, small fishes (< 10 cm in length) were reported in 25% of the observations and larger fishes (15 - 25 cm in length) were only reported in 8% of these observations. Pufferfishes (*Tetodontidae*) were seen on five occasions and a ray (*Elasmobranchii*), once. In the videos some fishes were identified: several individuals of the striped blenny *Meiacanthus grammistes*; an individual of the butterflyfish (*Chaetodon* spp.), and a juvenile yellowtail snapper *Ocyurus chrysurus*. The highest number (12 individuals) of large fish reported in the track line log corresponded to lionfish (*Pterois volitans*), an invasive Indo-pacific species. These results are consistent with those of Reef Check (2011), which that pointed out that many of Haiti's coral reefs are among the most exploited reef ecosystems in the world. There are virtually no commercial fishes in reproductive sizes present, and overfishing has destabilized the ecosystem by eliminating the herbivorous fish, allowing algae to grow unchecked, covering and annihilating the corals.

Table 4.13 – Marine Flora Species Identified in the Project Area

Family	Scientific Name	Marine Group	IUCN Protection Status
Caulerpaceae	<i>Caulerpa</i>	Macroalgae	
Dictyotaceae	<i>Padina</i>	Macroalgae	
Halimedaceae	<i>Halimeda</i>	Macroalgae	
	<i>Halimeda incrassata</i> (?)	Macroalgae	N/A
Hydrocharitaceae	<i>Thalassia testudinum</i>	Marine phanerogams	Least concern
Lycopodiaceae	<i>Stycopodium</i>	Macroalgae	

Udoteaceae	<i>Avrainvillea</i>	Macroalgae	
	<i>Avrainvillea</i>	Macroalgae	
	<i>Penicillus</i>	Macroalgae	
	<i>Udotea</i>	Macroalgae	

Source: Adapted from Earthtech Engineering, 2014b, Appendix 1

Table 4.14 – Marine Fauna Species Identified in the Project Area

Marine Group	Family	Scientific Name	IUCN Protection Status
Stony corals	Agariciidae	Agaricia fragilis	Data Deficient
	Astrocoeniidae	Stephanocoenia intersepta	Least Concern
	Faviidae	Diploria clivosa	Least Concern
	Faviidae	Manicina areolata	Least Concern
	Meandrinidae	Dichocoenia stokesii	N/A
	Milleporidae	Millepora complanata	Least Concern
	Poritidae	Porites astreoides	Least Concern
		Porites divaricata	Least Concern
		Porites furcata	Least Concern
		Porites porites	N/A
	Siderastreidae	Siderastrea radians	Least Concern
		Siderastrea siderea	Least Concern
Octocoralls	Briareidae	Briareum asbestinum	N/A
	Gorgoniidae	Pseudopterogorgia acerosa	N/A
		Pseudopterogorgia americana	N/A
	Plexauridae	Plexaura flexuosa	N/A

Sponges	Aplysinidae	Aplysina cauliformis	N/A
		Aplysina fistularis	N/A
	Chondrillidae	Chondrilla caribensis	N/A
	Irciniidae	Ircinia felix	N/A
		Ircinia strobilina	N/A
Echinoderms	Diadematidae	Diadema antillarum	N/A
	Echinometridae	Echinometra lucunter	N/A
	Echinometridae	Echinometra viridis	N/A
		<i>Holothuroidea</i> (Class)	N/A
	Oreasteridae	Oreaster reticulatus	N/A
Fishes	Blenniidae	<i>Meiacanthus grammistes</i>	Least Concern
	Labridae	<i>Thalassoma bifasciatum</i>	Least Concern
	Lutjanidae	<i>Ocyurus chrysurus</i>	N/A
	Percoidea	<i>Chaetodon spp.</i>	N/A
	Scorpaenidae	Pterois volitans	N/A
	Tetraodontidae	<i>unknown</i>	N/A

Source: Adapted from Earthtech Engineering, 2014b, Appendix 1

The environmental conditions of the territory surrounding the study area have had a detrimental influence on the coral reefs, and varying degrees of impact on the different benthos types present. Seagrasses appear to be in good condition. The reduction of coral cover and attendant increase in algal cover with depth is a trend that has been observed in other coral reef environments in the region, including reefs in Les Arcadins, 30 km northwest of the Project area. However, reefs in the Les Arcadins area are in general much healthier than those in the study area (Graphic 4.23), due to that area's increased distance from coastal influences and closer proximity to the open ocean.

Graphic 4.23 – Views of Healthier Reefs, Les Arcadins Area, Haiti



Source: ETEL, 2014b, Figures 18 and 19

Existing Social Conditions

This section presents the social and economic baseline for the Project area. The information is based on a number of questionnaires and focus group interviews conducted by researchers from ETEL as part of the 2014 ESIA and as a follow-up to support the current ESIA.

Graphic 4.24 – Political Map of Haiti

Source: Maphill, 2015

4.1.11 Socio-Economic Baseline Study Area

The Project's socio-economic baseline study area is defined in Section 4.2, and shown in Graphic 4.2. The following presents more detail about the locations included within this area.

The Project is located in the Source-Matelas Communal Section, Cabaret Commune, Arcahaïe arrondissement, of Haiti's West Department. Six communities are located within the Source-Matelas Communal Section: Aubry, Lafiteau, Simonette, Source-Matelas, St. Gerard, and Titanyen. As part of the 2014 ESIA, social baseline data

were gathered for the Lafiteau, Simonette, and St. Gerard; the data collected for these three communities is considered to be generally representative of the remaining communities within the Source-Matelas Communal Section. No governmental census data are available; however the 2014 ESIA provided the following estimated data for local populations:

- **Lafiteau** (est. population – 1,150)
- **Simonette** (est. population – 295)
- **St. Gerard** (est. population – 289).

The socio-economic conditions of the general population within the baseline study area are typical of towns situated within rural areas of Haiti. The baseline study area is only 1.5km from the main national highway ("Route National No. 1") and as such, the area also has some urban characteristics due to the good transport links, high level of industrialization in the region and proximity to Port-Au-Prince. An overview of the socioeconomic conditions in the baseline study area follows.

- The social and economic conditions of the population living within the baseline study area are consistent with the regional norms for towns in rural areas
- These conditions include limited public health assistance and educational opportunities and scarce, often non-existent, water and sanitation services
- Lafiteau, on the south side of the Project area, is a community of over 700 residential structures made from predominantly cement and approximately 400 shelters made with tarps
- Simonette, a seaside community to the north of Port Lafito is considerably small and has 250 residential structures of conventional type and 45 tarpaulin shelters
- St. Gerard is situated 800 meters inland on a dirt track joining Simonette to the main highway through the region and has approximately 260 houses and 30 shelters
- All three communities suffer from a lack of public services typical in small towns and rural areas across Haiti
- There are no hospital or emergency service facilities
- There are no public sanitation services
- Most households in the local population dispose of garbage in open land.

The field work for the social baseline study was carried out in three phases:

- A rapid house/business count
- Focus groups with community representatives
- Household surveys

Although Haiti has long lacked reliable national census data, the researchers conducted a review of available demographic information from numerous sources, including the United Nations, the World Bank, and the GoH, to assess how conditions in the local communities relate to regional and national trends.

In the first phase, a team of surveyors conducted a rapid count of homes and businesses in the three communities in the social baseline study area, and collected a list of contacts, including business owners and influential stakeholders to be invited to participate in focus groups. During this phase, the Team Lead also conducted open interviews with 20 stakeholders: these included a range of people from local elected officials to unemployed residents in a camp for people displaced by the 2010 earthquake (a list of business contacts and open interview contacts is available in Appendix E).

In the second phase of research, teams of two guides and a logistics coordinator conducted four focus groups, one each with local leaders in Lafiteau, Simonette, and St. Gerard; and the fourth in Lafiteau attended by stakeholders from all three communities. The focus groups were participatory workshops where community group representatives and other stakeholders were invited to share their appraisal of the local economy and their own living conditions. The focus group leaders encouraged input on employment, income, education, health, sanitation, and other factors using a discussion guide developed for this study after consultation with stakeholders in open interviews, and a review of regional and national demographic data. The discussion guide used for the workshop and other particularities of the Focus Groups can be found in Appendix F.

In the third and final phase of the research, a team of interviewers surveyed 251 randomly selected heads-of-households or spouses of heads-of-households (considered hereafter as heads-of-households) in the communities of Lafiteau,

Simonette, and St. Gerard. Another 32 households were randomly selected and the household heads interviewed in Lafiteau camp, a term used in this study to refer to 419 improvised shelters provided to people in the community by the international faith-based NGO Samaritan's Purse. The dwellings were intended to be temporary shelters for people in the area whose homes were destroyed in the Jan. 12, 2010, earthquake, but they are now treated as long-term residences by local families who lack the resources to build or rent new homes. Questionnaires and interview reports are presented in Appendix G. Table 4.15 below summarizes the observations made in each of the assessed communities and its share of contribution to the survey's outcomes.

Table 4.15 – Interview Respondents by Community

<i>Community</i>	<i>No. Female Respondents</i>	<i>No. Male Respondents</i>	<i>No. Total Respondents</i>	<i>Percentage of Survey</i>
<i>Lafiteau</i>	98	29	127	50%
<i>Simonette</i>	25	17	42	17%
<i>St. Gerard</i>	33	17	50	20%
<i>Lafiteau Camp</i>	20	12	32	13%
<i>Totals:</i>	176	75	251	100%

Source: NRE 2014, Table 5

To select households, the supervisor counted and assigned a number to blocks of eight households; one house in each block was then randomly selected to be interviewed. Surveyors visited the selected households and using the questionnaire presented in Appendix G interviewed the heads-of-households. An electronic form was used as survey instrument loaded on mobile devices (tablets). The responses and GPS points of each interview location were recorded and are part of the report database.

4.1.12 Demographics

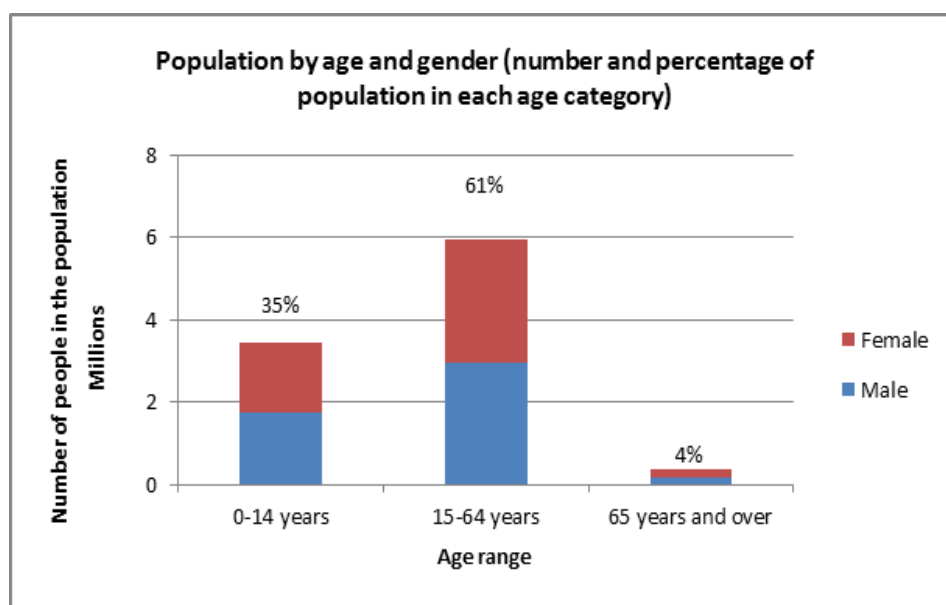
Regional and local population statistics were not available for the majority of the towns and communities in the baseline study area. The only recent demographic

data available for the country are 2009 statistics from the *Institut Haitien de Statistique et d'Informatique* (IHSI), pre-2010 earthquake. The IHSI data indicate that Cabaret, the nearest large town to the Project, recorded a population of 36,120 in 2009.

4.1.12.1 Age, Gender, and Growth Rate

General demographic data are provided for the country as a whole, as neither regional nor Project site-specific recent data exist. Haiti's 2010 population was estimated at 10,303,698 according to the United Nations Population Division (2011). With an annual growth rate of 2.2%, the country's population is expected to reach 12.3 million by 2030. Total life expectancy at birth was estimated at 62 years in 2008. Crude birth and death rates were 27 births and 9 deaths per 1,000 people, respectively, in 2009. The total fertility rate (number of children per woman) declined from 4.7 (2000–2001) to 4.0 (2005–2006). Haiti's population is young, with more than 50% under the age of 21 and 35% under the age of 14. Women represent 51.8% of the population (86 men per 100 women in urban areas and 98 men per 100 women in rural areas).

Graphic 4.25 – Population by Age and Gender, Haiti 2013



Source: NRE 2014, Figure 12

Survey results from interviews in the baseline study area are consistent with the national data.

4.1.12.2 Households in the Study Area

The majority of survey respondents (187, or 74.5%) reported having a spouse living in their household. A slightly higher number said they were married (77, or 30%) or in a common-law union (110, or 42.8%). Only four (less than 2%) were divorced, while 22 (8.6%) were widowed, and 44 (17.1%) were single as summarized in the table below.

Table 4.16 – Marital Status of Respondents

Marital Status (n=251)	Male/Female Ratio, Frequency	Percentage of Respondents
Single	(16/25) = 41	16.3%
Common Law	(29/81) = 110	43.8%
Married	(23/54) = 77	30.7%
Divorced	(3/1) = 4	1.6%
Widowed	(4/15) = 19	7.6%

Source: Modified from NRE 2014, Table 15

Respondents had an average of four children, and reported that their spouses had an average of three, with an average of 4.7 people per household and a maximum of 14. This figure appears roughly consistent with observations nationwide indicating that every person who earns a salary has five other people depending on the income to survive. The average household had 1.6 children between ages 6 and 12. Households averaged 1.3 children who were not in the respondent's immediate family, and 1 servant working in the house.

Table 4.17 - Average Household Composition of Respondents

Number of children aged 6-12 years old not in school	1.6
Number of children in the house who are not in respondent's family	1.3
Number of servants working in the house	1

Source: NRE 2014, Table 46

The presence of older children brought the average number of people in the household to 4.7, as shown in the following table.

Table 4.18 - Number of People in Respondents' Household by Age

Age	Girls/Women	Boys/Men
0-5 years	1.2	1.2
6-12 years	1.2	1.2
13-18 years	1.5	1.4
18+ years	1.5	1.4

* Average number of people living in household: 4.7

Source: NRE 2014, Table 57

As shown in Table 4.19 below, 159 respondents are in joint headship households (households where there are male and female household heads together), 64 respondents are in single female-headed households (no male spouse living in the household), and 28 respondents are in male-headed households (no female spouse living in the household).

Table 4.19 – Gender of Heads-of-Household in Survey – Lafiteau, Simonette, and St. Gerard

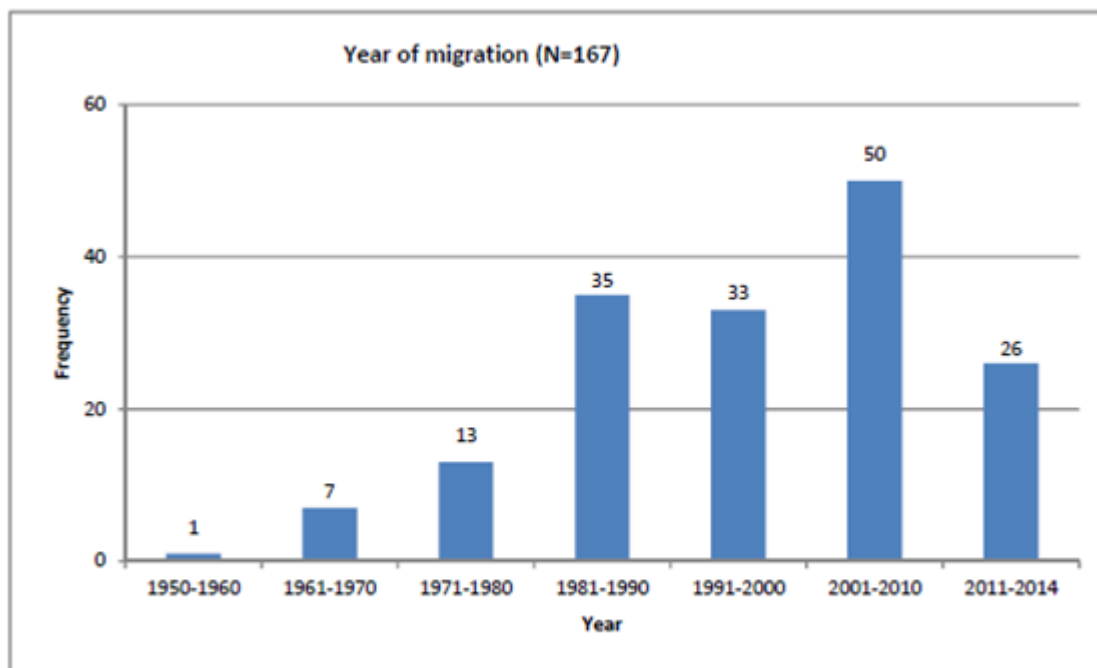
Household Type	Frequency of Occurrence in Survey Population	Percentage of Occurrence in Survey Population
Male & Female	159	63.3%
Single Female	64	25.5%
Single Male	28	11.2%

Source: NRE 2014, Table 11

4.1.12.3 Migration and Immigration

Slightly over half (53.4%) of Haiti's population lives in urban areas, which leaves a considerable 46.6% living in the countryside. Haiti is less urbanized than neighboring countries including the Dominican Republic (69.7% urban population), and Cuba (75.2% urban population). However, Haiti's real and projected urbanization rate (2010-2015) is higher than its closest neighbors, however – 3.7% in Haiti compared to 2.0% in the Dominican Republic and 0.1% in Cuba.

Since 1950, the move from rural areas to cities and towns has been more pronounced in the Lafiteau, Simonette, and St. Gerard area (an industrialized pocket in a traditionally rural zone) than in much of the country. Migration to urbanized areas was especially apparent during the 1980s and the 2000s - this trend is graphically represented in Graphic 4.26.

Graphic 4.26 – Migration Trends in Haiti by Decade

Source: NRE 2014, Figure 13

Several factors have contributed to this influx in the baseline study area, including the area's close proximity to Port-au-Prince. Job seekers have migrated to the communities in periods of increased industrial activity, such as the reopening of the Portland cement production facility Cimenterie Nationale (CINA) in Fond Mombin in 2001, and during periods of expanded operations and services offered by the area's concentration of foreign missionary NGOs, as occurred after the 2010 earthquake.

Table 4.20 – Survey Respondents' Area of Origin

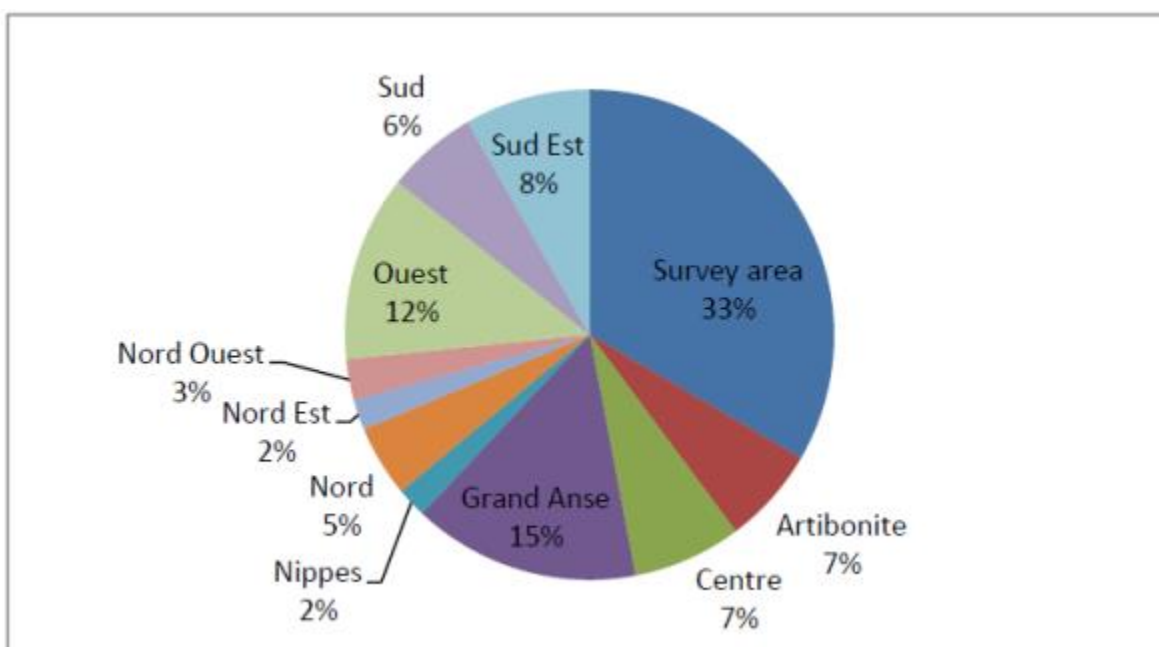
Area of Origin	Number of Female respondents	Number of Male respondents	Total number
Survey Area	56	28	84
Artibonite	11	5	16

Centre	16	2	18
Grand Anse	28	10	38
Nippes	2	3	5
Nord	8	4	12
Nord Est	4	0	4
Nord Ouest	4	3	7
Ouest	22	9	31
Sud	10	5	15
Sud Est	15	6	21

Source: NRE 2014, Table 12

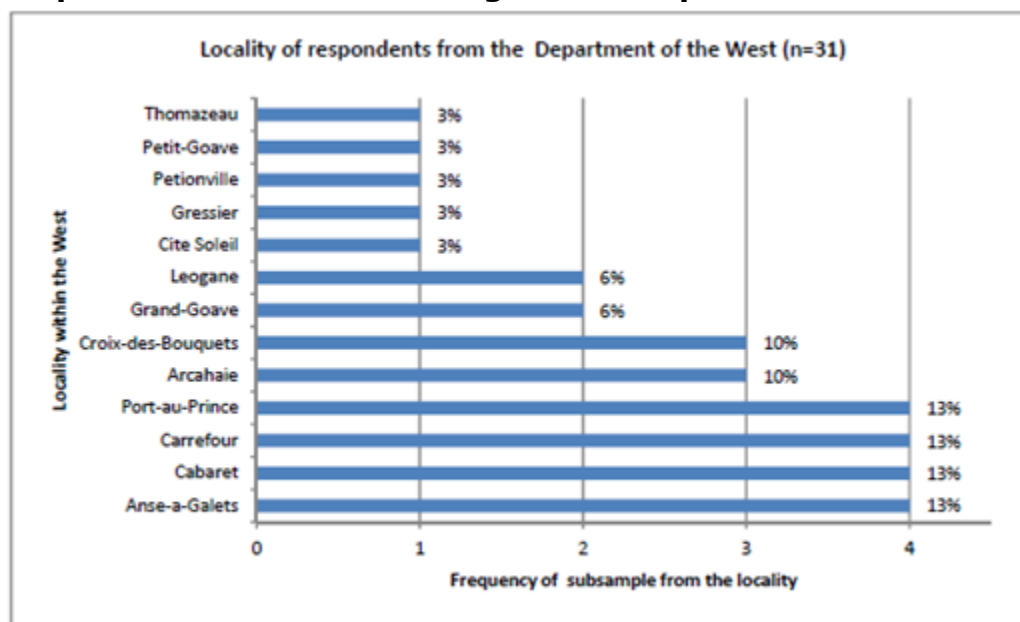
Of the 251 survey respondents, 84 (33.5%) were originally from the area, while the rest had moved in from other areas. Among those who migrated into the baseline study area communities, the largest numbers came from the Departments of Grand Anse (38, or 15.1%) and West (31, or 12.4%).

Graphic 4.27 – Area of Origin, Survey Respondents



Within West Department, the majority (13) came from the Port-au-Prince area - Graphic 4.28 below presents the various backgrounds of those immigrants from the West Department who settled in the baseline study area.

Graphic 4.28 – Town of Origin for Respondents from West Department



Source: NRE 2014, Figure 14

The average age of survey respondents was 41 years, with an age range from 16 to 92. The average age of those who migrated into the area was only 23 years.

4.1.12.4 Health

In terms of the ability to provide health care to its population, Haiti ranks last among the countries in the Western Hemisphere. Economic instability has limited any growth in this area. WHO statistics show that there are 25 physicians and 11 nurses for every 100,000 people. Per capita, Haiti spends about US\$83 annually on health care. Only one-fourth of births are attended by a skilled health professional. Most rural areas, including the baseline study area, have no access to health care,

making residents susceptible to otherwise treatable diseases. Some WHO estimates, establish that only 43% of the target population receives the recommended

In addition, Haiti has the highest incidence of human immunodeficiency virus/acquired immune deficiency syndrome (HIV/AIDS) outside of Africa. Estimates vary, but the United Nations projects the national prevalence rate to be 1.5% of the population. Other estimates place the rate as high as 5% in the urban population and 3% in rural regions. Annually, 5,000 Haitian babies are born infected with the AIDS virus. The disease causes a fifth of all infant deaths and has orphaned 200,000 children.

Dengue fever, a mosquito-borne virus, is present across Haiti as shown by Figure 4.7 and reported by the Centers for Disease Control (CDC). The CDC notes that dengue is a leading cause of illness and death in the tropics and subtropics, and is transmitted by mosquito bite. Effective dengue control measures typically involve reducing the incidence of mosquito bites, via use of mosquito control measures such as spraying, use of mosquito nets, or reduction of mosquito habitat.

Leaf-doctoring, or herbal cures, are an integral part of many rural Haitians lives. Since residents of the baseline study area communities have limited access to the attentions of doctors and modern medicine when ill, their reliance on leaf-doctoring is essential to remedying their sicknesses and maintaining a state of good health. Local people are accustomed to collecting or buying herbs and using herbal remedies to treat various ailments.

4.1.13 Education and Literacy

Formal education rates in Haiti are among the lowest in the Western Hemisphere. Haiti's average literacy rate of 53% (55% for males, 51% for females) is far below the 90% average literacy rate for Latin American and Caribbean countries. The country faces shortages in educational supplies and qualified teachers, and in general terms the rural population is less educated than the urban population. The 2010 earthquake exacerbated the already constrained parameters on Haiti's

educational system by destroying infrastructure and displacing 50-90% of the students.

The majority of survey respondents reported that children between the ages of 6 to 12 in their household were attending school. Out of the 251 total survey respondents, 218 (86.8%) said that all children in this age range in their household were attending school. Table 4.21 below shows the statistics for the 33 households reporting school-age children not attending school. Almost all of the children in the respondents' households were members of their immediate family, with 18 respondents reporting at least one child in the home who was not their own.

Table 4.21 –School-Age Children Not Attending School, by Household

Number of Children	Respondent's Own Children		Children in House, Not in Respondent's Family	
	Number	Percent	Number	Percent
1	20	60.6%	16	88.8%
2	9	27.3%	0	0%
3	2	6.1%	0	0%
4	1	3.0%	1	5.6%
5	0	0%	1	5.6%
6	0	0%	0	0%
7	0	0%	0	0%
8	1	3.0%	0	0%
Totals:	33 Respondents	100%	18 Respondents	100%

Source: Modified from NRE 2014, Table 13

Most respondents had an elementary school education or less. Out of 251 respondents, 110 (43.8%) said their highest level in school was 1st through 6th grade, while four (1.6%) said they had only reached kindergarten, and 37 (14.7%) reported never having attended school at all. Ninety-five (37.9%) had reached 7th through 13th grade, and five (2.0%) had attended a university or technical school.

Their spouses were more likely to have reached 7th through 13th grade (77, or 48.4%).

Table 4.22 – Head-of-Household Education

Education Level	Respondent		Spouse	
	Frequency	Percentage	Frequency	Percentage
No school	37	15%	20	13%
Kindergarten	4	1%	2	1%
1 st – 6 th grade	110	44%	56	35%
7 th – 13 th grade	95	38%	77	49%
University or professional school	5	2%	4	2%
Totals:	251	100%	159	100%

Source: Modified from NRE 2014, Table 14

4.1.14 Living Conditions

4.1.14.1 Home Construction

The majority of rural houses in Haiti are two-room dwellings that have walls made from cement, wood, or a combination of both materials and cement or dirt floors, Roofs are constructed of corrugated metal sheet and in some cases thatched with local palm leaves. Most windows have no glass and are closed with wooden shutters; and there is little furniture present. In most such dwellings, the kitchen is located outside the living quarters, and sanitation facilities often consist of a simple latrine dug at a distance from the house. Houses are built almost exclusively by the male heads of households and their male friends and relatives.

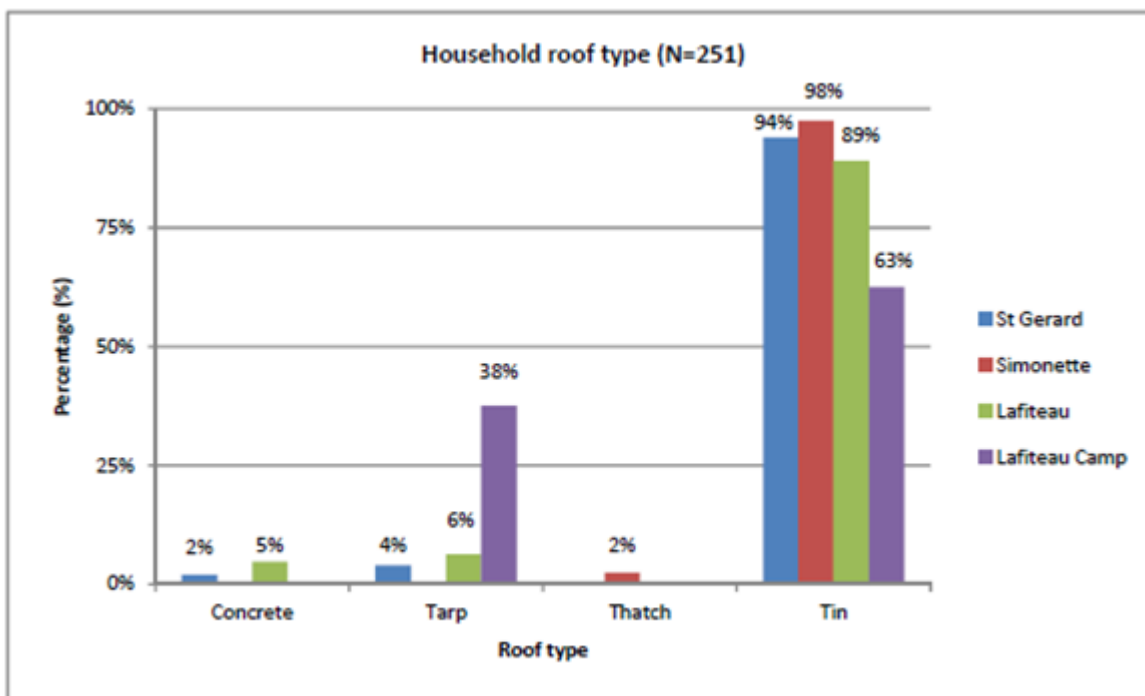
The most common roof material in the communities surveyed is tin, a standard material used for suburban roofing in developing countries due to its affordability, availability, and durability. Concrete roofs were present in a significantly smaller

percentage, while tarpaulins were present mainly in the temporary housing Lafiteau Camp, although homes in other communities in the baseline study area are also currently using tarpaulins for roofing (Graphics 4.29 and 4.30, below).

Graphic 4.29 – Typical Shelters by Site Ble (L); Concrete House in Simonette (R)

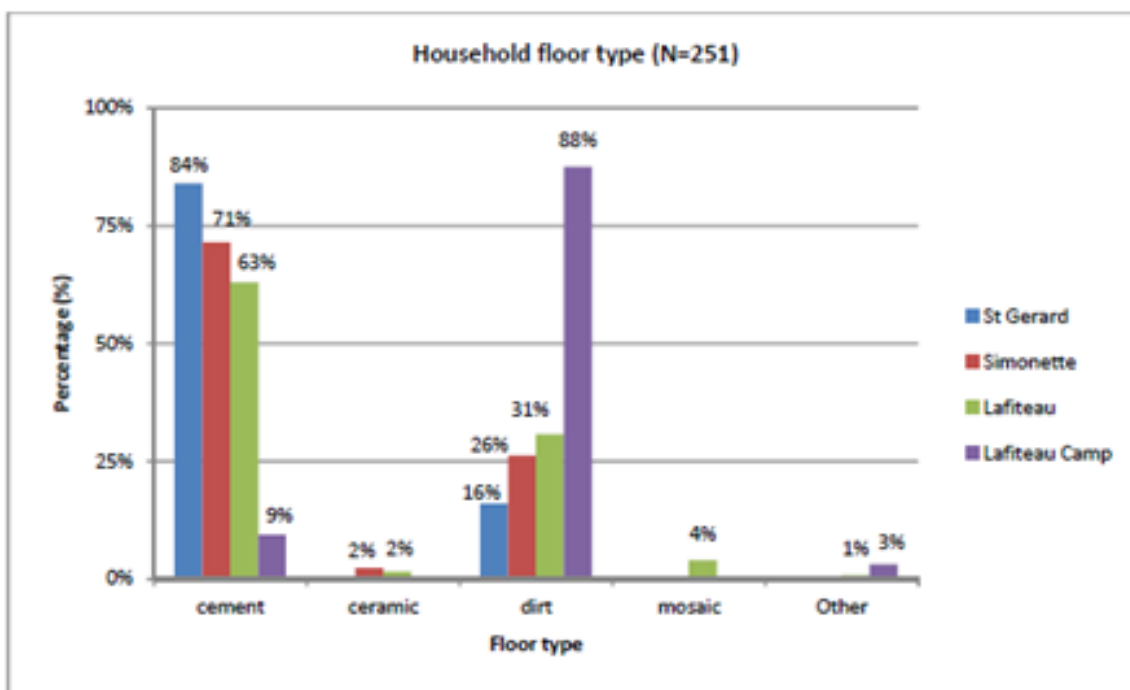


Source: Earthtech Engineering, 2014 a, Figures 37 and 38

Graphic 4.30 – Housing Infrastructure – Roof Type

Source: NRE 2014, Figure 21

The majority of homes (155 or 61.8%) have cement floors, while 86 (34.3%) have dirt floors (Graphic 4.31). Again, the noteworthy exception is the Lafiteau camp, where most (28 out of 32 homes, or 87.5%) have dirt floors. Other flooring types such as ceramic tile and hardwood floors are used less frequently.

Graphic 4.31 – Housing Infrastructure – Floor Type

Source: NRE 2014, Figure 22

4.1.14.2 Water and Sanitation

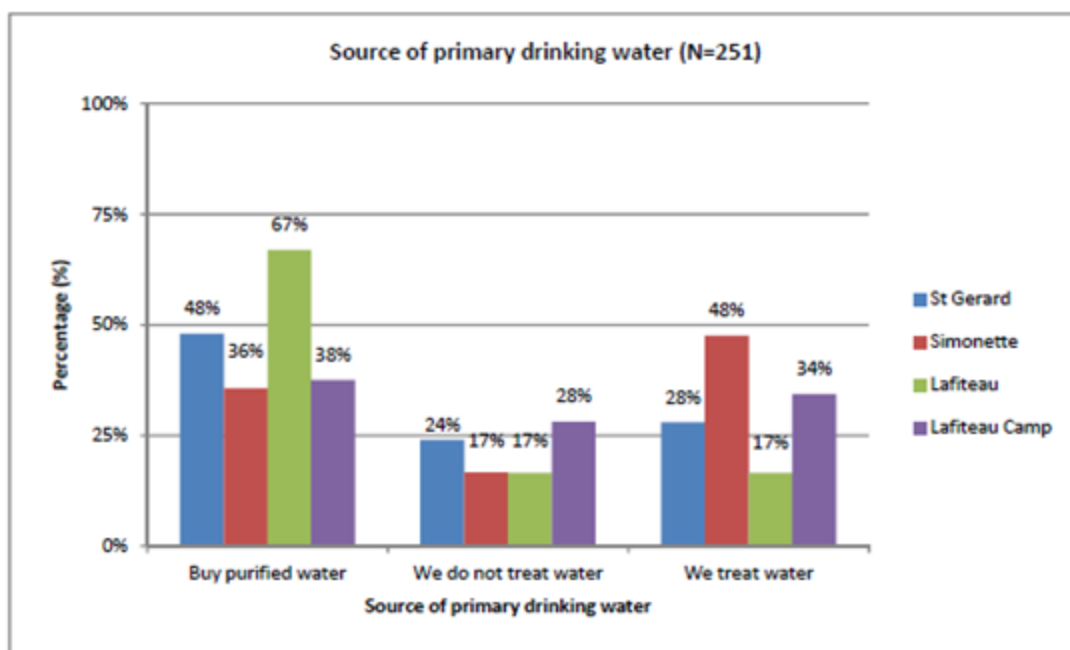
A major problem, according to focus group respondents and other stakeholders, is a lack of potable (treated and safe) drinking water. Water is used to cook, prepare hot and cold beverages, for washing, and to drink directly. In Lafiteau, which has no surface water sources, most people get water for domestic use from hand-pumped wells – there are six scattered throughout the residential areas (see Figure 4.5). Water can also be purchased for 7 gourdes (about \$0.14) per five-gallon bucket from a privately run water tower that is refilled by tanker truck every two weeks (Graphic 4.32, below). Neither of these sources is treated. Focus group respondents said the well water is salty and has a poor taste. “The water from the pumps, you can’t drink it”, said a Lafiteau women’s group representative in Focus Group 1.

Graphic 4.32 – Water Tower by Min Lafiteau Road



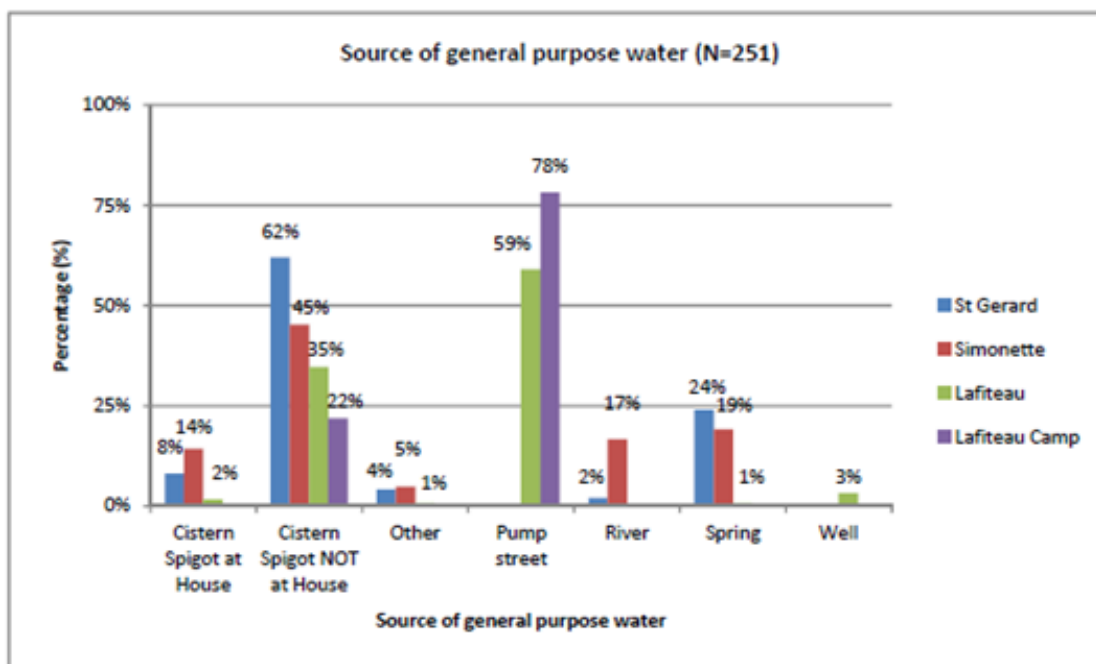
Source: NRE 2014, Figure 39

Most survey respondents purchase purified drinking water (136, or 54.28%) at local stores or treat their own (66, or 26.39% – see Graphic 4.33).

Graphic 4.33 – Primary Drinking Water Sources

Source: NRE 2014, Figure 24

Eighty percent get water for general purposes (cleaning, washing, sanitation) by the bucketful from privately owned cistern spigots, or from a public hand-pumped well (Graphic 4.34). In Lafiteau, several wells equipped with submersible pumps supply water to an improvised network of pipes for distribution to nearby houses.

Graphic 4.34 – General Water Supply Sources

Source: NRE 2014, Figure 25

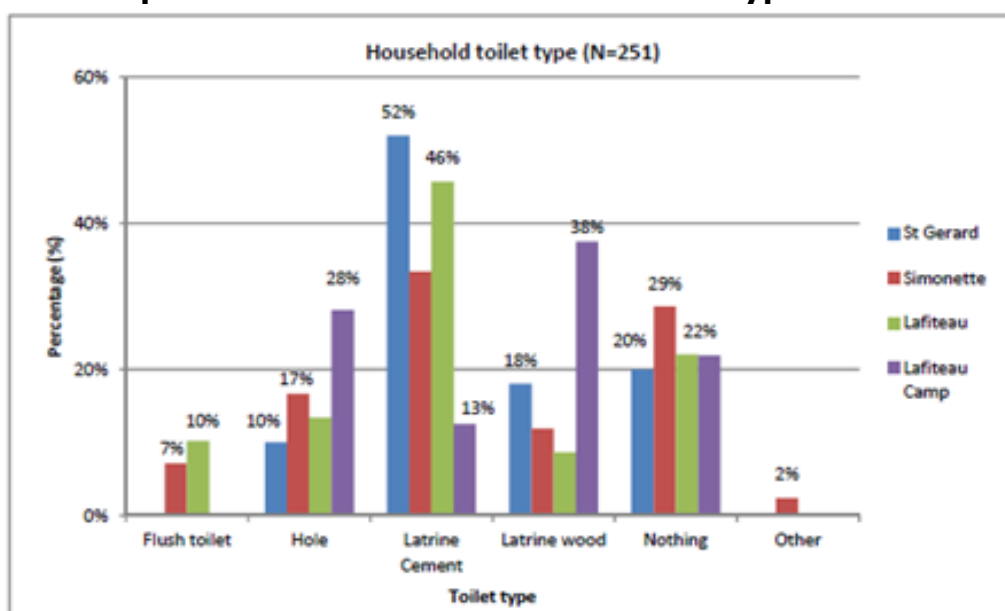
In open interviews and focus groups, residents expressed the view that water from all such sources is undesirable or even undrinkable. This scarcity of adequate drinking and general use water sources reflects conditions that are widespread in Haiti. According to 2012 World Bank Country data (World Bank, Haiti Overview, 2014), 75% of urban Haitians had access to an improved drinking water source, such as piped water, a public tap, or protected well or spring. In rural areas, the figure was just 48% in 2012.

Eighty percent of the Lafiteau population drinks treated water (purchased or treated in the household), more than the average urban (58%) or rural (76%) Haitian populations, according to 2012 data from the Haitian Ministry of Public Health and Population (Cayemittes et al., 2013). St. Gerard has an abundance of springs that once provided clean drinking water, but the community lacks resources to properly tap the springs, leaving the water sources susceptible to contamination from livestock. Stakeholders expect this situation to worsen if new immigrants arrive

with further industrial development, as a St. Gerard NGO technician said (in Focus Group 2) happened between 2005 and 2014

The most common type of sanitary facility reported in baseline area residences was a cement latrine, reported by 102 of the 251 households, or 40.6% (see Graphic 4.35 below). Other respondents reported using a hole (6.4%), a wooden latrine (14.7%), a flush toilet (6.4%), or no facility at all (57, or 22.7%). Focus group respondents cited odors and the spread of waste in heavy rains as a significant source of pollution (see Focus Group Reports in Appendix F). Many households reported the lack of a proper service for disposing of sewage.

Graphic 4.35 – Water and Sanitation – Type of Toilet



Source: NRE 2014, Figure 23

4.1.14.3 Food and Nutrition

The World Food Program reports food insecurity is persistent in Haiti and today nearly a third of the population is considered food-insecure; of these 600,000 need

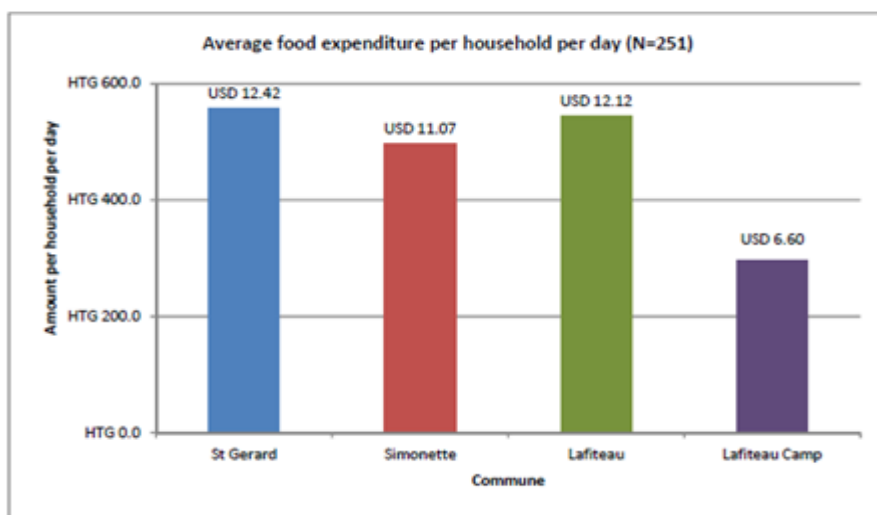
external food assistance to survive. Currently, one in every five children suffers from chronic malnutrition, 6.5% from acute malnutrition, and more than half of women and children suffer from anemia.

Within the baseline study area there are a number of school feeding programs run by NGOs, such as Grace Village and Mission of Hope. Grace Village has a feeding center that provides meals to 400 people in Titanyen each week. The average diet of the people living within the baseline study area is based on starch staples such as rice, corn, millet, yams, and beans, supplemented occasionally by consumption of meats, usually pork or goat. Locally available produce includes coconut, peppers, spinach, and plantains; these ingredients are usually affordable for the meals of residents in the assessed area.

The average cost of food expenditure per household per day varied considerably according to community: Lafiteau Camp had the lowest food expenditure - 6 USD (297.19 HTG) per household per day – placing them in the extreme poverty category. The other three communities had considerably higher food expenditure costs, all around 11 USD (489.17 HTG) or above (Graphic 4.36).



Graphic 4.36 – Daily Household Food Expenditures

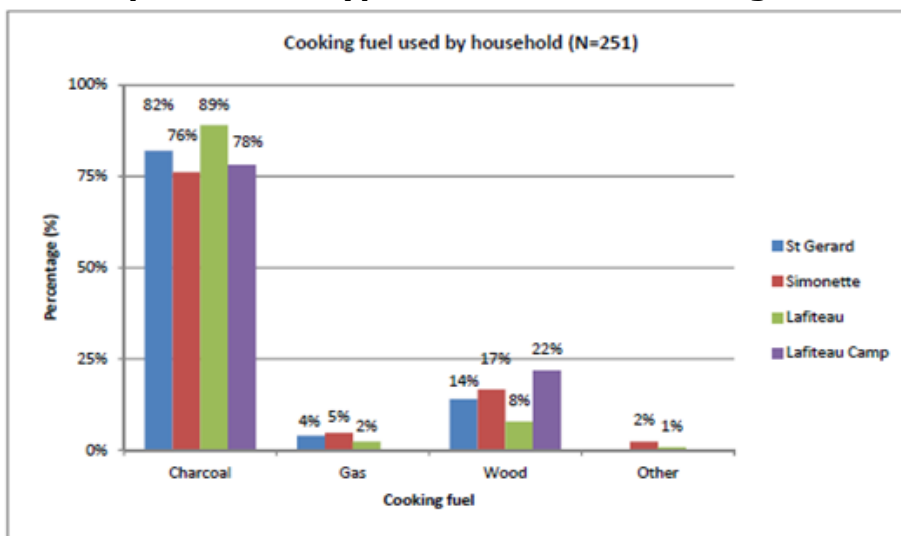


Source: NRE 2014, Figure 16

4.1.14.4 Cooking Fuel

Charcoal is by far the most common cooking fuel in the baseline study area (211 respondents, or 84.1%), followed by wood (31, or 12.45%). Only seven people (2.8%) reported using propane (Graphic 4.37, below).

Graphic 4.37 – Type of Household Cooking Fuels



Source: NRE 2014, Figure 26

4.1.15 Socio-Economics

Employment and income patterns provide insight into local economic conditions, including the strength of the local economy and the well-being of its residents.

4.1.15.1 Economically Active Population

Haiti's economically active population (those over age ten), represented more than half of the Country's total 10.3 million population, according to the World Bank. Forty-two percent of the official work force is female, ranking the country's female participation as one of the highest among developing countries. In rural areas, however, the role of women in production and commerce is apparently much greater than these statistics indicated.

The typical Haitian with an income supports five other people, so the creation of new jobs would create a significant ripple effect throughout the population. Haiti's age-dependency ratio in 2013 was 64 (World Bank, 2013), meaning that there were 64 people in non-productive age groups (people younger than 15 or older than 65) for every 100 people in the working-age population.

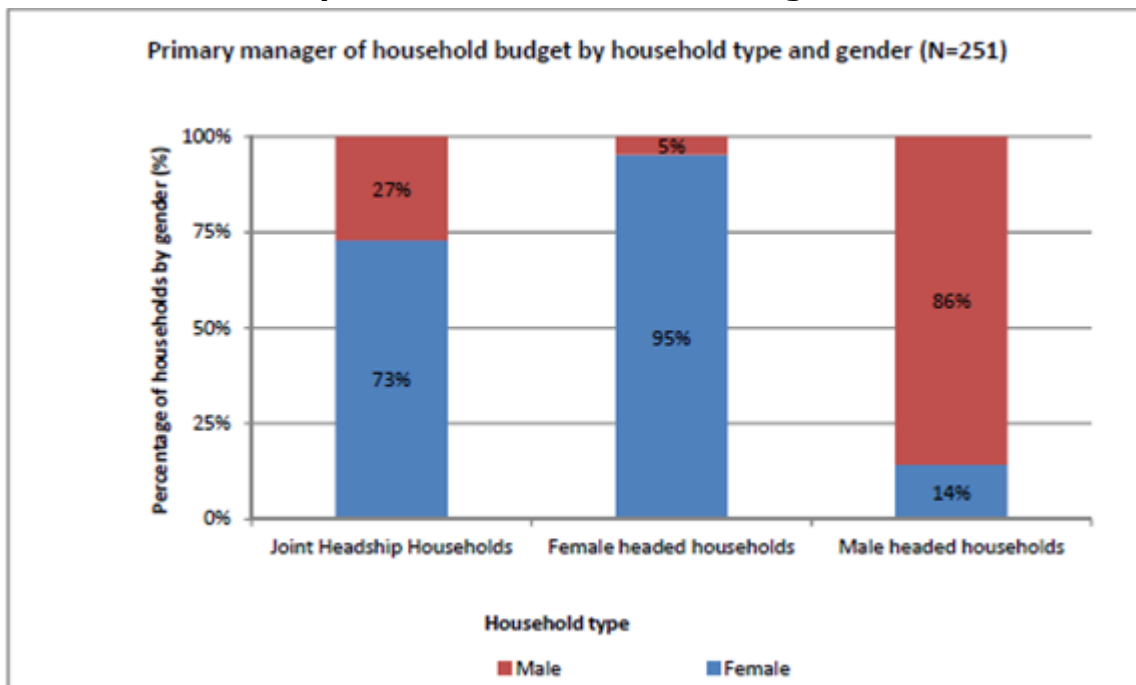
Historically the majority of the labor force worked in the agrarian sector, but recent decades have seen a shift from agriculture to services, with some growth in industry. Despite these changes, agriculture continues to dominate economic activity, employing around 55% of the labor force; followed by services, 30%, and industry, 15%. Based on these figures, Haiti continues to be the most agrarian, and the least industrial, society in the Western Hemisphere.

4.1.15.2 Income

In single heads-of-household families, generally whoever is the head of household manages the household budget. For single female headed households, it is usually the woman herself who manages the household budget (in 95% of female headed households). Similarly, for single male headed households, it is the man himself who manages the household budget in 86% of male household budgets. In joint headship households it is primarily the female who manages the household budget

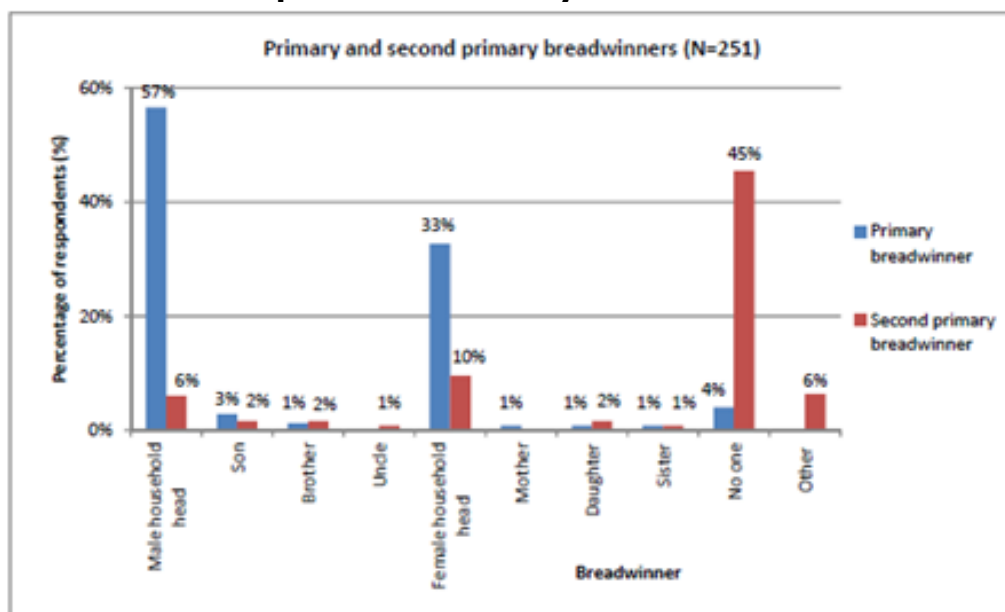
(73% female budget managers vs 27% male household budget managers - see Graphic 4.38 below).

Graphic 4.38 – Household Management



Source: NRE 2014, Figure 17

As shown in Graphic 4.39 below, the primary breadwinners in the households were male household heads (57%), followed by female household heads (33%). The majority of households had no second primary breadwinner (45%).

Graphic 4.39 – Family Breadwinners

Source: NRE 2014, Figure 18

4.1.15.3 Employment

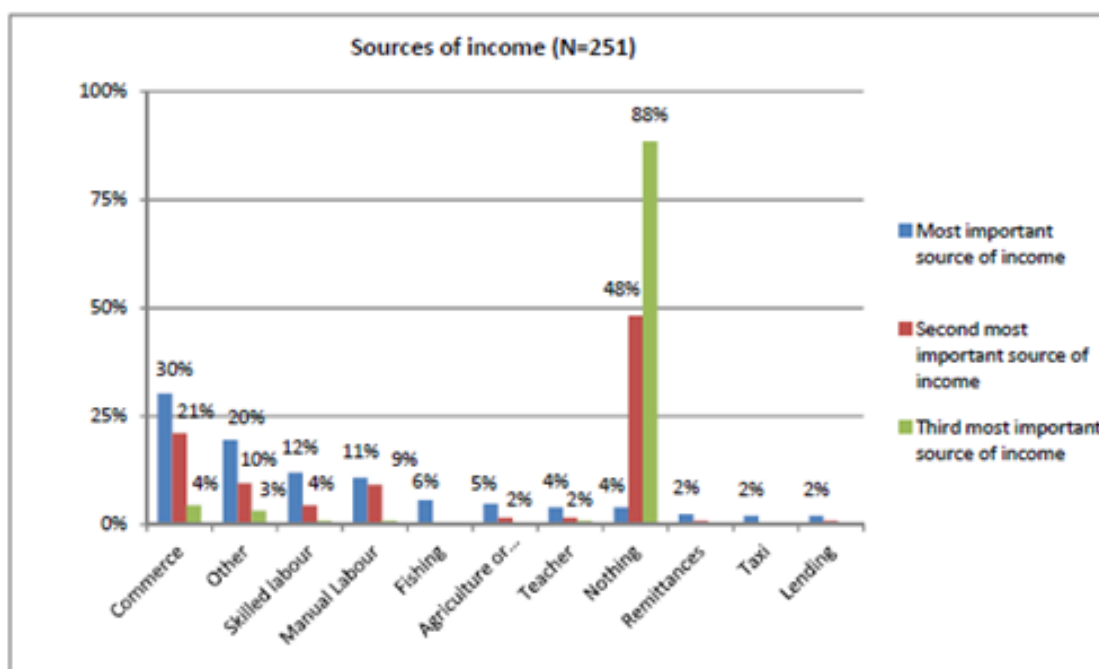
Statistics on employment and the methodologies used to gather such data varied widely; most unemployment figures in Haiti are only estimates. Following the 2010 earthquake, the unemployment rate in Haiti increased to 40.6% from a rate of 9.6% in 2009. The unemployment rate in Haiti averaged 15.0% from 1982 until 2010, reaching an all-time high of 40.6% in 2010 and a record low of 7.2% in 1999 as reported by the World Bank. Official unemployment is severe in Port-au-Prince, but comparatively low in rural areas, reflecting urban migration trends, rapid population growth, and the low number of skilled and semi-skilled workers.

In all four focus groups conducted for the social baseline, it was universally acknowledged that Lafiteau, Simonette, and St. Gerard are plagued by exceedingly high unemployment rates. St. Gerard focus groups participants have the perception that only 3% of people are working (a 97% unemployment rate), that and the income of that 3% is not sufficient to satisfy their basic needs. Others put the percentage of people in the area with formal jobs even lower: while carrying out

Focus Group 4, a representative of the Lafiteau community said that 1% of people are regularly employed, because a lot of people can only find short-term jobs (for a week or two).

The profile revealed in the survey data is of an area in which slightly more than half of household heads and their spouses depend on at least two sources of income to survive. Graphic 4.40 below illustrates the principle income-earning strategies. The most common primary source of income is commerce, cited by 30% of respondents. Focus Group participants all estimated the rate of employment in formal jobs to be in the low single digits, suggesting that the other occupations (with the exception of teacher) were primarily in the informal sector.

Graphic 4.40 – Sources of Income



Source: NRE 2014, Figure 15

Even though it was not assessed during the survey, (and respondents are reluctant to report on the subject), it is known that many people living in the baseline study area depend on remittances which are crucial for the survival of broad sectors of

the population. In the aggregate, remittances are the single greatest source of revenue for the entire Country, estimated at a minimum of 2 billion in 2012 (per capita US\$200). If informal transfers are included, remittances may account for as much as half of the Country's total revenue (IRIN, 2010).

The 2014 socio-economic baseline indicated that approximately 5% of survey respondents reported that fishing contributed significantly to household income. To better understand the role of fishing in local communities and fishing routes, a May 2015 study by ETEL was conducted solely targeting artisanal fishermen in Simonette and Lafiteau. This report is included in Appendix I of the current ESIA. The 2015 study supported the baseline data, with about 110 people in the two communities combined identifying as fishermen, 80 men in Simonette and 31 in Lafiteau: women do not participate in primary fishing activities. This result was consistent with comments from focus group participants, who estimated that a few percent of local residents worked primarily as fishermen, and that a total of about 40 small fishing boats operate from Lafiteau and Simonette beaches, catching various species of fish as well as lobster, conch, and crab. Fishermen are not organized formally and tend to fish independently in *kanot* (non-motorized, locally constructed wooden skiffs) that operate from beach areas in Lafiteau and Simonette (Figure 4.8). Fishermen tend to follow the same routes, generally restricted to the shallower waters surrounding both communities as shown in Figure 4.8.

Focus group participants noted that the local catch had dwindled in recent decades, and attributed the decline to several factors, including the smothering of marine life by runoff from deforested hillsides, pollution, and overfishing, especially fishing with nets. The inadequacy of the rudimentary equipment and traditional techniques used by local fishermen, as well as the absence of boats capable of safely reaching deep water, contribute to the overfishing problem. Fishermen faced with a dwindling catch deplete shallow areas of even the smallest juvenile fish, informants said, damaging near-shore nurseries and reducing the future catch even further. "We don't catch as many fish as before because nets destroy all of the little fish", said the Simonette ASEC in Focus Group 3.

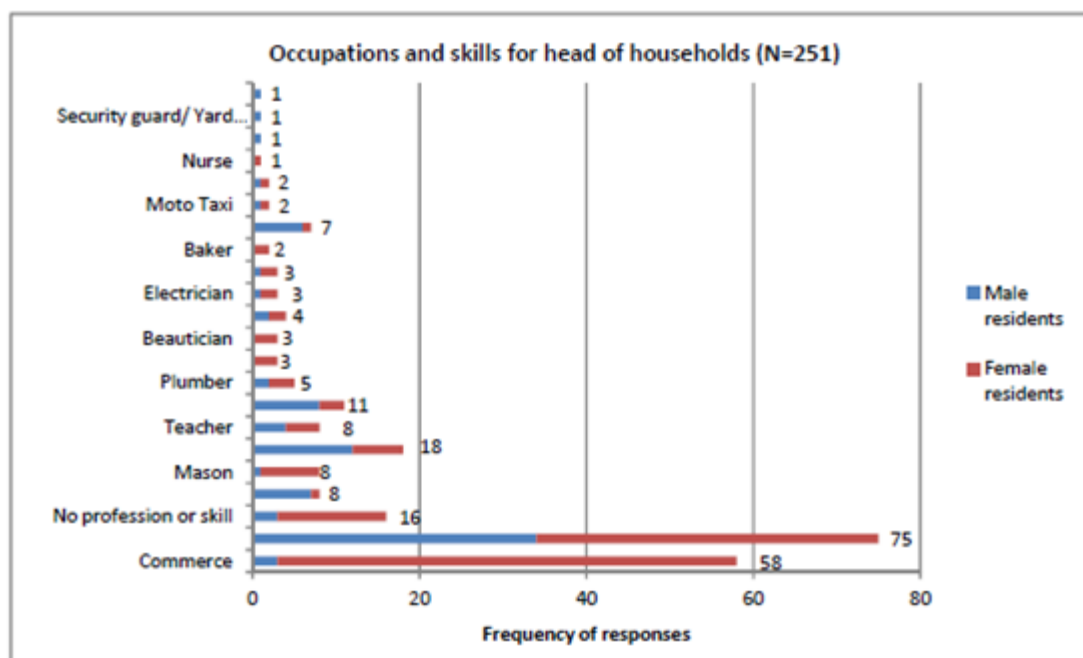
The jobs that will be created by Port Lafito represent a significant potential beneficial impact on the community. Expectations are growing among local

residents who envision job seekers from the nearby communities having hiring priorities for the project construction and operations. Focus group participants expressed high hopes for the local job market as the project progresses.

4.1.15.4 Occupations

In the baseline study area, men monopolize the formal job market. Only men work as construction workers, general laborers, mechanics, fishermen, and chauffeurs. The few wage-earning opportunities open to women are in health care and to a far lesser extent, in teaching. Women dominate the commerce sector. Fifty-five women said their primary occupation was commerce (see Graphic 4.41 below). The next most common occupation among women was listed as “other” (N=41), followed by “no profession or skill” (N=13), and manual labor (N=10). Among the men, the most common response on this question was “other” (N=33, or 44% of the 75 men in this group), followed by farmer (N=12, or 16%), and mason (N=10, or 13.3%).

Graphic 4.41 – Head of Household Occupation

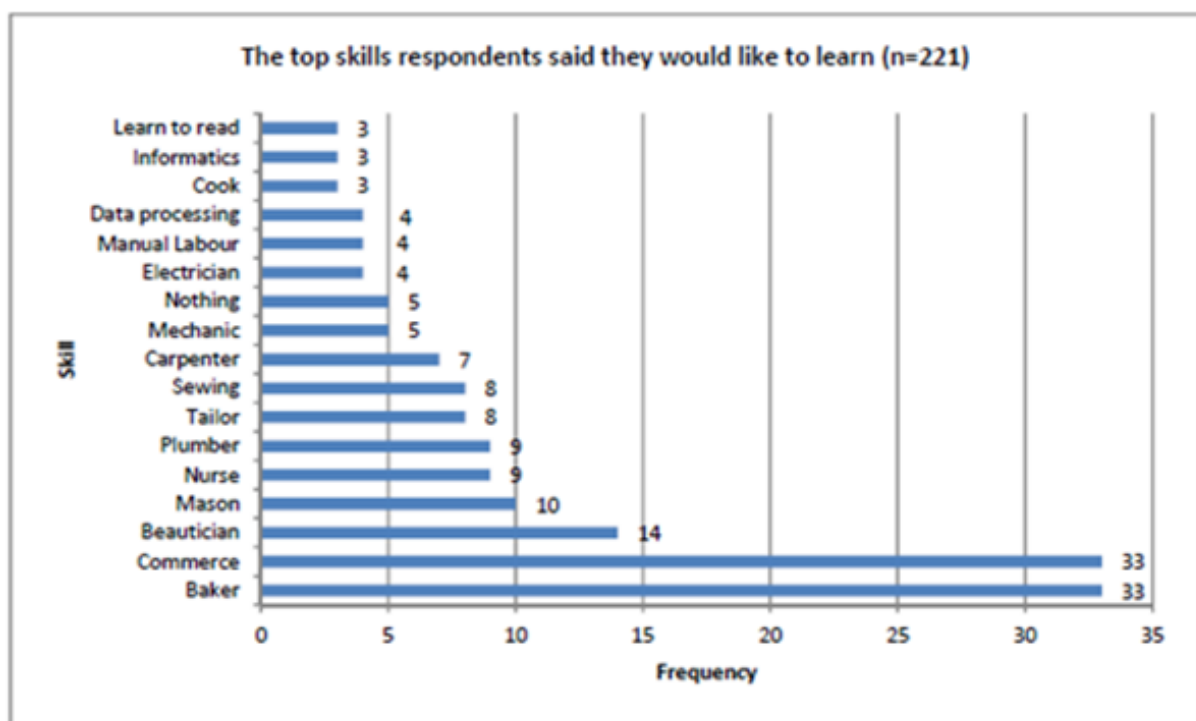


Source: NRE 2014, Figure 19

Only 1.2% (N=3) of respondents reported having another business. 96% (N=241) of respondents reported wanting to have another business. The primary reason (for 99.5% of respondents) for not having another business was lack of money.

Survey participants were also queried as to whether they would like to learn a new skill and if so, what type of skill or skills. Most of the participants living in the baseline study area were not attracted to the traditional agrarian sector, with the service and commerce sectors carrying greater appeal. Among respondents responding in the affirmative (N=221, or 88% of respondents), the most common responses were baker and commerce (N=33 for both) – see Graphic 4.42 below. The next most common responses were beautician (N=14), mason (N=10), nurse (N=9), and plumber (N=9).

Graphic 4.42 – Desired Skills



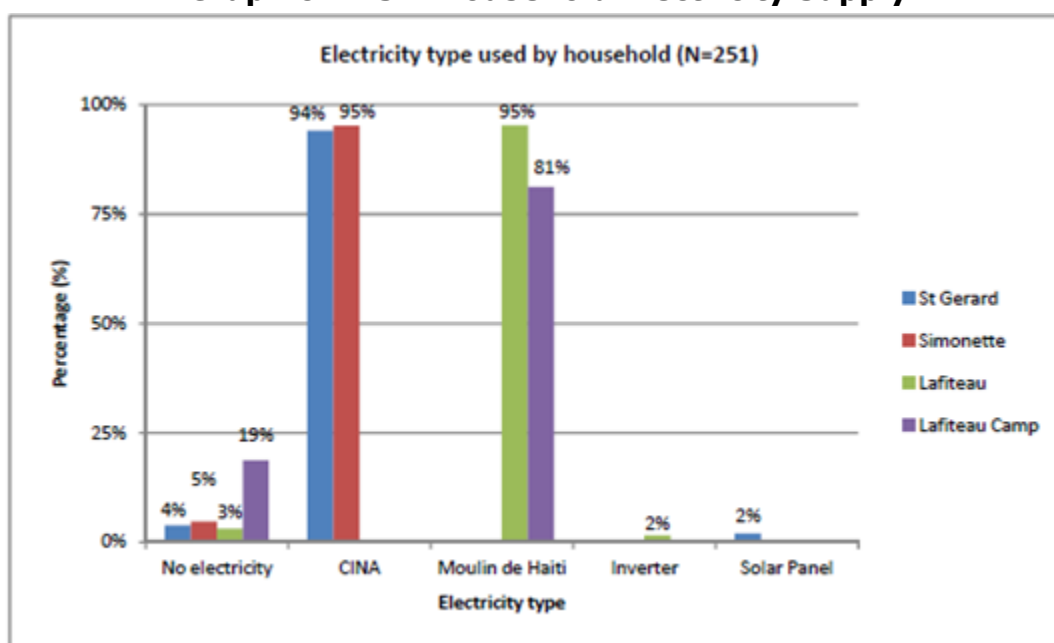
Source: NRE 2014, Figure 20

4.1.16 Community Infrastructure

4.1.16.1 Access to Electricity and Transport

Ninety percent of respondents reported that they had access to electricity for at least some part of each day, for which focus group respondents explained residents pay nothing beyond the cost of wires to tap into the network. CINA supplies power to the residents of St. Gerard and Simonette; LMH supplies it to people in Lafiteau. Graphic 4.43 below presents a breakdown of electricity sources for local households.

Graphic 4.43 – Household Electricity Supply



Source: NRE 2014, Figure 27

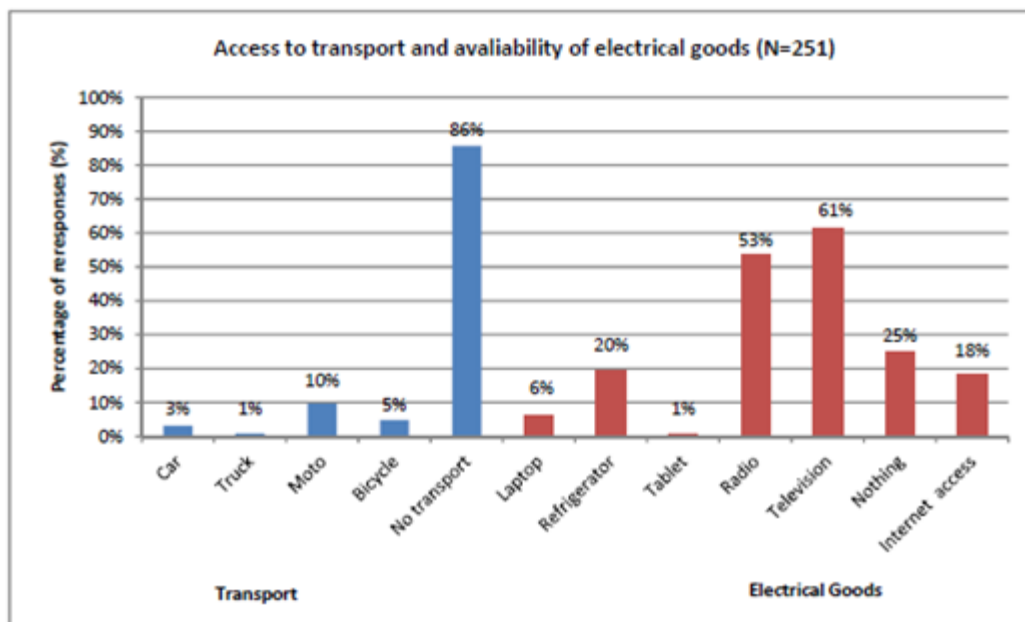
In focus groups, residents in the three communities estimated that they have access to electrical power for 10 to 12 hours per day. Several stakeholders said

they feared that the new port and industrial area could negatively impact the community by attracting a massive in-migration of workers and people seeking employment, overburdening the electrical system and forcing a reduction in the hours of current they receive daily. “In the past we had power 24 hours a day”, said a Lafiteau community group member in Focus Group 4, “but with the increase in population they don’t give as much as before”.

The issue of electricity has been a flashpoint for relations between industry and the community. Ciment d’Haiti provided St. Gerard and Simonette with power until it closed in 1992, but CINA did not begin supplying electricity until 2011, 10 years after it opened, following a series of large protests that blocked the streets. Focus Group participants and other stakeholders cited such demonstrations as a valid method of communicating community desires to factory management.

The majority of households (86%) did not have access to transport. Of those that did have access to transportation, the most common form of transport was motorcycle (10%).

The top three electrical items that households had access to were television (61%), radio (53%) and refrigerators (20%). Twenty-five percent of households had no access to any electrical goods. Access to transport and to electrical goods is shown in Graphic 4.44 below.

Graphic 4.44 – Access to Transport and Electrical Goods

Source: NRE 2014, Figure 28

4.1.16.2 Health Care Infrastructure

The lack of adequate health care resources is the primary shortcoming in the availability of services and infrastructure in the area, which has experienced natural disasters (the latest was the Jan. 10, 2010 earthquake), industrial accidents (the latest with fatalities occurred at CINA in May 2014, and at LMH in 2009), major highway accidents, and rainstorms that can block local roads with rocks and debris that wash down the denuded hillsides. The population is also vulnerable to maladies common in rural Haiti, including malaria, and diarrheal diseases. Two fatal cholera cases were reported at the Haitian Academy Hospital (then still functioning) in October 2010. Currently, the mosquito-borne Chikungunya virus has stricken a majority (according to local informants) of local residents, hitting especially hard in St. Gerard and other areas with abundant standing water. As of June 2014, there were no local facilities capable of providing emergency medical care or anything beyond first-aid care.

Lafiteau's only medical facility is a small first-aid clinic run by Real Love Ministries that treats 25 to 30 patients per day. It is across the street from a government clinic that has been built but has not opened. An eight-bed hospital with a surgery room has operated across Route Nationale No. 1 from the Lafiteau entrance road at the Haitian Academy campus, treating up to 80 patients daily. The Haitian Academy closed in 2013; although there are plans to reopen the hospital, it currently provides only first aid attention.

St. Gerard has a clinic financed by CINA. Simonette has no medical facilities. All of the clinics are (or will be) first-aid clinics, leaving those with serious illnesses or injuries, or women in labor, to travel 18 kilometers to medical facilities in Cite Soleil or Sarthe, or even farther to the General Hospital in downtown Port-au-Prince. Another option is Arcahaie, 20 kilometers to the northwest. "When we have a case of urgent illness sometimes patients have to travel so far they die", said a Simonette community activist in Focus Group 3.

Graphic 4.45 – CINA Health Center in St. Gerard

Source: NRE 2014, Figure 40

The educational sector is under the responsibility of the Ministry of National Education and Professional Development (*Ministre de l'Éducation Nationale et de la Formation Professionnelle* or MENFP). MENFP provides very little funds to support public education in the baseline study area. As a result, the private sector and NGOs have become a substitute for governmental public investment in education. MENFP is limited in its capacity to improve the quality of education in Haiti.

4.1.16.1 Schools and Other Educational Institutions

In the baseline study area there are a number of primary schools, managed by communities, religious organizations, and NGOs. There are also a limited number

of secondary schools in the area. There are no universities or higher education institutions in the baseline study area.

Table 4.23 – Local Area Schools

Community	Schools
Lafiteau	Eben Ezer Union Mixte des Jeunes Bon Samaritain Les Cailloux Complexe Educatif Baptiste Conservatric 423 Ecole Insitution la Maison de l'Enfance Ecole Mr. Bourdeau
Simonette	Univers des Genies Ecole Chretienne des Rachetes de Simonette Ecole Communautairer des Enfants de Source-Matelas
St. Gerard	Ecole Nationale de Source-Matelas Ecole Foyer des Petits

Source: Modified from NRE 2014, Appendix I

Several focus group participants noted that the communities closest to Port Lafito have no technical schools, and that this causes residents to be overlooked in the hiring process at new employers because they lack training and skills necessary to do anything but manual labor, such as loading trucks or performing janitorial duties. Schools for children were not cited as an unmet need. “We have good classical schools, but we do not have a technical school for adults”, said a St. Gerard women’s group representative in Focus Group 2.

4.1.16.2 Religious Organizations

A number of churches are present in the baseline study area, as shown in Table 4.24, representing various denominations including Baptist, Catholic, Seventh Day Adventist, as well as non-denominational Christian churches.

Table 4.24 – Lafiteau, Simonette, and St. Gerard Churches

Community	Churches
Lafiteau	Eglise de Dieu Eglise Tabernacle de Sion Eglise Baptiste Conservatrice Eglise Baptists a la Foi Eglise Chretienne de la Foi en Christ Paroisse St. Joseph (Catholic) Armee Celeste Adventiste du 7eme Jour
Simonette	Eglise Chretienne des Rachetes de Simonette Eglise Nouvelle Grace Eglise Grace Infinie de Dieu
St. Gerard	Paroisse St. Gerard (Catholic) Eglise Theophile Eglise Siloe

Source: Modified from NRE 2014, Appendix I

4.1.16.3 NGO Facilities and Services

NGO Grace Village has a residential child-care center for 44 abandoned children, a Christian school with 380 pupils, and a medical and dental clinic serving the mission and Titanyen. Mission of Hope has a school accommodating 350 students, with plans to open a hospital with two operating suites, an eye clinic, labor and delivery rooms, and an emergency care facility in 2015.

4.1.16.4 Roads

There is only one main road through the three communities of Lafiteau, Simonette, and St. Gerard: a loop that intersects with National Route 1 at the entrances of Lafiteau and St. Gerard. This increases the impact from accidents, and from



protests staged by community members as elsewhere in Haiti, the majority of the population does not own a means of private transport.

Graphic 4.46 – Road through Simonette



Source: NRE 2014, Figure 42

Most people depend on a thriving privately owned system of public transport that includes motorcycle taxis, small brightly color pickup trucks called *taptaps*, and equally brightly colored larger trucks called *kamion*. The highway supports a steady flow of these regional and local public transportation minibuses and small trucks, private vehicles, long-range buses, and, from sunrise to sundown, lighter traffic overnight. There are no service stations located within the baseline study area; the nearest service station is 10 km north of the Project site in Titanyen.

Table 4.25 - Roads and Paths in the Project Area

Name	Category	Location from Site
National Route 1	Primary Highway	North
Av. St. Gerard	Local, Neighborhood, Rural or City Roads	West
Route Derriere Canal	Local, Neighborhood, Rural or City Roads	West
Route Minotrie	Secondary Highway	Southwest
Entré Ti cité	Local, Neighborhood, Rural or City Roads	North
Path kotyè	Local, Neighborhood, Rural or City Roads	South

Source: NRE 2014, Table 68

4.1.16.5 Local Ports

The primary national Port is located Port-Au-Prince eight nautical miles away from the Project site. There are two other small ports within the baseline study area, one at LMH in Lafiteau and one at CINA in Fond Mombin. The port at LMH is capable of receiving medium-size deep water vessels, and is located approximately 1 km southeast of the Project site. Although damaged in the 2010 earthquake, the LMH port can receive deep water vessels and was extensively used by ships carrying relief supplies and other cargo in 2010.

A second small private port used for receiving fuel and raw materials is located on the premises of Cementerie Nationale – CINA, about 3 km to the northwest up the coast from Port Lafito; this port is also capable of receiving deep water vessels.

4.1.16.6 Local Businesses

A number of small and medium business enterprises (SMEs) are present in the three permanent communities of the baseline study area, as shown in Table 4.26 below.

Table 4.26 – Local Businesses by Community

Type of Business	Community		
	Lafiteau	Simonette	St. Gerard
Store	14	3	3
Restaurant	3	3	1
Lottery Stand	14	1	2
Night Club	3	0	0
General Store	2	0	0
Auto Parts	1	0	0
Barber Shop	1	0	1
Soft Drink Wholesaler	2	0	1
Welding Shop	0	0	1
Mortuary	0	0	1
Bakery	1	1	0
Jewelry	0	1	0
Food Wholesaler	0	1	0
Clothes	1	0	0
Clothing	1	0	0
Pharmacy	1	0	0
Drinking Water	1	0	0
Totals:	45	10	10

Source: Modified from NRE 2014, Appendix E

4.1.16.7 Local Industries

Graphic 4.47 below shows the industries currently present in the communities immediately surrounding the Project.

Graphic 4.47 – Local Industries

Source: Modified from NRE 2014, Figure 29

The economy of the small industrial port town of Lafiteau has been supported by established processing plants, including LMH (formerly a state owned wheat flour mill that was privatized in 1996-97 and is currently owned by U.S.-based Seaboard Corporation and a group of private Haitian investors). The town had a population of approximately 2,000 before the Jan. 12, 2010, earthquake, and has received an influx of new residents displaced by the disaster.

Another industrial installation, Haiti Broilers, is situated between LMH and the Project. Haiti Broilers is a joint venture between Jamaica Broilers Group and the Coles Group. The joint venture produces broiler meats, eggs, and chicken and pig feed. Haiti Broilers was established in 2010 at the government-owned Lafiteau facility, which previously housed the U.S. import firm T&S Rice.

Graphic 4.48 – Entrance to Haiti Broilers

Source: NRE 2014, Figure 41

The CINA Portland cement production and shipping complex located on the opposite side of Simonette from the Port Lafito project is another source of jobs and resources in the area. The original national cement company opened in 1952 and operated for 40 years before closing in 1992. The plant was purchased by Colombia's Cementos Argos in 1998, renovated, and reopened as CINA in 2001. Simonette and St. Gerard are both within the communal section of Source-Matelas. About 8,000 of Source-Matelas' 12,000 inhabitants, including those in St. Gerard and Simonette, live within the Area of Influence of the CINA Foundation, which has funded the construction of a clinic (which offers general consultations, lab work, and first aid to about 40 patients per day), a public water distribution point in St. Gerard, and a public plaza in front of St. Gerard Catholic Church.

Topline Materials is a producer of washed sand, aggregates, concrete block, and ready-mix concrete mined from limestone reserved located within its property

approximately two km north of the Project site. Founded in 2011, Topline Materials contributes a portion of its profits towards reconstruction and economic and humanitarian efforts in Haiti.

4.1.17 Tourism

Recently, the tourism industry in Haiti has suffered from the country's political instability and the deficit of adequate infrastructure. In the 1970s and 1980s, however, tourism was an important industry, drawing an average of 150,000 visitors annually. Since the 1991 coup d'état, tourism has recovered slowly. The Caribbean Tourism Organization has joined the Haitian government in an effort to restore the country's image as a tourist destination. In 2001, 141,000 foreigners visited Haiti, most coming from the United States. To make tourism a major industry for Haiti, further improvements in hotels, restaurants, and other infrastructure are still needed.

There is essentially no tourist flow to the baseline study area because of the absence of infrastructure. Lafiteau is situated at the beginning of the Arcadins Coast, the nearest string of beaches to the capital. Busses from Mission of Hope and other missions in and around Titanyen occasionally visit the area, and there are two restaurants with swimming areas on the edge of Simonette that cater mostly to local bathers and domestic tourists.

Just off the coast in the Gulf of Gonâve sits Goat Isle (Île a Cabrit), which until two decades ago housed a popular resort hotel complex called Ibo Beach. GB Group has entered into a long-term lease of the island with plans to turn it into a recreational and resort facility with a hotel and residential development, Blu Lagoon. Residents report that there were significant employment opportunities in the area before Ibo Beach closed in the early 1990s, but now there are virtually none. The completion of the project – a recreational and residential tie-in to the Lafito Industrial development – has the potential to create more employment opportunities for residents of the area, but is outside the scope of the current ESIA.

4.1.18 Agriculture and Land Tenure

Farmers in the area grow a wide variety of produce and fruits, including melons, plantains, sugar cane, millet, corn, and spinach. Agriculture has been in decline in Lafiteau for at least three decades, according to participants in the Lafiteau Focus Group. The town does not have springs or surface water resources like St. Gerard and, to a lesser extent, Simonette, making cultivation of crops difficult. This situation is reflected in the survey data, which revealed that only 11% of Lafiteau respondents (and 12.5% of those in Lafiteau camps) had land they could cultivate. In Simonette, 26.2% of survey respondents had farm land; while in St. Gerard 47.8% of survey respondents had garden plots.

In rural setups, such as the study area, land is typically bought, sold, and inherited without official documentation (no Haitian government has ever carried out a cadastral survey). Although there are few land titles, there are informal tenure rules accepted by farmers and residents in these communities.

During his first term in office, Haitian president Jean-Bertrand Aristide created the National Institute for the Application of Agrarian Reform (INARA) as a means to provide farmers with small pieces of land for subsistence farming. Prior to the creation of INARA, land ownership in Haiti remained concentrated in a minority of the population; INARA estimated that the 60-80% of the Haitian population who identify as farmers had little or no access to land. As part of the agrarian reform, under INARA rural families received half a *carreaux* (0.65 hectares) of state land each, under a usufruct contract with the State. Because land titles were not concurrently provided with the usufruct contract, land ownership remains a contentious issue, although some of the INARA land recipients have been able to hand down their land to their descendants, for whom the tenure is still observed and in force.

Table 4.27 –Survey Respondents’ Agricultural Activities

Community	Respondents with land to	Average number	Average Total Land Area	Respondents with

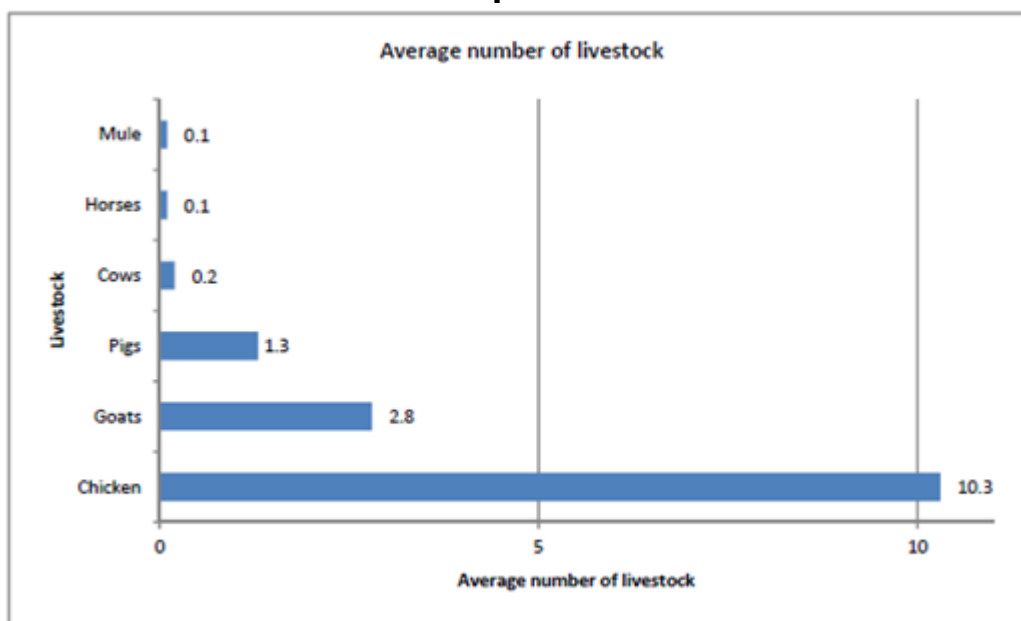
	cultivate	garden plots	100^{ths} of Carreaux	Hectares	livestock
St Gerard	73%	2.5	7.8	0.10	54%
Simonette	26%	2	3.2	0.04	41%
Lafiteau	11%	1.4	10.0	0.13	18%
Lafiteau Camp	13%	1.5	4.5	0.06	22%

Source: Modified from NRE 2014, Table 19

Seventy-four respondents reported that they had livestock. Chickens were most plentiful, followed by goats (Graphic 4.49). Goats are left to graze on dry brush on vacant land and along roadsides, including new, still-unpaved roads in the Project area (Graphic 4.50).



Graphic 4.49 – Average Number of Livestock per Respondent



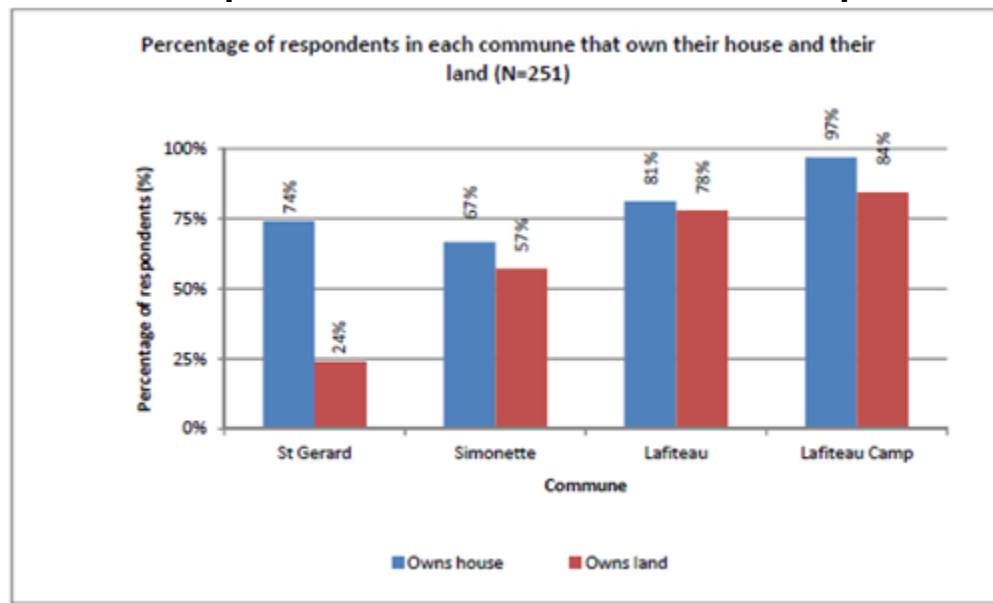
Source: NRE 2014, Figure 30

Graphic 4.50 – Free-Ranging Goats on Project Site



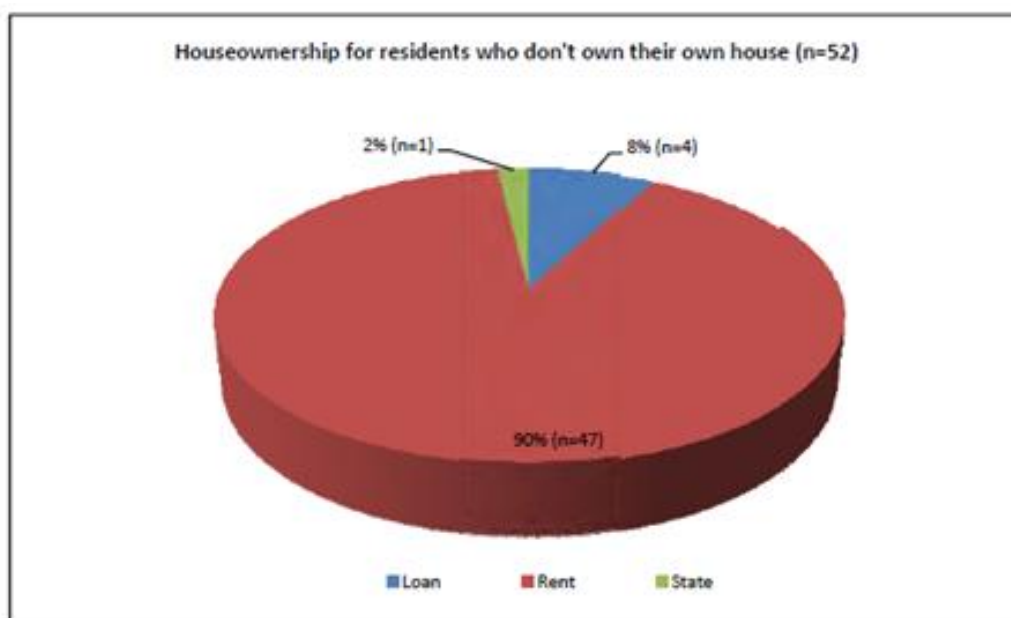
While only a minority of local residents have land to cultivate, a majority of respondents reported owning their own home. Only slightly fewer said they also own the land they live on - Graphic 4.51.

Graphic 4.51 – Home and Land Ownership



Source: NRE 2014, Figure 31

Among the minority (52 of 251 respondents) who do not own their house, 90% pay rent (Graphic 4.52). The average annual rental payment is approximately USD 190 (8,576 Haitian gourdes).

Graphic 4.52 –Home Tenancy for Non-Owners

Source: NRE 2014, Figure 32

4.1.19 . Socio-Politic Organization

4.1.19.1 Local Government

Local governments provide almost no services to the population. NGOs, private enterprises, and to a far lesser extent the National government are the only entities that have engaged in social welfare programs, specifically, water delivery and sales, provision of electricity, emergency housing, and health care. Local residents report rare interaction with the commune's mayoral office in Cabaret. Constituents can make direct appeals or complaints to the mayor and his staff, but focus group participants did not describe any examples of such contact. There is however a communal development plan (AKA: PNAEB587) listing 14 priority projects aiming to improve infrastructure and services in the Commune of Cabaret (Table 4.28); the status of these projects was not able to be determined.

Table 4.28 - Summary of Communal Development Plan Projects

Development Project	Project Description
Cabaret market	Construction of a market in the city of Cabaret
Titanyen market	Construction of a market in the town of Titanyen
Watersheds	Protection of Bretelle and Torcelle river watersheds
Waste disposal	Waste management in downtown Cabaret and other urban areas
Bus station	Creation of a bus station
Paving streets	CabaretStrengthening the electrical system with solar street lights
Paving streets	Paving 3km of streets in downtown Cabaret
Road work	Rehabilitation of the commune's road network (25km)
Bridge repair	Reconstruction of Sophi bridge in Cazale and downtown Cabaret
Community center	Construction of a community center dedicated to provisional shelters
Training center	Creating a vocational and technical training center
Health center	Strengthening the downtown Cabaret health clinic
Cazale clinic	Opening the Cazale health clinic
Water network	Study to extend the water supply network in Cabaret

Source: NRE 2014, Table 20

4.1.19.2 Social involvement and Organizations

The most basic level of community organization revolves around the parent boards associated with each primary school. The degree of cohesion generated from their activities (school parties, meetings with teachers, school feeding programs, etc.), makes them the most important organizational body of the localities in the baseline study area. In addition, the figure of the school teacher is important in this type of social organization as he or she acts as focal point, facilitator, and interlocutor when there are school- or community-related issues.



There are a number of regulatory mechanisms, institutions, and programs shaped by the national authorities to ensure social assistance and development of economic opportunities for the population living within the baseline study area, as shown in Table 4.29. Nevertheless, very little or nonexistent relationships among different actors has been reported.

Table 4.29 – Governmental Institutions and Programs for Implementing Social Policies, Baseline Study Area

Authority	Institution/Program	Area	Duties
First Lady's Office	National Coordination of the Fight against Hunger and Malnutrition (<i>Coordination Nationale de la Lutte contre la Faim et la Malnutrition-COLFAM</i>)	Food Security	Fight hunger and malnutrition
Ministry of Social Affairs and Labour (<i>Ministère des Affaires Sociales et du Travail-MAST</i>)	Office of Old Age Insurance (<i>Office National d'Assurance Vieillesse-ONA</i>)	Social Security	Manages the pensions for the private sector workers
	Public Enterprise of Social Housing Production (<i>Entreprise Publique de Production de Logement Social-EPPLS</i>)	Housing	State sponsored housing programs
	Housing and Public Buildings Construction Unit (<i>Unité de Construction de Logement et Bâtiments Publics-UCLBP</i>)	Housing	Access to housing and housing provision for the middle class
	National Council for the rehabilitation of disabled persons (<i>Conseil National pour la Réhabilitation des Handicapés-CONARHAN</i>)	Social Assistance	Support for disabled people
	Social Assistance Fund (<i>Caisse d'Assistance Sociale-CAS</i>)	Social Assistance	Financial assistance to to disadvantaged people

Authority	Institution/Program	Area	Duties
	National Migration Office (<i>Office National d'Migracion -ONM</i>)	Social Assistance	Support to repatriated migrants
	Office of Labor Accidents, Sickness and Maternity (<i>Office d'Accident du Travail, Maladie et Maternité-OFATMA</i>)	Social Security	Provides health care and insurance for work-related accidents for the private sector workers, insurance and maternity services
	National Handicrafts office (<i>Office National de l'Artisanat - ONART</i>)	Employment	Support of small artisans
Ministry of Economy and Finance (<i>Ministère de l'Économie et des Finances-MEF</i>)	Director's office of Civil Pensions (<i>Grupe Santé Plus</i>)	Social Security	Manages pensions for civil servants and former military
	Economic and Social Assistance Fund (<i>Fond d'Assistance Economique et Sociale-FAES</i>)	Social Assistance	Social promotion supporting productive activities and microfinance institutions
	Office of Monetization of Development Aid Programs (<i>Bureau de Monétisation des Programmes d'Aide au Développement-BMPAD</i>)	Social Assistance	Channels bilateral cooperation funds to projects in public works, agriculture, health infrastructure and education in order

Authority	Institution/Program	Area	Duties
			to generate temporary jobs and reduce food insecurity
Ministry of National Education and Professional Training <i>(Ministère de l'Éducation Nationale et de la Formation Professionnelle - MENFP)</i>	Universal, Free and Compulsory Schooling Program <i>(Programme de scolarisation universelle gratuite et obligatoire-PSUGO)</i>	Education	Education subsidies in public and private schools
	National Program of School Canteens <i>(Programme National de Cantine Scolaire - PNCS)</i>	Food Security	Meal distribution in public schools, manage and distribute external donations
Ministry of Public Health and Population <i>(Ministère de la Santé Publique et de la Population - MSPP)</i>	Free Obstetric Care <i>(Soins Obstétricaux Gratuits -SOG)</i>	Health	Subsidy for universal labor/delivery care allowance
	Initiative Polyvalent Community Agent <i>(Initiative Agent Communautaire Polyvalent, AKA Kore Fanmi-IACP)</i>	Health	Improve efficiency of supply of health and nutrition social services for families in Haiti

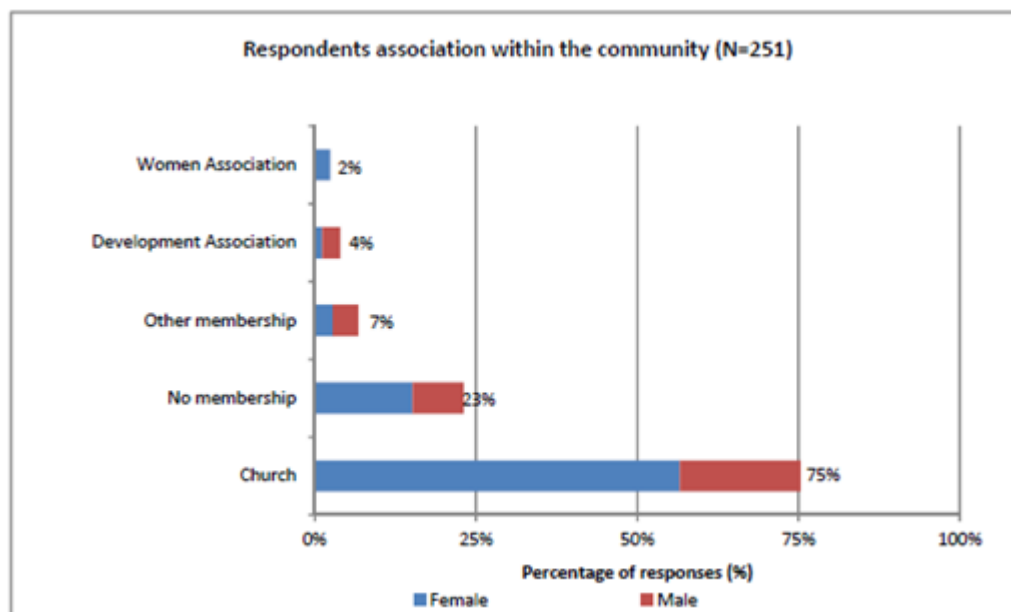
Authority	Institution/Program	Area	Duties
Ministry of Agriculture, Natural Resources and Rural Development (<i>Ministère de l'Agriculture, des Ressources Naturelles et du Développement Rura- MARNDR</i>)	Various projects of support for small producers and rural population	Food Security, Employment	Provide and promote projects related to irrigation, forestry, agriculture, fisheries, rural credit
Ministry of Public Works, Transportation and Communications (<i>Ministère des Travaux Publics, Transports et Communications-TPTC</i>)	Millennium Development Goals Achievement Unit	Health, Employment, infrastructure	Diverse public infrastructure projects country-wide related to water and sanitation in rural areas
Ministry of Women Status and Women's Rights (<i>Ministère à la Condition Féminine et aux Droits de la Femme-MCFDF</i>)	Micro-credit program for rural women (<i>Kredi Wòz pou Fanm Lakay</i>)	Employment	Provide credit to women owned productive projects

Authority	Institution/Program	Area	Duties
Ministry of Interior and Territorial Colectivities (<i>Ministère de l'Intérieur et des collectivités territoriales</i> -MICT)	Direction of Civil Protection (<i>Direction de la Protection Civile</i> -DCP)	Social Assistance	Attends to emergencies caused by natural disasters, manages resources from international cooperation programs

Source: NRE 2014, Appendix K

The majority of survey respondents reported no involvement in any kind of civic group; however, church membership represented the most common form of community association by a considerable margin.

Graphic 4.53 – Participation in Community Organizations



Source: NRE 2014, Figure 34

Seventy-five percent of survey respondents reported belonging to a religious congregation. Membership/participation in all other types of associations, including women's groups, development associations, or other types of community groups was cited by 13% of respondents. The table below presents a list of the non-governmental community associations in the baseline study area.

Table 4.30 – Non-Governmental Community Associations in the Baseline Study Area

Acronym	Association
AFADES	Association of Active Women for the Development of Source-Matelas (<i>Association des Femmes Actives por le Developpement de Source-Matelas</i>)

AJDS	Association of Youth for the Development of Simonette (<i>Association des Jeunes por le Développement de Simonette</i>)
AJS	Source-Matelas Youth Association (<i>Association des Jeunes de Source-Matelas</i>)
APROFES	Source-Matelas Association for the Advancement of Women (<i>Association pour la Promotion des Femmes de Source-Matelas</i>)
CERJAH	Center of Reflection for Young Haitian Artists (<i>Centre de Réflexion des Jeunes Artistes d'Haiti</i>)
CRMS	Committee for the Recovery of Source-Matelas (<i>Comité or le Relèvement de Source-Matelas</i>)
GNM	Good Neighborhood Ministry
MPHDD	Haitian Patriot Movement for the Development of Decentralization (<i>Mouvement des Patriotes Haïtiens por le Développement de Décentralization</i>)
NVGL	New Vision for Lafito Youth (<i>Nouvelle Vision des Jeunes de Lafito</i>)
ODIL	Organization for the Integral Development of Lafito (<i>Organisation por le Développement Intégral de Lafito</i>)
ODILE	Organization for the Integral Development of Lafito (<i>Organisation por le Développement Intégral de Lafito</i>)
OJTH	Organization of Talented Young Haitians (<i>Organisation des Jeunes Talents Haïtiens</i>)
RACDA	Assembly of Citizens for Agricultural Development (<i>Rassemblement des Citoyens pour le Développement Agricole</i>)
SOLDES	Solidarity of Leaders for the Development of Source-Matelas (<i>Solidarité dels Leaders pour le Développement de Source-Matelas</i>)
SOPROJEP	Solidarity for the Advancement of Young Farmers (<i>Solidarité pour la Promotion des Jeunes Paysans</i>)

Source: NRE 2014, Appendix L

4.1.19.3 Community Security

Many common complaints in industrial areas, including factory pollution and noise, are not commonly cited as major problems in Lafiteau, Simonette, and St. Gerard or in Lafiteau Camp. Despite the lack of an occupied police post in the area (the only local substation, in Lafiteau, had not yet been staffed at the time of the field research), respondents did not list crime as a major concern. Table 4.31 presents the percentages of survey respondents who reported being a victim of a crime.

Table 4.31 – Incidence of Crime Reported by Survey Respondents

Community	Percentage of Respondents Reporting as Crime Victims
Lafiteau	50%
Simonette	27%
St. Gerard	46%
Lafiteau Camp	41%

Source: Modified from NRE 2014, Table 21

In all three communities, respondents were more likely to respond that there was no major problem involving crime or bad behavior. Among those reporting incidences of crime, theft was the primary concern, as shown in the following table.

Table 4.32 – Most Reported Types of Crime

Community	Theft and Robbery	Percentage Reporting:	
		Home Break-In	Robbed on Street

Lafiteau	50%	21%	12%
Simonette	17%	7%	5%
St. Gerard	46%	30%	24%
Lafiteau Camp	38%	9%	9%

Source: Modified from NRE 2014, Table 21

St. Gerard had the highest reported rate of theft, with 30% of respondents from that area saying that their house had been broken into by a burglar, and 24% reporting that they had been robbed in the street. In Simonette, only 7% of people from that area had been the victim of a burglar, and 5% had been robbed in the street. The rates of victimization for Lafiteau and Lafiteau Camp varied from 38% to 50% for crime in general.

4.1.20 Community Concerns and Perceptions

The public consultation process has been designed to gather information about public concerns and perception, in addition to informing people about the Project and allowing them to raise questions regarding the Project's potential impacts. The consultation process also forms a key component for the development of mitigation measures and consideration of the social AOI. Chapter 9 presents a summary of the consultation process and consultation activities conducted to-date. This section presents a summary of community concerns and perceptions recorded during the baseline consultation and interview activities.

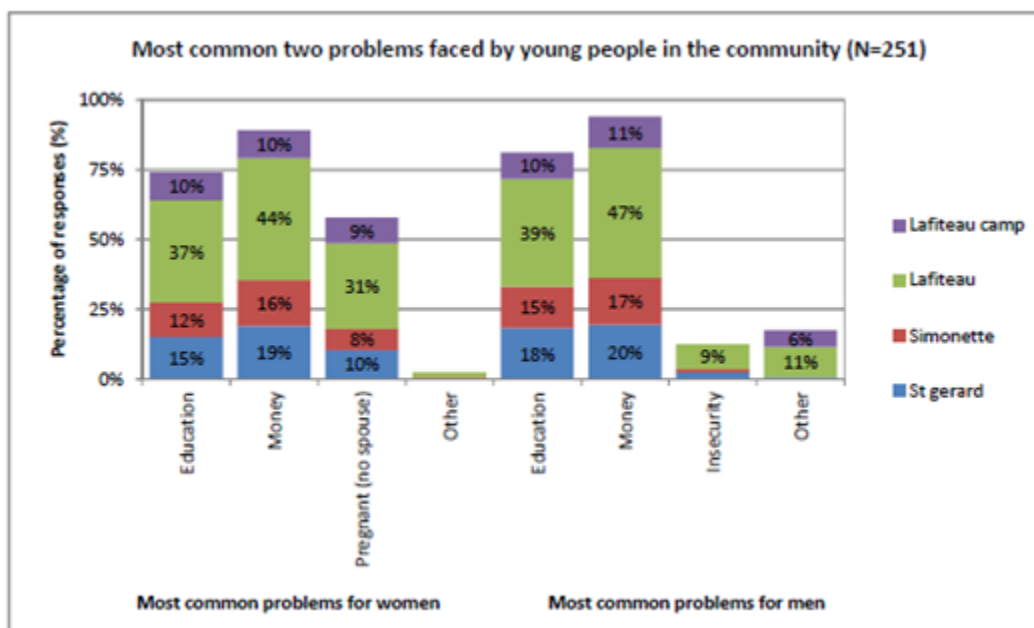
Graphic 4.54 –Gathering Information from Stakeholders

Source: NRE 2014, Figure 35

There was broad consensus in all four focus groups that the communities are well within their rights to use street demonstrations to press for services from the industrial facilities. These rallies, which have blocked the only road running through the three communities, can even be called a source of local pride.

4.1.20.1 Poverty

Survey respondents, like Focus Group participants, identified poverty as the most urgent problem in Lafiteau, Simonette, and St. Gerard. Nearly 90% of women and more than 90% of men listed money as one of the two most common problems (see Graphic 4.55 below). The root problem facing rural communities is the lack of investment being put into these areas. This condition leads to educational, security, and monetary issues. As a consequence, young people are tempted to leave the area to seek better opportunities.

Graphic 4.55 – Community Problems Identified by Survey Respondents

Source: NRE 2014, Figure 33

4.1.20.2 Educational Opportunities

Education, which is perceived as critical to increasing earning power, was the second most frequently cited problem. For women, the third most common problem – becoming pregnant with no spouse – is also directly linked to the issue of poverty, as households with only one breadwinner face obvious and severe economic challenges.

4.1.20.3 Lack of Employment

In the focus groups, the highest estimate anyone in the four focus groups gave for the employment rate was 5% – that is, that 5% of the adult population has a job in the formal sector. The elected ASEC in Simonette scoffed at the 5% figure, and estimated that 1% of locals were fully employed. Nobody estimated that more than 20 locals work in any of the three industrial facilities already located in the community – LMH, Haiti Broilers, and CINA.

In every group, stakeholders expressed frustration that the majority of workers at LMH and the other industrial facilities were bused in every day from Port-au-Prince. As the *Assemblée de Section Communale* (ASEC) (elected leader) in Simonette put it: “*Se youn zonn ki rich an endistri, men pitit li toujou ret nan mize* (This is an area that is rich in industry, but its children remain in misery)”. Considerable frustration was expressed in all four focus groups that too few jobs went to local residents in the factories located in the area on either side of the Port Lafiteau project.

4.1.20.4 Economic Development, Employment, and In-Migration

Economic development is the main benefit perceived by the population with regard to the project. Although some fear inflation in the local economy as a result of the project, the project is perceived as a motor that will stimulate the regional and even the national economy. The population expects job creation. In addition, people expect job training that will qualify them for positions on the project.

Considerable skepticism remains, however, based on the widely-held belief that local residents are passed over for work in the existing industrial facilities in the area, in favor of workers bused in from Port-au-Prince. Focus group participants also noted that there are no technical schools in the baseline study area and expressed doubt that locals would qualify for anything but unskilled work, such as loading trucks and cleaning the Project site. “The companies prefer to bring in people from other places to work”, said a Lafiteau church pastor. LMH has five buses that bring people to work at its Lafiteau plant, yet less than 20 of the workers are from Lafiteau. If the worst fears of stakeholders are met, and new employers (including GB Group and its clients) do not hire people from within the community, past experience suggests some community members will be in favor of staging protests similar to those that have blocked the only road running through the communities between the Lafiteau and St. Gerard intersections with Route Nationale No. 1.

In-migration is another concern of local stakeholders – the region has seen rapid growth in recent years, especially in the last half-decade, following the January 2010 earthquake. Figures 4.9, 4.10, and 4.11 show changes through time of three local communities: Lafiteau, Simonette, and Titanyen (respectively) from 2002 through 2014, the most recent satellite imagery available. Agriculture-based

Simonette has shown the least amount of visible growth during this timeframe, while Lafiteau in comparison has shown considerable growth. Titanyen however has expanded significantly since 2002, with the majority of growth occurring from 2010 onwards. Some focus group participants attributed specific community problems directly to population growth. “The drinking water problem started when the population began growing in 2005 up to 2014” stated a St. Gerard technician.

4.1.20.5 Access to Services and Public Infrastructure

The population hopes that the Project will increase their quality of life by providing services that are currently non-existent or poorly developed. Specifically, several people expressed the hope for dependable electrification and drinking water as compensation. The population hopes for the construction of infrastructure such as schools, and clinics, as well as road improvement. One common complaint raised during Focus Groups is poor road conditions. Road improvements to accommodate new projects in the area could have a positive impact on road quality but several local stakeholders noted that this could be offset by dust and noise from heavy truck traffic.

4.1.20.6 Environmental Concerns

Existing pollution and general environmental degradation are widely recognized as serious issues affecting the quality of life in the Project area. Respondents cited causes such as impacts from existing local industries including noise and vibrations, road dust, deforestation, lack of latrines, and marine pollution as concerns.

4.1.20.7 Access to Land

Stakeholders in the area attribute the decline in farming in Lafiteau to numerous factors. In Lafiteau there is a lot of drought. “People can’t plant any more”, said an agricultural group representative in Focus Group 4.

There is concern that GB Group and the industrial operations long-established in the area have acquired much of the zone’s scarce arable land. “Agriculture almost does not exist anymore because there is no land left to plant”, said a Lafiteau pastor in Focus Group 1. “The companies have bought all of the land where you

could grow food so they could build their factories” added the same participant. This sentiment was further in evidence during the survey, when several residents in Simonette refused to participate due to suspicion that the survey would be used to facilitate the acquisition of their land by GB Group. Considering the current conditions, it is anticipated that intensifying industrial activity in the area will only increase pressure on the land. This could stem from a number of factors, including population growth, and escalation of property value.

4.1.20.8 General Support for the Project

The overall results of consultation show that the affected public in Haiti (local authorities and population, regional and national authorities, and NGOs) is highly supportive of the Project. Stakeholders believe that the Project can have positive impacts in terms of use, economic growth and quality of life improvements for the population of the nearby communities and even for the Commune of Cabaret and nationally.

The Project’s Stakeholder Engagement Plan (summarized in Chapter 8) and the Information Disclosure and Consultation Report (Appendix H) provide details of past consultation activities and responses to the Project by stakeholders since engagement began in 2014. As part of the Public Meeting on November 13, 2014, Rapid Hearer Interviews (RHIs) were performed with randomly selected meeting attendees to gather additional input into public awareness and perceptions of the Project. The RHI data indicated that nearly 59% of respondents had a positive perception of the Project, and more than a third of respondents indicated that they expected the Project to create jobs, while 30% expected the Project will develop opportunities for the communities.

5.0 Potential Impacts, Mitigation, and Residual Impacts

GB Group is committed to developing the Project in line with international best-practice standards and in compliance with IFC's Performance Standards on Social and Environmental Sustainability, with the aim to enhance Project benefits and avoid or decrease to the extent practical the adverse effects of the Project on the environment, nearby neighbors, and local communities. The impact assessment process serves to identify effective methods through which to achieve these goals.

This chapter describes and assesses the potential environmental, health, safety, and social impacts, both positive and adverse, resulting from the implementation of the Lafito Project as described in Chapter 3, including Port Lafito, the LIFZ, the 25 MW power plant, and related infrastructure including the water retention pond and access roads. The chapter describes the environmental design and mitigation measures incorporated into the Project to eliminate or reduce potential impacts and enhance Project benefit. The chapter also describes any residual impacts remaining after the application of mitigation measures, and the management procedures that will be required to verify the effectiveness of mitigation measures.

Impact Determination

5.1.1 Impact Methodology

In general, potential impacts associated with the Project are categorized as short-term or long-term as follows:

- **Short-term impact** – An impact that is predicted to last for a limited period of time and which will cease on completion of the impact-causing activity or as a result of mitigation measures and/or natural recovery
- **Long-term impact** – An impact that is expected to continue over an extended period of time (such as the Project's Operations phase) and that will cease when the Project stops operating, including intermittent or repeated impacts.
- **Residual impact** – an impact that remains after the application of mitigation measures

Table 5.1, presented in the Tables Section at the end of this ESIA, identifies potential impacts and mitigation measures for the environmental, social, and health and safety areas for the Project. The table also qualitatively (graphically) presents impacts in three basic ways in the columns to the left of each impact/mitigation:

- The leftmost column shows the impact or benefit, without any mitigation or enhancement measures applied
- The center column shows the impact or benefit with mitigation/enhancement measures applied
- The rightmost column shows long-term residual impacts and benefits, with mitigation/enhancement measures applied

The impact assessment measured the potential effects on the physical and social environment as compared to the baseline conditions described in Chapter 4. The impact assessment process included evaluating both positive and adverse impacts based on the following criteria:

- **Neutral** – A rating of “neutral” indicates that, with or without Project development, there is no significant change to the baseline conditions.
- **Moderate** – A rating of “moderate” indicates that there is a potential for the impact to affect the physical or social environment in an evident way as compared to the baseline conditions. Moderate impacts require mitigation and monitoring to evaluate the significance of the proposed action on baseline conditions.
- **Significant** – A rating of “significant” for adverse impacts indicates that those impacts are unacceptable and require appropriate mitigation to reduce their significance to either neutral (if possible) or moderate levels. A monitoring program is required to assess the effectiveness of the mitigation activity. Additional mitigation measures may be necessary if those measures proposed prove not to be sufficient, based on future monitoring of their effectiveness. Positive significant impacts result from actions that will be taken as part of the community development plan that will promote sustainable development, or other measurable improvement to the socioeconomic well-being of the people.

Table 5.1 summarizes the key issues and impacts to the physical, ecological, and human environments as a result of Project development. Potential impacts are listed in the table by affected resource/population, in the same general order as the baseline information was developed. For each potential impact, the table presents

the location of the impact (port, power plant, entire site, surrounding communities, etc.), the primary receptor(s), and the mitigation measures that will be instituted to attenuate the impact. The graphic section of the table depicts each of the defined impacts during three different phases (from right to left): short-term (immediate) impact without any mitigation actions, short-term (during construction and operation) impact after applying mitigative actions; and long-term (residual) impact with mitigation actions at the end of construction and into operations.

Within each of the three phases, individual impacts are defined graphically as either neutral (presenting no change to baseline conditions – the middle column); moderate – either adverse or positive (the columns on either side of the middle column); or significant – either adverse or positive (the outer-most set of columns for each Project phase). The column on the far right of Table 5.1 lists any specific monitoring activities required by the impact’s mitigative actions, and provides a reference to those activities in the Framework Environmental and Social Management Plan (ESMP - Chapter 7). Table 5.1 is intended to serve as a helpful guide for tying mitigation commitments to Framework ESMP strategies for Project management.

Summaries of the impacts for each Project phase, proposed mitigation and monitoring activities, and relevant management plans are included in the Impact Summary tables that follow the impact assessment section for each affected resource throughout the rest of this chapter. These tables are included to provide a helpful cross-reference between the impact assessment and Framework ESMP chapters of this ESIA, and to provide more detail in tabular format than is available in the larger overview Table 5.1.

The impact assessment addresses both construction and operations phases of the Project. Environmental and socioeconomic impacts and mitigation measures are organized into the following main subject areas:

- Air Quality
- Noise and Vibrations
- Visual Resources
- Soils

- Water Resources
- Flora
- Marine Ecosystem
- Livelihood Activities
- Population
- Health and Safety
- Infrastructure/Services

The discussion for each subject area generally follows a format that identifies and addresses:

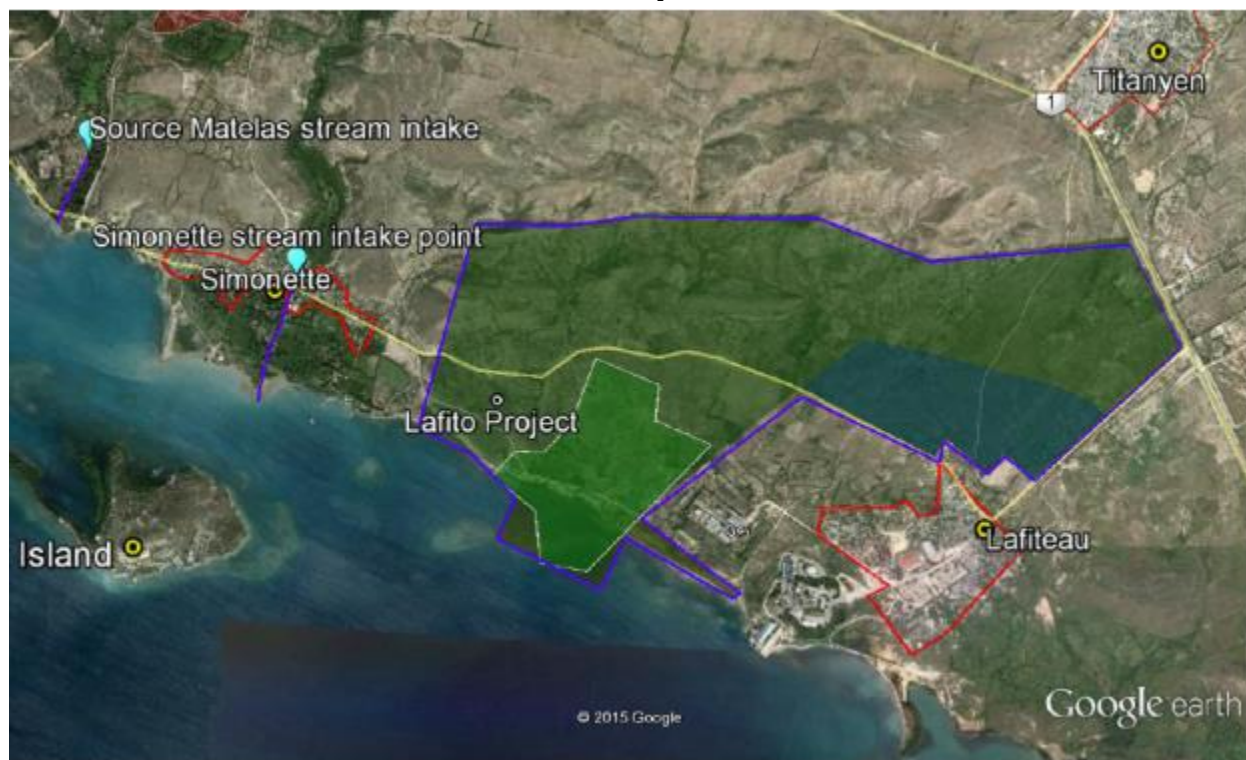
- Project Activities – Describes the Project activities and/or sources of potential impact for that particular subject area
- Potential Impacts – Evaluates short-term and long-term potential impacts as described above
- Mitigation Measures – Describes the engineering design that has been incorporated and/or the mitigation measure that will be taken to reduce potentially moderate or significant impacts to acceptable levels
- Residual Impacts – Identifies the level of monitoring that may be necessary to make sure that the proposed mitigation is effective in reducing the impact to an acceptable level

5.1.2 Areas of Influence

The areas of influence (AOIs) are defined as part of the impact assessment process as the geographic locations in which direct effects from Project implementation are projected to occur. For an environmental AOI, such effects could include increased noise or air emissions; for a social AOI the effects are typically livelihood impacts and benefits.

The Project' environmental area of influence (AOI) is defined as the areas in which impacts from fugitive dust, air emissions, increased noise and visibility, and water resources impacts are expected. Graphic 5.1 below shows the environmental AOI.

Graphic 5.1 – Project Environmental Area of Influence (blue line)



From a social and labor/employment perspective, the Project's social AOI is considered to be the communities within the Source-Matelas Communal Section (Graphic 5.2): Aubry, Lafiteau, Simonette, Source-Matelas, St. Gerard, and Titanyen. (The community of Latanier shown in Graphic 5.2 no longer appears to exist as an independent geographic location – the Mission of Hope NGO complex is currently located at the site.) The communities within the Project's social AOI are considered the highest priority for Project benefits such as local hiring.

Graphic 5.2 – Source-Matelas Communal Section – Project Social Area of Influence



Note: Red star marks approximate Project location

Source: Haitidata.org

Potential Impacts, Mitigation, and Residual Impacts

5.1.3 Air Quality

5.1.3.1 Project Activities Related to Air Quality

The following activities have the potential to affect air quality during Project construction:

- Earthmoving and grading
- Heavy equipment operation
- Light vehicle operation on unpaved roads/areas
- Package wastewater treatment plant operations
- Waste disposal practices

The following activities have the potential to affect air quality during Project operations:

- Cargo handling and transport
- Light vehicle operation on Project roads/paved areas
- Power plant operations
- Wastewater treatment plant operations
- Waste disposal practices

5.1.3.2 Potential Impacts to Air Quality

Fugitive Dust

Fugitive dust emissions due to land disturbance during construction will have an adverse impact on local air quality over the short-term. Construction-stage impacts to air quality in the Project area will include fugitive dust emissions from wind blowing over disturbed ground and from dust generated by heavy equipment during earthmoving activities, and from light vehicle traffic over unpaved areas and unpaved roads. Fugitive dust emissions during construction are expected to affect flora and agricultural areas and air quality at the site and in the immediate Project vicinity. Elevated concentrations of particulate matter settling on vegetation can impact the plants' ability to photosynthesize, disrupting their energy cycling. Such impacts are expected to occur locally and over the extreme short term, but may increase in frequency towards the end of the dry season.

During operations, no fugitive dust emissions are expected.

Particulate and Combustion Emissions

Other adverse impacts to air quality during construction and operations are expected to originate from mobile equipment emissions including heavy equipment and light vehicle traffic during construction and from cargo handling equipment and light vehicle transport during operations. These impacts are expected to affect Project employees and nearby neighbors, as well as any residents of local communities located along Project access roads.

AECOM Environment (2015a) was commissioned to conduct an emissions dispersion model to predict potential impacts to air quality from power plant operations. The AECOM Environment report is presented in Appendix B of this ESIA. The power plant will consist of 10 engines, fueled with 1% sulfur fuel oil and equipped with dedicated stacks each 80 feet high. Two engines will be designated standby for back-up purposes. Therefore, no more than eight engines will be in operation at any one time, and during overnight hours, a maximum of three engines will be in operation. Three different load scenarios were evaluated in the analysis to determine the most conservative case (highest emissions output) for modeling.

Table 5.2: Power Plant Load Scenarios Used in Modeling

Operating Conditions	Daytime Power Plant Load (7 am – 5 pm)	Nighttime Power Plant Load (5 pm – 7 am)
Scenario 1	8 engines at 80% capacity	3 engines at 80% capacity
Scenario 2	8 engines at 90% capacity	3 engines at 90% capacity
Scenario 3	8 engines at 95.4% capacity	3 engines at 91.6% capacity

Source: AECOM Environment, 2015b

Emissions Dispersion Modeling Methodology

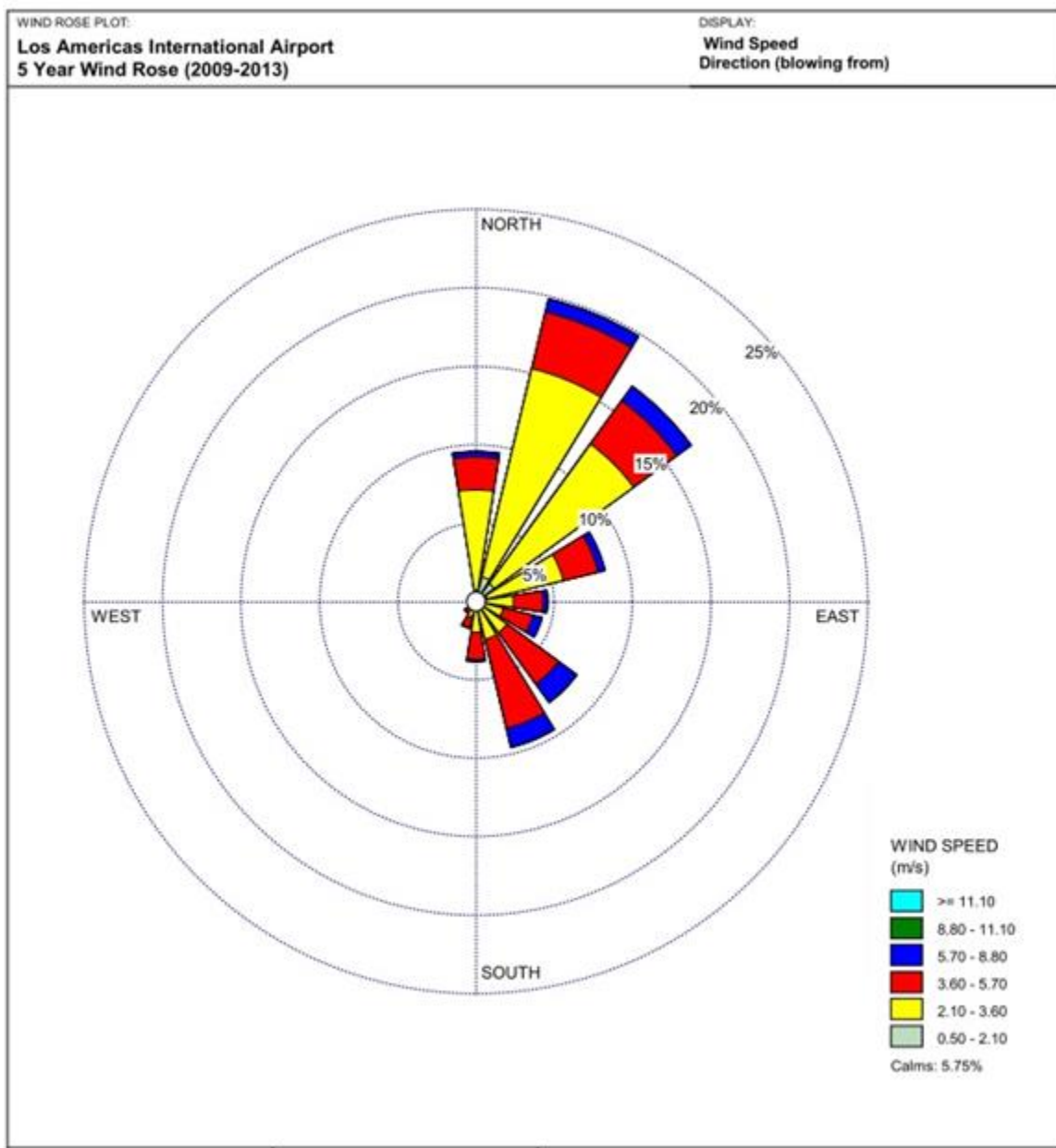
The emissions dispersion modeling was conducted to estimate ground-level concentrations of nitrogen dioxide (NO₂), sulfur dioxide (SO₂), fine particulate matter (PM₁₀), and particulate matter less than 2.5 microns (PM_{2.5}) due to air emissions from the power plant combustion engines. The maximum modeled NO₂, SO₂, PM₁₀, PM_{2.5} air concentrations were evaluated relative to World Health Organization (WHO) Ambient Air Quality Guidelines.

The modeling was conducted with the U.S. Environmental Protection Agency (USEPA) model AERMOD in accordance with guidance provided in USEPA's *Guideline on Air Quality Models* (USEPA, 2008). AERMOD is USEPA's state-of-the-art model designed to assess air quality impacts from stack sources in rural or urban environments involving both flat and hilly terrain features. AERMOD is recognized internationally as it is routinely applied in the U.S. and around the world for air permitting and air quality compliance demonstrations.

The modeling was conducted using five years of hourly meteorological data (wind speed and direction, temperature and cloud cover data) from Las Americas International Airport in the Dominican Republic from 2009-2013. An equivalent long-term, reliable data set was not available for the Project site, therefore the decision was made to use the Las Americas data as the closest, most representative data set available for the Project modeling. A wind rose illustrating the Las Americas wind patterns and magnitude of wind speeds is provided in Graphic 5.3. As shown in the figure, Las Americas winds are predominantly from the northeast, consistent with known trade wind patterns in the Caribbean.



Graphic 5.3 – Las Americas Wind Rose Used in Dispersion Modeling



Source: AECOM, 2015a

While it was understood that there was some meteorological data measured at the Project site, the data are questionable due to the quality of the instrumentation and lack of quality assurance/calibration. Graphic 4.8b in the baseline presents a wind rose of the data available from the Project Site, which aligns well with general Port-au-Prince wind patterns (Graphic 4.8a). Climate data available for Haiti indicate that winds are more easterly than in the Dominican Republic, due to terrain influences and east-west valley effects that tend to divert the northeast trade winds. As Graphics 4.8a and 4.8b show, these effects are generally consistent with the wind data obtained at the Project site.

Another potential difference between the Las Americas wind data and Project site wind conditions is wind speed. Comparison of the Las Americas and Haiti/Project site wind roses also indicates there is a greater frequency of lighter winds at Las Americas compared to the local Haiti data. Based on the differences between the Las Americas data and the more local wind data, the following observations can be made about potential effects of using Las Americas data in the modeling analysis:

- Wind direction – differences in wind direction would affect the distribution of modeled impacts, but not necessarily the magnitude.
- Wind speed – higher local wind speeds could improve dispersion and lower the maximum impacts since the modeling with Las Americas data indicated the highest modeled concentrations were associated with light winds.

In the absence of site-specific data, use of the Las Americas data set was an unavoidable prerequisite for air emissions dispersion modeling, which could produce overly conservative results based on differences between the data used in the model and actual site wind conditions.

A cumulative analysis was conducted that involved summing the maximum modeled concentrations with a background component (“total”) determined from the air quality supplemental baseline data program of May 2015. The cumulative analysis was conducted for the modeling results over the full receptor grid and the maximally impacted resident.

Note, that the only short-term WHO guideline concentration for NO₂ is based on a 1-hour average. Therefore, as discussed in the monitoring report, a scaling factor was developed to estimate a 1-hour monitored concentration for NO₂ that could be combined with the 1-hour modeling result for comparison to the WHO guideline.

The monitoring results were examined with consideration of activities in the vicinity of the monitors to identify the values that would best represent current baseline conditions suitable for the cumulative analysis. That is, construction activities that were ongoing during the program influenced the monitored concentrations. Because the construction activities will be temporary, and therefore not representative of baseline conditions, the potential effect of the construction emissions (fugitive and vehicular) on the monitoring results were considered in defining the baseline background concentrations for the cumulative analysis.

Preliminary emissions modeling conducted with AERMOD default options indicated that peak modeled impacts were associated with meteorological conditions of low winds under stable conditions. USEPA has recognized that AERMOD tends to over-predict air concentrations for these meteorological conditions. As such, USEPA introduced refinement options to AERMOD (the "beta u*" model option) to address this issue. In addition, the preliminary modeling incorporated a conservative method to model NO₂ concentrations from NO_x emissions. Therefore, AERMOD was also applied with the Plume Volume Molar Ratio Method (PVMRM) to refine computation of NO₂ concentrations.

Emissions Dispersion Modeling Results

The preliminary modeling maximum concentrations for all emissions/averaging periods were associated with Scenario 3, the maximum load case. Under this scenario, the maximum preliminary modeled concentrations exceeded the WHO guidelines for SO₂ (10-min and 24-hour) and NO₂ (1-hour). The SO₂ concentrations were predicted under low wind speed conditions and the NO₂ concentrations utilized a conservative modeling technique, as indicated above.

AERMOD was then applied with the 5-years of meteorological data and options for low wind speed refinement (beta u*) and NO₂ model refinement (PVMRM). The refined AERMOD application indicated the modeled concentrations exceeded the

WHO guideline for 24-hour SO₂ only. Tables 5.3 and 5.4 below present the modeling results for the refined AERMOD modeling runs for the most conservative operating conditions, Scenario 3.

Table 5.3 – Maximum Modeled Concentrations on Full Grid – Refined AERMOD

Parameter	Averaging Period	AERMOD Predicted Conc. (µg/m ³)	WHO (µg/m ³) ⁽¹⁾	% of WHO	Distance to Max Impact (m)
SO ₂	10-min	450.6	500	90%	164
	24-hour	114.4	20	572%	164
NO ₂	1-hour	175.9	200	88%	164
	Annual	19.8	40	49%	251
PM ₁₀	24-hour ⁽²⁾	17.0	50	34%	185
	Annual	5.2	20	26%	251
PM _{2.5}	24-hour ⁽²⁾	16.5	25	66%	185
	Annual	5.0	10	50%	251
⁽¹⁾ WHO guidance http://www.who.int/mediacentre/factsheets/fs313/en/ ⁽²⁾ Per WHO guidance, PM _{2.5} and PM ₁₀ 24-hour concentration is the 99th percentile value per year.					

Source: AECOM, 2015a

The predicted exceedances of the 24-hour SO₂ guideline are limited to three areas close to the facility property boundary:

- Model receptors located over water to the south of the facility
- Model receptors in an undeveloped area to the north of the facility
- Model receptors located in the Lafito industrial area adjacent to the southeastern property boundary

The results were also examined to identify the maximum modeled concentrations at residential locations, all of which were below the WHO guideline values.

Table 5.4 – Maximum Modeled Concentrations at the Maximum Impact Residential Location – Refined AERMOD

Parameter	Averaging Period	AERMOD Predicted Conc. ($\mu\text{g}/\text{m}^3$)	WHO ($\mu\text{g}/\text{m}^3$) ⁽¹⁾	% of WHO	Distance to Max Impact (m)
SO ₂	10-min	135.9	500	27%	617
	24-hour	15.9	20	80%	617
NO ₂	1-hour	85.1	200	43%	617
	Annual	1.2	40	3%	617
PM ₁₀	24-hour ⁽²⁾	1.3	50	3%	617
	Annual	0.2	20	1%	617
PM _{2.5}	24-hour ⁽²⁾	1.2	25	5%	617
	Annual	0.2	10	2%	617
⁽¹⁾ WHO guidance http://www.who.int/mediacentre/factsheets/fs313/en/ ⁽²⁾ Per WHO guidance, PM _{2.5} and PM ₁₀ 24-hour concentration is the 99th percentile value per year.					

Source: AECOM, 2015a

The maximum total concentrations for the full receptor grid (all located at receptors on the facility property line), exceed the WHO guideline concentrations for all parameters, with the worst-case being 24-hour SO₂. At the maximally impacted residential location, the total concentrations are all below the WHO guidelines with the exception of 24-hour SO₂. However, the results indicate that the total 24-hour SO₂ concentrations at this worst case residential location only exceed the WHO guideline 10 days of the 5-year period modeled (about 1,825 days) or 0.55% annually on average.

Nuisance Odors

Nuisance odors can arise from the improper storage or improper treatment of domestic waste, including food and food container wastes, human waste, and wastewater. Typically such odors do not present human health hazards, but can present a nuisance to employees or nearby neighbors.

5.1.3.3 Mitigation Measures for Air Quality

Fugitive Dust

As part of its Environmental Management Plan, the Project will initiate an air quality monitoring program at the Project site, with regular sampling of key air quality parameters including particulate matter, SO₂, and NO_x. Fill material for site construction will be dredged from the Port Lafito harbor area and hydraulically placed, helping to decrease the potential for fugitive dust emissions during earth-moving activities.

Standard best management practices for dust control are provided in the Erosion and Sedimentation Control Procedure and the Construction HSE Plan developed for the Project by the Construction contractor. Dust control measures may include, but not be limited to, the following:

- Avoiding clearing areas not immediately needed for construction
- Progressive rehabilitation of surfaces no longer needed for construction
- Enforcement of appropriate speed limits for heavy equipment and on unpaved road surfaces
- Limiting number of trips through efficient loading procedures for material transport
- Covering or top-wetting loads on trucks transporting soil and fill material
- Spraying water on unpaved roads and other traffic areas to decrease dust emissions
- Maintaining hard-pack/gravel/laterite cover on unpaved roads and traffic surfaces
- Application of stabilizing agents on areas of high fugitive dust emissions

Road watering programs and surface stabilizing efforts will be required to mitigate Project impacts only during the dry season, when airborne particulate loads are significant. With adequate control programs implemented, the resulting short-term impact will still be moderate during construction (Table 5.1). Once Project roads are paved and disturbed areas are covered by new construction, landscaped, or revegetated, the potential for fugitive dust emissions is expected to drop significantly, so that fugitive dust is not considered to be an impact during Project operations.

GB Group will supply adequate equipment and personnel to stabilize road surfaces to control dust on the Project roads during construction. This will include assigning staff to be responsible for a road watering program that defines what roads staff will be responsible for, how often water must be applied to each roadway, and what to do if changes need to be made to the road watering program.

Establishing and enforcing Project safety rules, including the posting and enforcement the Project-wide speed limit of 10 km/hr (6 mph) on Project roads and restricting off-road travel to the maximum practical extent, will limit public safety hazards as well as the potential for additional fugitive dust emissions during construction. Those employees whose jobs will include driving or vehicle operation will be advised of the safety rules and that driving off established roadways is not allowed. This instruction on driving safety and observation of speed limits will be included in the new employee orientation and annual refresher training and in task training for specific job assignments.

Decreases in the concentrations of dust on surrounding vegetation will accompany general fugitive dust emissions mitigative actions, and seasonal rain events will further remove any dust build-up on plant leaves.

Particulate and Combustion Emissions

Based on preliminary air emissions modeling, the power plant design has been modified to include fuel and stack height mitigation measures to reduce modeled emissions concentrations and impacts to ambient air quality. The initial Project plans were to utilize 2% sulfur fuel oil and the engines were to be equipped with stacks each 12.2 m (40 feet) tall. The Project has committed to utilizing 1% sulfur

fuel oil (the lowest % sulfur oil available in the area), and has increased stack height to 24.4 m (80 feet) for each engine. Lower sulfur fuel oil will decrease SO₂ emissions while higher stack height will increase dispersion and decrease ground-level emissions concentrations. As discussed in the impact analysis section, the emissions modeling is considered to be conservative, that is, to tend to over-predict actual emissions concentrations, based on the inherent nature of the AERMOD model and on the use of non-site-specific wind data. The Environmental Management Plan for the Project will include quarterly monitoring during power plant operations to verify that emissions are within WHO guideline values. Any exceedances encountered at offsite residential receptors will trigger a verification round of monitoring. Should both rounds return values of any parameter in exceedance of WHO guideline values, the Project will reduce power plant operating loads until a viable solution can be found. Potential mitigation measures could include, but are not limited to, the following:

- Modification of power plant operating load to coincide with optimal wind/meteorological conditions
- Inclusion of emissions controls systems in stacks
- Relocation of residences in long-term emissions exceedance areas

Adverse impacts to air quality resulting from vehicle and mobile equipment combustion emissions will be mitigated by enactment and enforcement of appropriate speed limits, driver and operator training including maximum allowable equipment idling times, and installation of appropriate emissions control equipment on vehicles. Regular maintenance of light vehicles and mobile equipment will be undertaken, to verify that vehicles and vehicle emissions control systems are in good working order. The effectiveness of these mitigative actions will be monitored through the Project's grievance mechanism and ongoing stakeholder engagement activities.



Nuisance Odors

Waste generated at the Project site will be collected and temporarily stored in large roll-of containers, then transported off-site for treatment and disposal on a regular basis; therefore no impacts to air quality are anticipated due to nuisance odors from waste or waste treatment.

5.1.3.4 Residual Impacts to Air Quality

Fugitive Dust

No residual impacts to air quality are expected after the close of Project construction activities.

Particulate and Combustion Emissions

Based on the conservative nature of the modeling effort, no residual impacts to ambient air quality are expected during Project operations.

Nuisance Odors

No residual impacts from nuisance odors are anticipated.

The following table presents a summary of the anticipated residual air quality impacts, relevant Project phase, and planned mitigation measures.

Table 5.5 - Residual Impact Summary – Air Quality

Impact	Source	Primary Receptor (1)	Phase (2)		Significance(3)		Mitigation Measures	Management Plan
			C	O	ST	LT		
Fugitive Dust / Particulate	General Site Area, Land Disturbance, Vehicular Traffic, Heavy Equipment	E, NN AL, FI	*		N	N	- Enforce speed limits for heavy equipment and general traffic on unpaved roads. - Restrict off-road travel unless absolutely necessary. - Limit number of trips with efficient loading procedures for material transport. - Cover or top-wet truckloads of soil / fill material. - Spray water on unpaved roads and traffic areas. - Hydraulically place dredge spoils from port harbor for site construction use. - Complaints monitoring.	Environmental Management Plan
							Use employee personnel protective equipment where required and occupational medical monitoring.	Construction Health, Safety, and Environmental Management Plan
Combustion Engine and	Vehicles, Mobile Equipment, and	E, NN	*	*	N	N	Enforce speed limits for heavy equipment and general traffic on all roads.	Environmental Management

Impact	Source	Primary Receptor (1)	Phase (2)		Significance(3)		Mitigation Measures	Management Plan
			C	O	ST	LT		
Point Source Emissions	Power Plant						• Use low-sulfur HFO as fuel; stack height optimized. • Air quality monitoring per AECOM • Perform regular maintenance and inspection of vehicles and mobile equipment.	Plans
Nuisance Odors	Solid Waste Handling and Disposal Facilities, Sanitary Sewage System	E, NN	*	*	N	N	• Incorporate appropriate waste storage, handling and disposal procedures. • Operate waste disposal facilities such that exposed refuse is covered with soil or gravel. • Operate sewage treatment facilities properly and monitor operational performance (including odors). • Complaints monitoring.	Waste Management and Disposal Plan
							• Use employee personnel protective equipment where required and occupational medical monitoring.	Health and Safety Management Plans

Notes:

(1) Primary Receptors:
E = employees
NN = nearby neighbors
AL = agricultural land

(2) Project Phase: C = Construction, O = Operations

(3) Expected Significance Rankings: ST = short-term with mitigation, LT = long-term with mitigation
S - = significantly adverse
M - = moderately adverse

Impact	Source	Primary Receptor (1)	Phase (2)		Significance(3)		Mitigation Measures	Management Plan
			C	O	ST	LT		

Fl = flora

N = neutral

M + = moderately improved

S + = significantly improved



5.1.4 Noise and Vibration

5.1.4.1 Project Activities Related to Noise and Vibration

The following activities have the potential to affect ambient and vibration noise levels during Project construction:

- Earthmoving and leveling activities
- Dredging and dredge spoil deposition
- Pile driving
- Heavy equipment operations
- Light vehicle operations
- Facility construction activities
- Road paving
- Truck traffic on access roads

To the extent possible, construction activities are restricted to daylight hours.

The following activities have the potential to affect ambient noise and vibration levels during Project operations:

- Port operations (ship arrivals/departures, ship loading/unloading)
- Mobile equipment operations (cargo transport)
- Power plant operations
- Industrial activities at LIFZ buildings
- Light vehicle operations

Operation of the port facilities will affect ambient noise levels at varying times throughout any 24-hour period, depending upon the arrival and departure schedule of ships. Outside of ship arrivals and departures, port operations will be typically limited to daytime hours. However, ships may arrive and depart at any time. On a typical day of operation at the port, the loading or unloading of a vessel will generate continuous noise while in progress. Supply and container truck traffic is expected to generally occur during daytime hours.

5.1.4.2 Potential Impacts from Noise and Vibration

AECOM Environment (2015b) conducted a noise modeling exercise for various operational scenarios for power plant operations in combination with truck traffic, considered to be the two principle sources of operational noise at the Project. The noise modeling report is included as Appendix C of this ESIA. The noise modeling analysis of the port was conducted using SoundPLAN, a specialized three-dimensional environmental noise prediction software program.

Noise Modeling Methodology

The main noise sources at the port section of the project were assumed to be the auxiliary power units (APUs) for docked ships, and the diesel mobile harbor cranes. Source levels for ship APU levels were generated from existing measured sound data of similar size container ships. Harbor cranes source levels were provided by the manufacturer. APUs were expected to be running 24 hours a day, while a usage factor of 50% was applied to the mobile harbor cranes.

The site power plant consists of 10 diesel engines and generators with 10 corresponding exhaust stacks fitted with noise silencers. Operations were evaluated for three load scenarios shown previously in Table 5.1.

Since source data for different load conditions was not available, usage factors were used as a surrogate (for example 80% load was assumed as 80% usage at 100% load). The generators are housed within an enclosed and air conditioned building, therefore, the main noise sources associated with the power plant are the exhaust stacks. The manufacturer has provided data for exhaust level as well as attenuation of the silencers. Other equipment associated with the power plant such as transformers, cooling fans, and heat exchangers was not taken into account as no noise-source data was available at the time of modeling.

Noise generated from truck traffic associated with the proposed port operations was also taken into account in the noise analysis. The maximum budgeted capacity of Port Lafito is 61 trucks per day; this figure was averaged evenly over a 24-hour period to determine maximum noise generated from truck traffic. In addition, it



was assumed that a maximum of 10 idling trucks would be located in the truck idling area at any one time. Noise emission data for trucks was calculated according to the United States Federal Highway Administration's Traffic Noise Model (TNM). A complete list of all sources and source levels is provided in Appendix B of the noise modeling report. Site-specific wind data were included in the model – as shown in Graphic 4.8b.

The SoundPLAN computer model was used to calculate the exterior propagation of noise from these sources. Multiple variables such as source noise levels, terrain effects, building reflections, surface absorption and ground propagation effects were considered in order to predict the noise levels at the closest receptors. Nearby buildings and structures were included in the model to account for any shielding effects as well as potential reflections between the acoustically hard vertical surfaces and the acoustically soft ground. Similarly, topographical contours for the area were used along with building layout plant details (such as the building dimensions) to improve the accuracy of the modeling analysis.

All sources were assumed to be running at full capacity 100% unless otherwise noted. These operating conditions depict a conservative "worst case scenario" for noise impacts on the local residences and commercial/industrial property.

Predicted Noise Impacts

Short-term increases in ambient noise levels as a result of construction activities were not included as part of the modeling effort, but can reasonably be predicted to affect nearby neighbors in areas immediately adjacent to the Project and GB Group employees and contractors working at the site. These impacts are expected to be moderately significant without the application of any mitigation measures.

No baseline noise data currently exist for the nearest offsite receptors, which in the case of the noise sources included in the operational noise modeling, are residences in the northwestern edges of the Lafiteau community; baseline noise data collection was limited to two points located within the Project's footprint. In the absence of noise baseline data at these nearest off-site receptors, noise criteria are based

solely on the fixed IFC level of 45 dB(A) at night. IFC's alternative noise criterion is an increase of no more than 3 dB(A) above measured baseline noise levels, daytime or nighttime. Due to relatively high wind speeds at Port Lafiteo, it is reasonable to assume an ambient noise level of 45 to 50 dB(A). This ambient noise level would put the project into compliance for all operational scenarios.

Predicted noise levels from the noise modeling effort are shown in the table below. The modeling of future noise levels during operations from container equipment at the port facility, ship APUs, the power plant, and idling truck traffic concluded that:

- Noise levels from future port activities do not exceed the IFC nighttime noise criteria of 45 dB(A) for operational load scenarios 1 and 2.
- Unmitigated noise levels under hypothetical operational load scenario 3 exceeded the fixed IFC nighttime noise criteria of 45 dB(A) by 1 dB at the closest residential receptors in the community of Lafiteau.
- As pointed out above, in the absence of relevant baseline data, compliance with the less than 3 dB(A) increase over baseline criterion could not be evaluated for any of the operational scenarios.

Table 5.6 – Predicted Noise Levels from Project

Operating Conditions	Period	Modeled Noise at Receptor, in dB(A)				Exceeds IFC Criteria?
		Residential		Industrial / Commercial		
		Lafiteau	Simonette	Lafiteau Industrial Area	GBG HQ	
Scenario 1	Daytime	47	45	58	52	No
	Nighttime	45	42	54	49	No
Scenario 2	Daytime	48	45	58	52	No
	Nighttime	45	42	55	49	No
Scenario 3	Daytime	48	46	59	53	No
	Nighttime	46	43	55	50	Nighttime

Source: AECOM Environment, 2015b

During Project operations, other adverse impacts to ambient noise levels will occur as a result of noise associated with light vehicle traffic to and from the Project facilities, mobile equipment operation, standard port activities, and diesel power generation. These impacts are expected to be moderate and of a duration identical to that of the Project's lifespan, and will affect both GB Group employees and contractors and to a lesser degree, nearby neighbors.

5.1.4.3 Mitigation Measures for Noise and Vibration

Construction-phase impacts to ambient noise levels will be mitigated via use of mufflers on mobile equipment, scheduling of high noise-generating activities during daytime hours to the extent practical, and monitoring of any noise-related complaints through the Project's grievance mechanism. It is expected that even with such mitigative actions, construction activities will result in minor adverse short-term impacts to ambient noise levels for nearby neighbors.

During construction and operations, GB Group employees and contractors will be provided with hearing protection equipment when working in or exposed occupationally to high-noise environments, and trained in the equipment's correct usage. Signage in the appropriate languages and internationally recognized symbols for high noise environments will be posted in high-noise areas where hearing protection equipment use is mandatory for employees and contractors.

To decrease noise impacts from mobile equipment, vehicles will be routinely maintained and noise-decreasing equipment (such as silencers and mufflers) will be kept in good working order. To the extent practical, high-noise activities will be scheduled during daylight hours to decrease the potential for disruption of sleep for nearby neighbors. Vehicle speed limits will be enacted and enforced, and drivers and equipment operators will be trained in safe driving and noise-decreasing practices.

The port facilities, LIFZ, and power plant are located away from organized residential areas, in previously vacant or largely unpopulated areas. The nearest neighbors are on the outskirts of Lafiteau, approximately 750 m southeast of the Project's eastern border. Some adverse impact to ambient noise levels will occur as



a result of operation of the power plant. In the absence of site-specific baseline data for the nearest offsite receptors, it is recommended that the Project optimize power plant operating load scenarios so as not to exceed IFC noise guidelines (p. 35). In addition, the Project may consider conducting site-specific baseline ambient noise monitoring at the nearest offsite receptors in Lafiteau, which will allow the assessment of compliance with the 'less than 3dB(A) increase over ambient criterion.

Adverse impacts to ambient noise and vibrations levels may result periodically from increased Project-related vehicle and heavy truck traffic along transportation routes to the Project site. Speed limits will be set and strictly enforced for Project-related traffic in populated areas. Training programs for GB Group employees and contractors will specifically discuss noise mitigation strategies such as decreasing speed and limiting horn usage in populated areas. To the extent practical, heavy truck traffic will be limited to daylight hours to decrease disruption of sleep for residents along transportation routes. Noise and vibration effects from truck traffic along the Project access roads will be monitored via the Project's complaints procedure.

The effectiveness of noise mitigation measures will be monitored through the Project's complaints process. If valid complaints are raised regarding noise levels emanating from Project activities, additional noise mitigation will be considered.

5.1.4.4 Residual Impacts from Noise and Vibration

With the application of mitigation measures there are no residual impacts to ambient noise or vibrations expected over the long term.

The following table presents a summary of the anticipated residual noise and vibration impacts, relevant Project phase, and planned mitigation measures.

Table 5.7 – Residual Impact Summary – Noise and Vibrations

Impact	Source	Primary Receptor (1)	Phase (2)		Significance(3)		Mitigation Measures	Management Plan
			C	O	ST	LT		
Noise	Traffic: Vehicle Traffic, Heavy Equipment, Mobile Equipment, Supply Traffic	E, NN	*	*	M -	N	Perform regular maintenance and inspection of vehicles and mobile equipment, including mufflers.	Traffic Management Plan and Environmental Management Plan
							Enforce speed limits for heavy equipment and general traffic on all roads.	
							Schedule high noise-generating activities to daytime hours.	
							Position containers for use as temporary noise barriers when possible.	
							Use personnel protective equipment where required and occupational medical monitoring.	Health and Safety Management Plans
							Monitor noise-related complaints through the Complaints and Grievances Process.	Stakeholder Engagement Plan
Noise	Facilities: Equipment, Bulk	E, NN		*	M-	N	Perform regular maintenance and inspection of equipment, including lubrication.	Environmental Management

Impact	Source	Primary Receptor (1)	Phase (2)		Significance(3)		Mitigation Measures	Management Plan
			C	O	ST	LT		
	Material Handling, Bulk Storage, Loading and Unloading						- Enforce speed limits for heavy equipment and general traffic on all roads. - Schedule high noise-generating activities to daytime hours. - Perform regular maintenance and inspection of GB vehicles and mobile equipment, including mufflers. - Noise receptor and procedure for Lafiteau	Plan
							- Post signage in appropriate languages denoting areas of high noise where hearing protection is mandatory. - Use personnel protective equipment where required and occupational medical monitoring.	Occupational Health and Safety Management Plan
							Monitor noise-related complaints through the Complaints and Grievances Process.	Stakeholder Engagement Plan
Noise	Facilities: Equipment within Site	E		*	M -	N	Maintain design buffer distance from facilities.	Environmental Management Plan
							Use personnel protective equipment where required and occupational medical monitoring.	Occupational Health and Safety Management Plan

Impact	Source	Primary Receptor (1)	Phase (2)		Significance(3)		Mitigation Measures	Management Plan
			C	O	ST	LT		
Noise	Power Plant	E, NN		*	M-	N	Perform regular maintenance and inspection of equipment.	Environmental Management Plan
							Use personnel protective equipment where required and occupational medical monitoring.	Occupational Health and Safety Management Plan
Vibrations	Vehicles, Heavy Equipment	E, NN, B	*	*	N	N	- Enforce speed limits for heavy equipment and general traffic on all roads. - Schedule high vibration-generating activities to daytime hours.	Environmental Management Plan
Vibrations	General Site Operations	E, NN, B		*	N	N	- Schedule high vibration-generating activities to daytime hours. - Perform regular maintenance and inspection of equipment.	Environmental Management Plan
							Monitor vibration-related complaints through the Complaints and Grievances Process.	Stakeholder Engagement

Impact	Source	Primary Receptor (1)	Phase (2)		Significance(3)		Mitigation Measures	Management Plan
			C	O	ST	LT		
								Plan

Notes:

(1) Primary Receptors:
 E = employees
 NN = nearby neighbors
 B = buildings

(2) Project Phase: C = Construction, O = Operations

(3) Expected Significance Rankings: ST = short-term with mitigation, LT = long-term with mitigation

S - = significantly adverse
 M - = moderately adverse
 N = neutral
 M + = moderately improved
 S + = significantly improved

5.1.5 Visual Resources

5.1.5.1 Project Activities Related to Visual Resources

The following activities have the potential to affect visual resources during Project construction:

- Land clearing and earthmoving activities
- Erection of Project infrastructure
- Nighttime illumination at Project site
- Revegetation of disturbed areas (benefit)
- Landscaping around Project infrastructure (benefit)

The following activity is expected to affect visual resources during Project operations:

- Nighttime illumination at Project site

5.1.5.2 Potential Impacts to Visual Resources

Construction of the Project infrastructure will result in the alteration of the existing landscape. During construction and operations, nighttime lighting and mobile equipment headlights will be visible from various vantage points including Port-au-Prince Bay and portions of Lafiteau and Simonette. Facility buildings and structures will also be visible from similar vantage points during the daytime.

Nighttime lights and facility outlines will adversely affect visual resources in the Project area during facility construction and throughout its operational lifespan.

5.1.5.3 Mitigation Measures for Visual Resources

Construction contractors will be advised to purchase lowest emission lighting that will still provide sufficient light for safety purposes, where feasible. Lighting choices could include lights with protective screens and/or the installation of vegetative barriers to prevent light migration off site. Light sources for nighttime construction and operational activities will be pointed downward and away from primary receptors such as nearby neighbors to the extent practical without forgoing safety

purposes. Mobile equipment operators and drivers will be instructed in the appropriate use of high and low beams on headlights to further reduce visual resources impacts for nearby neighbors. The Project's grievance procedure will be monitored to assess the validity of any complaints about nighttime illumination.

At the close of construction, any remaining cleared areas will be revegetated. The Project includes landscaping and green spaces around Project infrastructure that will provide increased visual appeal beyond the baseline condition of disturbed scrubland.

Project infrastructure components will be finished and/or painted in colors that are designed to blend with the existing landscape, to the extent practical, while maintaining safety standards. Exclusions to this mitigation measure will include tall infrastructure components such as the stacks at the power plant, which may require additional markings such as high-visibility striping or beacon lights to minimize hazards for low-flying aircraft and birds.

5.1.5.4 Residual Impacts to Visual Resources

Increased nighttime illumination from the Project site will remain a moderate residual impact for nearby neighbors.

The following table presents a summary of the anticipated residual visual impacts, relevant Project phase, and planned mitigation measures.

Table 5.8 – Residual Impact Summary – Visual Resources

Impact	Source	Primary Receptor (1)	Phase (2)		Significance(3)		Mitigation Measures	Management Plan
			C	O	ST	LT		
Visual	Vehicles, Mobile Equipment, Buildings	NN	*	*	M-	N	• Use low-emission lighting that provide sufficient and safe lighting. • Aim light sources down and away from primary receptors. • Instruct drivers and operators about appropriate use of low and high beam headlights. • Use protective screens and/or install vegetative barriers.	Integrate during Design and Construction
Visual	Buildings, Structures	NN		*	N	N	• Perform regular maintenance and inspection of lights and lighted equipment.	Integrate into Operations
Visual	Nighttime Illumination	NN		*	M-	M-	• Use low-glare lights as possible/appropriate to maintain safe working conditions, point lights downward as possible; complaint monitoring	Integrate during Design and Construction
Visual	Limited revegetation/landscaping on and around site	E, NN		*	M+	M+	• Revegetate limited areas around site, and install landscaping on grounds of administrative buildings and site access corridors.	Erosion and Sedimentation Management Procedures

Impact	Source	Primary Receptor (1)	Phase (2)		Significance(3)		Mitigation Measures	Management Plan
			C	O	ST	LT		

Notes:

(1) Primary Receptors:
 NN = nearby neighbors
 E = employees

(2) Project Phase: C = Construction, O = Operations

(3) Expected Significance Rankings: ST = short-term with mitigation, LT = long-term with mitigation
 S - = significantly adverse
 M - = moderately adverse
 N = neutral
 M + = moderately improved
 S + = significantly improved

5.1.6 Soils

5.1.6.1 Project Activities Related to Soils

The following activities have the potential to affect soils during Project construction:

- Land clearing and earthmoving activities
- On-land disposal of dredge spoils
- Accidental spills of petrochemicals
- Vehicle and equipment maintenance activities

The following activities have the potential to affect soils during Project construction:

- Accidental spills of petrochemicals
- Vehicle and equipment maintenance activities

5.1.6.2 Potential Impacts to Soils

Erosion and Sedimentation

Construction activities involving vegetation clearing, ground leveling, and land disturbance will affect soil resources by removing topsoil and increasing soil erodibility. Topsoil removal has the potential to adversely impact soils by increasing the erodibility of underlying soil layers. Soil erosion will also result in impacts to receiving seawater quality in the form of increased turbidity and sediment loading. At the end of construction, any cleared areas that remain uncovered or are not revegetated may have soil losses due to wind erosion or precipitation runoff.

The waters of Port-au-Prince Bay are the ultimate receptor for any sediment produced by Project activities. Based on the existing sediment load experienced by the marine ecosystem in the Project area and the degree of existing impact, additional sedimentation to the marine ecosystem is considered to be a significant impact prior to mitigation.

Spoils from dredging in the harbor during construction are being deposited on land along the northwestern side of the port. Suitable coarse material is separated for use in construction activities. As the dredged material will be wet when deposited in the stockpile area, unmitigated impacts from erosion of the stockpiles during constructions are conservatively expected to be moderate.

Accidental Spills and Maintenance Activities

Accidental spills of chemicals will also adversely affect soil quality, with the degree of impact dependent on the type of agent spilled, volume of the spill, rapidity and effectiveness of spill response, and on the receiving soil type. Additionally, vehicle maintenance activities such as fueling, lubricating, and washing have the potential to release oil and gas residue to the underlying soils when these activities take place on permeable surfaces, such as non-graveled dirt areas. The severity of potential impacts to soils from accidental spills and improper maintenance activities is based on the volume/area affected by the spill - to be conservative; such impacts are herein considered to be significant without mitigation measures.

5.1.6.3 Mitigation Measures for Soils

Mitigation to reduce impacts to soils can be grouped into two control strategies: erosion and sediment control; and spill prevention and control. With the imposition of mitigation measures, impacts to soil and land resources are considered to be neutral. The mitigation measures for impacts to soil resources are discussed separately below.

Erosion and Sediment Control

The Project will develop and implement a Sedimentation and Erosion Control Procedures that will include good international practices (GIIP) for sedimentation and erosion control. The GIIP included in the Sedimentation and Erosion Control Procedure will be implemented during both construction and operations phases of the Project. Implementation of the following control measures during overburden clearing and salvaging will greatly reduce any erosion or sediment loading that may arise from the stripping activity:

- Use geotextile silt fencing, silt traps, and /or straw bales to reduce sediment transport within the construction site - overland flow from the construction area should be avoided
- Divert “clean” (non-contact) water away from the works area
- Suppress dusting by wetting or application of a dust control agent
- Grade the site and channel surface flow into ditches to reduce flow velocities and decrease the potential for erosion
- Collect and pump runoff to settling facilities or treat potentially affected water, including water used to decontaminate equipment, and impacted runoff
- Inspect and maintain silt control measures;
- Provide temporary storm water retention capacity;
- Proof-roll subgrade or stockpile materials
- Cover soil and re-establish vegetation on cleared areas not used for construction and establish a vegetative cover on topsoil stockpiles
- Implement a site-wide operational surface water quality-monitoring program to assess impacts of site runoff on receiving surface water bodies and effectiveness of construction control measures

Spill Prevention Response Control and Control Plan

A Spill Prevention, Response and Control Plan has been developed for the Project. Both GB Group employees and contractors will be bound by the procedures in the Spill Prevention and Response Plan. GB Group will provide training in spill prevention and control procedures contained in the Spill Prevention and Response Plan to its employees and contractors to decrease the potential for adverse impacts to soil and water resources quality in the event of an accidental spill or release during normal construction or operating conditions. Key actions and procedures for effective spill prevention and control include:

- Construction of appropriate, banded, impermeable containment around storage tanks and areas where spills could occur
- Placement of suitable impermeable under-layer/pavement in areas where chemicals, fuels, or lubricants are being handled or used

- Stocking and appropriate location of sorptive materials for the materials stored or in use in a particular area, allowing immediate spill contention and clean up
- Appropriate removal and disposal of any soils and sorptive materials contaminated by cleanup of accidental spills or improper maintenance activities, based on the procedures in the Project's Waste Management and Disposal Plan.

Any accidental spills or improper maintenance activities leading to contamination of soils will be classified as "environmental incidents" and will be documented and reported as part of the Project's Environmental and Social Management Plan (Chapter 7).

5.1.6.4 Residual Impacts to Soils

No residual impacts to soils are expected.

The following table presents a summary of the anticipated residual soil impacts, relevant Project phase, and planned mitigation measures.

Table 5.9 – Residual Impact Summary - Soils

Impact	Source	Primary Receptor (1)	Phase (2)		Significance(3)		Mitigation Measures	Management Plan
			C	O	ST	LT		
Soils	Land Disturbance	L, Sw	*		N	N	• Use erosion and sediment control measures to reduce erosion and sediment loading. • Salvage and stockpile as much topsoil as possible during clearing activities, and establish vegetative cover on the stockpiles to reduce erosion. • Maintain buffer distance for mangrove vegetation. • Revegetate as much cleared land area as possible after construction.	Erosion and Sedimentation Management Procedures
Soils	Equipment and Vehicle Maintenance Areas; Storage, Loading/Unloading, Materials Handling Areas; General Site Activities	L, Sw, Gw	*	*	N	N	• Develop and follow a Spill Prevention, Response and Control Plan (SPRC) for the site. • Provide initial and refresher SPRC training for all pertinent employees and contractor personnel . • Keep suitable containment and cleanup supplies (per the SPRC) readily available. • Install underlayment liner or pavement in chemical, fuel, and lubricant storage areas.	Spill Prevention and Response Management Plan; Health and Safety Management Plans

Impact	Source	Primary Receptor (1)	Phase (2)		Significance(3)		Mitigation Measures	Management Plan
			C	O	ST	LT		
							- Design and install adequately sized bunded areas around bulk liquid and fuel storage areas. - Use personnel protective equipment where required and occupational medical monitoring.	

Notes: (1) Primary Receptors:

L = land

Sw = surface water

Gw = groundwater

(2) Project Phase: C = Construction, O = Operations

(3) Expected Significance Rankings: ST = short-term with mitigation, LT = long-term with mitigation

S - = significantly adverse

M - = moderately adverse

N = neutral

M + = moderately improved

S + = significantly improved

5.1.7 Water Resources

Impacts to water resources were evaluated for surface water, groundwater, and seawater. The Project is planning on utilizing surface water for the main water supply; seawater will be used in a non-contact cooling system at the power plant; although groundwater resources will not be used by the Project, some Project activities could affect groundwater resources.

5.1.7.1 Project Activities Related to Surface Water Resources

No activities are expected to affect surface water resources during construction; water for construction use is being provided from precipitation and runoff captured in the water retention pond.

Although water use for port activities are expected to minimal and limited only to the port administration building (≤ 100 gallons per day), the following activity has the potential to affect surface water resources during Project operations:

- Withdrawal of water from the Simonette stream to supply the water retention pond at the Project site (for Lafito Industrial Free Zone and powerplant)
- Improvements to existing dam on the Simonette stream (benefit)

5.1.7.2 Potential Impacts to Surface Water

As discussed in the Project Description (Section 3.1), the primary extraction point is located on the Simonette stream in the community of Simonette, downstream of most if not all surface water users. Likewise for the Source-Matelas stream: there are no known water users downstream of the planned extraction point, from which the stream flows directly into the sea. Withdrawal of surface water at both locations will be via submersible pump, and no impacts to surface water quality in the impoundment or in the stream are expected from the withdrawal.

There is an existing low-head concrete dam in Simonette at the Project's planned surface water extraction point (Figure 4.3). As part of its Social Investment

Program, GB Group plans on making improvements to the dam that will fortify the structure and increase its retention capacity up to 19 m³ (5000 gallons) of water. Previously, excess water was allowed to overtop the dam and flow unhindered to the sea, approximately 400m downstream of the dam location. No diversion ditches are currently located downstream of the dam and its outlet with the sea, although a number of footpaths access the stream. Water impounded by the dam is currently used by residents of Simonette for domestic and recreational (swimming) uses.

Based on the projected water demand for full build-out/LIFZ occupancy defined in Table 3.5, the Project is estimated to withdraw water at a rate of up to 28.4 L/s (450 gpm) of water from local streams, primarily from the nearer Simonette stream, with the Source-Matelas stream as a secondary source. An impact assessment was conducted using the stream flow data from Table 4.5 and the estimation of water demand by Project components presented in Table 3.5.

The maximum and minimum extraction rates for pumping water from local streams are defined as follows:

- Maximum: 28.4 L/s (450 gpm) – rate provided by GB Group
- Minimum: 7.4 L/s (116.7 gpm) – calculated from Table 3.5 as the minimum pumping rate needed to maintain full pool in the water retention pond, based on water use calculations for full build-out/LIFZ occupancy

The following sets of tables demonstrate the projected impact on surface water flows using measured stream flow data from Table 4.5 and the maximum and minimum surface water extraction/pumping rates as defined above. Table 5.10 uses averaged stream flow data from the baseline, and demonstrate that the maximum extraction rate (28.4 L/s or 450 gpm) is expected to exceed stream flow availability in the Simonette stream; extraction from both streams simultaneously would decrease impact to each individual stream.

Table 5.10 – Maximum Extraction Rate as a Percentage of Average Stream Flow

Stream	Average Measured Flow L/s (gpm)	Maximum Extraction Rate as a % of Average Stream Flow
Simonette	24.3 (385.0)	>100%
Source-Matelas	34.8 (552.3)	81.6%
Combined	59.1 (937.3)	48.0%

Table 5.11 uses the stream flow data from the two dates for in Table 4.5 where simultaneous stream flow measurements were made, and demonstrates maximum extraction rate as a percentage of total combined measured stream flow. The table shows that under maximum extraction withdrawal, simultaneous pumping from both streams reduces the impact to individual surface water resources.

Table 5.11 – Maximum Extraction Rate as a Percentage of Total Available Combined Stream Flow

Flow Measurement Date	Measured Flow, L/s (gpm)		Total Stream Flow Available	Maximum Extraction Rate as a % of Total Stream Flow
	Simonette Stream	Source-Matelas Stream		
8 July 2014	25.1 (397)	35.6 (564)	60.7 (961)	46.8%
4 March 2015	31.0 (491)	32.1 (509)	63.1 (1000)	45.0%

The second set of tables assesses potential impacts to surface water resources based on the minimum extraction rate of 7.4 L/s (116.7 gpm) required to maintain the water level in the water retention pond, assuming the water demand at full build-out/LIFZ occupancy shown in Table 3.5. Table 5.12 demonstrates the decreased impact on average stream flow for both streams individually and combined under minimum pumping rate conditions.

Table 5.12 – Minimum Extraction Rate as a Percentage of Average Stream Flow

Stream	Average Measured Flow L/s (gpm)	Minimum Extraction Rate as a % of Average Stream Flow
Simonette	24.3 (385.0)	30.5%
Source-Matelas	34.8 (552.3)	21.3%
Combined	59.1 (937.3)	12.5%

Table 5.13 demonstrates potential impacts to surface water flow under minimum extraction withdrawal using actual measured stream flow data for both streams.

Table 5.13 – Minimum Extraction Rate as a Percentage of Total Available Combined Stream Flow

Flow Measurement Date	Measured Flow, L/s (gpm)		Total Stream Flow Available	Minimum Extraction Rate as a % of Total Stream Flow
	Simonette Stream	Source-Matelas Stream		
8 July 2014	25.1 (397)	35.6 (564)	60.7 (961)	12.2%
4 March 2015	31.0 (491)	32.1 (509)	63.1 (1000)	11.7%

Although there are no documented downstream water users for either stream, decreases in surface water availability can have additional impacts, both current and future:

- Impacts to freshwater stream biota and fauna using the streams, downstream of the extraction point
- Impacts to marine biota in the mixing zone where the streams enter the sea
- Future impacts on the ability of local communities to expand and/or to develop more sophisticated water uses (such as increased agriculture/irrigation or installation of indoor plumbing).

No information is available on freshwater aquatic biota; however the Project's baseline biological data strongly suggest that freshwater and marine communities are currently significantly impacted by anthropomorphic pollution and terrestrial sedimentation. Therefore the unmitigated impacts of Project water withdrawal in

terms of effects to ecosystems and biological ecosystem services are considered insignificant.

5.1.7.3 Mitigation Measures for Surface Water

Infrastructure and processes across the Project have been designed to minimize fresh water use to the extent practical, and to recycle any fresh water used or produced at the Project. The power plant's cooling systems have been designed to reduce the need for fresh water to the minimum extent practical. The high-temperature cooling system that utilizes fresh water is sealed, meaning that used cooling water continually recirculates within the system. Once charged, the ongoing demand for fresh water by the high-temperature cooling system will be negligible. The secondary (low-temperature) cooling system uses seawater to cool plates containing heated fresh water from the high-temperature system. The seawater used in the low-temperature cooling system does not come into contact with any Project components beyond the cooling plates, and is returned to the sea via an open, concrete-lined channel to accelerate heat dissipation.

GB Group will continue to seek low-water-intensive manufacturing and industrial clients for the LIFZ, to reduce impacts to surface water resources to the extent practical. Current leases include four garment manufacturers, with no significant additional anticipated process water needs beyond the fire protection and restroom facilities that are already included in Project design plans for LIFZ buildings. In addition, the Project will utilize low-flow shower heads and toilets site-wide to decrease surface water demand. Faucets in restrooms and kitchen facilities will include aerators to reduce water use. Treated wastewater from the Project's package wastewater treatment facilities will be recycled for use in dust control and for irrigation of landscaping and green areas around the Project.

In discussions with the local community council regarding water take from the Simonette Stream, GB Group has committed to purchasing and installing solar-powered water treatment system next to the pump building at the impoundment site. Potable water produced by the system will report to a 7.6m³ (2,000 gal) tank from which residents can withdraw water via a series of spigots. GB Group will provide maintenance of the community potable water system; decisions on potable water allocation will be made by the community council. GB Group has also

committed to replacing both existing informal dams on the Simonette stream with engineered structures.

5.1.7.4 Residual Impacts to Surface Water

Long-term residual impacts to surface water users are expected to remain moderate due to the limited availability of surface water sources in the Project region. GB Group has committed to engage a hydrological engineering consultant to refine the assessment of potential impacts to surface water resources prior to the start of operations at the LIFZ.

5.1.7.5 Project Activities Related to Groundwater Quality

The following activities have the potential to affect groundwater quality during Project construction and operations:

- Accidental spills of petrochemicals
- Vehicle and equipment maintenance activities

5.1.7.6 Potential Impacts to Groundwater Quality

Accidental spills and improper vehicle and equipment maintenance procedures could result in infiltration of spilled materials into groundwater underlying the spill area. The degree of significance of a spill's impact to groundwater quality will depend upon the agent spilled, volume of spill, rapidity and effectiveness of spill response, and on the permeability of the surface receiving the spill. As shown in Figure 4.5, groundwater is inferred to flow from the higher ground to the northeast of the Project in a generally southwest direction towards Port-au-Prince Bay. Inferred depth to groundwater for major infrastructure is shown in the table below, based on the well capacity testing performed in 2014.

Table 5.14 – Inferred Depth to Groundwater, Major Project Components

Project Component	Inferred Depth to Groundwater, m below ground surface
LIFZ	2.4 – 3.0

Power Plant	0.1 – 1.2
Port Lafito	0.3 – 0.6

Source: Modified from NRE 2014, Figure 4

Groundwater wells fitted with hand pumps are used by surrounding communities and nearby neighbors for domestic water wells; those in Lafiteau are also shown in Figure 4.5. No existing groundwater wells will be directly affected or removed by Project implementation. The closest hand pump wells to the Project are PLLAFDW1, PLLAFDW2, PLLAFDW3, and PLLAFDW7, all located along the LIFZ's southeastern corner, within 65 – 175 m of the Project border.

5.1.7.7 Mitigation Measures for Groundwater

Appropriate Good International Industry Practices (GIIPs) to prevent and respond to accidental spills will be detailed in the Spill Prevention and Response Plan being developed for the Project. Proper implementation of this Plan in concert with employee training can reduce the risk of accidental releases and reduce the onsite and offsite impacts to groundwater resources from an accidental release. Additional mitigation measures to protect groundwater quality will include adequate engineering design and operation of the sanitary sewage and stormwater retention ponds and treatment facilities.

5.1.7.8 Residual Impacts to Groundwater Quality

No residual impacts to groundwater quality are expected from Project implementation.

5.1.7.9 Project Activities Related to Seawater Quality

The following activity has the potential to affect seawater quality during Project construction:

- Increased sedimentation from land disturbance activities

The following activities have the potential to affect seawater quality during Project operations:

- Use and return of seawater in power plant low-temperature cooling circuit
- Discharge of water from sedimentation control system to sea

5.1.7.10 Potential Impacts to Seawater Quality

The potential impacts associated with increased sedimentation to seawater from land disturbance activities during construction are discussed in and are not repeated here.

Adverse impacts to seawater quality may occur from Project-related discharges of stormwater runoff from industrial and infrastructure areas. These impacts will occur over the short term during facility construction and operations, and are not expected to affect regional water quality or hydrologic regimes.

Sanitary sewage generated at Project area facilities will be collected and piped to the wastewater treatment plant systems located on site; solids from the treatment plant will be vacuum-extracted and disposed of in an appropriate landfill by a duly licensed provider. Treated wastewater from the treatment plants will be recycled for use as irrigation water for Project landscaping and green areas; no discharges to seawater from the wastewater treatment system are expected. Any effluent generated by food service and laundry facilities serving site employees will also be routed to the wastewater treatment plant system. Stormwater runoff from industrial areas will be routed through an oil/water separator prior to reporting to the stormwater management system and subsequent discharge off site. Stormwater runoff from other areas of the site will be collected in retention ponds for settling of suspended sediment prior to discharge to Port-au-Prince Bay. Thermal discharge from the seawater cooling system for the power plant will be returned to the sea via a rip-rap lined open concrete channel, designed to accelerate heat loss from the cooling water prior to return to the sea.

5.1.7.11 Mitigation Measures for Seawater Quality

By design, seawater used in the low-temperature cooling system for the power plant will not come into contact with any moving parts or combustion components of the power plant, and thus will only have its temperature changed by use in the cooling system. To decrease thermal effects in the area of the seawater return

outlet in Port-au-Prince Bay, heated seawater will be routed from the power plant to a concrete-lined channel that will direct the flow into the bay. The channel will be open and lined with a rip rap, slowing the return water flow and increasing turbulence and mixing with air, to accelerate heat transfer from the return seawater flow to the surrounding atmosphere so that return seawater will only have a slight elevation in temperature over ambient (receiving) seawater temperature. The mitigation measures designed into the seawater return system reduce this potential impact to neutral.

The Project will use a number of package wastewater treatment plants working in parallel to capture and treat sewage from the various Project facilities including restrooms and kitchens at the mancamp and LIFZ cafeterias and from restrooms at the port and power plant. The number of package plants will be based on LIFZ tenancy and wastewater treatment requirements. The plants are designed to comply with GIIP, and will be regularly inspected to ensure that they are maintained in good working condition. Treated discharge from these facilities will comply with IFC's Indicative Values for Treated Sanitary Sewage Discharges (Wastewater and Ambient Water Quality Guidelines, General Environmental, Health, and Safety Guidelines, April 2007), and will be regularly monitored as part of the facility's water quality monitoring program (Environmental Management Plan). Treated wastewater from the wastewater treatment system will be recycled and used for irrigation of Project landscaping and green areas. Application of these mitigative measures to wastewater treatment facility discharge will produce a neutral impact to seawater quality.

Stormwater, including runoff from industrial areas, will be collected and treated as necessary so that it will meet discharge standards. Stormwater discharge will be monitored for compliance with IFC guidelines, resulting in a net neutral impact to the quality of receiving seawater.

Stormwater from non-process areas runoff will be diverted away from Project components to the extent practical and kept separate from wastewater and sanitary sewage treatment streams to reduce water treatment costs and volumes. Oil/water separators and grease traps will be installed at appropriate locations. Stormwater from the Project site will be diverted to a stilling basin for removal of suspended



sediment prior to discharge to Port-au-Prince Bay, and will be regularly monitored for compliance with IFC guidelines for stormwater discharge.

5.1.7.12 Residual Impacts to Seawater Quality

There are no residual impacts to seawater quality expected as a result of return flow of seawater from the low-temperature cooling circuit at the power plant or from discharges from the stormwater retention system.

The following table presents a summary of the anticipated residual impacts to water resources (surface water, groundwater, and seawater), relevant Project phase, and planned mitigation measures.

Table 5.15 – Residual Impact Summary – Water Resources

Impact	Source	Primary Receptor (1)	Phase (2)		Significance(3)		Mitigation Measures	Management Plan
			C	O	ST	LT		
Water	Project Area	Sw, Gw, Cw	*		N	N	GB has committed to engaging a hydrological engineering consultant prior to the start of LIFZ operations to conduct a sustainability assessment of available surface water supply, development of a water balance, and refinement of the water resources impact assessment.	
Water	Water Quality: Sanitary Sewage System, Industrial Wastewater, Stormwater Discharge	Gw, Cw	*	*	N	N	- Design and operate sanitary sewage system according to Good International Industry Practices (GIIP). - Conduct regular inspections of sanitary sewage system. - Keep stormwater separate from industrial wastewater and sanitary sewage treatment streams. - Divert stormwater from non-process areas away from Project components to the extent possible. - Divert stormwater to stilling basins for suspended sediment removal prior to discharging into water bodies; monitor for compliance with discharge guidelines.	Sedimentation and Erosion Control Procedures; Water Management Plan; and Waste Management and Disposal Plan

Impact	Source	Primary Receptor (1)	Phase (2)		Significance(3)		Mitigation Measures	Management Plan
			C	O	ST	LT		
							- Collect, monitor, and treat (as necessary) industrial wastewater (including runoff). - Perform regular monitoring of treated discharge water as part of facility's water quality monitoring program. - Collect additional baseline surface water data for effluent discharge modeling and impact analyses.	
Water	Water Quality: Equipment and Vehicle Maintenance Areas; Storage, Loading/Unloading, Materials Handling Areas	Gw, Cw	*	*	N	N	- Develop and follow a Spill Prevention, Response and Control (SPRC) Plan for the site. - Provide initial and refresher SPRC training for all pertinent employees and contractor personnel . - Keep suitable containment and cleanup supplies (per the SPRC) readily available. - Design and install adequately sized bunded areas around bulk liquid and fuel storage areas. - Install underlayment liner or pavement in chemical, fuel, and lubricant storage areas.	Spill Prevention and Response Plan
							Use personnel protective equipment where required and occupational medical monitoring.	Health and Safety Management Plans

Impact	Source	Primary Receptor (1)	Phase (2)		Significance(3)		Mitigation Measures	Management Plan
			C	O	ST	LT		
Water	Water Quality: Project Operations	Cw, Me		*	N	N	Monitor site and power plant cooling water discharges; maintain all water discharges within accepted temperature and water quality limits/guidelines.	Environmental Management Plan
Water	Improvements to Low Head Dams in Simonette	Sw, NN		*	S+	S+	- Benefit to local water users. - GB Group has committed to purchasing and installing solar-powered water treatment system next to the pump building at the Simonette impoundment site.	
Water	Water Retention Pond: Withdrawal of water from Simonette and Source Matelas streams	Sw, NN		*	M-	M-	Install and monitor float switches/proximity sensors on pumps of reservoir capacity; flow monitoring; complaint monitoring	Environmental Management Plan

Notes:

(1) Primary Receptors:

(2) Project Phase: C = Construction, O = Operations

(3) Expected Significance Rankings: ST = short-term with mitigation, LT = long-term with mitigation

S - = significantly adverse

M - = moderately adverse

Sw = surface water

Gw = groundwater

Cw = seawater

Impact	Source	Primary Receptor (1)	Phase (2)		Significance(3)		Mitigation Measures	Management Plan
			C	O	ST	LT		

NN = nearby neighbors

Me = marine ecosystem

N =
neutral
M + =
moderately
improved
S + = significantly improved

5.1.8 Flora

5.1.8.1 Project Activities Related to Flora

The following activities have the potential to affect flora during Project construction:

- Ground-clearing activities on land
- General construction activities
- Ground-clearing activities along coastline

5.1.8.2 Potential Impacts to Flora

Loss of Terrestrial Flora

Ground-clearing and leveling activities on the landward side of the Project are expected to directly affect an estimated 49.7 Ha. The terrestrial habitat in the majority of the Project area consists of arid scrubland with low biodiversity value, due both to the area's dry climate and to the land's former use as a sisal plantation. No endemic flora species were reported during the baseline sampling. Local residents also typically let their livestock, including goats, range freely; the Project footprint area was also heavily browsed by goats, with resulting impacts to vegetation growing on the site. The unmitigated loss of terrestrial vegetation from ground-clearing and leveling activities is considered a moderate impact due to its baseline conditions within the footprint of the Project.

Effects of Fugitive Dust on Plants

Construction activities are expected to generate fugitive dust over the short term, from earthmoving and levelling activities as well as from heavy equipment and light vehicle traffic over unpaved surfaces. Unmitigated, fugitive dust depositing on surrounding flora and agricultural crops is considered to be a moderate impact and is discussed in Section 5.2.1.

The dust that is generated from construction activities could fall on the surrounding flora including nearby agricultural fields and garden plots. Dust-fall on plant leaves would have a detrimental effect to the evapotranspiration rate of the affected

individuals, affecting their ability to exchange gasses. This eventually could have an effect on the growth and survival of some of plants. Due to the short-term nature of the impact and the amount of dust that could potentially be generated by the construction activities, it is considered that the impact to plants from dust settling is moderate. This impact is expected to occur principally in the areas closest to the active construction zones and along access roads. The further removed from the area of dust generating activities, the lower the potential for impact. This impact is considered in Table 5.15.

5.1.8.3 Mitigation Measures for Flora

For each of the identified potential impacts, there are measures that can be implemented to reduce the significance of the impact. The measures that can be implemented to reduce the impacts identified above are presented in the following sections.

Loss of Terrestrial Flora

The direct loss of existing vegetation will be minimized by restricting land disturbance and construction activities to the area of the Project footprint, to the extent practical. At the close of construction activities, cleared areas will be revegetated with a mix of non-invasive/native species. The Project design incorporates landscaping around Project infrastructure components, as shown in the conceptual renderings of completed facilities in Figures 3.4, 3.6, and 3.8. Green areas are also incorporated into the Project design. Treated wastewater from the Project's wastewater treatment plant/s will be recycled for use in irrigation of Project landscaping and green areas. These mitigation measures are expected to result in a net neutral impact to terrestrial flora in the Project area.

5.1.8.4 Residual Impacts to Flora

The mitigation measures for impacts related to loss of terrestrial flora are expected to result in a net neutral long-term impact to terrestrial flora. (As mentioned in Section 5.2.3.4, landscaping around Project infrastructure and the inclusion of green areas are expected to result in a net moderate benefit to visual resources.)



Revegetation of mangrove species in a suitable location and follow-up monitoring to assure the safety and successful growth of the new plants is expected to result in a long-term moderate benefit to mangroves.

The following table presents a summary of the anticipated residual flora impacts, relevant Project phase, and planned mitigation measures.

Table 5.16 – Residual Impact Summary - Flora

Impact	Source	Primary Receptor (1)	Phase (2)		Significance(3)		Mitigation Measures	Management Plan
			C	O	ST	LT		
Loss of Terrestrial Vegetation	Clearing, Stripping, and Bulk Earthwork during Construction of Facilities and Roads	Ag, Nv	*		N	N	- Optimize design and minimize construction disturbance to limit the areas of lost natural habitat and agricultural land. - Locate dredged material placement equipment away from plant communities wherever possible.	Integrate during Design and Construction
							- Implement planned erosion and sediment control measures. - Revegetate disturbed areas with affected species where and when possible after construction ends. - Partner with appropriate conservation organization to offset any vegetation loss, as applicable.	Sedimentation and Erosion Control Procedure
							Implement dust control measures stipulated in Section 5.2.1	Environmental Management Plan
							Keep vehicle traffic out of from areas not required for access during construction activities.	Traffic Management Plan

Notes: (1) Primary Receptors: (2) Project Phase: C = Construction, O = Operations
Mn = mangrove (3) Expected Significance Rankings: ST = short-term with mitigation, LT = long-term with mitigation
Ag = agricultural & fallow land S = significantly adverse

Nv = natural vegetation

M - = moderately adverse

N = neutral

M + = moderately improved

S + = significantly improved

5.1.9 Marine Ecosystem

The following activities have the potential to affect the marine ecosystem during Project construction:

- Dredging of harbor area
- Ground-clearing and general construction activities on land
- Clearing of coastal land for port construction
- Accidental spills and improper maintenance activities

The following activities have the potential to affect the marine ecosystem during Project operations:

- Maintenance dredging
- Discharge of stormwater from the sedimentation control system
- Accidental spills and improper maintenance activities
- Return of seawater used in the low-temperature cooling system
- Discharge of ballast water from vessels at the port

5.1.9.1 Potential Impacts to the Marine Ecosystem

Loss of Benthic Communities

The benthic communities in the dredging area will be lost and are not expected to recover, as the dredged area will be deeper than the original benthos and will be subject to periodic maintenance dredging, which will limit the establishment of any permanent re-colonization. The Marine Assessment report (Earthtech, 2014b) documented the existing degraded and sediment-impacted state of the benthos in the Project area; based on baseline conditions, unmitigated impacts to benthic communities from dredging are considered to be moderate during construction and during operations.

Increased Sedimentation to Seagrass Beds

Dredging during construction and maintenance dredging periodically throughout operations are expected to cause turbidity in the surrounding marine environment by disturbing and re-suspending sediments during removal of dredge spoils. In addition, land disturbance activities during construction and discharge of stormwater from the Project's sediment control system also have the potential to increase sediment loading and sedimentation to the marine ecosystem. The marine baseline in Section 4.1.10 describes the degraded and low-quality state of the few coral reefs present in the Project area. In contrast, seagrass beds are more widespread, present in generally more healthy condition, and provide a greater range of ecosystem services. Therefore, increased sedimentation from various Project activities during construction and operations is considered to be a significant impact to seagrass beds, prior to the application of mitigation measures.

Accidental Spills to Marine Environment

Accidental spills of chemicals such as fuel and lubricating oils can impact the marine ecosystem directly, if the spill occurs over or adjacent to the sea, or indirectly if spills are allowed to seep into soils or shallow groundwater flowing eventually to the marine environment. Improper maintenance activities have a similar potential to either directly or indirectly eventually affect marine resources. The severity of the potential impact is based on the volume of the spill and type of chemical spilled; however such impacts are conservatively considered to be severe prior to the application of any normal control or mitigation measures. These types of impacts are discussed further Table 5.20.

Changes to Seawater Quality

The return of seawater used in the power plant's low-temperature cooling system has the potential to affect seawater quality by slightly increasing the temperature of the seawater in the immediate area of the return outlet. Engineering estimates of the temperature of heated seawater used in the low-temperature prior to recirculation back to the sea are greater than 2 degrees above ambient seawater temperature, prior to the application of any design measures to decrease the return water temperature.

Additional potential impacts to seawater quality are posed by accidental spills, as discussed in Sections 5.2.4 and 5.2.5.

Introduction of Invasive Benthic Species

Invasive benthic species may be introduced to the port area through discharge of foreign vessel ballast. If these species do not have natural biological controls in the Project site environment, they could become nuisance species. If unmitigated, the significance of this impact is considered to be moderate.

Increase in Biological Diversity

The pilings supporting the quay at the port will dramatically increase the surface area of hard substrate available for colonization by sessile marine species. The increase in hard substrate is expected to increase habitat diversity. In the medium-term, this change will cause a local modification of the benthic communities, allowing fixed organisms to colonize these new hard surfaces. This increase in marine habitat is considered to be a moderate benefit to the marine ecosystem throughout the Project's life.

5.1.9.2 Mitigation Measures for the Marine Ecosystem

Mitigation measures associated with potential impacts to seawater quality (accidental spills, thermal discharges) are discussed in 5.20.

Loss of Benthic Communities

The Project is preparing a Dredging Management Plan that will describe the procedures that will be utilized to minimize the impacts from dredging activities at Port Lafito. The Dredging Management Plan will include the use of GIIPs for dredging (such as the use of silt curtains) and dredge spoil handling and deposition. A hydraulic cutter head dredge will be used to minimize the disturbance of surrounding areas during dredging operations. Dredge spoils will be deposited on land to further minimize impacts to the marine ecosystem. Ongoing dredging activities will be optimized to limit the area for dredging, to the extent possible.

Increased Sedimentation to Seagrass Beds

The GIIP included in the Dredging Management Plan are designed to minimize the disturbance of the benthos and re-suspension of sediments. Use of a hydraulic cutter head dredge further decreases turbidity and re-suspension of marine sediment, decreasing additional sedimentation to seagrass beds. The Sedimentation and Erosion Control Procedure will include GIIP that minimize the potential for runoff and terrestrial sediment to reach the marine environment.

Introduction of Invasive Benthic Species

Ships moored at the port and vessels in transit in the approach channel to Port Lafito will be prohibited from discharging their ballast water. Instructions regarding this matter will be included in the Notice of Arrival form provided to incoming vessels

Increase in Biological Diversity

The presence of the pilings in the quay is expected to increase hard substrate surfaces available for colonization by marine biota – this is considered to be a Project benefit. To maintain the moderate level of benefit, every reasonable effort should be made to avoid disturbance to the marine biota colonizing the pilings, as long as the biota pose no safety risk or hazard to the stability of the pilings or to port operations.

5.1.9.3 Residual Impacts to the Marine Ecosystem

The mitigation measures for the majority of the identified potential impacts to the marine ecosystem will be effective in reducing the impacts from dredging and sedimentation to moderate levels; however these impacts are expected to remain moderate over the long term.

Mitigation measures to avoid the introduction of invasive species potentially present in ships ballast water via the prohibition of such discharge while at the port or in nearshore waters are expected to eliminate this potential impact over the long term.



Increased biological diversity is expected to remain a moderate benefit to the marine ecosystem throughout the Project’s life.

The following two tables present summaries of the anticipated residual marine ecosystem impacts, relevant Project phase, and planned mitigation measures.

Table 5.17 – Residual Impact Summary – Marine Ecosystem

Impact	Source	Primary Receptor (1)	Phase (2)		Significance(3)		Mitigation Measures	Management Plan
			C	O	ST	LT		
Loss or Disruption of Benthic Communities and/or Habitat	Dredging	Mb	*	*	M-	M-	- Minimize dredging footprint area and frequency - Use hydraulic cutter head dredge and silt curtain	Dredging Management Plan
Increased Sedimentation in Seagrass Beds	Dredging	Ss	*	*	M-	M-	Dispose of dredged material on land; use hydraulic cutter head dredge and silt curtain	Dredging Management Plan
							Minimize and control sediment runoff from disposed dredging material.	Sedimentation and Erosion Control Procedure
Increased Hard Substrate in Quay Pilings	Quay	Mb		*	M+	M+	Benefit - no mitigation required	

Impact	Source	Primary Receptor (1)	Phase (2)		Significance(3)		Mitigation Measures	Management Plan
			C	O	ST	LT		
Introduction of Exotic and/or Invasive Species	Visiting vessels ballast	Me		*	N	N	Implement effective ballast water prohibition.	Environmental Management Plan

Notes:

(1) Primary Receptors:
 Mb = marine biota
 Me = marine ecosystem

(2) Project Phase: C = Construction, O = Operations

(3) Expected Significance Rankings: ST = short-term with mitigation, LT = long-term with mitigation

S - = significantly adverse
 M - = moderately adverse
 N = neutral
 M + = moderately improved
 S + = significantly improved

5.1.10 Livelihoods Activities and Employment Opportunities

The following activities have the potential to affect the livelihood activities and employment opportunities during Project construction:

- Installation of power distribution lines to offsite customers
- Vehicle/livestock collisions
- Exclusion from traditional fishing areas
- Direct employment at the Project site
- Indirect employment in a business supplying or supporting the Project
- Vocational/technical training
- Land clearance and site preparation activities

The following activities have the potential to affect livelihood activities and employment opportunities during Project operations:

- Vehicle/livestock collisions
- Exclusion from traditional fishing areas
- Direct employment at the Project site
- Indirect employment in a business supplying or supporting the Project
- Vocational/technical training

The management and mitigation measures in this section focus on enhancing employment and training opportunities for nearby neighbors and the surrounding communities and ensuring that economic and livelihood restoration is achieved for people within the social Area of Influence. While nearby neighbors and communities will have the highest priority, direct and indirect employment opportunities and skills development will also be preferentially aimed at residents in the surrounding peri-urban and rural areas, many of whom live near the Project site.

5.1.10.1 Potential Impacts to Livelihoods and Employment

Installation of Power Distribution Lines to Offsite Customers

GB Group is planning on selling excess electrical power to nearby industries located outside of the current Project boundaries and property limits. To do so, pre-fabricated concrete poles will be installed in the right-of-way along existing public roads and paths. In the majority of instances, these right-of-ways currently carry power poles from other electrical lines and are not intruded upon by structures such as home; some exceptions exist in busier areas such as the marketplace in Titanyen (Graphic 5.5 below).

Graphic 5.5 – Electrical Power Right-of-Way in Titanyen Market



The poles are expected to carry medium-voltage 13.8 kV distribution lines running from the power plant's substation directly to the industrial client's connection portal. The potential exists for power pole installation to affect structures or cultivated land or fruit trees existing in the right-of-way, if no avoidance of these livelihood assets is possible. The unmitigated significance of this potential impact is considered to be a significant impact during construction. Health and safety

considerations related to power distribution line operation are discussed in Section 5.1.10.2.

Vehicle/Livestock Collisions

The construction of access roads in the Project area and the operation of vehicles on these roads may increase the potential for accidents between vehicles and free-ranging livestock, specifically goats and chickens. The impact to the animals involved in such encounters is serious and often fatal and the loss of the animal can also have a significant impact on the owner's livelihood, therefore these collisions are considered to be a significant impact during construction and operations, prior to the application of mitigation measures.

Exclusion from Traditional Fishing Areas

The socioeconomic survey data from the 2014 ESIA reported that approximately 3% of local residents (8 out of 251 respondents) self-identified as independent fishermen. To better assess whether the Project would affect artisanal fishers, ETEL completed a Fishermen Survey (Appendix I) in May 2015; this study used focus groups targeted at fishermen in Lafiteau (13 people) and Simonette (14 people) to fill out a detailed questionnaire about their fishing activities. Focus group participants provided lists of names of 111 other people in both communities identifying as fishermen. Rapid surveying of *kanot*-type boats visible in satellite imagery of the two communities corroborates the count – using July 2014 data, 40 small *kanot*-type open, un-powered boats were visible (19 for Lafiteau and 21 for Simonette), consistent with the data provided by informants. Artisanal fishing activities consisted of primarily of collection of intertidal species in mangrove areas and coastal fishing using boats and nets and/or lines. Since the open boats used by the artisanal fishermen do not have outboard motors, the fishermen remain close to shore, seldom going more than 3 km offshore. Graphic 5.6 below shows the standard fishing routes followed by the two groups of local fishermen in the Project area. Activities at the port including dredging and the small craft exclusionary zone have the potential to affect artisanal fishermen operating in the area.

Graphic 5.6– Lafiteau and Simonette Artisanal Fishing Areas

Source: ETEL 2015b

Direct Employment at the Project Site

During the 19 months of Project construction to-date, the Project has engaged a total construction workforce of 169 people. The operation of the port is estimated to require 48 people, and power plant operation and overall Project management and security are estimated to require an additional 95 people, for a total GB Group operational workforce of 143. At final build-out (completion of Phase 2 construction) and full tenancy, the LIFZ has the potential to employ up to an additional 20,000 people. It should be noted that GB Group does not have the ability to control the number of jobs created/offered by LIFZ tenants. However, GB Group will contractually obligate its tenants to comply with the environmental, labor, health, and safety commitments included in this ESIA and promulgated by IFC's Performance Standards, including its commitment to preferential local hiring,

and with GB Group's ESMS which encompasses Haitian Law and applicable ILO conventions.

The Project will have a direct positive impact by preferentially employing local residents. Via specific language in all tenant contracts, a Tenant Manual, and a Tenant Council, GB Group will ensure that (along with all other commitments present in this ESIA) its policy of preferential recruitment is applied to the LIFZ tenants who are expected to create the majority of jobs during Project operations. Direct employment will have positive economic impacts on workers employed during construction and on their families. Job creation is very important to the local population, as there are few opportunities for people in the region, apart from temporary jobs and subsistence agriculture. The Project will also conduct periodic audits of tenant compliance with labor laws, either via internal resources or via an external labor auditor.

During the operations phase, there will be fewer temporary jobs but significantly more long-term positions for workers with tenants at the LIFZ, and therefore more significant overall economic benefits to people hired from the local communities. The majority of permanent workers are expected to be able to be sourced from the Cabaret Commune region. The progressive transfer of management responsibilities from expatriates to Haitian nationals is also a key Project objective, and the number of expatriates is expected to decrease significantly as national staff replaces expatriate supervisors and managers.

GB Group has committed to uphold ILO labor conditions and standards and to provide competitive wages in accordance with Haiti's ILO agreements (Section 2.8). The Project has developed a Human Resources Policy and Employee Handbook that define the conditions of employment for both parties, for both day laborers ("jobbers") and hourly/salaried employees. During both construction and operations, direct employment is expected to have a significant positive impact to Project employees.

There is a risk that local people could be excluded from direct employment benefits because of low education and skill levels. Expectations related to employment are high and as such, if employment aspects are not adequately managed and benefits maximized for local people, this positive impact may quickly become a source of frustration and unmet expectations.

Indirect Employment

Indirect employment impacts are expected from the creation and expansion of businesses supplying or support the Project. The Project and its contractors will require numerous vendors and service providers to meet their daily operating needs and also the domestic needs of their employees. At the same time, Project employees will likely enjoy a higher disposable income level than they had prior to Project development, which will add to the demand for local products and services. In addition, the Project will produce indirect economic activity as a result of immigration by job-seekers.

Surrounding communities in Cabaret Commune will receive short-term economic benefits as a result of indirect employment opportunities created by the Project construction. Operation of the Project will create a range of sustained indirect economic opportunities at local, regional and possibly national levels. Local sourcing of goods and services will result in revenues for local businesses and entrepreneurs, provided they can offer sufficient quality and reliability and can meet Project standards, particularly for health and safety. The Project will encourage its suppliers to hire locally from lists of employable workers in the Project's social AOI.

Land Clearance and Site Preparation Activities

GB Group has acquired all the land it plans to use to develop the Lafito Project from three single owners of large parcels of land, and has indicated that all transactions were conducted on a willing-buyer, willing-seller basis. Off-site electrical power distribution lines are expected to be erected along existing right-of-ways and easements. However, it is recognized that in such a large development area, there may be persons who are using land or natural resources in these areas even though

they have no formal rights to use the land. In accordance with IFC PS5, these persons would still be eligible for some assistance to ensure that they are not 'made worse-off' by the Project. Based on current activities in the Project's social AOI, it is possible that there is some crop/tree production, livestock grazing, and/or other economic activities being conducted in the GBG land acquisition area. Loss of access to natural resources can also be a trigger for economic displacement impacts, e.g., loss of access to mature fruit trees or crops planted along existing right-of-ways or easements.

This is an area of risk for GB Group because there was no formal inventory or cut-off date announcement previously implemented by the company – because of the willing-buyer, willing-seller situation. However, it is still necessary for GBG to avoid and minimize any displacement impacts in accordance with IFC PS5; this includes 'squatters' or encroachers that were on the land prior to (and potentially afterwards of) GB Group's acquisition, particularly in the context where no formal cut-off date for land use/occupancy by others has been implemented or enforced. It is in the interest of GB Group to work with local authorities to enforce restrictions on land use in their land acquisition area.

5.1.10.2 Mitigation Measures for Livelihoods and Employment

General Measures

Restoration of livelihoods will be achieved through a combination of different measures that may include mitigation and social investment, to go beyond restoration to improving incomes. Components (which may not apply to all affected people), may include:

- Preferential local hiring
- Vocational training
- Development of alternative sources of livelihood and creation of new markets.

As part of the Social Management Plan, the Project will develop and implement a Local Hiring Program that will include:

- Mapping of locally available skills
- Mapping of priority areas for hiring
- Recruitment and hiring procedures
- Vocational and on-the-job training plans and commitments
- Salary scales
- Timelines and budgets
- Measures for measuring and assessing achievement of local hiring commitments
- Reporting commitments

The Local Hiring Program will favor the granting of temporary or permanent employment to nearby neighbors and residents of local surrounding communities. The Project will utilize a zoned priority approach to hiring, where people from the communities within the Project's social AOI will be given first priority; if no applicants from these communities meet the minimum job qualifications, residents from other communities within Cabaret Commune will next be given consideration; then, the search will be widened to include the rest of the country. All managers of the various Project components, along with the construction contractor and sub-contractors, will be informed of this policy. The Project will periodically monitor tenant compliance with contractual labor commitments.

Currently, all hiring is done through the Project's local Human Resources office at the Project site. Criteria used to filter hires based on location include:

- Resident community, with preference given to people residing in Lafiteau, Simonette, Titanyen, and Cabaret
- Length of residency in local community; applicants with less than 1 year of residency in a local community are de-prioritized
- Good behavior testimonials from local leaders to ensure that the applicants are not criminals and have lived in the area for the term indicated

Loss of Livelihood Assets

A Land Acquisition Policy was completed to provide GB Group with a guidance mechanism for handling any future land acquisition activities that will directly impact existing land users or livelihood assets, such as homes, crops, garden plots, or large fruit-bearing trees, including any livelihood assets or structures present in existing right-of-ways that may be affected by electrical power line installation, operation, or maintenance. The Land Acquisition Policy is part of the Project's Social Management Plan.

To the extent practical and safe, routing of the 13.8 kV power distribution lines will be along existing public right-of-ways that do not affect structures, homes, large fruit-bearing trees, or agricultural areas. When avoidance of such livelihood assets is not possible, the Project will utilize the public consultation process in the Stakeholder Engagement Plan to notify people in advance of power distribution.

Vehicle/Livestock Collisions

Collisions between vehicles and free-roaming livestock can be reduced through the implementation of certain measures. These measures may include, but are not restricted to:

- Implementation of an education program to sensitize the workforce (including management) and contractors to the importance of livestock to local residents and the possibility of its presence along Project access roads
- Identification of areas where vehicle/livestock encounters are likely and installing signage to warn vehicle operators to take extra care in these areas
- Implement and enforcement of speed control measures on all access roads
- Consideration for lost livestock will be made as part of the Project's Social Management Plan

Monitoring of the complaints mechanism in the Stakeholder Engagement Plan to identify cases of vehicle/livestock collisions.

Traditional Fishing Areas

Evidence from the fieldwork investigations into artisanal fisheries in the Project area completed by ETEL indicates that traditional fishing areas are likely to be unaffected by current development plans for the port area and its shipping approach. Lack of appreciable markets or sizable catches prevents intracoastal traffic of small boats as well.

Direct Employment

GB Group has developed General Business Principles (Appendix A) that set forth the company's approach to project management and treatment of its employees, nearby neighbors, and surrounding communities, including:

- To respect the human rights of our employees and to provide them with good and safe working conditions, and competitive terms and conditions of employment
- To promote the development and best use of the talents of our employees
- To create an inclusive work environment where every employee has an equal opportunity to develop his or her skills and talents
- To be good neighbors by regularly improving the way in which GB Group contributes directly or indirectly to the general well-being of the communities around the Project
- To manage the social impacts of GB Group's business activities carefully and work with others to enhance the benefits to local communities
- To mitigate any negative impacts from our activities

The implementation of the Local Hiring Program in the Social Management Plan will be the primary means of mitigation for the following components:

- Local hiring policies and plans that include a framework for preferentially recruiting and hiring local employees
- Worker enhancement program that includes a training plan for providing training (vocational, literacy, and on-the-job) for unskilled and semi-skilled local employees
- Gender opportunity policy and programs which encourages seeking opportunities to train and hire women for non-traditional positions

The Project has developed employment and training policies that give preference to those who are most affected by the Project. These policies are based on a priority hiring approach that gives first consideration for employment to people within the Project's social AOI, then to people who live in the rest of Cabaret Commune, then to other Haitian nationals, and lastly to other country nationals.

GB Group will establish employment targets to maximize local employment during construction and operation, with preference beginning with nearby neighbors and any Project-affected people, then expanding to include communities within the Project's social AOI, then regional, national, and international prospects. Procedures for identifying and verifying where applicants live will be implemented in collaboration with local authorities.

The Project will maintain an employment database for review by general contractors responsible for construction and for provision of other services, including all people in the social AOI. GB Group will conduct a follow-up program and assist in the recruitment of these persons to the extent practical based on hiring needs and applicant skills.

A training program will be set up to provide future employees with the skills they need to work for the Project. The vocational training program will be initiated far enough in advance of operations to ensure that local attendees will receive sufficient training to enhance their employability by the Project. Special training programs will be directed at women to improve their prospects for employment.

The Project's Employee Handbook establishes human resource policies that comply with Company protocol, Haitian legislation, and IFC's Performance Standard 2. Working conditions are defined for each position and all employees are subject to an employment agreement (e.g., no informal employment practices). The Project will establish wage rates at levels that are in compliance with Haitian regulations as well as within industry standards for the Project area and which will be re-examined annually to ensure that they are keeping up with inflation. A formal grievance mechanism is available to all employees, defined in the Employee Handbook and in the Environmental and Social Management Plan.

Fair and transparent recruitment procedures that comply with anti-discrimination policies will be implemented by the Project. Recruitment and employment information will be regularly disclosed in advance to local communities (as well as regionally/nationally), and will include job descriptions for available positions, selection criteria, and training opportunities. Designated locations for recruitment will be identified periodically to mitigate against informal in-migration and requests at site or other areas. GB Group will seek to manage expectations related to employment by ensuring that the number and nature of jobs available during construction and operations are disclosed to interested parties.

Employment policies, preferential hiring practices, and training programs to which GB Group is committed will also be required of the Construction contractor (and their sub-contractors) and encouraged among suppliers of materials, equipment, and other goods.

The policies and procedures established in the Local Hiring Program and Employee Handbook will be monitored by the Project social team to ensure internal and contractor compliance. The Project will also track direct and indirect employment numbers disaggregated by gender, by skill level, and by community/area of origin.

LIFZ Tenant Employment

The Project will obligate LIFZ tenants to comply with Haitian labor law and ILO conventions, and with the commitments of this ESIA, including commitments for preferential local hiring from the social AOI. Tenant compliance will be periodically audited.

Improved Skill Base as a Result of the Project

The Project will provide a level of training commensurate with work situation to employees to meet job requirements and health, safety, and environmental standards. The Project's vocational training program is currently in development, and is expected to be outsourced pending requirement guidelines from LIFZ tenants as well as the assessment of knowledge, skills, and abilities in local communities.

Given that the Project area is mostly rural, few existing residents have appropriate industrial job skills; therefore some locally sourced employees will require vocational and other types of career training. GB Group will develop local communities and promote local employment through its education and career-based training programs. Skills development opportunities will include on-the-job/technical training (such as the current Vocational Mentoring Program), environmental health and safety procedures, and various other training and skills development activities. Skills will be enhanced considerably for employees, and therefore it is expected that there will be long-term benefits for employees from the local communities in the Project's social AOI and other communities in Cabaret Commune, as well as those from other areas in Haiti, as a result of the Project.

Vocational training will take place via an independent entity that issues a certificate of completion un-associated with the Project or GB Group. Training will be provided at a reasonable cost to interested residents of local communities within the Project's social AOI; participants will be selected for training based on passing minimum entrance exams geared toward the type of training they will receive, such as:

- Basic mathematics skills
- Ability to read and write
- Job-specific aptitude tests

A major part of the Vocational Training Program will be educating local residents on what they should expect and what is expected of them in any direct employment situation.

The Project also will help improve the skill base of the local residents and potentially throughout the region through the Vocational Training Program in ICI its Social Investment Program in the Social Management Plan. Improved skills are therefore expected to extend beyond employees of the Project to other people who are involved with additional training programs offered by GB Group.

Indirect Economic Benefits

The Project and its contractors will require numerous vendors and service providers to meet their daily operating needs and also the domestic needs of its employees. At the same time, Project employees will likely enjoy a higher disposable income level than they have prior to the Project development, which will add to the demand for local products and services. In addition, the Project will produce indirect economic activity as a result of in-migration by job-seekers.

One of the components of the Social Investment Plan is improving the local supply chain to be able to support local procurement for the Project and help the creation or building of SMEs. GB Group will develop specific policies and procedures to maximize local/regional procurement and supply opportunities. Local procurement and supply policies to which GB Group is committed will be required of the Construction contractor and its sub-contractors. Management measures will seek to optimize opportunities for Haitian nationals, but provide preferential opportunities to businesses and entrepreneurs from the social AOI. The Project will encourage (but not compel) its suppliers to hire locally from lists of employable workers provided by GB Group.

The Project's procurement and supply program will maximize the local procurement and supply opportunities to the extent practical. The Project will give preference to construction materials and other goods and services from local companies providing that they are competitive in terms of price, delivery, and quality of product. The program shall include seminars (or similar) with potential suppliers and sub-contractors to inform local businesses of opportunities to supply both construction-related services as well as goods and services to other parts of the Project, such as construction camps. GB Group and the Construction contractor shall explain to potential suppliers/local companies:

- The sub-contracts and business opportunities that may arise from the Project
- What sub-contractors and businesses need to do to be better placed for this work (e.g., health and safety standards, ethical and business conduct requirements)

- The process for identifying potential suppliers, how to proceed if they are invited to tender, and the bid evaluation process

Since a number of the indirect economic opportunities during construction will relate to temporary or short-term supply of goods and services, local companies (and communities) will be informed about the duration of such opportunities so that they can plan for supplying goods (e.g., produce) without compromising their own needs. Locally sourcing agricultural goods will also help offset the tendency for local farmers to seek perceived better-paying jobs, which can adversely affect food security.

The Project will track the number of business' and jobs created by the Project supply chain.

Other Training and Skill Development Opportunities

Various community training programs will also be offered to the populations in the affected areas designed to minimize the impact from various Project components and possible indirect impacts. The community training will include topics such as traffic safety awareness, and HIV/AIDS transmission and prevention.

The Social Management Plan will also include training as part of its community development initiatives; including training and skills development in construction, industry, labor, business, and financial management for residents locally and regionally.

Mitigation Measures – Land Clearance and Site Preparation Activities

Prior to development of any new parcels of land within the current land acquisition area or work along existing easements and right-of-ways, the Project will conduct a land assessment to determine if there may be any displacement impacts from development of the land. In the event that people are identified to be using land or natural resources that will be affected by the acquisition, a Land Acquisition Policy will be prepared by GB Group.



5.1.10.3 Residual Impacts to Livelihoods and Employment

Livelihood Activities

Over the long term, the livelihoods of the social AOI are expected to be restored to at least pre-Project levels or better, and therefore the impact is expected to be neutral to positive.

Direct Employment

In the short and long-term, direct employment related to the Project is expected to have a significant positive impact, providing that preferential employment strategies and other support programs for local communities are implemented.

Indirect Economic Benefits

Indirect employment and procurement opportunities will have a significant beneficial impact over the long term. While some indirect employment and procurement activities may decrease following the cessation of construction activities, it is expected that many of the indirect economic activities will be able to continue to provide services during Project operations. It is expected that the the long-term impact will be beneficial, due to the increased skill levels and income-earning potential of the local population.

Improving Skill Base

With the effective implementation of accessible and appropriate training and capacity building programs, short and long-term benefits are expected to be highly beneficial to the livelihood opportunities of the local population.

The following table presents a summary of the anticipated residual impacts to livelihood activities and employment opportunities, relevant Project phase, and planned mitigation measures.

Table 5.18 – Residual Impact Summary - Livelihood Activities and Employment Opportunities

Impact	Source	Primary Receptor (1)	Phase (2)		Significance(3)		Mitigation Measures	Management Plan
			C	O	ST	LT		
Physical and/or economic displacement: loss of agricultural land and crops	Project Site including Small-craft Exclusionary Zone around Port	La	*		N	N	• Create and implement a Land Acquisition Policy • Determine and implement local restrictions of land use on right-of-ways • Develop alternative sources of livelihood for any people whose livelihoods have been adversely affected by Project activities (including fishing); addressed by preferential hiring. • Complaints monitoring.	Social Management Plan
Economic Loss	Vehicle/Livestock Collisions	La, NN	*	*	N	N	• Implement and enforce speed control (10 kms), traffic flow control, and livestock access control. • Provide driver training and awareness programs.	Traffic Monitoring Plan and Social Management Plan
							• Complaints monitoring. • Preferential hiring	Stakeholder Engagement Plan

Impact	Source	Primary Receptor (1)	Phase (2)		Significance(3)		Mitigation Measures	Management Plan
			C	O	ST	LT		
	Exclusion from Traditional Fishing Areas	Af	*	*	M-	N	Land Acquisition Policy; minimize the size of the affected exclusion zone and dredging area; complaint monitoring.	Dredging Management Plan and Stakeholder Engagement
Employment	Direct and Indirect Employment Opportunities from Development of the Project	NN	*	*	S+	S+	- Benefit - no mitigation required. Direct employment at site, and indirect employment at nearby suppliers and facilities. - Project will institute a preferential hiring plan for residents of local communities within social AOI. - Institution of vocational training program for residents of local communities in advance of LIFZ operations. - Encourage third-party suppliers to preferentially hire from residents of local communities. - Periodic labor audits of LIFZ tenants to assure compliance with Haitian law and ILO conventions.	Social Management Plan

Impact	Source	Primary Receptor (1)	Phase (2)		Significance(3)		Mitigation Measures	Management Plan
			C	O	ST	LT		
Improved Local Skill Base	Project	NN, E	*	*	S+	S+	Benefit - no mitigation required. Local vocational training programs.	Social Management Plan

Notes:

(1) Primary Receptors:

La = local agriculturists

NN =

nearby neighbors

Af - artisanal fishermen

Cu = current land users

E = employees

(2) Project Phase: C = Construction, O = Operations

(3) Expected Significance Rankings: ST = short-term with mitigation, LT = long-term with mitigation

S - = significantly adverse

M - = moderately adverse

N = neutral

M + = moderately improved

S + = significantly improved

5.1.11 Population

Development of the Project has implications for various aspects of the local population. Even with the commitment to maximize employment for local residents at the Project, an influx of non-local job-seekers is still likely to occur and this could have an impact on existing residents. Key impacts addressed in this section are therefore:

- Induced and informal in-migration
- Public expectations and perceptions

Impacts to livelihoods are described in Section 5.8.

5.1.11.1 Potential Impacts to the Population

Informal In-Migration

GB Group has adopted a preferential local employment policy that aims to offer jobs first to residents within the Project's AOI communities (Aubry, Lafiteau, Simonette, Source-Matelas, St. Gerard, and Titanyen), then to residents of the rest of Cabaret Commune, and finally to other Haitian nationals (Local Hiring Program, Section 7.10.2.10). Due to the scale of the LIFZ at full build-out and full tenant occupancy, it is also expected that a significant number of job seekers will relocate to the Project's AOI and surrounding communities, with the potential to create significant impacts on existing community resources and infrastructure. Indeed, the presence of GB Group and the ongoing construction activities are already creating high expectations of further economic opportunity in the Project AOI.

Some residents may benefit from economic opportunities associated with population growth (e.g., provision of services and supplies to the workforce), an increase in the market for local goods and produce, and local infrastructure development resulting from in-migration. However, uncontrolled in-migration can have significantly adverse impacts on the local population, including:

- Increased pressure on land resources, available housing, community infrastructure and social services

- Increases in socially disruptive behavior such as alcohol abuse, prostitution, and crime
- Health implications such as increased transmission of HIV/AIDS and other sexually transmitted diseases
- Perceptions of increased crime and social disruption that become sources of dispute and conflict with local communities
- Increased traffic
- Competition with locals for job opportunities and other activities
- Increased pressure on local fisheries due to an increase in fishing
- Potential “boom and bust” economic cycles
- Inflation

Communities in the Project area have already been experiencing in-migration for various reasons, including job seekers looking for work at existing regional industries such as CINA, LMH, and Haiti Broilers. The community of Titanyen grew up around the cross roads between two major arteries, National Route 1 and the road to Saut d’Eau to the east; in recent year Titanyen has grown as a direct result of exodus from Port-au-Prince and from the establishment of temporary settlements set up after the 2010 earthquake. Figures 4.9, 4.10, and 4.11 (in the Figures section) demonstrate in-migration to Lafiteau, Simonette, and Titanyen in the decade before the earthquake (July 2002 and December 2009) and four years later (July 2014). As can be seen in the graphics and as discussed in Section 4.2.10.4, development has occurred along the main roads without any strategic plan.

Pressure on the land resources and tensions between immigrants and local communities are expected to increase as a result of the Project. It is expected that the peri-urban and urban areas of Cabaret will most likely be affected by in-migration issues; as such areas typically will offer the most housing options for in-migrants. At full build-out and full tenancy of the LIFZ, in-migration to the Project’s AOI has the potential to be a significant impact even with the application of mitigation measures.

Potential Impacts to Community Expectations

The overall results of the successive phases of consultation show that Haitian stakeholders are very much interested in the Project and support it. However, unmet or unrealistic expectations can lead to community frustration and degraded relations between the Project and the local community. Frustrations can be further exacerbated by:

- Inability to access opportunities due to lack of public consultation/disclosure (a lack of information on future opportunities can exclude locals from investing in their own human capital, and accessing opportunities)
- Lack of effective complaints and grievance procedures (ineffective channels to express complaints may amplify dissatisfaction)
- Unrealistic expectations (such as employment for everybody), often a major reason for conflicts between companies and local communities

There is a particular risk related to the Project, as local residents have demonstrated a high level of frustration and discontent over the perceived lack of local hiring by existing industries in the area. These sentiments have led to various community blockades and protests aimed at local industries in recent years (Appendix F). Additionally, to a large extent, the number of jobs created by LIFZ tenant companies is out of the control of GB Group however this distinction has the potential to be missed and/or not understood by the public, should hiring not meet expectations.

5.1.11.2 Mitigation Measures for Population Impacts

In-Migration

The Project can take steps to minimize impacts from informal in-migration as well as to prevent induced development around the Project site, but it has limited control over many factors associated with influx and induced in-migration.

Components of the Social Investment Program specifically address influx management and will be designed to attenuate the adverse effects of additional population increases associated with jobseekers in the region. These measures may include support to local governments around urban development and capacity

building, location of employment offices outside of the Project site if feasible, Local Hiring Program, and support in development of urban-based worker housing. Areas targeted to receive the anticipated influx of newcomers will be identified and a set of actions (“pull” factors) will be developed to ensure that newcomers are preferentially directed to these communities.

Activities that discourage settlement in the immediate areas proximate to the Project site will include widely publicized recruitment and employment strategies that minimize the attraction of job-seekers to the Project area (e.g., effective disclosure on recruitment and employment policies). At the same time, the Construction contractor will publicize the fact that goods needed for the Project will not be purchased informally at camp locations or work sites, but instead through formal contracts with suppliers. Informal settlements close to camp or worksite boundaries will be reported to the relevant authorities.

The Social Investment Program can also be used to develop and implement projects that aim to support general community development and improvements in the standard of living of local residents, and thereby reduce adverse effects of population increases. The Project’s regional development approach will also improve the social infrastructure and services of the closest urban center, Cabaret to enable the responsible authorities to provide better services.

While the Project has little control over the possible proliferation of bars, brothels, and a possible increase in petty crime or alcoholism, it can and will develop programs targeted at local populations to minimize the increase in socially disruptive behavior. One example is to ensure that local girls and young women receive training and micro-finance for alternative forms of livelihoods, are encouraged to remain in school; and have employment options at the Project.

The Project will monitor indicators related to induced development and influx (including socially disruptive behavior) as part of its management plan.

Public Expectations and Perceptions

Effective engagement with nearby neighbors and surround communities is the single-most important element in building a positive relationship with local communities. Community expectations can be managed through fair and transparent processes, public disclosure mechanisms, and effective complaints and grievance processes. GB Group has developed a Stakeholder Engagement Plan (summarized in Chapter 8) that details how it will communicate with local communities and the wider public in the Project area and deal with their concerns and complaints.

Public awareness is an effective initial step that can benefit local communities to make better-informed choices regarding health, safety, waste management, and education. The Project will contribute to this education process by disseminating information through its stakeholder engagement program on key local issues. Implementation of the stakeholder engagement program will comprise public discussion elements that may include, but are not limited to:

- Providing communities with prior notice of all construction activities and likely impacts, including potential risks to health and safety
- Providing stakeholders affected by the project with regular information on the progress of work and any implications for these stakeholders
- Providing local communities with timely information regarding employment opportunities and requirements and recruitment policies
- Disseminating information on health associated with waste management practices, drinking water security, HIV/AIDS and other sexually transmitted disease prevention, and the adverse environmental effects of local practices

The Stakeholder Engagement Plan provides a description of the overall system for managing complaints or comments received about the Project. Complaints and grievances will be monitored and documented by the Project.

GB Group will develop a commitment register to enable it to track its commitments to Project stakeholders. Following through with commitments made to affected people is an important mechanism in managing community expectations. The implementation of commitments made will be monitored and reported (internally and externally) by GB Group and will involve providing feedback to affected people.

5.1.11.3 Residual Impacts to Population

In-Migration

With the appropriate implementation of influx management procedures to control and direct newcomers to designated areas, it is conservatively expected that the short term impacts will be moderately adverse. Community development initiatives that contribute to the economic uplift of local communities are expected to offset some pressures associated with induced and informal in-migration. In the long-term, impacts are expected to remain moderately adverse.

Public Expectations and Perceptions

Over the long term it is expected that effective implementation of mitigation measures will result in a positive impact, through the promotion of local access to benefits and a positive Project-community relationship.

The following table presents a summary of the anticipated residual population impacts, relevant Project phase, and planned mitigation measures.

Table 5.19 – Residual Impact Summary - Population

Impact	Source	Primary Receptor (1)	Phase (2)		Significance(3)		Mitigation Measures	Management Plan
			C	O	ST	LT		
Informal Influx/ In-migration of People from Other Areas	Surrounding and Distant Communities	NN, SC	*	*	M-	M-	- Implement measures to minimize in-migration; provide public information about hiring practices and requirements; community outreach. - Develop Local Hiring Program and Influx Management Program as part of the Social Management Plan.	Social Management Plan
Unrealistic Community Expectations and Perceptions of the Project	Surrounding Communities	NN, SC	*	*	M-	M-	Implement public disclosure and consultation.	Stakeholder Engagement Plan
							Provide Project Communication Center	Social Management Plan

Notes:

(1) Primary Receptors:

NN = nearby neighbors
SC = surrounding communities

(2) Project Phase: C = Construction, O = Operations

(3) Expected Significance Rankings: ST = short-term with mitigation, LT = long-term with mitigation

S - = significantly adverse

Impact	Source	Primary Receptor (1)	Phase (2)		Significance(3)		Mitigation Measures	Management Plan
			C	O	ST	LT		

M - = moderately adverse
 N = neutral
 M + = moderately improved
 S + = significantly improved

5.1.12 Health, Safety, and Security

This section addresses impacts to both Project worker and community health and safety. Whenever there are residential areas in close proximity to industrial activities, there is an increased risk of direct impacts from those operations to local residents. Employee and public health and safety is important to GB Group and Project-related risks must be effectively managed to assure they are limited to the maximum extent practical.

Project development will have various implications for human health, safety, and security due to factors that include alterations to the natural environment, livelihood activities, and the general population. Safety issues include the general exposure to hazardous working conditions, such as ship loading/unloading and heavy machinery usage. Security issues include the presence of a private and armed security force at the Project site. Key impacts addressed in this section are therefore:

- Occupational health and safety
- Exposure of nearby neighbors to Project hazards
- Transmission of water-borne diseases
- Increased traffic and traffic-related incidents
- Increased presence of social ills and communicable disease
- Presence of security personnel

The majority of local economic activities are physical, relying heavily on good human health. People generally lack secure employment that could accommodate sick-periods, and local health facilities lack the capacity to address major local health issues. Poor health has significant impacts on livelihoods as without the ability to work and the added financial burden of medical treatment to promote recovery, an individual's ability to bring in an adequate income is significantly curtailed.

5.1.12.1 Potential Impacts to Health, Safety, and Security

Occupational Health and Safety

Construction and operations activities at the Project site have the potential to cause harm to workers who are not properly trained, not following correct safe working procedures, or not wearing appropriate PPE. Potential risks include:

- Physical hazards associated with:
 - General construction activities
 - Working around rotating or moving equipment
 - Occupational noise or vibration exposure
 - Electrical hazards
 - Eye hazards
 - Welding/hot work
 - Industrial vehicle driving and site traffic
 - Working at heights
 - Repetitive motions/ergonomics
 - Illumination
 - Working around water
- Chemical hazards, associated with:
 - Air quality and equipment emissions
 - Fire and explosions
 - Corrosive, oxidizing, and reactive chemicals
- Biological hazards associated with medical waste
- Exposure to non-ionizing radiation
- Natural disasters occurring during working hours (earthquakes, hurricanes, tsunamis, wind storms)

If unmitigated, the impact from these hazards to worker health and safety are considered to be significant.

At full capacity, the water retention pond near the LIFZ will hold 45,425m³ (12 M gallons) of untreated fresh water. The presence of such a large body of water can present a drowning hazard for workers who are not able to swim who come into contact with the pond or are working near its perimeter. Due to the potential for drowning or other serious injury around the pond, the unmitigated impact of this facility to occupational health and safety is considered to be significant.

Community Health and Safety

The Project is located adjacent to portions of residential areas of Lafiteau, and within a kilometer of Simonette. The presence of a large industrial complex and port has the potential to affect the health and safety of nearby residents who may be unfamiliar with industrial activities or the standard safety precautions necessary in such facilities, such as exclusion of free-ranging livestock and traffic awareness on area roads. In-migrants to the area in search of jobs also have the potential to adversely affect local communities in terms of bringing in disease, disrupting the existing social fabric of local communities, and contributing to social ills such as excessive drinking, gambling, or prostitution.

Traffic

Access roads will be shared with a range of traffic; including pedestrians, motorcycles, and large trucks and as such, increases to road traffic can cause significant safety and nuisance impacts. Increased traffic and the introduction of additional large vehicles may increase the risk of injury to local residents. In addition, accidents along transportation arterials could result in the spillage of chemicals and/or hazardous materials.

Presence of Security Personnel

Project site facilities will require security to restrict access to construction areas and operational facilities throughout the life of the Project. Due to the proximity of local communities of Lafiteau and Simonette, Project security will include plans for responding and defusing public protests, which have occurred frequently in the

general Project area for a variety of reasons, the majority of which have not been associated with the Project.

Security personnel, who patrol/manage construction areas as well as the port and associated facilities once they are operational, will be essential to ensure the safety and security of employees, the public, and Project equipment and assets. GB Group will use external private security providers to supply security personnel and associated arrangements for the Project. Based on the current social situation and the lack of a police presence in the surrounding communities, there is a need for armed security forces at the Project to assure worker and public safety.

The presence of security personnel in the local community could result in conflict or similar situations between the different groups. At the same time, the use of private (or public) security forces can sometimes lead to abuses against members of the public, under the appearance of Project security requirements. If security providers and personnel are not adequately assessed in terms of their ability to provide an appropriate level of security for the risks involved and their track record in upholding human rights for example, the Project may engage with people or companies who they would otherwise consider undesirable contractors. There are known examples where companies have inadvertently funded militia or similar groups to act as security for their projects, leading to a range of adverse impacts.

Mitigation Measures for Health, Safety, and Security Impacts

Occupational Health and Safety

GB Group believes that the health and safety of its employees, contractors and visitors are a primary concern during all stages of Project activities including construction and operations. To this end, GB Group is committed to rigorous health and safety training programs. An Occupational Health and Safety Management Plan will be prepared by GB Group that will be updated to ensure that it complies with GB Group standards and processes as well as IFC Performance Standards. The primary objective of the Health, Safety, and Security Management Plan is to provide a healthy and safe working environment for all employees.

Employees required to work in areas where there may be exposure to various hazards including for example where noise levels are excessive or uncomfortable, will be required to wear Personal Protective Equipment (PPE). PPE will be required where regulatory or industry standards require them for specific job-tasks and will be defined in the Occupational Health and Safety Management Plan for the Project. Particular attention will be paid to health and safety related to vehicle hazards as well as to port activities, including ship loading/unloading and water hazards.

Proper handling and disposal of Project wastes, as well as development of programs to minimize waste generation, will be implemented to provide a safe and healthy workplace. The proper disposal of putrescible wastes will minimize the risk of rodents and other disease vectors that can adversely affect human health. The Waste Management and Disposal Plan will provide a description of the waste repositories and processing facilities that are planned for the site, and discuss the actions and procedures for handling and disposing of wastes in an appropriate manner. Hazardous waste disposal will be in compliance with international best practice.

GB Group will establish effective emergency response procedures along with employee training programs. These responses will be described in the Emergency Response Plan and will limit worker and community exposure to hazardous situations or conditions, and reduce the nature and extent of adverse environmental effects. The Emergency Response Plan will be communicated to security personnel and emergency response teams (as well as government authorities and potentially affected communities).

Occupational health and safety policies and training programs to which GB Group is committed will also be required of the construction contractor (and their sub-contractors) and encouraged among suppliers of materials, equipment and other goods.

The Project will prepare an Occupational Health and Safety Plan that sets forth proper and safe working procedures for all working conditions and positions during construction, and for operations at the port and power plant. General occupational health and safety procedures in accordance with GIIP for operational administration

and maintenance activities at the LIFZ will also be included. It is expected that LIFZ tenants will provide their own occupational health and safety plans that are in line with the Project Occupational Health and Safety Plan and that follow GIIP.

The Occupational Health and Safety Plan will include a list of PPE for various situations and the instructions for use of PPE. Employees will be instructed in safe working conditions, how to report unsafe situations, and in the use of PPE as part of their induction training.

Areas with specific hazards, such as high noise and high voltage, will be adequately posted with warning signs in relevant languages and with international hazard symbols. Employees engaged in activities at port and at the water retention pond will be required to demonstrate self-rescue/swimming ability prior to job start in these areas. Appropriate water rescue and lifesaving equipment will be provided at the port and at the water retention pond in case of accidental falls into the water. The Security Management Plan will include procedures for training of a marine response team in responding to accidental falls into water at either location.

Emergency situations including industrial accidents such as large spills, injury accidents, or natural disasters will be addressed via the procedures included in the Emergency Response Plan. The Project will also prepare a Hurricane and Major Storm Action Plan as part of the Emergency Response Plan that addresses site-specific emergency procedures across the Project during these extreme events.

Community Health and Safety

Waste generation will be minimized at the Project site; food and organic wastes that have the potential to attract pests such as rodents will be disposed of daily in appropriate containers for storage until the waste can be transported offsite to a sanitary landfill.

Community access to the Project site will be controlled during construction to prevent accidents to local residents from construction activities and traffic. During operations, the Project area will be enclosed with a perimeter wall to restrict access of unauthorized people to the site, as well as to prevent accidental contact of

nearby residents and free-ranging livestock with Project activities that could present a danger to them.

In the case of an accidental spill or other industrial incident that could pose a health or safety threat to nearby neighbors or surrounding communities, the procedures for notification of communities included in the Project's Emergency Response Plan will be followed. These procedures include a list of key contact people in leadership roles in the surrounding communities so that they will be able to warn affected people of the potential danger. GB Group will maintain this key contact list up to date.

General construction mitigation measures that will help to avoid public exposure to Project hazards include:

- All construction activities will take place within agreed areas
- Construction sites and operational facilities will be clearly demarcated
- Construction techniques will be used to minimize disruption to local communities including their property and assets
- Access routes will be safe, clearly visible and illuminated
- Any diversions of community infrastructure or services will be identified in advance by contractors with as much advance warning as possible, and include notification of GB Group and affected communities

Control measures to minimize risks to the public at Project sites during construction and operations include a combination of physical/engineering controls, safe work procedures and community awareness training. GB Group and its contractors will:

- Secure the areas. This means implementing natural or artificial fences that enclose the Project boundaries.
- Sensitize local communities to risks. This involves the development of awareness training and a consultation procedure where the risks are explained to local residents and they have an avenue to express their problems with potential hazards to the Company.
- Implement dedicated procedures to limit access in the construction zones and operational facilities by the public.

Community liaison staff will be responsible for providing regular information to nearby communities about the changing activities related to the Project, including details about any potential hazards and the measures necessary to avoid them.

The 13.8 kV medium voltage power distribution lines will be designed to have transformers at either termination of the line, helping to protect against illegal tapping into the lines. The distribution line route will be designed to avoid to the extent practical existing homes, to provide a buffer zone (with width based on international best practice) on either side of the distribution line, to reduce the potential for nearby neighbors to come into contact with electro-magnetic fields (EMFs).

Traffic

To limit the potential for traffic accidents both with nearby residents and to the public in general, GB Group will develop traffic management policies and procedures that aim to limit health and safety risks posed by increased road traffic. The Project's Traffic Management Plan will include standard operating procedures to define safe operating arrangements. GB Group will require the Construction contractor to develop and implement its own traffic management plan that is acceptable to GB Group or to adopt the Project's Traffic Management Plan. LIFZ tenants will be contractually obligated to comply with all commitments included in this ESIA.

Monitoring of the traffic safety performance and its impacts on nearby neighbors will be accomplished through the stakeholder engagement program, and adjustments to the traffic management system will be made as needed, based on the issues identified through this consultative process. A training program that addresses traffic safety awareness related to the Project will be conducted with local communities. Specific mitigation measures for the traffic management system will be developed in consultation with residents, such as impacts related to potential livestock collisions, safety of children and elders, and accidents.

GB Group expects to use outside service contractors for the transportation of most of the materials and supplies that will be delivered to and from the Project. Companies or individuals who are retained by GB Group to transport goods to and from the Project will be contractually required to provide documentation demonstrating that reasonable and appropriate emergency plans are in place that are specific to the mode and route of transportation. As part of the contract arrangements, GB Group will assess the supplier's emergency response programs relative to emergency response commitments made in its Emergency Response Plan.

Presence of Security Personnel

GB Group is committed to ensuring that the safeguarding of personnel and property is carried out in a legitimate manner that avoids or minimizes risks to the community's safety and security. To this end, GB Group will develop policies and procedures for security management of the Project, in accordance with the Voluntary Principles on Security and Human Rights (<http://www.voluntaryprinciples.org/>). The Project will prepare a Security Management Plan that outlines how the security management policies and procedures will be implemented, including measures to ensure appropriate interaction between security personnel and the public. The Project will work with public security forces to assure the application of the Voluntary Principles, to minimize the risk to local community members in case of road blockages or demonstrations, and in reviewing the rules of engagement.

GB Group will require a full security assessment prior to the engagement of any private security providers for the Project. The security assessment will include an investigation into the picture on the ground in the region, the provider's history in security and human rights and the procedures and processes that a provider proposes to deal with the risks presented by the Project. Security providers will be required to set out their plans for providing an appropriate level of security for the risks involved with the Project, their rules of engagement for the services required, how they will maintain detailed logs and accurate records and their processes for responding to any complaints and/or disciplinary incidents that may occur. The

Project will support security providers to offer training in human rights to their personnel. In addition, GB Group has committed to working with security personnel from the UN Stabilization Mission in Haiti (MINUSTAH) to provide best practices security training to the Project's security force.

GB Group will require that its contractors to abide by all security policies and procedures set out for the Project including undertaking a security assessment. Contractors will be required to obtain approval from GB Group for any security personnel and related arrangements that they intend to employ on the Project.

GB Group will designate a specific person/team that will be responsible for managing security on behalf of the Company. GB Group and its contractors will monitor and audit the security arrangements of any providers at least annually.

5.1.12.2 Residual Impacts to Health, Safety, and Security

Occupational Health and Safety

With effective implementation of the Occupational Health and Safety Plan, provision of PPE, and employee training in PPE use and safe working procedures, no residual impacts to occupational health and safety are expected. Likewise, the correct and effective implementation of mitigation measures for prohibiting access to and working safely around the water retention pond are expected to result in a net neutral impact to worker safety.

Community Health and Safety

Appropriate waste management practices at the Project site will eliminate the potential for the introduction of pest species. Over the long term, it is expected that impacts to community health and safety will remain neutral as residents become accustomed to the Project and to the Project's community safety and security procedures and apply them in their daily lives.

Mosquito-Vector Disease

No long term impacts to employee or community health are expected from the proper operation and maintenance of the water retention pond.

Traffic

Long term impacts from increased road traffic in the Project area are expected to be neutral, as local communities and employees adapt to the presence of the Project and Project activities. Small craft traffic in the port area may be affected during operations. An exclusionary zone along with tracking and training of fishermen and small craft will mitigate.

Presence of Security Personnel

In the short and long-term security related to the Project is expected to have a neutral impact providing that continuous and adequate measures are defined for screening of security providers, management of security arrangements and for periodic review of their performance.

A complaints process will be developed as part of the Stakeholder Engagement Plan (Chapter 8) that will be used to allow the affected community to express concerns about the security arrangements and acts of security personnel.

The following table presents a summary of the anticipated residual health, safety, and security impacts, relevant Project phase, and planned mitigation measures.

Table 5.20 – Residual Impact Summary – Health, Safety, and Security

Impact	Source	Primary Receptor (1)	Phase (2)		Significance(3)		Mitigation Measures	Management Plan
			C	O	ST	LT		
Occupational Hazards	Construction and Operation of the Project	E	*	*	N	N	• Apply best international practice building and engineering design and construction codes to all aspects of project development, including life and fire safety, seismic hazards, and weather-related hazards. • Define all potential terrestrial and marine hazards and exposure pathways in the Project Health, Safety, and Environmental Management Plan (includes risks with retention pond, collisions, and spills). • Provide sufficient on-site medical facilities (LIFZ and Power Plant) and personal protection equipment for all employees. • Provide onsite medical clinics and occupational medical monitoring for all employees (LIFZ and Power Plant). • Implement a program that confirms all employees and contractor personnel on site are current and sufficiently trained and qualified in health and safety. • Provide additional and refresher training to all employees. • Maintain a safe and clean work environment.	Construction Health, Safety, and Environmental Management Plan; and Occupational Health and Safety Management Plan

Impact	Source	Primary Receptor (1)	Phase (2)		Significance(3)		Mitigation Measures	Management Plan
			C	O	ST	LT		
							Perform regular inspections and audits to ensure all aspects described above are current and working.	
Accidental Site Spills of Contaminants	Project Area	E (NN)	*	*	N	N	- Provide initial and refresher spill response training to applicable employees. - Be prepared to implement all aspects of the Spill Prevention and Response Plan. - Provide emergency response and prevention equipment where necessary. - Be prepared to implement the Emergency Response Plan if necessary.	Spill Prevention and Response Plan; and Emergency Response Plan
Potential Pest and Disease-Carrying Species	Project Area and Surrounding Area	E, NN	*	*	N	N	- Implement all aspects of the Waste Management and Disposal Plan. - Perform regularly scheduled inspections of potential areas for pests and disease-carrying species. - Be prepared to implement control of pests and disease-carrying species. - Implement continued employee education regarding indicators of pest and disease-carrying species presence; provide similar education to surrounding communities.	Waste Management and Disposal Plan

Impact	Source	Primary Receptor (1)	Phase (2)		Significance(3)		Mitigation Measures	Management Plan
			C	O	ST	LT		
External Exposure to Project-Related Hazards	Project Site Area, Roads, and Port Area Waters	NN	*	*	N	N	• Use proper construction techniques to minimize and eliminate offsite disruptions and effects. • Make all access routes, safe, clearly visible, and illuminated. • Notify any potentially affected persons or communities of possible disruptions well in advance of them occurring. • Provide awareness training for all nearby persons and communities • Secure all construction and operations areas from public or unauthorized access using barriers, fences, security personnel, etc. • Exclusionary zone for small craft traffic, training, tracking and complaints monitoring	Construction / Occupational Health, Safety, and Environmental Management Plans; Traffic Management Plan; and Stakeholder Engagement Plan
Exposure to Low-Level Electro-Magnetic Fields and Encroachment onto Right-of-Ways	Port Area, Power Plant, and Power Distribution Lines	NN	*	*	N	N	• Implement preventative access control measures onto project. • Provide educational awareness and prevention training to employees and communities. • Regularly inspect project area and right-of-ways for signs of civilian/livestock unauthorized use or encroachment. • Regularly inspect power distribution lines for signs of civilian use or tapping.	Stakeholder Engagement Plan; Social Management Plan; and Security Management Plan

Impact	Source	Primary Receptor (1)	Phase (2)		Significance(3)		Mitigation Measures	Management Plan
			C	O	ST	LT		
Presence of Security Personnel	Construction and Operation of the Project	E, NN	*	*	N	N	• Prepare a Project Security Management Plan • Prepare a Risk Assessment of the Security Provider • Provide regular and refresher security training to security personnel. • Require contractors to abide by all security policies and procedures, including the Voluntary Principles. • Annual audits of the Project security force by the Corporate Security Director of the GB Group. • Designate a specific person/team to be responsible for managing security on behalf of the Project. • Provide Project liaison staff as needed or requested for all nearby persons and communities • Communicate with all nearby persons and communities regarding restrictions and security processes; complaint monitoring.	Security Management Plan Stakeholder Engagement Plan

Notes: (1) Primary Receptors: E = employees (2) Project Phase: C = Construction, O = Operations (3) Expected Significance Rankings: ST = short-term with mitigation, LT = long-term with mitigation

Impact	Source	Primary Receptor (1)	Phase (2)		Significance(3)		Mitigation Measures	Management Plan
			C	O	ST	LT		

NN = nearby neighbors

S - = significantly adverse
M - = moderately adverse
N = neutral
M + = moderately improved
S + = significantly improved

6.0 Alternatives Analysis

Various alternatives were considered in evaluating the technical and economic feasibility of the Project. Project location, power generation method, power plant fuel type, water supply, and dredging method were the key Project components where significant alternative options were considered early in the Project design process.

GB Group evaluated alternatives using internal resources, with assistance from its engineering contractors. In most cases, the preferred alternative emerged as the only viable design choice to ensure that the Project would be able to go ahead economically and in a timely manner. The following sections present a brief discussion of the main Project components considered to have potentially viable alternatives, along with a discussion of the justification for selecting the preferred alternative.

Alternatives Assessment Criteria

Criteria that were considered in selecting the preferred alternative included:

- Availability of land – both for purchase and for development (undeveloped, fallow, or abandoned land preferred)
- Minimizing to the extent possible physical and economic displacement of any residents on purchased land
- Ease of land purchase (minimizing the number of land owners involved in land purchase negotiations)
- Offshore water depth
- Proximity to a potential labor force
- Proximity to Port-au-Prince
- The significance of social and environmental impacts and the ability to mitigate adverse impacts to acceptable levels
- The level of support that could be gained in local communities
- Adherence to corporate environmental, health, safety and community policies and commitments

Project Location

The coastline of Haiti's West Department has many topographic features that favor ports and harbors. In the general Project region, the large island of Gonâve in the western Gulf of Gonâve provides a significant wave- and wind-break to the waters of Port-au-Prince Bay and the coastline to the east. GB Group selected the Port Lafito area partly based on its sheltered location along the Port-au-Prince Bay, as well as for its proximity to the clientele and the business-industrial-transportation hub of Port-au-Prince.

Bathymetry in the general Project region is also favorable to development of a deep-water cargo port. Bathymetric contours drop off steeply from the shore along the coast between Simonette and Lafiteau, as indicated in Graphic 4.18, minimizing the amount of dredging required to provide and maintain 12m of depth in the port area.

GB Group was able to purchase the majority of land for the Project site from a single seller, which substantially accelerated the Project's schedule. Additionally, as the land was at the time of purchase an abandoned sisal plantation, there were no resettlement or livelihood issues that required compensation associated with the land acquisition. Subsequent plots have been acquired in the same willing buyer-willing seller manner, resulting in the property boundary shown in Figure 3.1a.

In addition, the Project site is located near to Port-au-Prince, and has a substantial local and regional labor pool available in surrounding towns and the peri-urban center of Cabaret.

Taking all of these factors into consideration, the current Project site was the only feasible alternative for Project development.

Power Supply

The national electrical grid in Haiti is one of the most poorly developed in the Western Hemisphere, with only about 10% of the country's population having access to limited service (IDB). There is no national electrical grid infrastructure in the area of the Project, or in surrounding towns. Therefore, the Project turned to

consideration of a self-contained power plant to supply electrical energy to the port and the LIFZ. This option would provide the Project with a secure and reliable power source, as well as with the ability to sell excess power to any nearby industries or other users that might be interested in purchasing power from the Project.

GB Group considered the following alternatives to supply power to the Project:

- Solid fuel
- Liquid natural gas (LNG)
- Propane
- Diesel generators
- Wind and/or solar

Solid fuel plants such as coal-fired power plants were excluded from further consideration due to concerns with meeting emissions standards. Haiti currently has no infrastructure for importing, handling, or distributing either LNG or propane, so both were also ruled out. The Project required a the ability to reliable generate energy during the nighttime as well as daytime, so solar was considered unfeasible, and wind power as the main Project power source was also not feasible, as wind velocities typically fall at night in the region. Therefore, multiple generators working in series were selected as the preferred option.

Diesel/HFO generators were chosen because this type of fuel is common in Haiti and its distribution and handling networks are already in existence, providing a significant reduction in potential capital expense. The Project's choice of fuel for the generators was further refined to low-sulfur HFO based on the outcome of the emissions modeling undertaken by AECOM (2015).

6.1.1 Water Supply

The 2014 ESIA contemplated the use of groundwater to supply the Project's need for potable, sanitary, industrial, and fire water. In July 2013, Cespedes S.R.L. conducted a well capacity test using two existing water supply wells located within

the Project boundary north of the LIFZ, wells PLGBGGW1 and PLGBGGW2. Well PLGBGGW1 was pumped for five hours at two different rates (65 gpm and 25 gpm), and water level measurements were recorded during each test in well PLGBGGW2. A near steady state was achieved in well PLGBGGW2 at the 25 gpm pumping rate.

The results of the well capacity test were extrapolated to allow for calculation of a drawdown cone surrounding the proposed water supply well PLGBGGW1, when pumped at a rate of 25 gpm. It was assumed that the aquifer was homogeneous, isotropic, and of uniform thickness and hosted by silty fine sand. The results of the drawdown calculations are summarized in the table below and indicate that using groundwater to supply the Project's water needs would have significant impacts on groundwater levels for nearby neighbors, primarily in Lafiteau, including a number of hand-pump-operated drinking water wells in the community.

Table 6.1 – Projected Groundwater Drawdown from Pumping Well PLGBGGW1 at 25 gpm

Projected Drawdown	Radius of Influence (from PLGBGGW1)	Drawdown Affects
3.0 – 15.2 m	200 m	Project area immediately surround well
1.5 – 3.0 m	500 m	Extreme north Lafiteau, including 2 drinking water wells
0.3 – 1.5 m	1000 m	Central Lafiteau, Haiti Broilers, landward portion of LMH, including 5 additional drinking water wells
0 – 0.3 m	1150 m	Most of southern Lafiteau, terminal of LMH terminal, including 4 additional drinking water wells

Source: After data from NRE 2014

Based in part on the drawdown and on groundwater quality results reporting a brackish aquifer in the Project area, the decision was made to investigate the use of local surface water resources as a water supply.

The only suitable surface water sources are two streams located to the northwest of the Project site, one running through the community of Simonette and the other running through the community of Source-Matelas. Both streams have hand-dug diversion canals branching off of their higher-elevation upper reaches, which bring water to surrounding agricultural plots and home sites. Below the planned Project extraction points there are no water users and both streams drain directly into the sea. CINA withdraws its water from the Source-Matelas stream downstream of the community of Aubry/St. Gerard. GB Group currently plans on extracting water from both of these streams to supply the Project's fresh water needs.

6.1.2 Marine Dredging

Several dredging methods were considered for use on this project, including mechanical and hydraulic dredging. Mechanical dredging, typically barge-based, was discarded as deep-water discharge of dredge spoils was not an option. Hydraulic dredging using a cutterhead suction dredger was selected as the preferred alternative. Cutterhead suction dredgers remove material from the seabed and pump the spoils to the disposal site using a fixed (often floating) pipeline. This method allowed dredge spoils to be deposited on land, where they can be used for construction material, and reduces disturbance and sedimentation impacts to the surrounding benthos and marine environment. The Project utilizes a silt curtain during dredging to further contain sedimentation.

7.0 Environmental and Social Management Plan

GB Group is committed to being at the leading edge of social and environmental responsibility and to set its performance standards at a level that is comparable to leading industry practices. GB Group is committed to continuously improving the operational performance of the Lafito Project to enhance social and environmental benefits and to limit adverse impacts to the maximum extent practical. This Environmental and Social Management Plan sets forth the framework for implementing the Project-specific actions that are necessary to comply with international best practice as exemplified by IFC's Performance Standards on Social and Environmental Sustainability (www.ifc.org).

Objectives

The objectives of the Environmental and Social Management Plan are to:

- Establish social and environmental management standards (to also include health and safety) that meet or surpass statutory, industry, and community expectations
- Manage environmental and social risk in line with IFC and other international requirements and guidelines
- Continually review and, where appropriate, amend the performance criteria to reflect developments in technology, statutory requirements, leading industry practice, and community standards
- Develop and implement contingency plans for the control and correction of incidents
- Inform Project personnel of their responsibilities with respect to social and environmental issues and to monitor the manner in which those responsibilities are implemented
- Audit business activities and working procedures and implement changes as needed to demonstrate that these objectives are being met

The preparation of the Environmental and Social Management Plan was guided by focusing on:

- Occupational health and safety and environmental and community risk prevention, to protect the community, workers, and the environment

- Compliance with relevant international standards, codes, and practices applicable to the work being performed
- Conducting all activities in a safe and responsible manner, including maintaining equipment in good operating condition, for the protection of human health, safety, local communities, and the environment.

No policy, plan, or procedure can be fully effective without the application of performance measures to measure the success of the actions performed or of the policies undertaken. In turn, such performance measures must include an ongoing process of review, assessment, and improvement. Thus, this Environmental and Social Management Plan will be a “living” document, meaning that with its implementation, it will be reviewed, updated, and modified as needed.

Scope

A high-level Environmental Impact Assessment was prepared for Port Lafito and submitted to the Government of Haiti (GoH) in 2012. This document fulfilled the government’s cursory requirement for an impact assessment and construction activities started at the port in December of 2013.

IFC became involved in the Project, and requested the preparation of a more comprehensive Environmental and Social Impact Assessment (ESIA) document. The 2014 ESIA document for the Port Lafito project (NRE 2014) summarized the available information on the port project through the time of its preparation in the context of the regulatory framework, project plans, environmental and social baselines, and included a general review of predicted impacts and suggested mitigation measures for port construction. Systems for environmental and social management and monitoring were not included in the 2014 document.

With IFC’s continued participation in the Lafito Project, the 2014 ESIA was repackaged and expanded to include the port operations and construction and operations of the LIFZ and power plant, and to provide a re-assessment of impacts, additional and specific mitigation measures, and the inclusion of an Environmental and Social Management Plan that provides a framework for the Project’s management systems and discipline-specific management plans.

This ESIA document has been prepared between April and May of 2015 to update and reformat the information presented in the 2014 ESIA to better conform to the GB Group Project implementation schedule and the organizational structure and content required by the IFC.

This Environmental and Social Management Plan focuses on the actions that must be implemented to mitigate potentially significant adverse impacts to acceptable levels and to enhance Project benefits. Impacts predicted to social and environmental resources and the human environment are discussed in Chapter 5 and summarized in Table 5.1.

The Environmental and Social Management Plan highlights the issues and concerns that are presented in Chapter 5 and identifies reasonable and practical responses to address and mitigate potentially adverse effects and enhance Project benefits. It defines the specific actions that will be required to effectively implement those responses in a timely manner and describes the methods by which GB Group will demonstrate that those requirements have been met. It also establishes the course that GB Group will follow in complying with Haitian laws and regulations as well as Project lenders' requirements.

This Environmental and Social Management Plan addresses the following key components:

- Social and environmental management framework and strategies
- Mitigation plans, procedures, and programs
- Responsibilities and staffing

The Environmental and Social Management Plan also identifies the specific actions that GB Group believes are needed to demonstrate that the social, environmental, health, and safety standards are being achieved to a level that is generally compliant with good international industry practice (GIIP).

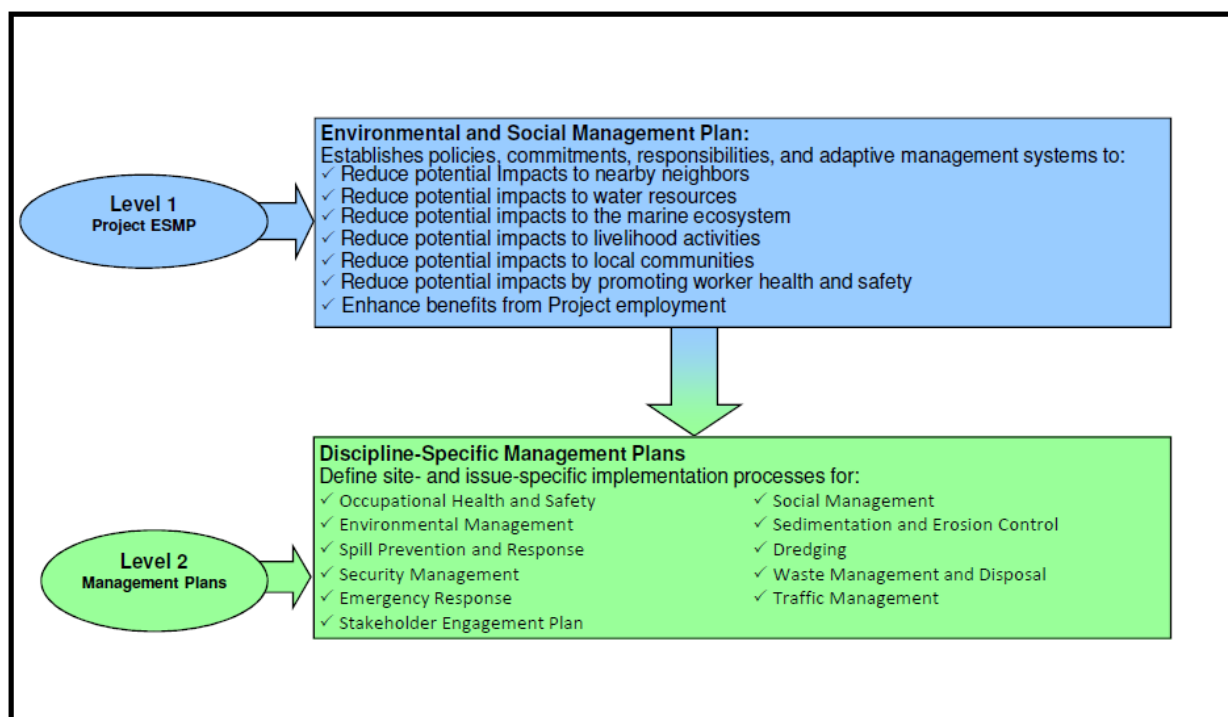
This Environmental and Social Management Plan will be regularly updated to reflect changing requirements as Project components (port, LIFZ, and power plant) move

from construction through to operations, and is designed to be applicable to additional Project development phases and components in the future.

Structure

The following diagram shows the structure of this Environmental and Social Management Plan, divided into two levels, to illustrate how the Environmental and Social Management Plan translates into operating procedures. The implementation of the Environmental and Social Management Plan involves all levels of construction, management, and operations. The two-level structure is based on the premise that responsibility must be assigned to the individual or to the unit operation that controls the impacting activity and is most able to respond and mitigate any occurrence requiring action.

Graphic 7.1 – Project Management System Structure



7.1.1 Level 1 – Environmental and Social Management Plan

The Environmental and Social Management Plan should be viewed as an “umbrella plan” which presents the overarching structure under which the various discipline-specific management actions (Level 2 plans) will fall. This “Level 1” structure serves to establish the policies, framework, commitments, and resources required to mitigate and manage Project impacts and benefits, and indicates how responsibilities are assigned within the GB Group and the Project’s administrative organization.

Level 1 management will ultimately be the responsibility of the Project Director, supported in particular by the Health, Safety, Environment, and Community (HSSE) Team and the managers and their various supervisory-level staff with direct responsibility for construction, operations, maintenance, planning, environmental, social, health, and safety issues. These staff will be responsible for:

- Providing guidance and support to the various operations units as they implement their relevant discipline-specific plans by means of standard service procedures or otherwise;
- Providing technical services to operations units through performance monitoring and mitigation strategies to support operations units in meeting Environmental and Social Management Plan objectives; and
- Reviewing the frequency and types of monitoring regularly to promote:
 - Compliance with relevant national and international guidelines and standards;
 - Compliance with permit conditions, including those issued by the Government of Haiti; and
 - Effective monitoring and mitigation of Project impacts.

GB Group is retaining control of overall construction management within its own organization, rather than hiring an engineering, procurement, construction, and management (EPCM) contractor. As such, the Project’s Executive Vice President (EVP) of Construction retains oversight of the various contractors employed on the site for construction and commissioning of Project components. The Project has contracted with one principle general construction firm to conduct the dredging

activities and to handle earthworks and civil construction for all marine and land components. Specialty contractors have been engaged to perform specific tasks such as electro-mechanical work.

It is the EVP Construction's responsibility to make sure that contractors abide by the commitments and procedures included in this Environmental and Social Management Plan, or that they develop and implement their own analogous environmental, health, and safety management plan. This contractor plan is known as the Construction Health, Safety, and Environmental Plan (HSE Plan). Contractually requiring implementation of either approach will assure that the Project's contractors are fulfilling the health, safety, environment, and community commitments of the Project's ESIA, under the terms of its contract with GB Group. While GB Group remains fully responsible for implementing the commitments of this ESIA, some of those commitments may be implemented by and through the Project's contractors by way of the contractor's individual management plans.

The monitoring component of the Environmental and Social Management Plan contributes to a flexible and responsive approach to management through which mitigation and monitoring will be adapted to changing social and environmental conditions over the life of the Project.

7.1.2 Level 2 – Discipline-Specific Management Plans

Discipline-specific management plans take the general plans presented in the Environmental and Social Management Plan and contractor management plans a step further by defining specific procedures, actions, and monitoring needed to accomplish certain tasks required by the Project. Under the policy direction defined in this Environmental and Social Management Plan, the discipline-specific management plans define the purpose, responsibilities, and the operational performance criteria that are needed to monitor their effectiveness. The responsibility for their implementation, application, review, and periodic revision is assigned, as appropriate, to the operations units having direct responsibility.

Discipline-specific management plans vary in detail, reflecting the significance and complexity of the issues and the information available relative to the current stage

of Project development. Proposed mitigation may include additional baseline work, further research, and plan development. The purpose of these plans is to provide an applicable framework and in some instances spell out the specific steps for implementing the impact-mitigating actions.

Project Phases

Chapter 5 predicts impacts and identifies mitigation measures for each phase of the Project. These impacts are summarized in Table 5.1, and have been grouped into key issue topics as defined in Section 7.16. This Environmental and Social Management Plan defines the framework and makes the commitments to develop management plans that are needed to implement specific actions required to mitigate potential Project impacts. It is intended to identify those actions that are required to implement the mitigation measures identified in Chapter 5 and Table 5.1 for all phases of the Project.

It is not the intention of this Environmental and Social Management Plan to strictly define the exact titles, numbers, and content of every Level 2 and Level 3 plan; rather it intends to identify plans of logical content groupings that are required to implement the mitigating actions to control the predicted impacts to acceptable levels and to facilitate modifications and continuous improvements per the management system framework. This Environmental and Social Management Plan anticipates each discipline-specific management plan and standard service procedure to be “living documents” that are updated throughout the life of the Project so that the appropriate level of emphasis and detail is applied to each plan relative to its level of significance at any given time throughout the life of the Project.

Performance Targets

GB Group’s commitment for this Environmental and Social Management Plan is to apply technologies and practices that avoid or minimize adverse impacts through:

- The use of good international industry practice
- The implementation of technically and financially feasible, cost-effective actions

- Conformance with the World Bank Group (WBG)/IFC environmental, health, and safety (EHS) guidelines and other appropriate international guidance in the absence of relevant national legislation
- Adopting a “Zero Harm” approach to human health and safety, local communities, and the environment

There are currently no established national discharge standards in the Republic of Haiti. In the absence of Haitian general and numeric performance targets, the guidelines established by the IFC and other groups (such as the World Health Organization) give direction on leading industry practice. As presented in Section 2.6, the following WBG/IFC guidelines will be used to measure Project performance:

- Environmental, Health, and Safety Guidelines General Guidelines (May 2007)
- Environmental, Health, and Safety Guidelines for Ports, Harbors and Terminals (April 2007)
- Environmental, Health, and Safety Guidelines for Thermal Power Plants (December 2008)
- Environmental, Health, and Safety Guidelines for Electrical Power Transmission and Distribution (April 2007)

These EHS guidelines contain the performance levels and measures that are generally considered to be achievable at reasonable costs by existing technology at new facilities such as the Project.

The applicability of the EHS Guidelines should be considered based on the results of the impact assessment (Chapter 5) where site-specific variables, the Haitian context, assimilative capacity of the environment, and other Project factors are taken into account. Where variations are considered over established guideline values, the technical basis for alternative performance targets should be based on the professional opinion of qualified and experienced persons.

Management System

The management system defined in this Environmental and Social Management Plan is appropriate to the nature and scale of the Project and commensurate with

the level of social and environmental risks and impacts. The system incorporates the following elements:

- Identification and review of the social and environmental impacts and risks of the operations
- Definition of a set of policies, objectives, and organizational capacity for social and environmental performance
- Establishment of a management program to achieve these objectives
- Implementation of appropriate and effective training programs
- Monitoring of program performance against policies and objectives
- Appropriate disclosure and reporting of results
- Review of the system and outcomes, striving for continuous improvement
- Meaningful engagement and dialogue with local communities and other legitimate Project stakeholders

Corporate Commitment

GB Group is committed to the long-term involvement of protecting the environmental quality and human interests in Haiti, including the health and safety of its people. GB Group's social and environmental programs aim to regularly improve environmental and safety performance in the workplace, maintain multi-directional communication among the Company, local communities, and interested stakeholders, and to limit local community dependence on the Project. To this end, GB Group has developed its General Business Principles - presented in Appendix A.

Policy Implementation

GB Group intends to implement leading industry practice and business-based health, safety, environment and community management systems in all areas of operation. Social and environmental management of the Project will be administered through a chain of command that includes corporate oversight, site management, local employees, contractors, and subcontractors who will be responsible for:

- Complying with local, national, international, and financial lending institution laws, regulations, policies, and performance standards, as appropriate
- Providing adequate staff and resources at each Project location to implement and maintain the social and environmental management systems envisioned by the policy
- Reporting on the effectiveness of such activities to executive management and the GB Group Board of Directors for review and corrective action, as necessary

GB Group will develop the capabilities and support mechanisms necessary to administer its social and environmental management programs. Implementation will be based on raising the level of company-wide awareness of social and environmental requirements, expectations, and benefits. Health, safety, environmental, and community protection and development are among the highest Project priorities.

Organizational Responsibility

Responsibilities for the various programs defined in this Environmental and Social Management Plan are specifically assigned to the senior management team. During construction, GB Group will designate a senior management representative who will be responsible for assuring the implementation of the commitments of this plan during the construction phase.

7.1.3 GB Group Organization Structure

The following information identifies the reporting structure and the specific responsibilities assigned to each GB Group manager. The Project Director is ultimately responsible for all actions and implementation programs called for by this Environmental and Social Management Plan since all senior management staff as well as the Construction contractor Project Director report directly to the GB CEO.

The GB Group Project Director is responsible for all employees and activities at all locations of the Project and will report directly to the GB Group Board of Directors.

The HSSE programs defined in this ESIA are the direct responsibility of the HSE functional department Manager. Within the HSSE functional department, responsibility is assigned to environmental, health and safety, and social/community specialists in the Project area. Those specialists are also responsible for training in their respective work areas.

The GB Group HSE Manager is responsible for all environment, health, and safety program management systems, environmental awareness and training, health and safety training, security, waste management, regulatory compliance, compliance audits, stakeholder engagement, community training and capacity-building, social program monitoring and recordkeeping, stakeholder liaison, and dispute resolution. These responsibilities will be assigned to individual positions within the HSSE functional department as appropriate, but the ultimate management responsibility lies with the GB Group HSE Manager and the Project Director.

GB Group has already retained qualified professionals with international experience to fill some of the key roles identified. GB Group will appoint a qualified and experienced HSE Manager to be responsible for the implementation of measures set out in this Environmental and Social Management Plan. Key responsibilities of the GB Group HSE Manager include the following:

- Acting as the point of contact for the construction contractor with respect to environmental issues
- Documenting that environmental protection procedures are followed as planned by both GB Group and by the construction contractor
- Reviewing and assessing the adequacy of the construction contractor's HSE Plan
- Auditing the construction contractor's implementation of the Construction HSE Plan
- Liaising with members of the public, local organizations, and governmental and non-governmental organizations on environmental issues
- Liaising with other businesses potentially affected by the project
- Reporting results of mitigation and monitoring activities to Haitian authorities, project lenders, and other applicable parties

Management Systems

A management system is a set of management tools and principles that allows companies to systematically manage their health, safety, environment, and community matters. It is a framework for continual regular planning, implementing, reviewing, and improving a business' operations to integrate environmental concerns into daily business practices and generate reports on social and environmental performance progress. Management systems do not set compliance standards, but instead set out procedures designed to meet performance requirements that are relevant to the Project and/or required by government agencies and Project lenders.

GB Group will focus on developing the capabilities and support mechanisms necessary to achieve its social and environmental policies, objectives, and targets. To enhance the success of these targets and objectives, GB Group will liaise with local communities and other interested stakeholders. Implementation will be based on raising the level of awareness of social and environmental requirements, expectations and benefits, and the working ties between departments in order to place health, safety, and environmental protection as well as social issues and community activities among the highest of Project priorities.

7.1.4 Construction Health, Safety, and Environmental Management Plan

During the construction phase, the Level 1 plan developed by the construction contractor defines the occupational health and safety, environmental, and social actions required for this phase of the Project. The construction contractor is updating the HSE Plan, which will be substantially equivalent to and in many cases more detailed than the general content of this Environmental and Social Management Plan, and which is relevant specifically to the contractor's actions. The construction HSE Plan establishes the management framework for the construction contractor to address the social and environmental commitments made in this ESIA. It defines the relational responsibilities among GB Group, the construction contractor and any subcontractors who may be retained. It addresses the management controls, training, and communications protocols as well as

defining the specific requirements, plans, and procedures for addressing discipline-specific Project needs.

7.1.5 Discipline-Specific Management Plans

Level 2 discipline-specific management plans represent the next level of detail after the Environmental and Social Management Plan to further define Project-specific procedures. Certain Level 2 plans were committed to in the 2014 ESIA documents. Other management plans were developed to address the impacts and mitigation measures identified in this ESIA. The discipline-specific management plans discussed in this Environmental and Social Management Plan are:

- Occupational Health and Safety Management Plan
- Sedimentation and Erosion Control Procedure
- Dredge Management Plan
- Waste Management and Disposal Plan
- Traffic Management Plan
- Environmental Management Plan
- Spill Prevention and Response Plan
- Security Management Plan
- Emergency Response Plan
- Social Management Plan
- Stakeholder Engagement Plan

These Level 2 plans have been, or are in process of being, developed based on the Project plans, site conditions, and the current understanding of the local and regional environmental and socio-economic conditions. These plans will require the participation of GB Group managers, supervisors, and employees for the implementation of the procedural activities contained within the plans. Each of these discipline-specific plans will be updated as the Project progresses to provide timely actions and responses to the issues they address, and task-specific Level 3 SSPs will be developed as required to define and detail each relevant job procedure.

The following table identifies the Level 2 plans that were committed to in the 2014 ESIA, and cross references those plans and procedures that GB Group will refine from the 2014 ESIA for the current ESIA, as well as listing the new plans required by this ESIA.

Table 7.1 – Discipline-Specific Management Plans

2014 ESIA	This ESIA
Construction Health, Safety, and Environmental Plan	Occupational Health and Safety Management Plan
	Waste Management and Disposal Plan
--	Dredge Management Plan
--	Traffic Management Plan
--	Environmental Management Plan
--	Spill Prevention and Response Plan
--	Security Management Plan
Emergency Action Plan	Emergency Action and Response Plan
Hurricane and Major Storm Action Plan	
--	Social Management Plan

Brief summaries of the discipline-specific management plans that are included and will be developed pursuant to this ESIA follow; where the plan or a framework for the plan exists, it has been included in an appendix to this ESIA, with the reference provided in the appropriate summary section. GB Group is currently developing the remaining plans, with the assistance of various contractors, to define the specific procedures, actions, and monitoring needed during the construction and operations phases of the Project.

7.1.5.1 Occupational Health and Safety Management Plan

The Occupational Health and Safety Management Plan developed for the Project will utilize the structure and general content of the Construction HSE Plan, and will be updated to provide Project-specific content. The Plan will define safe working conditions and expectations for employee conduct and use of PPE in the various working environments and occupational situations present at the Project site during Project operations. Procedures for employee orientation, training, emergency procedures, and reporting of unsafe or potentially dangerous working conditions will also be included. The Occupational Health and Safety Management Plan will include specific provisions for Project staff who work in or near the sea or the water retention pond, including demonstration of swimming ability, self-rescue training, and provision of appropriate PPE such as life jackets and training in its use.

7.1.5.2 Dredging Management Plan

The Dredging Management Plan prepared by AMI applies specifically to the Port Lafito area and includes mitigation measures designed to limit the concentration of suspended particulate during dredging activities. The Dredging Management Plan defines dredging practices, disposal areas, and the process for maintenance dredging to limit the potential for impacts to seawater quality and to the marine ecosystem.

7.1.5.3 Waste Management and Disposal Plan

The Waste Management and Disposal Plan defines the roles and responsibilities, specific requirements, and mitigation and monitoring controls for managing solid and hazardous wastes generated by the Project. Wastes covered in the Plan also include treated wastewater from the wastewater treatment plant system, stormwater collection ponds, and organic/food wastes generated by the mancamp and LIFZ cafeterias. The Waste Management and Disposal Plan will include guidelines for reducing the production of wastes, waste recycling opportunities, temporary waste storage on site, and appropriate disposal methods and locations for generated wastes.

7.1.5.4 Traffic Management Plan

The Traffic Management Plan will be developed to promote safe driving and traffic flow procedures within the Project site and for Project vehicles transporting materials or supplies to and from the site. Its purpose is to protect Project staff, the community, and Project materials during transportation activities. The Traffic Management Plan will also include the establishment and maintenance of a marine small craft exclusionary zone around Port Lafito. The Traffic Management Plan will include provisions for community safety and present appropriate strategies for moving staff and materials to, from, and within construction areas. The Plan will establish Project speed limits and enforcement protocol, safe driver training programs including pedestrian and livestock awareness, incident avoidance, refresher training schedules, and incident reporting procedures.

7.1.5.5 Environmental Management Plan

The Environmental Management Plan is a comprehensive plan that includes procedures for monitoring and managing all of the environmental commitments undertaken by the Project in this ESIA. The Environmental Management Plan includes programs for:

- Air emissions management and monitoring
- Noise management and monitoring
- Water quality management and monitoring
- Surface water flow monitoring
- Groundwater level monitoring
- Revegetation of disturbed areas

Each program may include specific monitoring commitments (locations, parameters, frequency, compliance standards). The programs will set forth the specific procedures to be followed for collecting samples, recording data, and reporting results, along with any thresholds for corrective action. Results of the Environmental Management Plan monitoring programs and progress reporting on non-monitoring-based environmental program commitments will be compiled annually in the Project's Environmental and Social Performance Annual Monitoring

Report (AMR) document for disclosure to stakeholders. A summary of the content of the Environmental Management Plan by program follows.

Air and Noise Monitoring Program

The Air and Noise Monitoring Program aims to monitor air emissions from areas where construction and operation activities are occurring and will include actions to control airborne particulate. It will also define actions to mitigate, prevent, or avoid to the extent practical noise nuisances to site personnel and nearby neighbors. The Plan will address particulate and other emissions from the power plant with respect to local communities. A noise monitoring station (and procedure for the collection of data, to be determined) will be maintained for Lafiteau.

Water Monitoring Program

The Water Monitoring Program will be developed to document the quality and quantity of surface water at the water intake points for the Project and groundwater levels and quality in water supply wells adjacent to the Project in nearby communities. It will also include management practices that limit the potential for adverse impacts to water resources, and to monitor, control, and minimize water consumption. It will detail the management of stormwater and treated wastewater around the Project site. The plan will be updated as necessary based on the results of GB Group's monitoring procedures and in response to the community complaints process. The results of the Water Monitoring Program will be compiled and shared in the Project's AMR.

Disturbed Area Revegetation Program

Remaining cleared areas disturbed by Project construction activities will be re-vegetated at the conclusion of construction, to decrease the potential for erosion and fugitive dust generation, and to decrease impacts to visual resources. The Disturbed Area Revegetation Program will define the areas to be re-vegetated, provide direction for selecting native or non-invasive plant species that will be easily established and are tolerant of coastal and low-water conditions, and protocol for verifying the success of the revegetation program.

The results of the Disturbed Area Revegetation Program will be compiled annually as necessary and included in the Project's AMR.

7.1.5.6 Spill Prevention and Response Plan

The Spill Prevention and Response Plan will define the management and response practices to reduce the risk of accidental exposure of fuels and other hazardous materials to human and environmental pathways, for both onshore and offshore Project activities and components. During construction, chemicals or materials expected to be on-site include petroleum products such as fuel, oil, lubricants, paints, and solvents. During operation, chemicals used as site are expected to include the fuels, oils, and lubricants stored at the power plant's tank farm. The Spill Prevention and Response Plan will include general GIIP for containment and handling of relevant materials, safe working conditions to avoid spill creation, spill response protocol including notification of management, spill control and disposal of spill clean-up materials, and incident reporting. The Spill Prevention and Response Plan will incorporate an Environmental Release or Spill Reporting Requirements procedure developed by the Project. Spill reporting will be compiled and presented in the Project's AMR.

7.1.5.7 Security Management Plan

The Security Management Plan will define management procedures for the Project's security force and will address worker and community safety and security conditions in accord with the guidelines of the IFC. A security risk assessment was conducted for the port in partnership with an ISPS consultant; the results of this risk assessment are incorporated into the Project's Security Management Plan. The procedures will include internal incident tracking and a corrective action program to prevent recurrence of incidents with due consideration for the lack of police presence in the region. Topics addressed in the Plan will include:

- Background checks for all security personnel and applicants
- Security staff code of conduct a rules of engagement
- Training in human rights and appropriate behavior within communities
- Appropriate response training
- Guidelines and training on the use of force

- Periodic assessment of site security risks
- Interaction with local, national, and international police and security forces
- Record-keeping and incident reporting
- Site-specific security considerations

The Security Management Plan will also address community safety and security procedures according to IFC PS 4 and the Voluntary Principles on Security and Human Rights (<http://www.voluntaryprinciples.org/>). All communities identified as being within the Project's overall social zone of influence will be included within the Plan's coverage. Credible reports of human rights abuses by public security forces within the Project's social zone of influence will be reported to the appropriate government authorities and include in the Project's AMR. The Project's complaints and grievances processes will be closely monitored with regards to any charges of human rights violations or inappropriate actions regarding Project security personnel; any such complaints will be immediately advanced to the Corporate Security Manager and Project Director for priority action.

The Project's Security Training Program currently under development will be an integral part of the Security Management Plan. A security risk assessment has taken place for ISPS certification for the port; however, a risk assessment of the security provider will take place. To verify compliance with the Voluntary Principles and IFC's PS-4, the Corporate Security Director of GB Group will conduct an annual audit of the Project's security force. At the Project level, an annual security summary report will be prepared that details all security incidents and interactions with community members; this summary report and the corporate security audit will both be include in the Project's AMR.

7.1.5.8 Emergency Response Plan

The Emergency Response Plan will define the response and reporting procedures to follow in the event of an emergency or natural disaster. It will outline the process for responding to onsite and transportation emergencies, fires, explosions, medical emergencies, and accidental releases from Project facilities (e.g., power plant tank

farm). It is designed to minimize employee exposure to risk and injury and limit potential impacts to the environment and the community in emergency situations. The Emergency Response Plan will incorporate the specific procedures developed for the Project to respond to earthquakes and other natural disasters such as hurricanes.

The emergency response plan will also include:

- Training in emergency preparedness and emergency response
- Emergency contact information for medical, security, and management
- Contact information for current community leaders in case of emergency
- Emergency Project shut-down and re-start procedures
- Communication of emergency status and resolution to communities and employees as appropriate

The plan will also address community emergency preparedness and will be disclosed in a culturally appropriate manner to all communities within the Project's overall social zone of influence. Project activities, equipment, and infrastructure often bring benefits to communities including employment, services, and opportunities for economic development. However, projects can also increase the potential for community exposure to risks and impacts arising from equipment accidents, structural failures, and releases of hazardous materials. Communities may also be affected by impacts on their natural resources, exposure to diseases, and the use of security personnel. While GB Group acknowledges the Haitian government's *de facto* role in promoting the health, safety, and security of the public, it also accepts the responsibility to avoid or minimize the risks and impacts to community health, safety, and security that may arise from managing, monitoring, and evaluating potential impacts to communities from:

- Infrastructure and equipment safety
- Hazardous materials
- Communicable diseases
- Environmental health and natural resources
- Emergency response and preparedness

7.1.5.9 Social Management Plan

Like the Environmental Management Plan, the Project's Social Management Plan is a comprehensive plan that groups together all of the Project's social program commitments into a single management plan. The Social Management Plan includes guidance in the following program areas:

- Human Resources policy
- Local hiring program
- Induction training
- Vocational mentoring
- Vocational training program
- Tenant Manual
- Social investment
- Land acquisition policy
- Influx management plan
- Chance finds procedure
- Grievance mechanism (for workers)
- Complaints mechanism (for community members)

The Social Management Plan will define short-, medium-, and long-term programs aimed at enhancing Project benefits for nearby communities and employees and helping to attenuate the influx of job-seekers while limiting the potential for dependency on the Project by encouraging community development. It will also provide the planning structure necessary to accommodate economic and social capacity changes over the life of the Project. The Social Management Plan programs are intended to benefit the regional community, with particular emphasis at least in the near term on Project-area communities and nearby neighbors.

Components of the Social Management Plan include programs targeted at employment and training (including priority hiring of people in the social AOI) and enhancing local business development, community health and education, local infrastructure, and to the extent possible, institutional capacity. To adapt to

changing economic and social conditions over the long-term, GB Group's social investment planning process will include a Social Investment Fund to support social and environmental programs to benefit the wider Haitian community.

Human Resources Policy

The Project's Human Resources (HR) Policy includes the development of an HR manual or Employee Handbook that will be provided to all employees upon hiring by the Project. The HR Manager will provide training in the content of the Employee Handbook to all new hires. The Employee Handbook will be organized in a manner that addresses the requirements of IFC PS 2 on Fair Labor and Working Conditions and at minimum will include the following:

- A description of the working conditions and terms of employment
- Consideration for collective agreements
- Respect for the workers' right to organize and bargain collectively
- A non-discrimination and equal opportunity policy
- A grievance process
- A stated policy against forced and harmful child labor
- Provision of a safe and healthy work environment

The Human Resources Policy will also implement commercially reasonable efforts to require suppliers, contractors or other intermediaries to apply the applicable requirements of PS-2 in conducting their businesses, including addressing child labor and forced labor in the supply chain.

The Plan will include English language training for non-English-speaking staff. It will also include an HIV/AIDS and communicable diseases prevention program that may include multiple approaches such as:

- HIV/AIDS and communicable diseases awareness campaigns and education
- Workforce social codes of conduct
- Housing that integrates family members when possible

- Monitoring of HIV/AIDS and other relevant data and information

Local Hiring Program

Job creation is the most significant benefit of the Project; to maximize this benefit for local communities, the Project will implement hiring practices that preferentially target nearby neighbors for employment. The Local Hiring Program employs a tiered strategy in offering employment at the Project: first consideration is given to people living in the communities located within the Project's zone of social influence; if no applicants are available with the minimum basic requirements for the position, the radius of applicants is expanded to consider applicants residing in the rest of Cabaret Commune. If no appropriate candidates are encountered regionally, the Project will open up the search to consider applicants from the rest of Haiti, including the Port-au-Prince area. In cases where a particular technical expertise is required, the Project may extend the search to consider ex-patriates.

The Local Hiring Program will include detail on:

- Mapping of locally available skills
- Mapping of priority areas for hiring
- Recruitment and hiring procedures
- Vocational and on-the-job training plans and commitments
- Salary scales
- Timelines and budgets
- Measures for measuring and assessing achievement of local hiring commitments
- Compliance and reporting commitments

The Local Hiring Program will be implemented across all components of the Project, and is applicable to GB Group, its construction contractor, and sub-contractors. As part of their agreement with GB Group, LIFZ tenants will be contractually obligated to participate in the Project's Local Hiring Program, which will be included in the Tenant Manual provided by GB Group.

The Local Hiring Program applies to all classes of Project employees, including:

- Salaried employees
- Hourly employees
- Day laborers (“jobbers”)

Induction Training Program

All GB Group and LIFZ Tenant employees will receive induction training prior to the start of work at the Project. The level and content of the induction training will be commensurate with the type of employee and with the employee’s position and work area. Specific training programs are discussed further in Section 7.11.

Vocational Mentoring Program

A Vocational Mentoring Program has been in place at the Project since 2014; as of May 2015, approximately 150 Haitian employees have been enrolled as apprentices.

Experts in various technical fields of construction act as mentors to the apprentices; currently all mentors are ex-patriates however there is no restriction on nationality of mentor. The types of apprenticeships available vary depending on the current needs of the Project; apprenticeships include, but are not limited to, the following areas:

- General labor
- Trades (plumbing, electrical, carpentry, ironworking, pipefitting)
- Concrete work
- Surveying
- Welding
- Fence installation
- Dredge operation
- Crane operation
- Security

More detail on the Vocational Mentoring Program is provided in Section 7.16.5.2.

Vocational Training Program

The Project will develop a Vocational Training Program to complement its Local Hiring Program and to assist residents of communities within the Project's social AOI to acquire the skills necessary to get hired by the Project and/or LIFZ tenants. As such, the Vocational Training Program will be initiated sufficiently in advance of LIFZ operations to provide adequate time for program participants to complete the training. The Vocational Training Program is an essential part in mitigating social risks associated with Project implementation, by providing assistance to local residents to better qualify them for Project and LIFZ tenant hiring.

Vocational training will take place via an independent entity that issues a certificate of completion un-associated with the Project or GB Group. Training will be provided at a reasonable cost to interested residents of local communities within the Project's social AOI; participants will be selected for training based on passing minimum entrance exams geared toward the type of training they will receive.

Tenant Manual

Prior to LIFZ operations, the Project will develop a Tenant Manual with which LIFZ tenants will be contractually obligated to comply. At a minimum, the Tenant Manual will oblige LIFZ tenants to comply with:

- IFC Performance Standard 2 (Labor and Working Conditions)
- Haitian law
- Applicable ILO conventions
- The Project's Local Hiring Program
- The Project's ESIA

Social Investment Program

The Project will initiate a Social Investment Program that will support community development initiatives within the Project's zone of social influence. GB Group will contribute financially to the Social Investment Program, and expects to attract other private sector and NGO contributors. The Social Investment Program will partner with community leaders in determining appropriate investment activities and goals.

Land Acquisition Policy

The Project will develop a Land Acquisition Policy prior to the development of other areas outside the port. This policy framework will provide guidance in the event of physical or economic displacement as a result of Project activities, in compliance with IFC's PS 5.

The principles of the Land Acquisition Policy will be adhered to by GB Group, its contractors, and via contractual obligation, LIFZ tenants and will be communicated to all Project stakeholders.

Influx Management Program

The Influx Management Program will specifically address collaboration with the GoH on management of squatter settlements and influx impacts. Main strategies and actions included in the Influx Management Program will be oriented toward shifting the focus of in-migration from the smaller communities adjacent to the Project site to the larger peri-urban area of Cabaret. GB Group will be responsible for:

- Establishing, promoting, and ensuring local hiring goals
- Communicating Project plans to stakeholders, locally and regionally
- Vocational training
- Liaising with government entities to create an economic pole in Cabaret

The Influx Management Program will also recognize the limited capacity currently existing within the GoH to manage influx independently, and will include specific measures to prevent or decrease influx for social AOI.

Chance Finds Procedure

The Chance Finds Procedure will address the actions and notifications necessary in the case of the accidental discovery of archaeological artifacts or human remains during Project construction activities. The Chance Finds Procedure includes the protocol for reporting such a find and subsequent actions that should be taken, and is designed to protect, mitigate, or provide consideration for any cultural heritage artifacts that may be accidentally discovered during development or earthmoving activities.

Complaints and Grievances Mechanisms

Complaints (for community concerns) and grievances (for worker concerns) mechanisms are included below Table 7.2.

7.1.5.10 Stakeholder Engagement Plan

The Stakeholder Engagement Plan is a stand-alone document that has been developed for the Project; although it is not included as part of this repackaged ESIA, a summary of key content and engagement information from the Plan is provided in Chapter 8. The Stakeholder Engagement Plan describes how the Project has and will continue to engage with people who are affected by and/or interested in the Project, how each of the social management protocols will be communicated to stakeholders, and will include a complaints mechanism to respond to community comments and complaints. Worker complaints are handled under a separate grievance mechanism has been developed and is included in the Project's Employee Handbook. Engagement with local communities and other stakeholders has been ongoing since January 2014.

The Stakeholder Engagement Plan will capture the past engagement activities conducted by GB Group and its contractors and will describe the key results that have come from these interactions. The Stakeholder Engagement Plan also will establish the basis for how GB Group and its contractors will conduct business with the community going forward throughout construction and during operations.

The Stakeholder Engagement Plan highlights actions that will be implemented by GB Group to ensure that there is regular improvement in the stakeholder engagement program. The aim of the Stakeholder Engagement Plan is to continue to provide opportunities for stakeholders to actively participate in the Project as it progresses.

Training Programs

All employees will receive general health, safety, environmental, and social awareness training that emphasizes each employee's responsibility for complying with the relevant environmental and social laws, regulations, and commitments as well as GB Group corporate policies and standards. In addition, employees will receive safety training in programs such as hazard recognition, first aid, and cardiopulmonary resuscitation (CPR), emergency response procedures, job-specific health hazards and safe operating procedures, and legal and regulatory requirements applicable to the Project.

Initial health, safety, environment, and community training will be conducted for all new employees and with an annual refresher thereafter throughout the life of the Project. The Employee Handbook will include induction and annual refresher training specific commitments.

Employees will be provided on-the-job training for their specific job tasks and the environmental or social aspects that should be considered while undertaking such tasks. Experienced personnel will provide periodic specialized training in specific job tasks as needed on a case-by-case basis. In some instances, it may be necessary to retain specialty consultants to provide certain specialized training. On-the-job vocational and job-specific training will be handled through the Project's Vocational Mentoring Program under the Social Management Plan. The level and duration of the vocation mentoring will vary depending on specific requirements of the Project and on each apprentice's capabilities and progress.

Contractors and consultants who work at the Project and LIFZ tenants will be required to adhere to all of the HSSE policies and procedures that GB Group has committed to, throughout their tenure with the Project.

The next sections provide more detail on the following basic training areas:

- Environmental
- Social and Cross-Cultural Integration
- Occupational Health and Safety
- Vocational

Depending on Project needs, some or all of these topics may be included in the induction and refresher training courses as well as in Vocational Mentoring training programs, as appropriate.

7.1.6 Environmental Training

Managers and staff will be properly trained in the concepts of environmental conservation and prudence. Environmental training programs will review procedures for complying with regulatory requirements and focus on providing individuals assigned to environmental monitoring programs with the appropriate skills required to adequately accomplish their work. These programs will be designed to increase awareness of the need for environmental protection, pollution prevention, waste minimization and management practices, and regulatory compliance.

Training will be led by qualified personnel who may address the following topics:

- Environmental impacts and mitigation measures associated with the various phases of the Project
- Environmental monitoring programs and reporting requirements
- Specific environmental issues surrounding the Project (e.g., dredging, noise, and air quality impacts to nearby residents)
- Waste management and appropriate disposal procedures
- Response to spills and other emergency actions that may adversely affect people or the environment
- Site security expectations and procedures

Certain employees will be specially trained to collect, perform quality checks, interpret, report, and disseminate information on environmental conditions under the responsible direction of the HSE Manager. These staff will be specially trained in sampling and analytical techniques, data management and compilation methods, data interpretation processes, quality assurance and quality control (QA/QC) procedures, and reporting procedures.

The HSE Manager will develop the environmental training programs with due consideration of the training audience (e.g., environmental staff will receive more rigorous training than a new employee who will be assigned to work at the power plant). The HSE Manager will arrange for an appropriate level of environmental training to be included in the new employee induction and in annual refresher training programs for all employees, and will be responsible for maintaining records showing that all training programs include an appropriate environmental component. The HSE Manager is also responsible for assuring that that specialty training in environmental disciplines is adequately accomplished; in some cases such training may require the participation of third-party consultants with specialty expertise to supplement in-house capabilities.

7.1.7 Social Training

Certain GB employees will receive specialized training to familiarize them with GB Group's corporate commitments to the local community. This will foster proactive communications and transparency among government authorities and other Project stakeholders, including local communities. Social and community relations training programs will review the fundamental aspects of the Stakeholder Engagement Plan, the Social Management Plan, and other community issues as deemed appropriate by the HSE Manager.

As a minimum, the induction and annual refresher training programs will include a component addressing the following community relations areas:

- Social impacts and mitigation measures associated with the various phases of the Project
- Social monitoring programs and reporting requirements

- Cross-cultural differences and acceptable behaviors
- Workforce management and social “code of conduct” requirements
- Procedures for responding to community complaints and social unrest
- Effective stakeholder engagement and disclosure

Certain employees will be specially trained to deal with complaints and grievances; community and other stakeholder consultation; community training and development; and government relations. The HSE Manager is responsible for these activities and will organize specialty training in community disciplines by qualified instructors, which may include outside consultants with specialty expertise on an as-needed basis.

7.1.8 Occupational Health and Safety Training

GB Group, with and through its construction contractor, will develop a health and safety training program to address and reduce the hazards associated with Project operations. At a minimum, the health and safety training program will include:

- An initial orientation to identify the general work conditions and potential hazards of the work environment
- A summary of the local, national and other applicable legal, regulatory, and policy requirements applicable to the site
- Training to review occupational hazards, safety procedures, and information sources (e.g., Material Safety Data Sheets and warnings on barrels and containers)
- Emergency evacuation plans and escape routes
- Fire-fighting procedures and responses to emergency situations
- Health and safety hazards associated with certain tasks or assignments
- Water safety for personnel who work at the port or near the water retention pond
- First aid and CPR training for all employees
- Task-specific training for each new job assignment
- Additional training and annual refresher courses as appropriate

The HSE Manager is responsible for verifying that appropriate health and safety training is provided by qualified instructors all employees and visitors to the site. The technical content and administration of all new employee health and safety training programs and annual refresher programs is also the responsibility of the HSE Manager. The port, LIFZ, and power plant managers are responsible for providing job-specific training and safe job procedures for individual tasks assigned to employees and must provide evidence of such training to the HSE Manager for all employees in their respective areas.

7.1.9 Vocational and Career Skills Training

To be able to achieve its local hiring goals, vocational and career skills training programs will be necessary to enable job seekers from local communities to be competitive. To that end, GB Group has committed to offer vocational and career skills training in the Project region, at a centralized location convenient to local communities away from the Project site, in advance of LIFZ operations. GB Group will partner with a Haitian technical school that has demonstrated experience in providing successful vocational and career services training to adults in non-classroom settings to offer the training at minimal cost to participants. The vocational training center will be based within the community (social AOI). Participants will be selected based on passing basic tests.

Project contractors will be required to hire and train Haitians to the greatest extent possible. The steps in the Vocational and Career Skills Training program will likely include:

- Strategic labor assessments – identifying skills that meet project demand and anticipate post-construction job opportunities at the Project or with LIFZ tenants
- Careful evaluation of both technical skills and non-technical barriers to employment success that help develop customized technical and non-technical training programs
- A phased approach that provides continuous training and opportunities for interested and capable workers, including as applicable pre-vocational, classroom, on the job, and/or mentoring

- Provision of access to alternative job markets – operations, suppliers, contractors, and related industries
- Involvement of community partners or NGOs to strengthen local ownership, responsibility, and benefits

As planning advances, GB Group may consider rolling the Vocational Training Program into the Social Investment Program, as the access to vocational/technical training to Project-area residents and regionally will be a significant benefit of the Project, even without direct employment as a result.

Monitoring and Reporting Systems

The monitoring required to document the effectiveness of mitigation measures is an important element of demonstrating that the predictions made in Chapter 5 are actually being realized as the Project advances. This section gives general guidance and protocols for collecting the samples required to meet the monitoring commitments, along with guidance on sampling procedures and data management.

A key aspect of an effective management system is how well the system can efficiently accept changes that may occur in the field relative to predicted conditions and make expedient modifications to the processes in order to regularly improve the Project's health, safety, social, and environment performance. These thresholds and guidelines for corrective action are also presented in this section, but will require further development and refining as the Project database for each resource is expanded. Implementing a technically adequate sampling, analysis, interpretation, and reporting program is key to disclosing an accurate picture of Project impacts on the environment and local communities.

Monitoring will occur throughout all phases of the Project, with the aim of demonstrating:

- Compliance with relevant Haitian standards, WBG/IFC EHS Guidelines, and management commitments
- The need for any contingency investigations and/or mitigation measures if unexpected impacts are detected

- Facilitating regular improvement and best management practices
- Stakeholder engagement, stakeholder concerns, and support for the Project

GB Group is responsible for accomplishing the required monitoring and will submit required reports to the Haitian authorities as required and annually to financial institutions documenting its social and environmental performance and compliance. During construction, GB Group will require its construction contractor to accomplish some of the monitoring obligations specifically with regards to direct construction impacts; however GB Group retains ultimate responsibility for performance, regardless of the contractual relationships it may engage in with others.

The main environmental concerns during construction are:

- Compliance with ESIA commitments
- Discharges (waste, sewage, emissions) related to construction activities
- Occupational health and safety, including all contractors and subcontractors
- Community health and safety
- Influx management
- Effective local hiring practices
- Effective community relations and maintaining broad community support
- Control of air quality (fugitive dust), noise and vibration
- Protection of biodiversity
- Community complaints
- Worker grievances

Monitoring during construction will be supervised by the construction contractor. GB Group will implement sufficient program-level review as to determine that the plans and specifications implemented by the construction contractor conform to GB Group's social and environmental commitments. The main concerns during operations are:

- Influx
- Compliance with ESIA commitments and/or operating permits
- Discharges (waste, sewage, emissions, mancamp)
- Occupational health and safety
- Worker management
- Community health and safety (including influx management)
- Effective community relations and maintaining broad community support
- Non-interruption of water supplies proximate to Project area
- Control of air quality (fugitive dust), noise, and vibration

Monitoring during the operations phase will be accomplished by GB Group staff and/or its contractors. Where contractors are appointed to accomplish monitoring on GB Group's behalf, GB Group will implement sufficient program-level review analogous to those required of its construction contractor. Analogous to the construction phase, GB Group retains ultimate responsibility for social and environmental compliance during Project operations.

The monitoring programs call for specific sampling to be carried out. Where monitoring is straightforward, such as using stakeholder engagement to monitor nuisance noise or light, or noise sampling for occupational exposure levels, specific sampling is not discussed in this section. For air, water, occupational health, and social/community inputs, an outline of the sampling protocols are included. Table 7.2 (below) provides a summary of the impact-mitigating actions that have associated monitoring programs, by Project phase.

Table 7.2 – Required Impact-Mitigating Actions with Associated Monitoring, by Project Phase

	Impact-Mitigating Actions and Monitoring	Monitoring during Construction	Monitoring during Operations	Monitoring via Complaint Mechanism *
Reducing Impacts to Nearby Neighbors				
	Dust suppression	■		■

	Impact-Mitigating Actions and Monitoring	Monitoring during Construction	Monitoring during Operations	Monitoring via Complaint Mechanism *
	Emissions control and air quality monitoring	■	■	
	Nuisance odor monitoring			■
	Noise controls and monitoring	■	■	■
	Visual impact minimization			■
	Vibration controls and monitoring	■	■	■
	Waste management	■	■	■
Reducing Impacts to Area Water Resources				
	Stream flow and surface water quality monitoring	■	■	
	Stormwater runoff discharge monitoring	■	■	
	Groundwater level and quality monitoring	■	■	
	Dredging management	■	■	
	Spill response	■	■	
Promoting Biodiversity Conservation				
	Disturbed area revegetation	■		
Promoting Benefits from Project Employment				
	Preferential opportunities for local communities	■	■	
	Vocational mentoring program	■	■	
Reducing Impacts from Economic or Physical Displacement				
	Land Acquisition Policy	■	■	
Reducing Impacts to Local Communities				
	Traffic management plan and GB driver training	■	■	
	Influx management	■	■	
	Social Investment Program	■	■	
	Community safety and emergency response	■	■	

	Impact-Mitigating Actions and Monitoring	Monitoring during Construction	Monitoring during Operations	Monitoring via Complaint Mechanism *
	Vocational Training		■	■
	Community relations and public awareness	■	■	
	Small craft exclusionary zone around port	■	■	
	Aeration of water retention pond		■	
	Chance finds procedure	■		
	Stakeholder engagement, complaints mechanism monitoring	■	■	■
	Security management monitoring	■	■	■
Reducing Impacts by Promoting Worker Health and Safety				
	Occupational Noise Exposure	■		
	Occupational Dust and Air Emission Exposure	■		
	Electro-magnetic field exposure at the power plant		■	
	Water Safety	■	■	
	Tenant Manual compliance		■	■
	Human Resources Policy compliance	■	■	■
	Local Hiring Program monitoring	■	■	■
	Managing Project Wastes On Site	■	■	
	Responding to Emergencies	■	■	
	Grievance mechanism monitoring	■	■	■

* Aesthetic impacts (nuisance noise, nuisance lights, nuisance odors, etc.) will be monitored via the public complaints process. Noise will, from time to time, be sampled at Lafiteau.

This table should be viewed as a guideline; it should be modified if it is determined that specific actions either are or are not required during a particular phase of Project implementation.

Specific monitoring program commitments are included in Table 7.2 (above) – due to size, this table is included in the Tables section of this ESIA.

7.1.10 Air Monitoring

Ambient air quality was sampled at two sites (PLA1 and PLA2) in 2014 for the 2014 ESIA, after construction activities at the port had already commenced. To provide additional baseline data across the Project components covered in the current ESIA, a new sampling round was completed in May 2015 at four additional sites (AMS-1, AMS-2, AMS-3, and AMS-4) across the Project site. Due to security concerns, to date all air quality sampling has taken place on land owned by GB Group. The locations of the previous ambient air sampling locations date are shown on Figure 4.1.

Because of the proximity of some Project components to nearby neighbors, air quality monitoring locations will be sited generally downwind of the power plant at the property boundary at the closest off-site receptor. During operations, ambient air quality will be monitored quarterly for SO₂ and NO₂ and for particulate matter for a minimum of one year, to verify compliance with regulatory guidelines established in Section 2.6. The frequency and parameters in the monitoring program may be changed depending on a review of the data obtained after the first year of operational monitoring.

A program for monitoring PM₁₀ and/or PM_{2.5} will commence as part of the ongoing monitoring programs.

Continuing air quality monitoring, and any modifications to the existing program, will be addressed and justified in the Environmental Management Plan.

7.1.11 Water Resources

To support the 2014 ESIA, surface water and groundwater sampling was carried out at the locations shown on Figure 4.1. With the Project's change to a surface water-based water supply system and the inclusion of the LIFZ and power plant into the Project Description, a revision of the water resources monitoring program was

required. Surface water and groundwater monitoring locations for the completion of the construction and operations phases for the Project will be selected to provide coverage of:

- Surface water flow and field parameter measurements at the Project water intake location on the Simonette stream
- Surface water flow and field parameter measurements at the Project water intake location on the Source-Matelas stream
- Groundwater level and quality data at the installed community hand-pump wells in Lafiteau nearest to the Project boundary.

The goals of the construction and operations water monitoring programs are to verify that the Project's water take and construction and operations activities do not affect the quality or quantity of water available to nearby neighbors. Water quality sampling will occur bi-annually; surface water flow and groundwater level sampling will occur quarterly throughout the Project's life span.

Employees will be trained prior to any fieldwork. Part of that training will include field observation of water collection procedures by the HSE Manager or other appropriately trained staff.

7.1.11.1 General Surface Water Collection Procedures

Prior to water quality sampling, instruments will be assembled, calibrated, and tested before arriving at the site. All items that potentially come into contact with water at the sampling location will be pre-cleaned before arriving at the next sampling site. Continued surface water quality monitoring, and any modifications to the existing program, will be addressed and justified in the Environmental Management Plan.

7.1.11.2 General Groundwater Collection Procedures

Groundwater sampling and collection equipment will be assembled, calibrated, and tested before arriving at the sampling location. All items that potentially come into contact with groundwater will be pre-cleaned before arriving at the sampling site.

Regular groundwater quality monitoring, and any modifications to the existing program, will be addressed and justified in the Environmental Management Plan.

7.1.12 Occupational Health

Monitoring of worker exposure to airborne emissions and noise levels is an important aspect of the occupational health program. This need not be done on a repetitive basis, but it is appropriate to confirm air quality and noise levels in areas where there may be elevated levels of parameters of concern or noise due to construction or other industrial activities. These measurements should be made within the first month of facility commissioning at locations where dust, emissions, or excessive noise may be resident. Once occupational exposures are identified using routine measuring devices, signage and appropriate notification and training of employees will be accomplished to alert employees to the areas where PPE is required. The HSE Manager is responsible for identifying the locations where PPE is required; the appropriate managers at the Port, Industrial Free Zone, and power plant are responsible for providing the appropriate PPE, training in its use and operation, and requiring that it be used in the designated locations.

During construction the construction contractor will ensure that all expatriate employees arrive on site with pre-employment medicals conducted prior to deployment, with medicals conducted according to a specification set by the contractor and in agreement with GB Group.

Health records as available and work-related incidents will be monitored to assess the performance of the health and safety training program. Work-related incidents will be reviewed by the HSE Manager, in coordination with on- or off-site medical staff, as part of the health and safety monitoring program in an effort to reduce future occurrence of similar accidents.

7.1.13 Social and Community

Social program sampling to assess effectiveness of social programs will be carried out according to the programs defined in the Stakeholder Engagement Plan and the Social Management Plan. In general, social sampling must adequately profile all

affected groups, including public and private organizations and give proper weighting of inputs based on social and political boundaries, population distribution, and local customs and traditions. Due consideration must also be given to vulnerable groups including:

- Women
- Ethnic minorities
- Elderly, infirm, or disabled persons

Data Management and Interpretation

Monitoring records, data interpretation, and reporting required by Project lenders and stakeholders will be kept at the Project site for easy reference. It is the responsibility of the HSE Manager to establish a suitable data management and control system and to prepare and issue reports conforming to any regulatory, lender, and stakeholder commitments.

7.1.14 Document Control

GB Group will maintain sufficient documentation to describe the core elements of the Environmental and Social Management Plan and their interaction. The Environmental and Social Management Plan documentation will be integrated with other systems implemented by GB Group and will not necessarily be located in a single manual. Such documentation will include:

- Training records
- Permit and authorization database (where required)
- Organizational charts
- Various management plans

GB Group will establish and maintain procedures for controlling documents so that:

- Documents can be located

- Documents are periodically reviewed, revised, and accepted by appropriate management personnel
- Current versions of relevant documents are available at those locations where operations essential to the effective function of the Environmental and Social Management Plan are performed
- Obsolete documents are removed from points of use or otherwise protected against unintended use
- Any obsolete documents retained for legal and/or knowledge preservation purposes are suitably identified

All documentation will be legible, dated (with correct revision dates), readily identifiable, organized in an appropriate manner, and archived for a specified period of time. Procedures and responsibilities will be established and maintained concerning the creation and modification of the various types of documents.

7.1.15 Data Management

Existing data from baseline investigations will be incorporated into an appropriate database/s to provide a comprehensive collection of resource data for air quality, water quality and flow, groundwater quality and levels, community development program performance, and employee training records.

GB Group will supervise the integration and maintenance of the database/s and will develop methods for collecting, storing, updating, and maintaining data sets. These data sets will include geographical data as well as tabular data. The project database/s will require ongoing maintenance procedures for updates, backups, and programming.

The HSE Manager is responsible for the adequacy and accuracy of the format, additions, or updates to the database/s. This includes confirming that various types of data are converted properly and correctly entered. The HSE Manager will also be responsible for handling requests for data from Project staff, thereby controlling access to the database/s.

Database maintenance will include regularly scheduled backups of Project data sets to guard against hardware failure, software problems, or user mistakes. Few

spatial database tools have internal backup procedures; so manual backups may be required at the file system level. A copy of the system backup file will be sent offsite to a remote GB Group office at least quarterly for safe storage. This will protect the records from catastrophic accidents or incidents that could destroy site records.

7.1.16 Thresholds for Environmental Corrective Action

The threshold-levels at which corrective actions will be taken are presented in the Policy, Legal, and Regulatory Framework (Chapter 2). These thresholds are based upon general EHS guidelines and specific parameters for port and power plant operations as indicated in Chapter 2, or as in the case of the environmental media, according to data collected during the baseline evaluations. These thresholds may change over time and may be updated to conform to current regulatory guidance and standards.

Data collected during the previous baseline evaluations will be supplemented with data collected from the monitoring programs to further define and adjust threshold levels for air quality, water quality, and social impacts throughout the life of the Project. As the Project environmental and social database is expanded, alert levels should be established at reasonable levels below the threshold limits in order to facilitate pre-emptive actions prior to exceeding threshold values, based on established data trends.

The development of the environmental monitoring recommendations in Section 7.12 has taken into account natural background conditions of the areas since these influence the range of parameters and concentration limits that are relevant to each area to limit and mitigate environmental impacts from Project operations. Recommendations for monitoring social programs and community initiatives are also addressed in the Stakeholder Engagement Plan and the Social Management Plan.

GB Group will establish and maintain procedures for defining responsibility and authority for handling and investigating environmental impacts, taking action to mitigate these impacts, and initiating and completing corrective and/or preventive

actions. Any corrective or preventive action taken to mitigate impacts will be appropriate in relation to the magnitude of the impact encountered. GB Group will implement and record any changes in the documented procedures resulting from corrective and preventive actions.

In establishing and maintaining procedures for investigating and correcting the impact, GB Group will include the following basic elements:

- Identify the degree and type of impact
- Identify the cause of the impact
- Contact the appropriate authorities, as required
- Identify and implement the necessary corrective actions
- Monitor and measure to identify success of the corrective actions
- Implement or modify controls necessary to avoid repetition of the impact
- Record any changes in written procedures resulting from the corrective actions
- Document the level of corrective action performed
- Coordinate with the HSE Manager, who is responsible for public relations, as needed for transparency

Records will be kept in an easily accessible location on information regarding impacts and corrective actions.

Performance Assessment and Reporting

GB Group will develop mechanisms for appropriate internal and external reporting on Environmental and Social Management Plan performance, both routinely and in emergency situations. Standard reporting will include, but not be limited to:

- Periodic external reports on Environmental and Social Management Plan performance to GoH authorities, local communities, employees, and the media translated into French
- HSE Annual Monitoring Report to corporate owners, lenders, and stakeholders, reported in English and French

- A summary of mitigation actions taken or recommended
- Periodic reports highlighting deviations of Environmental and Social Management Plan performance from accepted standards and other issues pertaining to performance
- Timely reports for emergency and crisis situations including, but not limited to, accidents and occupational illnesses, spills, fires, and other incidents

The organization charts presented in Section 7.9 establish reporting and decision-making lines of authority for the health, safety, environment, and community safety programs. While GB Group may oblige its contractors, suppliers, and other parties who may be involved with the Project to conform to the social and environmental commitments made in the ESIA documents, the ultimate responsibility lies only with GB Group as the Project proponent to determine if mitigation measures are effective and to implement the commitments made in the ESIA documents.

The monitoring programs presented in this Environmental and Social Management Plan require both routine and non-scheduled inspections and surveys based on the parameters being monitored. A set of *pro forma* report documents will be developed and used by the HSE Manager for recording the findings.

Because HSSE programs are seconded to the construction contractor during construction, the HSE Manager will oblige the construction contractor HSE responsible manager to provide a report containing current monitoring results (and an historical summary), a synopsis of environmental issues encountered, and the effectiveness of the solutions to these issues on at least a quarterly basis. The HSE Manager will use these as the basis for GB Group's internal quarterly reports, which will also include commentary on the implementation and effectiveness of the social and environmental mitigation actions required by the Environmental and Social Management Plan. During operations, this reporting is not necessary as GB Group staff will be directly responsible for the HSSE programs.

GB Group will also prepare and submit any additional reporting which may be required by the Haitian government or Project lenders.

7.1.17 Health, Safety, Social, and Environment Annual Monitoring Report

GB Group will conduct annual internal audits of its compliance with the requirements of the Environmental and Social Management Plan and Project lenders. The responsibility for implementing these audits will lie with the HSE Manager. The HSSE Annual Monitoring Report (AMR) will reconcile the site activities and accomplishments; characterize the health, safety, social/community, and environmental program performance over the past period; and anticipate the plans and actions that will be accomplished in the forthcoming year. The HSE AMR should include a compilation of monitoring accomplished and address, but not to be limited to, the following:

- Description of significant environmental, health, and safety incidents that occurred during the reporting period
- Description of significant community issues and/or grievances that occurred during the reporting period, and their resolution status
- Summary of the significant activities accomplished and outcomes pursuant to the Action Plan to include commitments in the Stakeholder Engagement Plan and the Social Management Plan, including significant grievance issues
- Summary of the monitoring program performance relative to appropriate government and lender requirements, principles, performance standards, and WBG/IFC EHS guidelines
- Explanation of violations of any laws, administrative rules, or numeric standards that have occurred during the reporting period (if any), the cause of the violation, and the corresponding corrective measures that have been implemented, planned, or are underway to prevent recurrence
- Provision of additional relevant information which occurred during the reporting period of which government agencies and lenders should be made aware (e.g., awards and special initiatives)
- Summary of the status of permits, licenses, or other approvals that will be required or that will expire, including identification of any new permits that may be required in the coming year
- Description of changes, if any, in applicable safety, health, and environmental regulations that have affected the Project in the reporting period and any that may be implemented in the coming year

- Disclosure of material project payments to the Haitian government (such as royalties, taxes, and profit sharing), and the relevant terms of key agreements between GB Group and the GoH to assure transparency of payments

7.1.18 Change Management and Regular Improvement

GB Group is committed to the creation and implementation of programs that reduce the probability of adverse social and environmental occurrences and will implement programs that seek to improve efficiencies, effectiveness, and overall environmental performance as a logical end result of Environmental and Social Management Plan implementation. Implementing this Environmental and Social Management Plan does not by itself assure better environmental or social program performance; GB Group must establish systematic processes by which conformance with the policies, values, and directives of the system can yield consistent, predictable, and ever-improving results.

During project implementation, changes may be required to address unforeseen or unexpected conditions or situations. A change management process will be applied to allow environmental and social issues to be addressed as part of any significant changes to Project procedures, processes, design, or activities. GB Group management will be responsible for managing changes within their respective areas of responsibility throughout the life of the Project. GB Group has incorporated into this Environmental and Social Management Plan, and will have the construction contractor incorporate into its Construction HSE Plan, a change management process based on the following general steps:

- Identification of item/situation potentially requiring change
- Preparation of a Change Request Document that:
 - Outlines the nature of the item/situation requiring change
 - Outlines impacts of the change (e.g., cost, schedule, safety, operability)
 - Identifies potential biophysical, social, economic, or health concerns
- Review the Change Request Document for compatibility with GB Group's Environmental Manual and the construction contractor's HSE Plan, as applicable:

- At the task manager level for minor changes;
- By the Project Director and HSE Manager level for significant changes
- Review and approval by the environmental ministry and financial lenders (as appropriate) for significant changes
- Documentation of the approval or rejection of the change request
- Application for, and receipt of, any approvals required to effect the change under Haitian law
- Implementation of the approved change, including communication to appropriate parties concerning the nature, scope, and timing of the change
- Summary of project changes and status to be included in annual reports to Project lenders

The results of the audit and analysis of the effectiveness of the management system will be used to identify areas that require change or improvement. Identified weaknesses or shortcomings in the system will be addressed and remedial actions will be applied. GB Group, with and through its construction contractor, will review the objectives of the Environmental and Social Management Plan and will take corrective action where improvements are appropriate. The Environmental and Social Management Plan objectives may also be modified over the life of the Project to reflect changing practices, environmental laws, regulations, standards, and technologies.

Transparency

Transparency of the health, safety, social, and environmental aspects of the Project is important in maintaining public confidence. The environmental management and social programs should properly monitor and document activities and conditions to determine how these activities are affecting employees, local communities, and the receiving environment. GB Group will proactively solicit input from local communities and other interested stakeholders through the effective implementation of its stakeholder engagement program. The Project Director, in coordination with the HSE Manager, is responsible for assessing the effectiveness of the overall environmental and social management programs, including disclosure of

information to Project stakeholders. Open disclosure of revenues and taxes paid to government entities is another important part of transparency.

7.1.19 Stakeholder Engagement and Disclosure Program

The Stakeholder Engagement Plan details how GB Group has in the past and will continue in the future to engage with Project stakeholders that have the ability to affect, are affected by, or have a legitimate interest in the Project.

The Stakeholder Engagement Plan calls for a range of formal and informal consultation meetings, disclosure activities, and other engagements and media interactions with people directly affected by the Project as well as other relevant stakeholders. Activities held frequently during the early phases of the Project have established recurrent contact between GB Group, its contractors and the local communities in the vicinity of the Project site. Information materials will continue to be made available and there will be continuing interaction between community liaison teams and local communities to keep them apprised of the activities that will be occurring at the sites. Local communities will also be advised of the potential health, safety, social, and environmental impacts associated with those activities, ways to limit their exposure to potentially adverse effects, and opportunities to enhance their access to Project benefits.

7.1.20 Project Communication / Recruitment Center

GB Group has constructed a Project Communication Center located adjacent to the water retention pond on the road to Simonette. The Communication Center is designed to provide a location where people can inquire about employment opportunities, provide the Project with their skill set and contact details, ask questions and receive information about the Project, and lodge complaints.

The Communication Center is staffed by individuals from neighboring communities who are trained to respond to questions from the public and to route their concerns or complaints to the appropriate management personnel.

In-migration of potential job seekers and of those who hope to provide services to the Project and future workers is a potentially significant impact associated with the development of any large project such as the Lafito Global. The goal of influx management programs are to define points of contact for those interested in learning more about the Project and enquiring about jobs. To this end, the Project will maintain the current Project Information Center. The Project Information Center will be staffed with local residents who have been trained by Project staff to respond to the public's questions about the Project and to accept complaints in accordance with the complaints procedure outlined in the Stakeholder Engagement Plan (Chapter 8). The Project Information Center will be equipped with general information about the Project and will identify when the public can expect certain activities to occur and what the effects are expected to be during the implementation of those activities.

In addition to having trained personnel to answer questions and give information, materials that will be accessible through the Project Information Centers will include:

- Handouts giving general information on the Project and the effect it is expected to have on health, safety, social, and environment issues
- Handouts answering "frequently asked questions"
- Topical handouts that are relevant to the current status of the Project
- Results of monitoring events accomplished by the Project
- The most recent Annual Monitoring Report
- The Executive Summary of this ESIA

All of the above-listed documents, except possibly the monitoring reports, will be available at the Project Information Centers in French.

The Project Information Center will continue to handle recruiting until such time as deemed ineffectual. By centralizing all recruiting activities for the Project (including LIFZ tenants) in a single entity located within the Lafito Global footprint, the majority of in-migration may be directed to a developed area with a higher potential for handling additional influx, in comparison to the much smaller towns in

the Project's Area of Influence. The Project Information/Recruitment Center will be staffed by local residents trained by the Project's social team to respond to job enquiries, and will enter prospective job applicant's contact details and skills into a searchable database program. In addition, the Project Information/Recruitment Center will provide:

- Posted notifications of upcoming job vacancies and direct employment opportunities with the Project
- Potential indirect employment opportunities (such as food or equipment suppliers)
- Vocational mentoring and training programs
- A copy of the Project's grievances procedure

Additionally real time information on the GB Group Project is available on the Sponsor's website at www.gbgroup.com. The current 2015 ESIA document will be posted to this website, which will allow visitors to directly send/lodge comments on these documents.

7.1.21 Health, Safety and Environment Annual Monitoring Report

The HSE AMR will also serve as an important instrument to demonstrate Project transparency that will be made available to the public through the Project Communication Centers and/or on GB Group's website. The report will summarize the results of the Project's health, safety, social, and environmental programs over the past year and will present its tentative plans in these areas for the coming year. It will disclose significant health, safety, social/community and environmental incidents that occurred during the reporting period and will reconcile the performance of monitoring programs, compliance issues, and anything else that may be considered important to understanding the activities and performance of these programs. This report will be distributed to government agencies, Project lenders, and interested stakeholders as appropriate and will be posted on a GB Group-hosted web site in both French and English. The general information contained in the AMR will also be articulated to the public through the stakeholder engagement process.

7.1.22 Complaints and Grievances Mechanisms

The Stakeholder Engagement Plan developed for the Project will include the overall system for managing complaints for the Project from the general public. The complaints procedure included in the Stakeholder Engagement Plan is summarized in Section 8.2.5, and presents individual responsibilities and defines the specific procedures for filing complaints as well as the Company's procedures for addressing, disclosing, monitoring, and reporting on those complaints. Record keeping and archiving are also addressed. The aim is to register and adequately respond to all complaints that arise from the community and other affected stakeholders.

A formal grievance mechanism specifically addressing issues and grievances of Project employees has been established and is included in the Project's Employee Handbook that is presented and explained to all employees. This grievance procedure will be developed and managed by the Human Resources Manager under the responsible direction of the Project Director.

Impact-Mitigating and Monitoring Activities

Chapter 5 of this ESIA presents an analysis of the social and environmental effects that Project construction and operations will have on ecosystem components and on the human population. It also assesses the significance of those impacts on each resource media. The impact summary table (Table 5.1) compares the short- and long-term residual effects of those impacts after mitigation measures have been applied. This summary of impacts establishes the basis for prioritizing the actions presented in this Environmental and Social Management Plan.

The Environmental and Social Management Plan focuses only on those mitigation measures that require specific action items for their implementation. It presents the Level 1 actions, plans, and/or compensatory measures that are required to implement those mitigation measures in order to reduce potentially significant adverse environmental impacts to acceptable levels. For relevant impacts, reference is made to Level 2 discipline-specific plans that have been developed to manage a particular issue.

7.1.23 Summary of Key Issues and Impacts

Based on the Table 5.1 impact summary table, the following issues represent the key mitigation action items that are required to reduce Project health, safety, social, and environmental impacts to acceptable levels as well as the monitoring and reporting required to document their implementation and performance. The impacts have been grouped by significant major topic to focus the implementation efforts on actions that will:

- Reduce potential impacts to **nearby neighbors** by implementing specific safety programs; monitoring and controlling noise, dust, vibration, and emissions
- Reduce potential impacts to Project area **water resources** by controlling surface water flow and quality impacts as well as monitoring the quality and quantity of available groundwater
- Promote **biodiversity conservation** by implementing revegetation of disturbed areas with appropriate native/non-invasive and low-water-use species
- Promote Project benefits from **employment** by implementing a local hiring program and vocational mentoring for Project employees, as well as providing for the right of freedom of association and prohibition of discriminatory hiring practices for Project employees and LIFZ tenants
- Reduce potential impacts to **local communities** by promoting economic growth and diversification, controlling induced development resulting from job-seeker influx, and limiting physical hazards and the effects of social ills to the extent possible
- Reduce potential impacts to Project employees and visitors by promoting **worker health and safety** and maintaining a clean and safe work environment, limiting occupational exposure to risks, and adequately managing wastes and emergency situations

Certain action plans presented in this Environmental and Social Management Plan that implement the mitigation strategies presented in Chapter 5 will occur during both the construction and operations phases of the Project, while other action plans are phase-specific.

All site activities should be accomplished with due consideration for GB Group goals, environmental stewardship, and the health and safety of employees and nearby communities. The principles of good community relations and sustainable development are to be integrated into all activities affecting local communities.

Within each topic, monitoring programs are described and responsibilities assigned to certain management team members. A summary of all monitoring commitments presented in this section is presented in Table 7.2.

7.1.24 Reducing Impacts to Nearby Neighbors

As shown on Graphic 4.2, the Project site is located near several communities. Residents in portions of Lafiteau and Simonette are considered nearby neighbors and have the potential to be more affected by the Project due to their close proximity to Project components and site activities than people living farther from the Project site within the same or other communities. Impacts to nearby neighbors are considered to be aesthetic/nuisance impacts including impacts from:

- Fugitive dust
- Air Emissions
- Noise
- Visibility
- Vibration

Impacts to residents and surrounding communities that could pose risks to community health or safety are considered separately, in Section 7.1.29.

7.1.24.1 Fugitive Dust

Nearby neighbors will be exposed to additional fugitive dust from the Project site during construction activities particularly in the portions of Lafiteau community adjacent to the LIFZ, as there is minimal opportunity for significant dispersion between the areas of the disturbance and the nearest offsite residential receptors.

Specific Actions – Fugitive Dust

Specific fugitive dust suppression programs are currently in place for construction activities. Such programs include utilizing efficient equipment management practices to limit the number of trips required; applying gravel, water, or stabilizing agents, as appropriate to dust-generating surfaces; and limiting traffic speed. The dust suppression programs should provide adequate equipment and staff capacity with specific directives and/or Level 3 SSPs, which may include but not be limited to:

- Which areas staff are responsible for and how often water or other controls must be applied to each area
- What to do if changes need to be made to their instructions
- Special provisions for dust suppression during dredge spoil movement or other major earthmoving activities

Excessive speed on non-surfaced roads will result in additional dust liberation if not adequately controlled. Limiting speed over un-surfaced roadways can reduce the airborne particulate generated. GB Group will establish and enforce Project safety rules, including the posting and enforcement of speed limits across the site during construction and limiting off-road travel to the maximum practical extent.

At the completion of construction, any remaining disturbed areas will be revegetated to control the generation of fugitive dust. Project roads and parking areas will be paved or hard-surfaced (gravel, etc.) to further reduce the potential for dust generation during operations.

Monitoring – Fugitive Dust

Quarterly throughout construction activities, GB Group will use a portable PM₁₀ or PM_{2.5} sampler to monitor respirable particles on all sides of the Project to estimate the respirable dust reaching local residents. PM₁₀ or PM_{2.5} sampling may be conducted in conjunction with settleable dust monitoring to determine correlations if appropriate.

Maintaining adequate fugitive dust control is the responsibility of the Construction contractor. The HSE Manager is responsible for air quality and dust monitoring,

recordkeeping, and reporting as well as for the stakeholder engagement process, which will provide feedback on the effectiveness of the air quality and dust control programs for the Project.

7.1.24.2 Air Emissions

As part of this ESIA repackaging effort, an emissions dispersion model was developed and run to estimate potential impacts from the power plant operation. The modeling effort included:

- Collection of supplemental baseline particulate, SO₂, and NO₂ air quality data
- An air dispersion model discussion
- Compliance of power plant emissions with good international industry practice for power plants
- Recommendations for emissions control and operational monitoring

Specific Actions – Air Emissions

Based on preliminary emissions modeling results, the Project has incorporated certain engineering and supply measures into the Project design to reduce emissions from the power plant, including increasing stack height and using 1% sulfur HFO fuel.

Monitoring – Air Emissions

SO₂ emissions will be measured on a quarterly basis for the first year of power plant operations to determine compliance with IFC General EHS and thermal power plant air quality and emissions guidelines (pages 47, 50). After the first year, results will be reviewed and the frequency of the monitoring program may be scaled back as warranted. Air quality will be monitored at the property boundary between the power plant and the nearest downwind offsite receptor.

7.1.24.3 Nuisance Odors

If not managed correctly and disposed of promptly, Project wastes can be a source of nuisance odors to Project employees and nearby neighbors. In particular, organic/food wastes and byproducts of the package wastewater treatment plants have the potential to generate nuisance odors.

Specific Actions – Nuisance Odors

The Project's Waste Management and Disposal Plan will provide specific guidance for reduction, management, and disposal of all waste types likely to be generated at the Project, including those with the potential to generate nuisance odors. The HSE Manager will be responsible for verifying that Project wastes are collected, stored, managed, and disposed of in a timely and environmentally protective manner, in accordance with the guidance provided by the Waste Management and Disposal Plan.

Monitoring – Nuisance Odors

Since nuisance odors do not pose any health-related risks to human health, the Project's complaints and grievances mechanisms will be used to monitor for any odor-related issues. The HSE Manager will be responsible for investigating and responding to any odor-related issues that arise.

7.1.24.4 Noise

Impacts associated with increased noise from the Project during construction and operations will be most significant to the nearby neighbors of the Project. Nuisance noise is expected to be more significant in the LIFZ area since the port and power plant are situated in close proximity to existing industries (See Graphic 4.47) in Lafiteau. Construction and operations activities at the Project are generally confined to daytime hours, however the schedule for vessel arrivals is not solely dictated by the Project, thus during operations vessels may arrive at the port during the nighttime and require unloading. Noise will increase over baseline conditions across the Project site during both construction and operations, but is more likely to be attenuated by the operation of other nearby industrial facilities and community activities in the port area. Monitoring of aesthetic impacts including

noise will be managed through stakeholder engagement, including the Project-wide complaints process, detailed in the Stakeholder Engagement Plan.

General construction activities and some operations activities are expected to result in elevated noise at levels that may be a public nuisance or may potentially exceed international guidelines.

Specific Actions - Noise

Chapter 5 calls for mitigation measures that may include sound-attenuating devices (e.g., earthen berms, dense vegetation lines) positioned between the industrial areas and key receptors. The Project will also have a 4 m (12') concrete wall around its landward perimeter which will help serve as a noise barrier. These sound-attenuating devices will also limit visual and nuisance light impacts as well. Sound control and noise enclosures will be included on high noise equipment, including the power plant engine hall. Additional actions to mitigate sound impacts to nearby neighbors will be developed as needed through actions and/or procedures, which may include, but will not be limited to:

- To the extent possible, scheduling transportation activities that involve increased noise levels (such as ship loading/unloading and truck loading/unloading) with due consideration for local community quiet times
- Maintaining equipment in good repair
- Limiting activities that involve extraordinary noise during nighttime and quiet times (e.g., pile-driving, articulating mobile equipment in close proximity to residences that would only periodically activate back-up alarms)

Monitoring - Noise

Project-related noise will be similar to other port, manufacturing, and power generation projects of this magnitude. Nuisance noise will best be monitored through the complaints process of the Stakeholder Engagement Plan, which is the administrative responsibility of the HSE Manager. When valid complaints are identified, the HSE Manager is responsible for the noise data collection procedure for Lafiteau, conducting noise surveys, providing for the implementation of noise

controls, and devising additional mitigation measures to address complaints as appropriate.

7.1.24.5 Visibility

The Project will be visible to nearby neighbors. During daylight hours, port, power plant, and LIFZ infrastructure will be visible from certain vantage points, as will vehicle traffic in the Project area and on Project roads. The baseline conditions suggest that houses in the Project area do not have full-time access to electricity so nighttime lights are not a normal visual occurrence in this area. Lafiteau residents are familiar with nighttime light given the electrification of the LMH and Haiti Broilers operations and Source-Matelas residents are familiar with nighttime light from the CINA plant. Although Project lights will be most obvious in the port and LIFZ area, mobile equipment working in across the Project site and Project vehicles operating on access and are also potential light sources. Security lighting at night will be visible at port and the LIFZ to nearby neighbors and possibly to surrounding communities, from certain vantage points. When vessels arrive at the port during nighttime hours, increased lighting will be present to assure safe working conditions at the port.

Specific Actions - Visibility

The concrete perimeter wall that will enclose the landward components of the Project will also serve to block the line of sight between nearby residents and the LIFZ infrastructure, and to partially block views of the port and power plant installations. To the extent possible, Project operations will be confined to daytime hours, and nighttime lighting will be restricted to the amount necessary to ensure Project security and to provide safe working conditions for Project employees. Lights on infrastructure in the Project area will be directed toward specific areas and away from offsite receptors to the extent practical. These mitigation measures should serve to also mitigate nuisance light impacts; therefore, no additional mitigation is anticipated.

Monitoring - Visibility

No specific monitoring program is planned. The complaints process included in the Stakeholder Engagement Plan will serve to detect local concerns with Project

visibility and nuisance light. The HSE Manager is responsible for implementing modifications and/or improvement of light controls in the event that nuisance light is a significant public concern.

7.1.24.6 Vibration

Nuisance impacts from vibration may be experienced by local residents along the main access route to the Project as a result of increases in heavy truck traffic. Nearby neighbors adjacent to the property boundary may also experience increases in nuisance vibration during construction activities and Project operations. The LIFZ is designed for light industrial/manufacturing activities such as garment manufacturing and as such is not considered to be a likely source of nuisance vibration during operations.

Specific Actions - Vibration

The infrastructure and foundations for major equipment with the potential to generate vibration (e.g., generators) have been designed to include vibration damping. Truck traffic to and from the Project will be restricted to operational (daytime) hours to the extent practical to reduce the potential for nuisance vibration to residents along Project access roads. The Traffic Management Plan will include driver training and the imposition and enforcement of appropriate speed limits for Project vehicles in and around the Project site.

Monitoring - Vibration

The Stakeholder Engagement Plan's complaints process will be the primary method for collecting and assessing any nuisance vibration impacts to nearby neighbors and residents; no specific monitoring is currently considered necessary. The HSE Manager has the responsibility for addressing any nuisance vibration complaints.

7.1.25 Reducing Impacts to Area Water Resources

Project operational activities involve water diversion, power generation, and stormwater management activities, all of which have the potential to affect area water resources. The Project's operational water supply will come from the streams

running through the communities of Simonette and Source-Matelas; non-contact seawater used in the low-temperature cooling system for the power plant will be returned to the sea, and stormwater and runoff from the Project's stormwater management system will also be discharged to the sea. The Project will reduce the total quantity of surface water available to any downstream users but will improve the usable quantity by improving retention of the Simonette streamflow in the community. At the power plant tank farm and across the Project site, accidental spills of chemicals, fuels, or product may affect receiving water quality.

7.1.25.1 Surface Water Flows and Quality

The Project will pump water from small impoundments located on nearby streams in Simonette and downstream of Source-Matelas. At Simonette, the stream flows through the middle of the community and is currently impounded in two areas: an informally constructed concrete low-head dam has been installed where the main road through the community crosses the stream (via a bridge that is currently severely undermined by water erosion), and approximately 500 meters upstream via an informal stick and pike low-head dam. The intent of both of these existing structures is to slow stream flow sufficiently to maintain a flow of water to the various diversion ditches that have been dug from the stream leading to fields and homes. Water flows year-round through the dams and to the sea. Due to the drop of the stream bed relative to the land surface downstream of the concrete low-head dam, there are currently no surface water diversions between the Project's planned surface water intake point at the dam and the stream's outlet at the sea.

About 1.5 km downstream of Source-Matelas, CINA has constructed a concrete-lined holding tank upstream of a small low-head dam on the local stream. CINA pipes water from the holding tank to its operations for water supply. Excess water flows through a pipe out the bottom of the dam or overtops it during storm events and flows another 400 m or so to the sea. The Project has entered into negotiations with CINA to pump water from the stream immediately downstream of the holding tank's outlet, to the water retention pond at the Project site. At this point in its course, the Source-Matelas stream has cut deeply into the land surface, thus there are currently no surface diversions downstream of the Project's proposed water intake site on the Source-Matelas stream.

Specific Actions – Surface Water

GB Group has measured surface water flow on the Simonette and Source-Matelas streams using a portable V-notch weir periodically between December 2013 and March 2015 (Table 4.5). This information is useful for providing a general overview of streamflow conditions, but is not sufficient to quantify impacts to surface water resources from Project water withdrawal. Similarly, no water balance has been created for the Project to verify that the streams will be able to provide for ecological flow, current and reasonably foreseeable future community water users, and Project needs.

Based on GB Group's streamflow calculations and on internal projections for Project water use, the Project estimates that impacts to surface water users in the two communities will be minimal. In exchange for the removal of up to 50% of point flow of water from the Simonette stream, GB Group has negotiated with community leaders to provide an engineered replacement concrete low-head dam at the bridge crossing and to upgrade the informal stake dam farther upstream. In addition, GB Group as part of its Social Investment Program will install a solar-operated water purification system inside its pump house on the Simonette stream. Water spigots will be located on the outside of the pump house for free community supply and usage. Community leaders in Simonette are responsible for the allocation of the purified water to residents. The water intake pumps on both streams will be fitted with automatic cut-off switches that will prevent the pumping systems from over-drawing from the streams.

Prior to commencing LIFZ operation, the Project will contract with a qualified hydrological engineering contractor that has demonstrated experience in surface water resources calculations, development of water balances for similar-sized projects, and in analysis of impacts and formulation of mitigation measures to conform with GIIP and the IFC Performance Standards. This work will be done prior to Project operations, to verify that the surface water sources selected by the Project can support Project operations, ecosystem services, and provisional services including maintenance of base flow during drought years and ability to continue to support community and other water users. Water balance calculations will include at a minimum consideration of the following:

- Forecast full operations employment figures for both GB Group direct employees and LIFZ tenants, at full LIFZ occupancy
- On-site residents living in the mancamp during operations
- GIIP and industry benchmarks for daily water use for employees and mancamp residents
- Other Project freshwater needs, such as fire water and high-temperature cooling system charging
- Current and reasonably foreseeable community water usage of both the Simonette and Source-Matelas streams
- CINA current and projected water use of the Source-Matelas stream
- Amount of time required for first-fill of the water retention pond, and seasonal timing of the fill to reduce impacts to surface water resources and users and maximize input from precipitation and run-on

Based on the results of the hydrological assessment and water balance calculations, impacts and mitigation measures for surface water resources may need to be reassessed.

Monitoring – Surface Water

To assess the impact of surface water diversion on local water users, GB Group will monitor surface water flow downstream from the water intakes on the Simonette and Source-Matelas streams. The HSE Manager is responsible for regularly inspecting and maintaining the pumping facilities on both streams in good working order. The HSE Manager will also be responsible for the maintenance and operational upkeep of the water purification system for the community that GB Group will install in its pump house in Simonette. The HSE Manager will coordinate with a qualified technical expert to assess the integrity of the replacement low-head dams constructed by the Project on the Simonette stream annually and after any significant storm or seismic event. Any potential risks to community safety identified by these inspections will be immediately brought to the attention of the Project Director and relevant community leaders for immediate attention and to determine subsequent actions. The results of these inspections will be included in the HSE AMR.

The HSE Manager is responsible for surface water monitoring and reporting.

GB Group has scheduled the filling of the water retention pond to occur in a single season and will prioritize the filling of the water retention pond during the wet season to take advantage of the excess runoff that occurs during this period.

The Environmental Management Plan will include location-specific programs for surface water and groundwater monitoring (Figures 7.1 and 7.2). These programs will be based on the baseline data collected for the 2014 ESIA and on the streamflow data collected by GB Group (Section 4.1.6) and will carry forward the monitoring schemes through the remainder of the construction and into the operations phases of the Project. These monitoring programs will aim to document the quantity of surface water and quality and quantity of groundwater resources proximate to specific Project components over the life of the Project. The Spill Prevention and Response Plan will establish the framework and procedures for responding to spills and emergency events and for limiting the extent of the impact should spills and incidents occur, such as when refueling the pumps located at either water intake.

To establish the seasonal variation in surface water flow, monitoring will occur on a regular basis as presented in Table 7.3 and will include measurement of flow along with typical field parameters including pH, total dissolved solids, and conductivity.

The HSE Manager is responsible for the water quality and quantity monitoring program and must commence with disclosure of the water abstraction plans to local stakeholders and collaboratively develop mitigation measures for water supply impacts that will be acceptable to the downstream water users, should such impacts be determined to be of concern to Simonette and the Source-Matelas/St. Gerard communities. The HSE Manager, in cooperation with the Project Director, is responsible for providing appropriate mitigation measures in the event that a community water supply is interrupted.

7.1.25.2 Stormwater Runoff and Discharge

Project components and activities have the potential to affect the quality of seawater via discharge from the Project's stormwater management system. Any sort of land-disturbing activity will typically increase erosion and sediment carried by runoff and as such, appropriate sedimentation control measures must be implemented to limit sediment contribution to receiving waters. The Project's stormwater management system includes drainage ditches and stilling basins to capture and control stormwater and sediment, with eventual discharge to the sea along a rip-rapped concrete canal on the ports northwestern side (Figure 3.3).

Specific Actions – Stormwater

Facilities will be properly engineered to limit the potential for erosion and soil loss. Project roads and operational and parking areas will be paved or covered in a suitable hard surface (gravel, etc) to reduce fugitive dust and erosional runoff. Any disturbed areas remaining at the end of construction will be revegetated to limit the potential for erosion. The Environmental Management Plan will address all aspects of site water management. Sediment control structures will be constructed downgradient from major Project components. The operation and cleanout of the sediment control structures will be defined in project procedures may address the following:

- The maintenance of site drainage structures (e.g., culverts, ditches, bridges) in good working order
- The functionality of the inlet and discharge structures
- Cleanout procedures and appropriate sediment disposal locations and a schedule for those activities
- The use of temporary sediment controls to improve removal performance as needed, including temporary sediment basins, vegetation filters, silt fences, straw bales, gabions, and rock filter dams
- Procedures for redirecting sediment pond discharge to mitigate upset conditions

Monitoring - Stormwater

Water from stormwater management system will be routed to a partially open canal running along the front of the port, where it will mix with heated seawater from the power plant's low-temperature cooling return system, prior to discharge into the sea at the end of an open rip-rapped canal. Because the system only captures natural runoff water and non-contact cooling return water, discharges from the canal stormwater management canal will only be monitored for pH, conductivity and total suspended solids (TSS) on a quarterly basis.

In the event that the pH is found to be greater than 9, less than 6, or the total suspended solids (TSS) exceeds 50 mg/L, the HSE Manager will cause the discharge to cease and investigate the upset condition. The HSE Manager and the port, LIFZ, and power plant area managers are responsible for sedimentation control structures at the site. The HSE Manager is responsible for monitoring and reporting of monitoring results.

7.1.25.3 Groundwater

The Project will not utilize groundwater resources for any of its water supply needs. However, groundwater is the main source of domestic water for the residents of Lafiteau, which has no surface water resources. Lafiteau residents use hand pumps to extract shallow groundwater from a series of wells located across the community.

Specific Actions - Groundwater

Groundwater will not be used by the Project, and any potential impacts to groundwater resources are expected to be confined to accidental spills or discharges that will be handled as per the procedures in the Spill Prevention and Response Plan. To protect groundwater resources for local residents, GB Group will conduct periodic monitoring of groundwater levels and quality in community wells nearest to the Project, and will work with local groundwater water users through the stakeholder engagement process to determine if local wells are being adversely affected by Project activities. In the event that well productivity in nearby communities is adversely affected, follow-up actions may include:

- Drilling and completing new individual or community groundwater wells in a different/deeper aquifer that is not affected by Project activities
- Supplying a community water holding and distribution system if a community system is compromised
- Providing alternative consideration for interrupted water supplies

Specific implementation plans for assessing the Project effects on local groundwater will be included in the Environmental Management Plan.

Monitoring - Groundwater

The Environmental Management Plan will include location-specific programs for both surface water and groundwater monitoring at the Project, including monitoring of the leak detection system at the power plant tank farm. These programs will tier off the baseline data collected as part of the previous data collection efforts (Section 4.1.6) and carry forward the monitoring schemes through the construction and operations phases of the Project. These monitoring programs will aim to document the quality and quantity of surface water and groundwater resources proximate to specific Project components over the life of the Project.

Lafiteau relies on existing hand-pump groundwater wells to provide for the community's domestic water needs. Periodically throughout construction and operations, GB Group will monitor community groundwater wells adjoining or in close proximity to the Project site, to assess the effect that Project activities may have on groundwater resources. It is expected that such monitoring will be for contingency and reporting purposes only. GB Group will monitor the water level (if present) and field parameters for pH and conductivity, and groundwater quality in these wells as will be defined in the Environmental Management Plan. Groundwater monitoring, data interpretation, and reporting are the responsibility of the HSE Manager.

7.1.25.4 Dredging

Dredging to deepen the quay area of the port is currently in progress as a construction activity. Once the appropriate depth has been reached, periodic dredging of the quay area will be required to maintain a depth sufficient to allow fully laden Panamax-class vessels to remain afloat at berth at low tide. This dredging will occur on an as-needed basis, but is expected to be a relatively infrequent activity over the course of the Project's life.

Specific Actions - Dredging

Dredging activities will require planning for the placement and disposal of dredged solids. To this end, GB Group has developed and will continue to refine a Level 2 Dredging Management Plan. The plan may include, but is not limited to, the following elements:

- Dredging procedures
- Placement procedures for dredged materials
- Frequency and timing of dredging events relative to its potential to affect the marine and coastal ecosystems
- Controls for limiting suspended solids in the dredging area to the extent practical
- Emergency response protocols
- Water safety protocols

Due to the significant depth farther offshore in the immediate port area, maintenance dredging is considered to be an occasional activity only, throughout the Project life. Should new dredging activities be required to support GB Group Project activities, GB Group will engage a qualified independent consultant to conduct a rapid assessment of potential effects from the proposed new dredging activities on coastal resources including mangroves and on the marine ecosystem during the feasibility and planning stages for the activities. Mitigation and monitoring commitments resulting from such a new dredging assessment will be incorporated into the Dredging Management Plan and elsewhere in the Environmental and Social Management Plan as appropriate.

Monitoring – Dredging

Dredging activities are the responsibility of the port manager. Monitoring of dredging events will be defined in the Dredging Management Plan and will be the responsibility of the HSE Manager.

7.1.26 Promoting Biodiversity Conservation

The Project is being developed in an area considered to have a low and previously impacted biodiversity. Previous land uses and regional and historic anthropogenic disturbances have combined to produce cumulative impacts to biodiversity and biological resources in the Project area, including high sediment loads on coral reefs offshore and denudation and introduction of invasive/nuisance flora species on the Project land.

Any areas that were disturbed by construction activities (e.g., vegetation and topsoil stripping, levelling and grading) that remain open at the end of construction have the potential to erode via wind and rain. If left uncovered over the long-term, these areas will be sources of fugitive dust and sediment loading to the environment.

Specific Actions– Disturbed Area Revegetation

At the end of construction, any remaining disturbed areas will be revegetated with a mix of non-invasive plant species either via seeding, direct transplantation, or a combination of both methods. Preference should be given to native and low-water demand species that are adapted to the Project area climate and coastal location. Revegetated areas will be irrigated with treated wastewater from the Project's wastewater treatment system as necessary until well-established, then on a regular basis sufficient to promote plant growth. The HSE Manager will supervise revegetation efforts and periodic monitoring of revegetated areas until the new plants are well-established. A summary of the revegetation program will be included in the HSE AMR.

Monitoring – Disturbed Area Revegetation

Once established, no further monitoring of revegetated areas will be required. The HSE Manager will be responsible for revegetation activities, follow-up monitoring, and reporting of program outcome.

7.1.27 Promoting Benefits from Project Employment

The creation of new jobs is the primary benefit of the Project, and is expected to have a significantly positive impact on the local and regional economies.

7.1.27.1 Preferential Local Hiring

The Local Hiring Program component of the Project's Social Management Plan addresses GB Group's commitment to offer employment and training programs that preferentially benefit nearby local communities. The program includes preferential access to training opportunities, recruitment, and employment.

Specific Actions – Preferential Local Hiring

As its name implies, the Project's Local Hiring Program promotes the hiring of people from the communities nearest to the Project, with secondary emphasis on regional communities, followed by Haitian nationals from other parts of the country.

Currently the Project is following a semi-formalized hiring procedure based on the presentation of a paper copy of an applicant's curriculum vitae to the staff at the Project Communications Center. Applicants who do not possess a paper CV are not assisted by the Communications Center staff. Job opportunities are publicized informally via communications to community leaders, published in the paper or disclosed at the request of an applicant at the Communications Center.

As part of the Social Management Plan commitments in this ESIA, GB Group will formalize the application process to provide equal and fair access to all interested applicants, and will provide additional support to people as needed as they submit their application. A suggested standardized procedure may include, but not be limited to, the following steps:

- Communication Center staff will post a description of all current and reasonably foreseeable job openings, in locally appropriate languages
- Job openings will also be communicated to the public via the Project's stakeholder engagement and community participation program, to increase local awareness of current and upcoming hiring opportunities
- Applications for employment will only be accepted by staff at the Project Communications Center; any job seekers who approach Project staff or contractors will be referred to the Communications Center for attention
- Communications Center staff will enter each applicant's contact details (name, phone number, community, and skill set) into a Project employment database
- Local applicants will be screened to verify that they are resident within the local communities
- Project employment needs will be cross-referenced with the employment database to provide a list of potential employees for all positions; priority consideration will be given to applicants living in the Project's zone of direct social influence, followed by residents of Cabaret Commune, followed by other Haitian nationals
- To extend the benefits of Project employment to the maximum amount of people, the employment database will also track employment history at the Project (for example, number of times someone was employed as a day laborer)
- Job seekers will be informed of GB Group's non-discrimination policy based on sex, age, marital status, religion, race, ethnicity, sexual orientation

The standardized application process will be included as part of the Local Hiring Program. Local recruitment will be facilitated by the Project-created employment database containing relevant information on people from the local area.

GB Group will also facilitate local hiring by making available to contractors and sub-contractors a list from the database showing the available workers of the concerned communities and of the general affected zones. For all semi-skilled or specialized jobs, contractors and sub-contractors will test the candidates for competence to determine if they are qualified, as well as to prove to the population and authorities that chosen candidates were selected through an objective, equitable, and

transparent process. The representative responsible for community relations will be advised in advance of the testing and will monitor the process. The Human Resources Manager will keep a record of all testing and results.

Employment recruitment will take place at the Project's Information / Recruitment Center; job employment opportunities will be advertised through the Project Information Centers via standard employment sources (such as the newspaper and internet). Special recruitment methods that consider the ways information is best delivered to Haitians both locally and nationally will be designed to make all Haitians aware of the scope, nature, and requirements of Project employment opportunities. The information campaign is also designed to deliver this information in suitable languages and formats. These measures are intended to limit influx of people looking for jobs and to prevent harm to work progress, applicants, and communities.

GB Group and/or its contractors may not ask for or accept any amount of money or other gratification from people to pass or bypass a competence test or to be employed. Also, GB Group will organize regular liaison workshops for contractors and sub-contractors, with the objective of keeping them informed on the social situation in the Project zone and to supply employment and other information.

Monitoring – Preferential Local Hiring

The Human Resources Manager is responsible for monitoring recruitment and employment practices, including recruitment and selection processes and the number of people employed from different geographic areas. The policies and procedures established in the Social Management Plan will be monitored by the Project social team to ensure internal and contractor compliance. The Project will also track direct and indirect employment numbers disaggregated by gender, by skill level, and by country/area of origin.

7.1.27.2 Vocational Mentoring Program

To realize the vision of a safe, successful Project operated by a large, competent, trained, and efficient Haitian workforce, GB Group will implement a robust training development program.

Specific Actions – Vocational Mentoring Program

GB Group has implemented a worker vocational mentoring program, administered by construction supervisors with the assistance of the HSE Manager and the appropriate department managers that delivers technical (craft, administrative, and technical) and non-technical training and support (such as work ethic and culture) to meet project construction needs. The program will also prepare some of the workers for operations jobs and help others gain employment elsewhere.

As the Project transitions out of construction and begins gearing up for LIFZ operations and client occupancy, GB Group will re-evaluate the goals and structure of the Vocational Mentoring Program to determine if the program will continue to provide unique training and skills development opportunities to employees, or whether the mentoring training overlaps with the vocational and career skills training offered off-site by the Project and its Haitian technical school partner.

Monitoring – Vocational Mentoring Program

GB Group will apply outcomes-based evaluation of the Vocational Mentoring Program, focusing on skill acquisition and participation and successful completion of the program. Key performance indicators may include, but not be limited to:

- Number of skills acquired
- Number of apprentices enrolled in/completing the program
- Number of local-local labor personnel recruited, retained, and promoted
- Ability of individuals enrolled in the program to translate skills to other Haitians (peer mentoring)

7.1.28 Reducing Impacts from Economic or Physical Displacement

Loss of income associated with the loss of traditional livelihoods, loss of access to agricultural land, or loss of livestock to vehicle collisions can be a direct outcome and significant impact associated with Project development for local communities. To date, no economic or physical displacement impacts have been identified as a result of the current status of the Project's construction or from land acquisition of

the property boundary shown in Figure 3.1a. A Land Acquisition Policy will be developed for this ESIA prior to the start of operations Power Plant and/or LIFZ to assure that a minimum framework policy is in place to address any economic or physical displacement issues and impacts that arise in the future, from additional land acquisition or from construction and development of any future Project expansions.

Specific Actions – Land Acquisition Policy

The Land Acquisition Policy will provide specific guidance for review of land acquisition activities to determine their potential to impact livelihoods in advance of acquisition, as well as guidelines for follow-up actions should such impacts be identified. The Land Acquisition Policy will be applicable to displaced persons (if any) affected permanently or temporarily as a result of the construction or operation of the future phases of the Project (Power Plant, Free Zone, etc), including those living or conducting livelihood activities on land and those conducting livelihood activities in the nearshore marine environment.

Monitoring – Land Acquisition Policy

To ensure that potentially affected and displaced persons have avenues for raising complaints relating to land acquisition, relocation, impacts on livelihoods, construction-related damages, or other aspects of project implementation, a multi-step complaints procedure will be established by GBG as part of the Project's Stakeholder Engagement Plan. The key features of the complaints procedure are:

- Any person may lodge a complaint in the Project's complaints system; complaints will be stored in a database
- Complaints will be managed in accordance with GB Group procedures and guidelines
- Any person aggrieved by any aspect of the land acquisition or resettlement process can lodge an oral or written grievance to GB Group.
- Complaints shall be appropriately documented and registered and if the complaint cannot be resolved within 30 days of receipt, it will advance to the second stage of the process

- If the aggrieved person is not satisfied with the outcome of the initial stage consideration, or if local-level review is unable to reach a proposed solution, the aggrieved person can refer the issue to a complaints committee established by GB Group
- The complaints committee will review issues raised by the initial complaint and any actions for resolution suggested at the lower level and will make recommendations for resolution within 30 days of committee review
- If the aggrieved person is still dissatisfied following review by the complaints committee, the case may be referred to legal proceedings in accordance with Haitian laws and procedures
- GB Group will keep a record of all complaints referred to the complaints committee, including a description of issues raised and the outcome of the review process

The mechanism for receiving and managing potential complaints from any future physical or economic displacement impacts will be prepared and implemented in accordance with the key requirements of IFC PS1.

7.1.29 Reducing Impacts to Local Communities

GB Group aims to establish and maintain sound community relations with its host communities through effective stakeholder engagement and awareness activities, and by seeking to reduce potential impacts to local communities to the extent possible. GB Group recognizes that contributing to and assisting in local community initiatives and promoting community well-being is not only part of a company's social responsibility, it is essential to complying with the company's General Business Principles (Appendix A). The Project seeks to enhance Project benefits and reduce potentially adverse impacts to local communities by:

- Establishing and implementing GB driver training and community traffic safety awareness programs
- Managing the influx of job seekers
- Supporting community development programs through established and defined social investment initiatives
- Providing procedures and plans for notifying communities in the advent of an emergency at the Project that could affect community health or safety

- Establishing effective community relations and public awareness programs that are interactive, transparent, monitored, and regularly improved
- Establishing and enforcing a small-craft exclusionary zone around the port to protect artisanal fishermen
- Reducing the potential for water-borne disease at the water retention pond
- Establishing a chance finds procedure for cultural artifacts or human remains
- HIV/AIDS and communicable diseases awareness campaigns and education

Initiatives associated with each of the areas are included in the Project's Social Management Plan and further developed in the following sections.

7.1.29.1 Traffic Hazards

Project development will result in an increase in vehicle traffic on local access corridors. In particular, the frequency of traffic passing by residents who live at the major points of Project access will increase. Road traffic will increase as a result of employee traffic as well as the additional materials, supplies, and vendor traffic that will come to and from the Project.

Specific Actions – Traffic Hazards

To limit the potential for vehicle collisions and traffic accidents involving pedestrians and free-ranging livestock, GB Group will develop a Traffic Management Plan that aims to limit health and safety risks that are posed by increased road traffic from the Project. Procedures will also be developed as needed. Implementation and enforcement of procedures may include, but are not limited to:

- Installing dedicated pedestrian access/lanes along main Project access roads for local employees without vehicle access and for local residents travelling between communities
- Enforcing all local and national traffic laws, especially regarding traffic speed, and/or other safety standards
- Implementing appropriate speed limits for travel on Project roads and offsite by vehicles on Project-related business

- Requiring that GB drivers are suitably qualified to operate the vehicle to which they are assigned and that they possess a valid driver's license
- Providing additional training in safe and defensive driving for all drivers
- Scheduling deliveries of materials and supplies during daytime and low-traffic periods as is reasonable and practical
- Scheduling deliveries of any dangerous materials during low usage hours
- Providing road traffic safety training to local residents as part of the stakeholder engagement process
- Using pilot cars or other warning systems when prior warning of traffic hazards is appropriate
- Providing signage regarding large trucks and public information regarding traffic patterns and safety issues

The Traffic Management Plan will also address the management of temporary diversions that may be required to local transport routes. GB Group and its contractors will identify road diversions required in advance of road closures. Community liaison teams will consult with communities about access restrictions and will inform them at least 3 days in advance. Diversions will be properly signposted and alternate routes will always be available. Where road or access routes cross the Project areas, the responsible contractor will be required to provide and maintain safe diversions, temporary bridges, traffic controls, barricades, signs, and warning lights as may be required.

Monitoring – Traffic Hazards

The HSE Manager will be responsible for keeping track of the incidence and locations of all road traffic incidents involving GB Group staff and/or its contractors and suppliers, and its rail and road equipment. This information should be used to identify high-risk areas and facilitate changes to traffic patterns, speeds, or other considerations within the Project area and, if offsite, in cooperation with local traffic authorities. GB Group will prepare an Emergency Response Plan that defines the information that must be recorded and reported as a result of any traffic accident involving Project vehicles, and any traffic incidents involving pedestrians or free-ranging livestock. The HSE Manager will be responsible for all record-keeping, and if an employee is involved with such accidents, will also provide accident records to

the Human Resources Manager for inclusion into the employee's file.

Monitoring of the traffic safety performance and its impacts on nearby neighbors will also be accomplished through the stakeholder engagement program, under the leadership and responsibility of the HSE Manager. Adjustments to the Traffic Management Plan will be made as needed based on the issues identified through accident monitoring and this consultative process. A program that addresses traffic safety awareness related to the Project will be conducted with local communities through stakeholder engagement.

7.1.29.2 Influx Management

At full occupancy of the LIFZ, the Project is expected to bring large numbers of external workers into the Project area. This employment demand is likely to attract sizeable numbers of people from other areas of Haiti who are looking for Project employment and other Project-related income opportunities. GB Group recognizes that unmanaged influx – both of workers and opportunistic in-migrants – can have significant adverse impact, including:

- Decrease in the standard of living for local residents caused by increased pressure on local resources, price inflation for subsistence items, and stress on existing land and infrastructure (water, utilities, sewage systems, roads and transportation, land, schools, medical facilities, recreational and religious facilities)
- Increase in social problems, such as prostitution, increased drug use and alcohol consumption, spread of sexually transmitted and other communicable diseases, conflict, violence, sexual harassment, rape, divorce, and domestic violence
- Growth of informal settlements with no adequate source of sanitation or water, thus contributing to the spread of disease
- Social tension due to differences in cultural customs and norms

The GoH, in principle, has the responsibility to manage its population movements, but from a practical perspective may lack the experience or capacity at this time to adequately prevent or manage influx on its own. Consequently, GB Group will perform specific actions (below) along with supporting local Government to take

actions that will help to limit and/or control opportunistic in-migration, as well as manage adverse impacts.

Specific Actions – Influx Management

Specific actions to manage influx fall into one of two general categories: 1) measures that help limit or control influx; and 2) measures that help manage influx impact by stabilizing local economies and promoting culturally acceptable behavior. All measures are underpinned by regular consultation with local government and community leaders to get their input and support to minimize and manage influx.

Actions to limit or control influx may include:

- Supporting local government to help prevent spontaneous settlements and to manage people coming into the area, including capacity building in terms of planning and staffing
- Promoting an awareness campaign with communities to help them understand the potential adverse impact of allowing outsiders to lease or settle on land
- Employing as many workers from the Project area as possible, and implementing a recruitment system, including database and community leader verification, that clearly identifies local versus external applicants
- Implementing an employment communication/consultation program that consistently and clearly informs the national and local populace of the Project's employment policy that emphasizes the hiring of local people, employment opportunities and requirements, recruitment procedures, application procedures and locations, making clear that no recruitment will be conducted at the project site

Actions to help manage the impacts of influx may will include:

- Holding roundtable discussions with local and regional-level officials on issues associated with influx management and promotion of an integrated regional development program
- Promoting the organization of a Community-Project-Government consultation committee for early identification of influx related issues

- Establishing a clear and easily accessible complaints mechanism for communities to register complaints or contribute information important to worker behavior management
- Locating main worker camps and project recruitment center away from local communities
- Implementing effective workforce codes of conduct that control workforce interaction with local communities, purchasing of local products and services, housing outside of camp, and use of natural resources. The Code should also regulate work hours, visitors, behavior, alcohol use, prohibits use of drugs, sets rotations and home leave rules (e. g., outside workers may not remain in area), and home leave transport developed to minimize problems
- Implementing a cultural integration program for employees and including local communities that promotes understanding of acceptable behaviors
- Obliging all contractors and LIFZ tenants to conform to GB Group commitments for recruiting, hiring, and applying workforce codes of conduct, including monitoring
- Implementing worker and community health programs by providing a comprehensive workers health program and supporting local health programs. Examples include:
 - Workforce pre-arrival health exams and inoculations, regular check-ups, communicable disease (including HIV/AIDS) prevention and awareness, and information on area specific health issues
 - Community health education program including preventative information on local health issues, alcoholism, and drugs, and sexually transmitted diseases
 - Mosquito-vector disease control program
 - Funding for equipment and capacity building of hospital management teams (advice, planning, administration (both medical and administrative), resource management, budgeting, management training, and hygiene training
- Regional emergency response collaboration
- Participating in economic support programs that will help offset price inflation and pressure on local resources, including a local worker and a local supplier/small and medium enterprise (SME) program that will increase local income

- Participating in an infrastructure support program that reinforces existing infrastructure and facilities
- Assisting with a traffic plan that works with local government to design safer community traffic flow, speed limits, and intersections
- Developing an appropriate fire safety program that considers the crowding that occurs as a result of population increase

GB Group will develop an Influx Management Program as a component of the Project's Social Management Plan that will specifically address collaboration with the GoH on management of squatter settlements and influx impacts. The Influx Management Program will also recognize the limited capacity currently existing within the GoH to manage influx independently, and will include specific measures to prevent or decrease influx for affected communities.

Monitoring – Influx Management

GB Group's contributions to influx minimization and management comprise programs that will be monitored by their respective functional managers (for example, community engagement, human relations, construction management, etc.). The HSE Manager, through the Social/Community Manager, will have the responsibility of conducting outcome evaluations periodically by consultation with the community committee, reviews of complaints, and targeted interviews with key stakeholders.

7.1.29.3 Social Investment Program

GB Group recognizes the importance of contributing to the development and self-improvement of local communities outside of the mitigation efforts that are implemented to reduce Project-induced impacts. The long-term sustainability of any development program is a key issue, and careful design and implementation is required to achieve long-term success. Linkages and partnerships between GB Group, the appropriate authorities within the GoH, NGOs, and community-based organizations will be important options in establishing this framework. NGOs and government agencies can provide expertise in the design, planning, and achievement of development goals and in addition are likely to be present and

active in ongoing development works independent of the Project. The formation of partnerships therefore allows GB Group to tie their community investment programs for nearby communities into longer-term programs and plans for the region and the country as a whole.

Specific Actions – Social Investment

GB Group will develop a social investment strategy based on the Project's social-economic assessments, other studies of Haiti and the Project area, and consultations with local communities, the GoH (both nationally and locally), and civil society groups. The strategy will act as a framework for short-term, medium-term, and long-term community support programs, as well as the "rolling planning" necessary to accommodate economic, social, and governmental capacity changes over the life of the Project. It is noted that the strategy will be designed to phase away from Project support to community or government management by creating the capacity needed to continue programs without outside assistance.

The Social Investment Program components will respond to both the current dependence on subsistence activities and the need to create more diversified and potentially profitable income opportunities and development activities. Such social investment categories and objectives may include:

- Land based productivity:
 - Commercialize land-based products
 - Increase crop productivity through programs such as more intensive land use, improved seeds, or different crops
 - Increase animal productivity through programs such as improving animal husbandry practices, introducing new breeds, quality control, veterinary programs, pasture land improvements, and development of watering holes
- Employment and training:
 - Maximize number of Haitians employed by the Project during construction and operations through special recruitment and training measures
 - Employ special career advancement measures for local employees

- Implement resourcing plans that aim at maximizing the numbers of Haitian staff
- Business development:
 - Maximize the economic benefits that flow from the Project to the region and the country
 - Help diversify local people's income streams
 - Increase local people's income and improve their standard of living
- Health:
 - Increase local access to staffed and equipped health facilities
 - Improve the quality of the health care provided in local facilities
 - Improve the management of major health care facilities
- Education:
 - Expand access to staffed schools in the Project's area of influence
 - Improve the quality of the education at local schools
- Infrastructure:
 - Enhance local transportation routes to facilitate transition to a more cash-based economy and allow residents to participate in the economic activity generated by the Project and other opportunities
 - Improve waste disposal facilities and practices in the Project's area of influence
 - Improve the supply of safe drinking water
 - Expand provision of electricity outside the immediate project footprint using a pay-as-you-use, self-sustaining model
 - Improve housing stock to meet requirements of a growing population
- Environment:
 - Enhance overall understanding of the benefits of good environmental stewardship and the consequences of poor stewardship
 - Provide opportunities to enable the local population to adopt good environmental stewardship actions

- Educate local populations about the Project’s activities and its impacts on the environment
 - Raise capacity of local and national officials to monitor compliance (GB Group’s and other projects’) with environmental obligations
- Institutional capacity:
 - Educate local officials about the Project’s costs and benefits so they can make sound decisions on management of opportunities and risks
 - Facilitate government access of capacity-building from international development agencies or NGOs, especially with regard to the industrial and port sectors, urban and rural planning, agricultural development, and environmental monitoring
 - Assist national and local government to build capacity to monitor Project compliance under various authorizations, permits, and approvals
 - Assist government to effectively manage regional growth
 - Ensure that government effectively and transparently uses development funding provided by the Project

The Social Investment Program should be developed with due consideration for short-term (“quick hits”), medium-term, and long-term interventions. Short-term actions respond to prior community commitments as well as for all residents of Project-area communities. Some medium-term investments are underway and substantial progress has been made on certain programs such as local worker development. For the longer term, GB Group may wish to develop a “plan for planning” that will define the steps and responsibilities in a way that responds to the area’s changing environment and should consider the following principles:

- Economic programs will be founded on market-based opportunity assessments
- Programs will respond to changes in economic, social, and governance conditions
- Programs will fully consider lessons learned from early medium-term programs and projects

- Programs will be based as much as possible on collaboration with other private enterprises in the project area, NGO initiatives, or government programs
- Private sector advantages will be utilized (income opportunities)
- Programs will be coordinated with national planning
- The community, civil society, and government will be consulted to ensure their buy-in and participation

GB Group recognizes that the lack of planned and integrated development has inhibited growth in Haiti, and thus may propose to support a strategic partnership that will catalyze and support an integrated regional development (IRD) program. Core components of the IRD could include a permanent institutional arrangement, public financing (at the “regional,” prefecture, sub-prefecture, district, and commune levels), regional ownership, and regional aims and responsibilities.

A successful IRD program requires a number of conditions that do not yet exist in Haiti such as institutional capacity, a favorable national economic and monetary policy, a clear overall institutional framework, and resource allocation and mobilization mechanisms. As preparation, GB Group could continue to develop, monitor, and evaluate its own integrated programs as indicated by assessments and less formal interaction with local government, communities, and other foreign investments. Since development of IRD will not be linear, implementation of these “supporting” activities can motivate other actors, including government. GB Group may choose to use the following principles in its selection of support activities, considering:

- Natural, human, and cultural resources of the area
- Local initiative and enterprise
- Major problems, such as the limited capacity of areas and social groups to participate in economic and development activities
- Program focus such as capacity building (skills, institutions, and infrastructure)

Projects that are considered in the Social Investment Program will be reviewed to assess their alignment with the goals and objectives of GB Group's corporate policies (Appendix A). **Monitoring – Social Investment**

The GB Group HSE Manager will lead the Social Investment Program team, and will be responsible to ensure that Social Investment Program components are monitored and evaluated, in collaboration with the relevant functional or program managers. A monitoring and evaluation plan will be part of the Social Investment Program, and will include input (progress) monitoring, output monitoring, and outcome evaluation.

7.1.29.4 Community Safety and Emergency Response

Whenever there are residential areas in close proximity to active industrial operations, there is an increased risk of direct impacts from those operations to those local residents. The presence of a project security force, including armed guards as at the Project, can also present a risk to local communities and residents. These risks must be effectively managed in order to ensure that they are reduced and contained to the maximum extent practical. Central to effectively managing these risks is the implementation of effective stakeholder engagement and community safety and awareness programs.

Specific Actions – Community Safety

The Project's Community Relations team will include basic power line safety information in the Project Communications Centers and in public meetings with local communities through which the Project power distribution lines will pass.

As part of the Emergency Response Plan, GB Group will develop a procedures to alert community leaders in the case of an event or emergency situation at the Project site that could affect community health and safety.

The Project will employ its own security force, expected to be upwards of 100 guards and supervisors during operations. Approximately half of that force will be tasked with maintaining port security under the Port Security Manager; the remainder of the force will be responsible for security across the remainder of the Project site under the Site Security Manager. A sub-set of the port and general site

security teams will be armed. The Project is developing a Security Management Plan that will provide, among other content, for:

- Training in armed and unarmed engagement
- Conflict resolution and minimization
- Security code of conduct and human rights training
- Appropriate community interaction behaviors
- Reporting of security incidents

The Project acknowledges that repetition and tedium can form a large part of security duties, and aims to reduce potential problems related to boredom with a continual training program in all aspects of security training and in respectful and appropriate interactions with non-security personnel and local residents.

Monitoring – Community Safety

GB Group will conduct semi-annual inspections along the right-of-way for all Project power distribution lines located off site, to check for incursions into the right-of-ways. Any incursions will be reported to the local authorities and to the Project Director, for determination of subsequent actions.

The HSE Manager will be responsible for the timely updating of community leader contacts included in the Emergency Response Plan. The Project's emergency notification procedure for communities will be communicated to the appropriate local leaders via the consultation and stakeholder engagement process.

The Project Director retains ultimate responsibility for the management of site security; area security managers will be responsible for the implementation of the procedures in the Security Management Plan and for reporting on the outcome of training programs and any security incidents that occur during a given reporting period. Security reports will be summarized annually for inclusion in the Project's HSE AMR. The Project's complaints and grievances processes will be monitored for any complaints related to community safety or security force behavior or risks;

such complaints will be elevated to and handled immediately by the Project Director.

7.1.29.5 Community Relations and Public Awareness

Effective multi-directional communication is the single-most important element in building a positive relationship with the local communities. GB Group developed its Stakeholder Engagement Plan to define how it will communicate with its host communities and also how it will deal with their concerns and complaints. Community expectations are often very high and un-met expectations can result in considerable frustration and associated impacts to the Project. Creating and maintaining effective public awareness and consultation is central to accurately and regularly informing local residents and other stakeholders of the potential impacts and benefits of the Project. Public awareness is also an effective initial step that can assist local communities to make better-informed choices regarding such matters as health, safety, environmental management, and education.

Specific Actions – Community Relations

The Project can contribute to public awareness and education by disseminating information through its stakeholder engagement program on key local issues such as waste management and public safety hazards associated with road access or in educating local residents on the health risks associated with communicable diseases such as HIV/AIDS. Such programs can provide local residents with a better understanding of how to reduce their own health and safety risks and also how to improve the quality of the local environment. Implementation of the Stakeholder Engagement Plan will comprise public discussion elements that may include, but are not limited to:

- Disclosing environmental baseline study results and discussing the ramifications of those results on the local environment
- Providing information about the mitigation of health risks, including identifying the locations of safe drinking water sources and affordable techniques for improving water quality
- Developing strategies through the consultative process to mitigate immediate and longer-term health and environmental concerns that may

exist in the region in collaboration with government institutions, local communities, and other relevant partners

- Providing skills training programs to maximize benefits and opportunities to local people and particularly to vulnerable groups
- Communicating information on upcoming job openings and awareness of available skills training opportunities
- Supporting traffic safety initiatives, including safe driving skills and hazard awareness training
- Educating local community residents on the hazards of various social ills such as gambling, drug and alcohol abuse, and on options to limit the potential for exposure to HIV/AIDS and other sexually transmitted diseases

In addition to the community capacity building that can be accomplished through the consultation process, GB Group is also responsible for building a workforce culture that promotes health and safety for both the workforce and the local community. This includes developing appropriate social “codes of conduct” in terms of the behavior of Project employees with the local community regarding drinking, drug-use, gambling, and prostitution. Rules and security measures will be in place regarding access to Company-owned employee accommodation facilities, and no access should be granted to unauthorized personnel. GB Group has zero tolerance for violence and illegal activities within the workforce. Additionally, workplace information and education programs regarding the spread of HIV/AIDS and other sexually transmitted diseases will be implemented in collaboration with relevant government partners.

GB Group has already implemented a number of public outreach programs and has disclosed project information in a variety of ways as described in the Stakeholder Engagement Plan. As part of that disclosure, key Project documents will be disclosed locally and discussed with people within the social AOI. Indirectly affected individuals and groups will also have access to the Project documents and will have the opportunity to ask questions and raise concerns (if any) through participation in information meetings, by visiting the Project Communication Center, or other means as presented in the Stakeholder Engagement Plan

Monitoring – Community Relations

The community relations and public awareness programs, including consultation, monitoring, recordkeeping, and reporting are defined in the Stakeholder Engagement Plan. These programs are the responsibility of the HSE Manager, and may be independently audited as necessary for their adequacy and transparency by a third-party expert or panel of experts.

Workforce management and behavior of workers is the responsibility of the Human Resources Manager, who will standardize and disclose the Company's expectations of its employees relative to social codes of conduct. GB Group will work with its construction contractor and other contractors to standardize community relations and workforce management procedures for the Project.

The HSE Manager will be responsible for monitoring community relations as set forth in the Stakeholder Engagement Plan and other relevant programs. In particular, the HSE Manager will monitor community complaints and report at least monthly to the Project Director.

7.1.29.6 Small Craft Traffic Safety

ETEL conducted two surveys of fishermen in the Project area, a general survey as part of the social baseline supporting the 2014 ESIA, and a targeted survey of self- and community-identified fishermen for the current ESIA in May 2015. The results of both surveys indicate that fishing has become, over a long period, at best a supplemental income activity due to the degraded condition of the marine ecosystem in the region. No large-scale commercial fishing industry exists in the area for the same reason; fishing activities are limited to individuals in small wooden skiffs (*kanot*) who fish the nearshore shallower waters. Artisanal fishermen from Simonette follow a route that allows them to make a circuit of the shallow waters around Goat Island (Île de Cabrit) and fishermen from Lafiteau make a circuit in the shallow waters southeast of the LMH quay in Lafiteau (Figure 4.8). As the port is located in a stretch of coastline with deeper waters leading to the deepest parts of Port-au-Prince Bay, the port area was not considered a good fishing zone by local fishermen. The lack of refrigeration capabilities in Simonette

and Lafiteau also serves to keep fishermen local, rather than traveling up and down the coast to sell their catch at different communities.

Specific Actions – Small Craft Exclusion

To minimize any potential impacts to artisanal fishermen from port activities, the Project will establish and enforce a small craft exclusionary zone around the quay and vessel approach channel. The exclusionary zone may be demarcated by buoys, pilings, or other means, and port security teams will be responsible for making sure that private craft remain outside of the exclusionary zone. Special attention will be given to maintaining the small craft exclusionary zone when cargo vessels are expected at the port, at berth, or scheduled to depart from the port.

Monitoring – Small Craft Exclusion

The HSE Manager will coordinate with the community relations team to make sure that local communities and artisanal fishermen's groups in particular are made aware of the small craft exclusionary zone and the reasons for imposing it, via the stakeholder communication process. The Port Security Manager is responsible for enforcing the exclusionary zone. Any private vessels that enter the small craft exclusionary zone will be warned away; those that refuse to leave will be escorted outside of the exclusionary zone boundaries for their own safety. No penal actions will be enacted against exclusionary zone violations, unless the Site and Port Security Managers have reason to believe that the vessels pose a security threat to the Project. The Port Security Manager will include report any violations of the exclusionary zone in the regular security reporting. Any complaints associated with the exclusionary zone will be managed by the community relations team and the HSE Manager. The HSE AMR will include a summary of exclusionary zone incursions and Project security response.

7.1.29.7 Reduction of Mosquito-Vector Disease

Several mosquito-vector diseases are present in Haiti, including dengue fever and the Chikungunya virus. Both of these diseases are transmitted via mosquito bites, principally by the *Aedes aegypti* and *Aedes albopictus* mosquitoes. Dengue is prevalent across Haiti (Figure 4.7). The chikungunya virus has been increasingly

prevalent in Haiti since the 1980s and is spreading across the country (www.cdc.gov).

Standing water is required to complete the development cycle of mosquitoes. Standing water bodies opportunistically used by mosquitos can include natural cavities in trees up to water supply reservoirs. At the Project site, the water retention pond could serve as a source of mosquito-vector disease that could present risks to the community and Project employees.

Specific Actions – Mosquito Control

The risk of mosquito-vector diseases can be greatly reduced if stagnant water is aerated, treated or removed: agitated water is not an adequate breeding area for potential carrier mosquitoes. The Project will investigate practical methods for reducing the potential of the water retention pond to serve as a mosquito habitat. The Project will also verify that the design and construction of the low-head dam replacing the existing dam at the bridge in Simonette does not serve to create a stagnant impoundment upstream of the dam.

Monitoring – Mosquito Control

The HSE Manager will work with the Project's medical staff to document any cases of mosquito-vector diseases among Project employees. In the absence of a medical clinic in Simonette, the community relations team will monitor the complaints process and community reports of mosquito-vector disease. The Project will review and revise as necessary its mosquito control actions for standing water bodies should increases in the mosquito-vector disease rate among either of these populations be reported.

7.1.29.8 Chance Finds

Although there are no known historical or cultural sites of local or regional significance in the Project area, the Project has developed a chance finds procedure to manage any chance finds of cultural or archaeological resources (including human remains) that may be encountered during Project construction or

maintenance activities. The Chance Finds Procedure applies to both land and marine activities undertaken by the Project.

Haiti does not have robust guidance in place for the identification or protection of its cultural resources. The National Bureau of Ethnology (*Bureau National d'Ethnologie* – BNE) is tasked with the mission of identifying, classifying, and conserving archaeological objects discovered on Haitian soil. Within the BNE, the Anthropological Service (*Service d'Anthropologie* – SEDAN) is responsible for assessing archaeological or anthropological artifacts encountered in the field in its mission to study and support Haitian culture, however no clear procedure for reporting finds or following up with SEDAN or the BNE appears to currently exist.

Specific Actions – Chance Finds

The following specific actions will occur in the event of a chance find or cultural or archaeological artifacts or human remains:

- Stop the work in progress at the chance find site and notify SEDAN of the find
- Depending on institutional capacity, either SEDAN or the Project will mobilize a qualified specialist or archaeologist to the site to assess the significance of the find
- Based on the determination of the specialist and any recommendations from SEDAN, the Project may arrange for further specialist inventory of the area to determine the presence of any additional artifacts
- Coordinate with SEDAN government officials, local stakeholders, and the specialist in developing a suitable mitigation plan, as needed by the nature of the find, relevant legislation, and significance of the find
- Record the results of all inventories, including the artifacts found, their final disposition, and any other relevant information

Monitoring – Chance Finds

All chance finds will be documented with photographs and included in the Project's regular HSE reporting. Record-keeping to document response actions to chance finds of cultural resources will be the responsibility of the HSE Manager and included in the HSE AMR.

7.1.30 Worker Health and Safety

GB Group is committed to conducting its operations in a manner that is protective of the health, safety, and security of its employees and the local communities. As such, employees and local community residents will be eligible for training programs aimed specifically at the kinds of health and safety risks that could be associated with working at the Project or residing in the communities that are affected by its presence.

Certain safety risks are inherent to active port and industrial operations that requires site-specific hazard awareness training for those who enter the Project area. Site security will be established at primary points of access to the Project area and in the employee housing areas to limit access to the areas by unauthorized persons. GB Group will conduct its site security programs at Project facilities in accordance with the guidelines promulgated by the Voluntary Principles on Security and Human Rights (<http://www.voluntaryprinciples.org/>). Guard stations will be established at the main points of entrance to the Project where security guards will track the ingress and egress of visitors, suppliers, regulators, and other individuals who enter the property. Security guards will confirm that all persons entering the area have received an appropriate level of hazard training commensurate with the objectives of their visit. Secondary points of access may be manned by security guards or obstructed by fences, locked gates, and/or other exclusionary devices. Based on the lack of local police presence and the current social situation, the Project will utilize both armed and unarmed security forces at the Project site to assure worker safety and protect Project resources. Additional guidance about security measures and interactions with the public is presented in the Security Management Plan and in with regards to local community safety.

GB Group will provide personal protective equipment (PPE) to all employees whose job assignments require them to work in areas where conditions may pose a health risk. Required protective equipment will include wearing appropriate protective clothing, eyewear, hard hats, and safety shoes in all industrial areas, and approved flotation devices such as life jackets when working around water at the port or the water retention pond. Exceptions may be made at the discretion of the Project Director in low risk areas (e.g., Project offices).

Specific guidance is provided in the following sections for:

- Occupational noise
- Occupational dust and air emissions
- Water safety
- Site waste management
- Emergency response

7.1.30.1 Occupational Noise Exposure

Within the Project area, certain areas of the industrial processes will have elevated noise levels, most notably the power plant engine hall. Mitigation measures for reducing occupational noise exposure were included in the engineering design for high-noise areas, such as noise reducing insulation lining engine hall exterior walls.

Specific Actions – Occupational Noise

High-noise areas will be identified and procedures developed, if appropriate, for the use of protective devices when employees are working in these areas for prolonged periods. Such areas may include working at or near air compressors, generators, or where other excessively noisy equipment is being used. GB Group will develop an Occupational Health and Safety Management Plan that will define management procedures for addressing occupational health and safety standards, including workplace noise. All employees will be informed of the need to wear hearing protection in designated areas through new employee orientation training, and the issue will be reinforced in annual retraining sessions.

Monitoring – Occupational Noise

During Project commissioning and as often as needed thereafter, GB Group will conduct a noise survey to identify locations where noise levels are elevated to levels that require the posting of signs/symbols advising workers that hearing protection must be worn in those areas. Completing the noise survey on operating stationary equipment and motorized vehicles will be the responsibility of the HSE Manager. In addition, GB Group will provide hearing protection and enforce its use through its health and safety induction and training programs.

7.1.30.2 Occupational Dust and Air Quality Emissions Exposure

Within the Project area, certain areas and Project activities will result in the exposure of workers to elevated dust levels during construction. During operations, some areas may have elevated concentrations of certain constituents in the air.

Specific Actions – Occupational Air Quality

Areas that are likely to have excessive dust or elevated concentrations of certain constituents will be identified and procedures developed, if appropriate, for the use of protective devices when employees are working there. Such areas may include working at or near areas where airborne dust is high (naturally or work-induced); where fuels or chemicals are being handled, or where space is confined and air circulation may be inefficient. GB Group will develop an Occupational Health and Safety Management Plan that will define management procedures for addressing health and safety standards, including workplace air quality. All employees will be informed of the need to wear dust or other breathing protection devices in designated areas through new employee orientation training, and the issue will be reinforced in annual refresher sessions.

Monitoring – Occupational Air Quality

During Project commissioning and as often as needed thereafter, GB Group will conduct an air quality survey to identify locations where conditions are likely to require protective devices to protect employees from adverse air quality or dust conditions. Completing the occupational air quality survey will be the responsibility of the HSE Manager. In addition, GB Group will provide dust masks and other appropriate breathing protection as may be appropriate for the work location, and enforce its use through the Project's health and safety programs and training.

7.1.30.3 Water Safety

Workers involved in various port activities during construction and operations and at the filled water retention pond during operations will be required to work in close proximity to water hazards.

Specific Actions – Water Safety

GB Group has committed to develop an Occupational Health and Safety Management Plan which will include a management program for water safety. Such a water safety program may include:

- Requirements for employees to wear approved flotation devices in certain work areas
- Provisions for guardrails, handrails, or other protective devices in certain work areas
- Placement and maintenance of lifesaving equipment and flotation devices at strategic locations
- Requirements for workers to not work alone when working around water hazards

The Project's Security Management Plan will include training for security team members in water rescue procedures. The Dredging Management Plan will also address water safety considerations specific to the dredging actions.

Monitoring – Water Safety

Water safety in the port area and at the water retention pond is the responsibility of the relevant area managers. Monitoring will be as required by the Occupational Health and Safety Management Plan and the Dredging Management Plan, both of which are the responsibility of the HSE Manager.

7.1.30.4 Managing Project Wastes on Site

Proper handling and disposal of Project wastes as well as implementing programs to minimize waste generation is important to effective environmental management and in providing a safe and healthy workplace. In contrast, improper disposal of putrescible wastes can attract rodents and other disease vectors that can adversely affect human health and the environment.

Specific Actions – Waste Management

GB Group will develop a Level 2 Waste Management and Disposal Plan that provides a description of the waste repositories and treatment facilities that are planned for the site and discusses the actions and procedures for handling and disposing of wastes in an appropriate manner that is protective of human health and the environment. The Plan will identify wastes that are expected to be generated by the Project and will include, as a minimum, the following:

- Provision for recycling and waste minimization programs (such as composting) across all Project components
- Procedures for the management, collection, temporary storage, and disposal of hazardous waste
- Procedures for the management, temporary storage, and disposal of non-hazardous wastes, including solid waste, sanitary waste, wastes generated from the temporary employee housing facilities, and medical wastes
- Waste collection procedures for Project areas
- Primary roles and responsibilities of personnel responsible for waste management

Procedures will be developed as needed and to level of detail that sufficiently identifies how and where particular types of wastes will be generated and managed and the specific procedures for implementing the management obligations. Once the level of detail in the planning has progressed sufficiently for implementation at the Project site, the procedures will be updated to reflect the actual plans and repository locations onsite. This will include, as a minimum, discipline-specific plan updates and SSPs as appropriate for:

- Hazardous wastes, including waste oils, solvents, fuels and fuel filters, aerosol cans, petroleum-contaminated soils, and emergency response wastes
- Medical wastes including used bandages and syringes and blood-soaked items of any nature
- Industrial wastes, including glass, plastic, paper, aluminum, wire, light bulbs and cardboard; benign filtrates from water treatment systems or

other processes; latex painting wastes; rubber from vehicles or other sources; spray cans and tires from heavy equipment and street vehicles

- Domestic (organic) wastes, including kitchen wastes, rotting fruits and vegetables, egg shells, coffee grinds and tea bags, wood ashes and sawdust, plant material (i.e. leaves, stems) and grass, and paper products

It is noted that on-land disposal of dredge spoils will be addressed in the Dredging Management Plan.

Monitoring – Waste Management

Monitoring of waste management programs will be defined in the Waste Management and Disposal Plan. On-site waste management is the responsibility of the HSE Manager working in tandem with the area managers. The HSE Manager is also responsible for updating the Waste Management and Disposal Plan as Project conditions change with time and waste management practices evolve.

7.1.30.5 Responding to Emergencies

An important part of worker and community safety is being adequately prepared to respond to emergencies and upset situations. Establishing effective emergency response procedures along with employee training programs can greatly affect the nature and extent of the impacts associated with accidental releases and upsets. These responses will limit worker and community exposure to hazardous situations or conditions and reduce the nature and extent of adverse environmental effects.

Specific Actions – Emergency Response

GB Group will prepare a Level 2 Emergency Response Plan and a Spill Prevention, Response and Control Plan that describe the programs and procedures for responding to reasonably foreseeable spills, emergencies, major storms, and other crisis situations. These plans anticipate spills or emergency situations that may occur based on current Project plans and provide direction on what to do and who is responsible to limit the severity of those accidents, should they occur. The Emergency Response Plan will include, but is not limited to, responding to:

- Pipeline and tank ruptures
- Fires and explosions
- Medical emergencies and fatalities
- Spills of fuels, chemicals, or hazardous materials
- Transportation of dangerous goods
- Climatic events such as flooding or intense storms
- Social protests that threaten Project employees or infrastructure

All employees will be trained to respond to emergencies in their work areas, initially as part of the new employee orientation training and then annually thereafter as part of the refresher training program. Management personnel are also responsible for providing aid in an emergency regardless of time lost or normal duties ongoing at the time. Procedures will be developed as needed to complement the Emergency Response plans by further defining specific procedures and responsibilities for responding to specific accidents and/or emergencies. The Emergency Response Plan will also include procedures for contacting community leaders, along with their up-to-date contact details, in the event of an accident or emergency situation that could affect local communities.

Monitoring – Emergency Response

Monitoring and reporting requirements associated with emergency situations will be presented in the Emergency Response Plan. It is the responsibility of the Project Director to provide adequate training to both the management team and staff personnel to respond to emergencies. The management team must also be familiar

with the records and reports that must be produced if such emergency situation should occur. The HSE Manager is the clearinghouse for managing all emergency response records and will coordinate efforts with other members of the management team when such emergencies involve accidents or injuries to GB Group staff, its contractors in their respective work areas, or when they involve offsite incidents and/or individuals who are not employed by GB Group.

8.0 Stakeholder Engagement and Public Consultation

This chapter presents a summary of the Project's Community Relations management and reporting structure, Stakeholder Engagement Plan, and public consultation activities to date.

Community Relations Management Structure

Currently, the Project is in the process of defining and expanding its HSE management structure, and community relations duties are divided between the Human Resources Manager and the HSE Manager. Ultimately, the Human Resources Manager will be responsible for employees and the hiring process, while all community relations and stakeholder engagement activities will be the responsibility of the HSE Manager.

A Community Relations Manager will report to the HSE Manager; the Community Relations Manager will manage all stakeholder engagement activities including public meetings and workshops, community relations, the community complaints process. The Community Relations Manager will be responsible for hiring and maintaining a Community Relations team sufficient to conduct ongoing engagement and consultation activities with stakeholders including local communities in the Project's social AOI, as appropriate with the Project's development stage. Preference will be given to hiring and training of Community Relations staff to residents of communities within the Project's social AOI. The Community Relations Manager will also be responsible for updating the Stakeholder Engagement Plan in accordance with the contents of this ESIA and as necessary throughout the

Project's life, and with assuring compliance of consultation and other stakeholder activities with the content and commitment in the Stakeholder Engagement Plan.

Stakeholder Engagement Plan

As discussed in the Environmental and Social Management Plan the Stakeholder Engagement Plan is a type of Level 2 Discipline-Specific Management Plan that provides the framework and specific guidance and procedures for:

- Identification of Project stakeholders, including government officials
- Disclosure and dissemination of Project information as appropriate and timely
- Communication and consultation activities with stakeholders throughout the Project's lifespan
- Receiving, addressing, and reporting on community complaints and comments
- Reporting back to communities and other stakeholders on Project activities and key findings, such as monitoring results

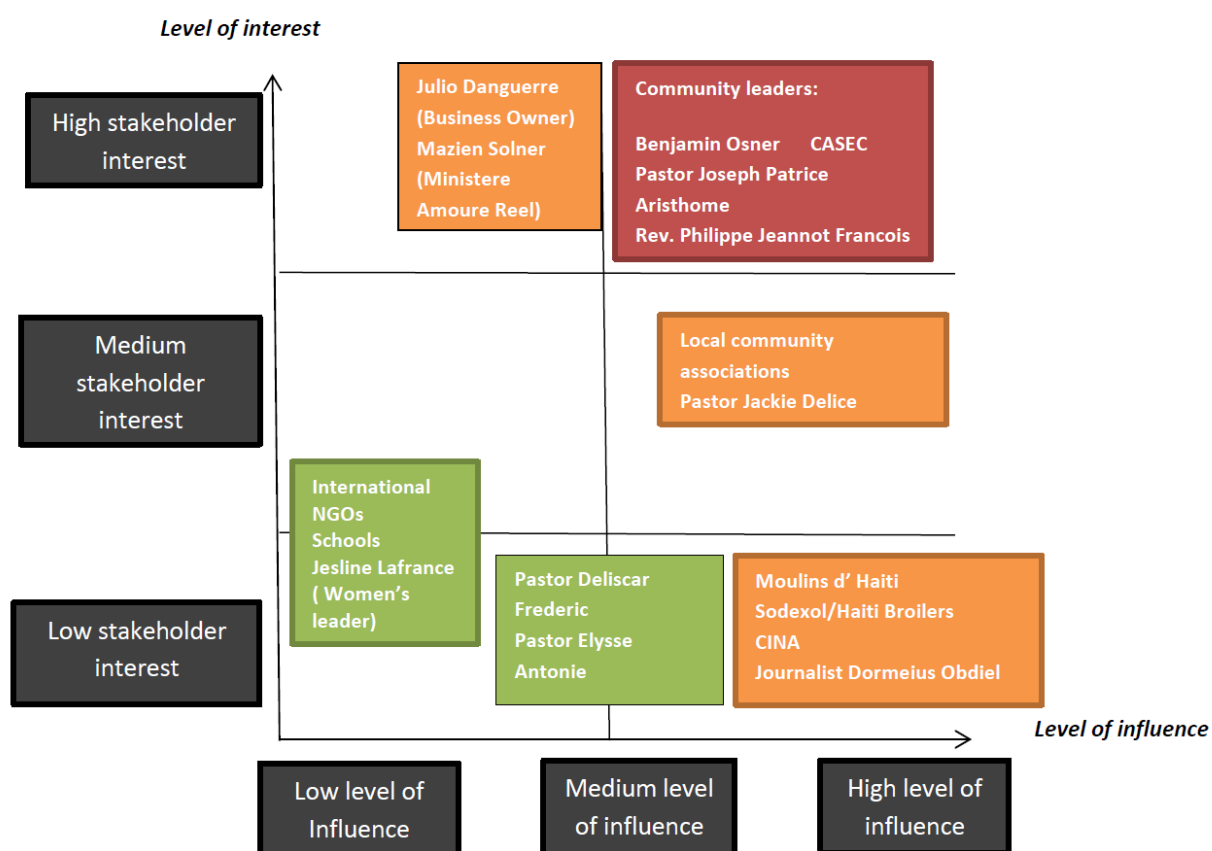
A Stakeholder Engagement Plan was produced as part of the 2014 ESIA; this plan was reviewed and commented on by IFC and is in the process of being revised and updated to address IFC comments. Key content of the Stakeholder Engagement Plan is summarized in the following sections.

8.1.1 Stakeholder Identification

The stakeholder identification process was initiated with a series of meetings with the government community liaison official or CASEC, who assisted the Community Relations team in gathering basic information about local communities. This information was used to assemble a key contact list for local businesses, community associations, schools, and religious institutions in the communities of Lafiteau, Simonette, and St. Gerard. Stakeholders were then categorized and plotted on a stakeholder map (Graphic 8.1) according to their perceived influence and interest in the Project. As part of current updates to the Stakeholder

Engagement Plan, the Project is identifying and updating the stakeholder mapping to include national government officials in the stakeholder list.

Graphic 8.1 – Stakeholder Map



Source: GB Group, 2014

8.1.2 Communications Center

A Communications Center was established at the Project site in September 2014, to serve as a location where interested stakeholders could review copies of the 2014 ESIA that had been translated into Haitian Creole (Graphic 8.2).

Graphic 8.2 – Communications Center Visitor Reviewing Copy of 2014 ESIA

Source: ETEL, 2014b

The Communications Center became so popular with that the decision was made to make it a permanent fixture at the Project site, and to staff it with people from local communities. Currently, two people are employed at the Communications Center, one from Lafiteau and one from Simonette and the Center is open daily from 8 am to 4 pm Monday through Friday (Graphic 8.3). The Communications Center is being used to provide information about the Project to interested parties, and to collect curriculum vitae and contact details of people interested in applying for jobs with the Project.

Graphic 8.3 – Project Communications Center on Site

As of the date of this ESIA, the Communications Center is under the direct supervision of GB Group's Human Resources department, with the support of the HSSE department and the Project's Construction contractor, when necessary. Staff at the Project Communications Center provide daily activity reports to the Project's HR director.

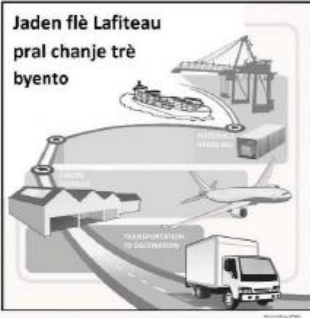
8.1.3 Communication Methods and Materials

The Project has utilized a variety of communications strategies to inform the local communities of Project activities, ranging from running advertisements in national newspapers, direct mailings, informal and formal meetings with stakeholders, and megaphoning (Graphic 8.4). Annex 1 of the Information Disclosure and Public Consultation Report (Appendix H of this ESIA) contains additional examples of communication materials used to date. Communications materials were prepared in Haitian Creole, French, and English, depending on the target audience.



Graphic 8.4 – Informational Brochure in Haitian Creole

**Jaden flè Lafiteau
pral chanje trè
byento**







Yon nouvo pwòjè ki rele

Port Lafito

Se anba devlopman rivaj distri nan kabare

Kisa sa vle di ojis?

GB Gwoup ap envesti nan zòn nan pou devlope yon gwo pwòjè ki rele Lafito Global, nan pwòjè sa ap genyen kote pou kago, yon zòn lib pou echanj, enstalasyon pou nouvo faktori, zòn vèt, yon pak jenerasyon enèji renouvlab, devlopman tè rezidansyèl ak inisyativ touristik.

Premye faz nan devlopman sa a ap genyen yon pò maritim nan riv Lafito a. Pò Lafito ap modèn ase poul okipèl de trafik kontinyèl kago gwo bato ki pral pote tout kalite machandiz nan peyi a ak opòtinite nan zòn nan.



Ou vle konnen plis sou sa?

Vini vizite Sant Kominikasyon nou an, yap baw plis enfòmasyon sou Pò Lafito ak chanjman zòn nan ap benefisye gras a li.

Adrès Sant Kominikasyon Pò Lafito a se wout nasyonal #1, 17 km 1/2 Lafiteau. Enfòmasyon sou pwòjè a ap disponib pou 15 jou a pati 30 Oktòb soti 8h00 nan maten rive 5h00 nan laprèmidi.

Nou vle gen ide pa ou

Kòmantè ou, dout ou genyen, nenpòt sa ou vle di, nap kontan konnen yo. Nap tann ou nan Sant Kominikasyon an.

Source: ETEL, 2014b

8.1.4 Consultation Activities

Consultation activities started in January 2014 and included in-person meetings, and informal gatherings in the communities surrounding the Project site. A team of social specialists from ETEL led the consultation activities, with assistance from the Project's HR Manager and GB Group social specialists based out of the Dominican Republic.

Activities included:

- Collection of social baseline data via interviews and surveys
- Conducting focus groups to understand local stakeholder concerns
- Presentation of the Project and main conclusions of the 2014 ESIA in a Public Meeting

The goal of the Project's consultation program moving forward will be to ensure that local communities and stakeholders are informed of Project impacts and mitigation and management measures, and that the communications will be ongoing. Communications activities and consultation will continue throughout the Project's life, in a manner commensurate with the amount and type of information to be disclosed and with Project development stage, including disclosure of this ESIA via meetings and public hearings.

8.1.4.1 Social Baseline Community Activities

Section 4.2 discusses the social baseline study and presents the socio-economic information obtained by ETEL. Consultation activities as part of the baseline included informal meetings, interviews with stakeholders, and completion of surveys by randomly selected members of local communities. Appendices E and G of this ESIA present more detail regarding the open interviews and questionnaire used during the social baseline community activities.

8.1.4.2 Focus Groups

Also as part of the 2014 ESIA, ETEL conducted four focus groups in June 2014 to ascertain stakeholders' views of the social and economic status of the Project area, including:

- Most significant problems and priority issues facing local communities
- Employment situation in local communities
- Community infrastructure state
- Social environment and conditions
- Attitudes and perceptions regarding the Project and its perceived impacts

One focus group was conducted in each of the communities closest to the Project: Lafiteau, Simonette, and St. Gerard; a fourth focus group was held in Lafiteau with members from all three communities. Focus group participants were invited, and were selected based on the stakeholder analysis previously conducted by GB Group and ETEL. Appendix F of this ESIA presents the Focus Group Report prepared by ETEL.

8.1.4.3 2014 ESIA Disclosure and Public Meeting

The ESIA developed for Port Lafito by NRE was translated into Haitian Creole and made available for public review in October of 2014, at the then newly opened Project Communication Center on site. A Public Meeting was scheduled for November 13th, 2014 during which the main findings of the Port Lafito ESIA would be presented to attendees.

To advertise the Public Meeting, the community relations team used direct mailings, distributed informative brochures, published advertisements in newspapers, made radio announcements, and used megaphoning (Graphic 8.5) to inform local communities of the upcoming meeting.

Graphic 8.5 – Megaphoning to Promote the 2014 Public Meeting

Source: ETEL, 2014b

The Public Meeting was held in a tent erected at the Communications Center, with 239 people in attendance. A slide presentation and commentary were delivered in Haitian Creole, in a manner designed to facilitate comprehension of technical material included in the ESIA. Information disclosed at the Public Meeting included:

- A description of the Project
- Key Project dates
- A summary of the existing environmental and socio-economic baseline conditions in the Project area
- Predicted adverse impacts and mitigation measures
- Project benefits and employment opportunities
- Project's open-door communications policy

The presentation was followed by a question and answer session (Table 1 in the Information Disclosure and Public Consultation Report in Appendix H of this ESIA). To solicit additional information from Public Meeting attendees, a series of Rapid Hearer Interviews (RHIs) to determine public sentiment and perceptions about the Project.

Graphic 8.6 – Participants at the 2014 Public Meeting



Source: ETEL, 2014b

8.1.5 Complaints Mechanism

As a key element of the Stakeholder Engagement Plan, GB Group will develop a complaints procedure that will allow for the lodging, addressing, and resolving of community complaints and concerns. It should be noted that this process is similar to, but separate from, the grievances procedure for Project employees that is

included in the Human Resources Handbook. The key features of the complaints procedure are as follows:

- Any person may lodge a complaint in the Project's complaints system; complaints will be stored in a database
- Complaints will be managed in accordance with GB Group procedures and guidelines
- Any person aggrieved by any aspect of the land acquisition or involuntary resettlement process can lodge an oral or written grievance to GB Group.
- Complaints shall be appropriately documented and registered and if the complaint cannot be resolved within 30 days of receipt, it will advance to the second stage of the process
- If the aggrieved person is not satisfied with the outcome of the initial stage consideration, or if local-level review is unable to reach a proposed solution, the aggrieved person can refer the issue to a complaints committee established by GB Group
- The complaints committee will review issues raised by the initial complaint and any actions for resolution suggested at the lower level and will make recommendations for resolution within 30 days of committee review
- If the aggrieved person is still dissatisfied following review by the complaints committee, the case may be referred to legal proceedings in accordance with Haitian laws and procedures
- GB Group will keep a record of all complaints referred to the complaints committee, including a description of issues raised and the outcome of the review process

The mechanism for receiving and managing potential complaints from any future physical or economic displacement impacts will be prepared and implemented in accordance with the key requirements of IFC PS1.

Stakeholder Engagement Action Plan

The Stakeholder Engagement Plan includes an action plan that identifies how frequently and by what methods key stakeholders will be kept informed of Project activities. The updated Stakeholder Engagement Plan will provide a list of all planned engagement activities for the next 12 months; this list will be reviewed

annually and updated as needed. Activities should include consultation on this ESIA (prior to finalization) and ongoing consultation to include potential impacts and mitigation measures, as well as updates on Project status and development phase.

Reporting

The Project is currently updating the Stakeholder Engagement Plan to include reporting to communities and government officials on Project progress and issues of concern. Key performance indicators (KPIs) will be developed to measure the effectiveness of community consultation and disclosure activities; these KPIs could include such benchmarks as:

- Number of community meetings held quarterly
- Attendance at community meetings
- Visits to Project Information Centers
- Timeframe for resolution and reporting back to aggrieved party on complaints

In addition, quarterly reports will be prepared by the Community Relations Manager on stakeholder engagement activities, progress, and compliance with Stakeholder Engagement Plan commitments for review by the Project Director and GB Group executive management. An annual summary of the quarterly reports will be included in the Project's Annual Monitoring Report.

9.0 References

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