Proposed Improvements to Guyana Shore Base Port, Georgetown, Guyana

Environmental Assessment

Inter-American Development Bank
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Washington, DC 20577

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The business of sustainability

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Acronyms and Abbreviations

°C	Degrees Celsius
AASHTO	American Association of State Highway and Transportation Officials
AISC	American Institute of Steel Construction
BSG	Bureau of Statistics Guyana
CDC	Civil Defence Commission
CH&PA	Central Housing and Planning Authority
CIA	Cumulative Impact Assessment
CLRP	Compensation and Livelihood Restoration Plan
CO	Carbon monoxide
DAI	Direct Area of Influence
EA	Environmental Assessment
EEGPL	Esso Exploration and Production Guyana Limited
EHS	Environmental, Health, and Safety
ENSO	El Niño Southern Oscillation
EPA	Environmental Protection Agency
EPC	Engineering Procurement Contractor
ERM	Environmental Resources Management, Inc.
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESMP	Environmental and Social Management Plan
FPSO	Floating production storage and offloading
GAB	Gender Affairs Bureau
GEA	Guyana Energy Agency
GGMC	Guyana Geology and Mines Commission
GII	Gender Inequality Index (GII),
GM	Grievance Mechanism
GOG	Government of Guyana
GSDS	Green State Development Strategy
GYSBI	Guyana Shore Base Inc.
HDI	Human Development Index
IAI	Indirect Area of Influence
ICC	International Code Council
ICZM	Integrated Coastal Zone Management
IDB	Inter-American Development Bank
ILO	International Labour Organization
IPCC	Intergovernmental Panel on Climate Change

ITCZ	Inter -Tropical Convergence Zone
KCOCA	Konashen Community Owned Conservation Area
KMPA	Kanuku Mountains Protected Area
km	Kilometres
km^2	Square kilometres
LCDS	Low Carbon Development Strategy
m	Meters
m^2	Square meters
m^3	Cubic Meters
MARAD	Maritime Administration Department
MARPOL	International Convention for the Prevention of Pollution from Ships
NBSAP	National Biodiversity Strategy and Action Plan
NDIA	National Drainage and Irrigation Authority
NDS	National Development Strategy
NEAP	National Environmental Action Plan
NO_2	Nitrogen dioxide
OHS	Occupational health and safety
PACs	Project-Affected Communities
PPE	Personal Protection Equipment
PSC	Private Sector Commission
PTS	Permanent Threshold Shift
SBPA	Shell Beach Protected Area
SDGs	United Nations Sustainable Development Agenda and Goals
SEL	Sound Exposure Level
SEP	Stakeholder Engagement Plan
SES	Sustainable Environmental Solutions
SO_2	Sulphur dioxide
SOL	SOL Fuel Company
SOLAS	International Convention for the Safety of Life at Sea
TOR	Terms of Reference
TTS	Temporary Threshold Shift
UNCB	United Nations Convention on Biodiversity
UNCBD	United Nations Convention on Biological Diversity
UNDP	United Nations Development Programme
VEC	Valued Environmental Component
VEC	Valued Environmental Components
VOC	Volatile organic compounds

WHO	World Health Organization

1. EXECUTIVE SUMMARY

The economy in Guyana has traditionally been open market and primarily based on commodities such as gold, bauxite, oil and agricultural products, thus, the economic performance has heavily relied on exports, as the main source of foreign earnings (90%) and fiscal income (46%). Guyana is poised to emerge as significant oil producer by the mid-2020s, and at the cusp of unprecedented economic growth and transformation.

Guyana Shore Base Inc. (GYSBI) provides support for oil and gas operator companies in Guyana. It also offers services such as waste management, chemical storage, warehousing, construction, berthing of supply vessels, cargo marshalling area, loading and offloading, supply chain management, expatriate management, and customs services, having expanded beyond the traditional pipe yards found in Guyana. GYSBI currently has over 350 employees and maintains an average of 95% local workforce.

The Inter-American Development Bank (IDB) Invest is supporting the efforts of GYSBI, as one of the main shore base companies that servers Guyana, to improve its Port transport and logistics services to support the rapidly expanding oil and gas industry. This Environmental Assessment (EA) addresses the proposed improvements to the Port's transport and logistics improvements (the "Project"), which can be divided into three main general activities:

- The construction of two new berths, Berths 3 and 4, at the existing berth area;
- Development improvements to the GYSBI Port area; and
- Construction of warehouses in the "Annex" area.

The Project is anticipated to deliver benefits during the operation of the shore base given the improvements of the Port transport and logistics; however, it is acknowledge that the Project could also potentially lead to negative environmental and social impacts during its construction and operation. Potential environmental and social impacts resulting from Project-related activities include:

- Emissions and noise from construction and operations vehicles, vessels, fuel storage, and equipment,
- Noise generated by construction equipment and activities,
- Dredging activities for berths' construction and maintenance dredging,
- Flood risk,
- Waste generated by construction and operations activities,
- Decreased pedestrian and traffic safety,
- Increased traffic congestion and disruption,
- Increased river traffic,
- Decreased access to critical facilities, shopping, bus stops etc.,
- Creation of jobs during construction and operations,
- Loss or disturbance of vegetation,
- Wildlife injury or mortality,
- Underwater noise,
- Degradation of aquatic habitat
- Increased surface water runoff from vegetation clearing,

- Temporary loss of access to local businesses,
- Impacts on potential vulnerable groups (gender or disability related),
- Impacts on health and safety of workers and public during construction activities,
- Damage to undiscovered archaeological sites due to construction, and
- Possible disruption of the use of living heritage sites.

Based on this assessment, none of the abovementioned impacts were determined to be major and would all be reduced to minor or negligible with the implementation of appropriate management measures. An Environmental and Social Management Plan (ESMP) has been developed outlining the measures and actions necessary to further minimize impacts to acceptable levels. In addition, implementation of the Project would result in positive environmental and social impacts as the Project components would address the Port's operational inefficiencies and its adjacent infrastructure.

2. INTRODUCTION

2.1 Project Background

The Republic of Guyana is located in the northeastern Atlantic Coast of South America, bordered by Suriname, Venezuela, and Brazil, with a population of approximately 786,550 people. Most of the population is concentrated in the northern coastal plain portion of the country. Guyana's interior is mainly tropical rainforest, occupying some 80% of the country's territory. The capital city of Georgetown and its suburbs are home to approximately 45% of Guyana's population (World Population Review, 2021).

The economy in Guyana has traditionally been open market and primarily based on commodities such as gold, bauxite, oil and agricultural products, thus, the economic performance has heavily relied on exports of extractives, among other commodities, as the main source of foreign earnings (90%) and fiscal income (46%) (Inter-American Development Bank, 2017). Guyana is poised to emerge as significant oil producer by the mid-2020s, and at the cusp of unprecedented economic growth and transformation. The Project is located in Houston Village, an old plantation that has seen recent rapid development as a result of the oil and gas industry emergence in Guyana.

Guyana Shore Base Inc. (GYSBI) provides support for oil and gas operator companies in Guyana. It also offers services such as waste management, chemical storage, warehousing, construction, berthing of supply vessels, cargo marshalling area, loading and offloading, supply chain management, expatriate management, and customs services, having expanded beyond the traditional pipe yards found in Guyana. GYSBI currently has over 350 employees and maintains an average of 95% local workforce.

2.2 Purpose and Need

As one of the main shore bases that serve as support for the rapidly expanding oil and gas industry in the country, and to comply with services required by Exxon Mobil (the "Offtaker"), GYSBI is making additional capital expenditures to expand its facilities, as follows:

- Construction of two new berth facilities at the Port (berths 3 and 4) to accommodate the increased number of ships associated with the offshore oil operations;
- Increase the size of the shore base logistics support area from 35 to 85 acres; and
- Expand other service capabilities to permit the Offtaker to operate five floating production storage and offload vessels, 20 – 25 platform supply vessels, and 4 – 5 drill ships.

2.3 Environmental Assessment Objectives

The objective of this EA is to assess the Project's potential environmental and social impacts and its alignment with IDB policies and safeguards. While it is anticipated that the Project would have a benefit to Guyana, the potential exists for environmental and social impacts to occur. This document describes the potential positive and negative effects of the Project and recommends an environmental and social management system to be put in place to augment positive effects and mitigate, manage, and monitor potential adverse impacts and risks for the life of the Project.

This EA has the following main objectives:

- Identify positive and/or negative changes in the human and natural environment that may affect the quality of life, as well as current and future options for sustainable social and economic development in the Project's Area of Influence, also referred to in this EA as the Project Area.

- Identify measures to minimize negative impacts and enhance positive impacts of the Project, following the mitigation hierarchy[1].
- Analyse alternatives and provide recommendations for the best course of action inclusive of any relevant prevention or mitigation measures.

The EA process included the following activities:

- Establishment of an environmental and social baseline through the following:
    - A document review and Project design information provided by GYSBI in addition to other documentation from the Government of Guyana and other publicly available sources.
    - A site reconnaissance including visual observation of the relevant areas directly and indirectly affected by the Project, meetings with relevant individual/groups/organizations, and data and information collection.
    - Collection of data through stakeholder engagement activities.
- Evaluation of the legal and regulatory framework applicable to the Project, including IDB policies and safeguards.
- Assessment of the potential environmental, social, cultural, health, safety, and labour impacts and risks associated with the Project.
- Recommendations for mitigation, management, and monitoring required for the Project in an Environmental and Social Management Plan (ESMP).
- A meaningful public consultation with affected stakeholders.

2.4 Environmental Assessment Scope

This EA considers both the construction and operations phase of the Project, and focuses mainly on the relevant existing physical, biological, and socioeconomic environments within the direct footprint of the Project, namely the new berths 3 and 4, the GYSBI Port area and the Annex. However, it is understood that in the case of some impacts such as air quality, noise and traffic, impacts may extend beyond the immediate Project footprint. As such, both a Direct Area influence (DAI) and an Indirect Area of Influence (IAI) are defined for the Project as follows below.

2.4.1 Direct Area of Influence

The DAI for the Project is defined as the footprint of the Project (see Figure 2-1), where the majority of the impacts from the Project are expected to occur and/or be experienced most acutely, namely:

- New berths 3 and 4
- GYSBI Port area
- The GYSBI Industrial Estate (the “Annex”)

[1] The mitigation hierarchy includes the following steps to manage potential adverse impacts of a proposed activity: avoid, reduce/minimize, remedy/restore and offset.

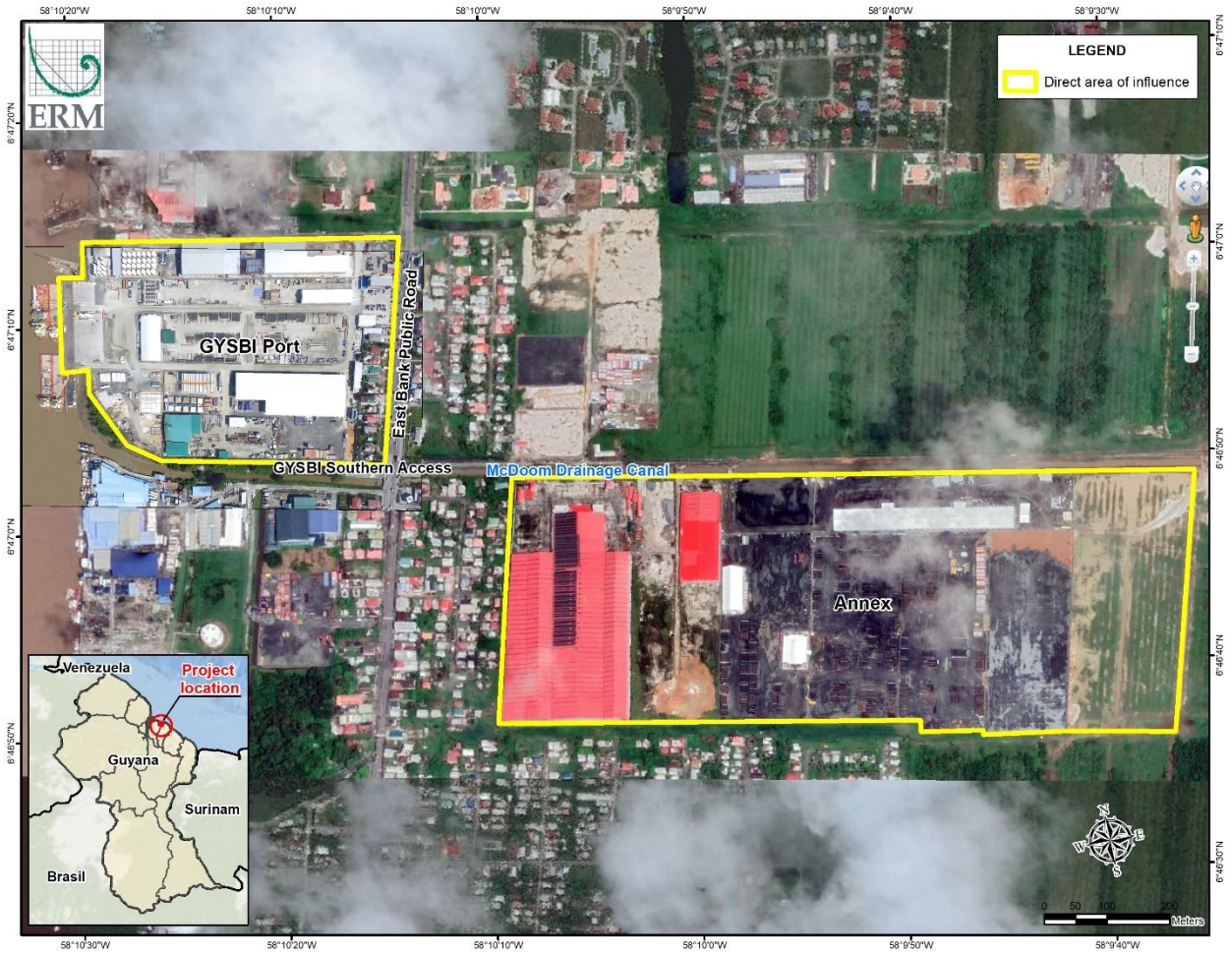


Figure 2-1: Area of Direct Influence

2.4.2 Indirect Area of Influence

The IAI of the Project is defined as the area within a 500-m radius of the Project footprint (see Figure 2-2) where some impacts such as traffic, dust and noise disturbance could occur, but generally with a lower level of intensity than in the DAI. In some instances, the IAI may encompass a bigger area, such as if there were an accidental oil spill in the Demerara River.

In the case of the socioeconomic baseline, affected populations are considered to be those who either reside, travel through, or engage in commercial or recreational activities within the DAI and/or IAI.

It is noted, that in many cases secondary sources of baseline data are available only for wider administrative areas. Data at these levels are supported by DAI- and IAI-specific information and data from interviews and field reconnaissance activities to provide as accurate a characterization of the impacted areas as possible.

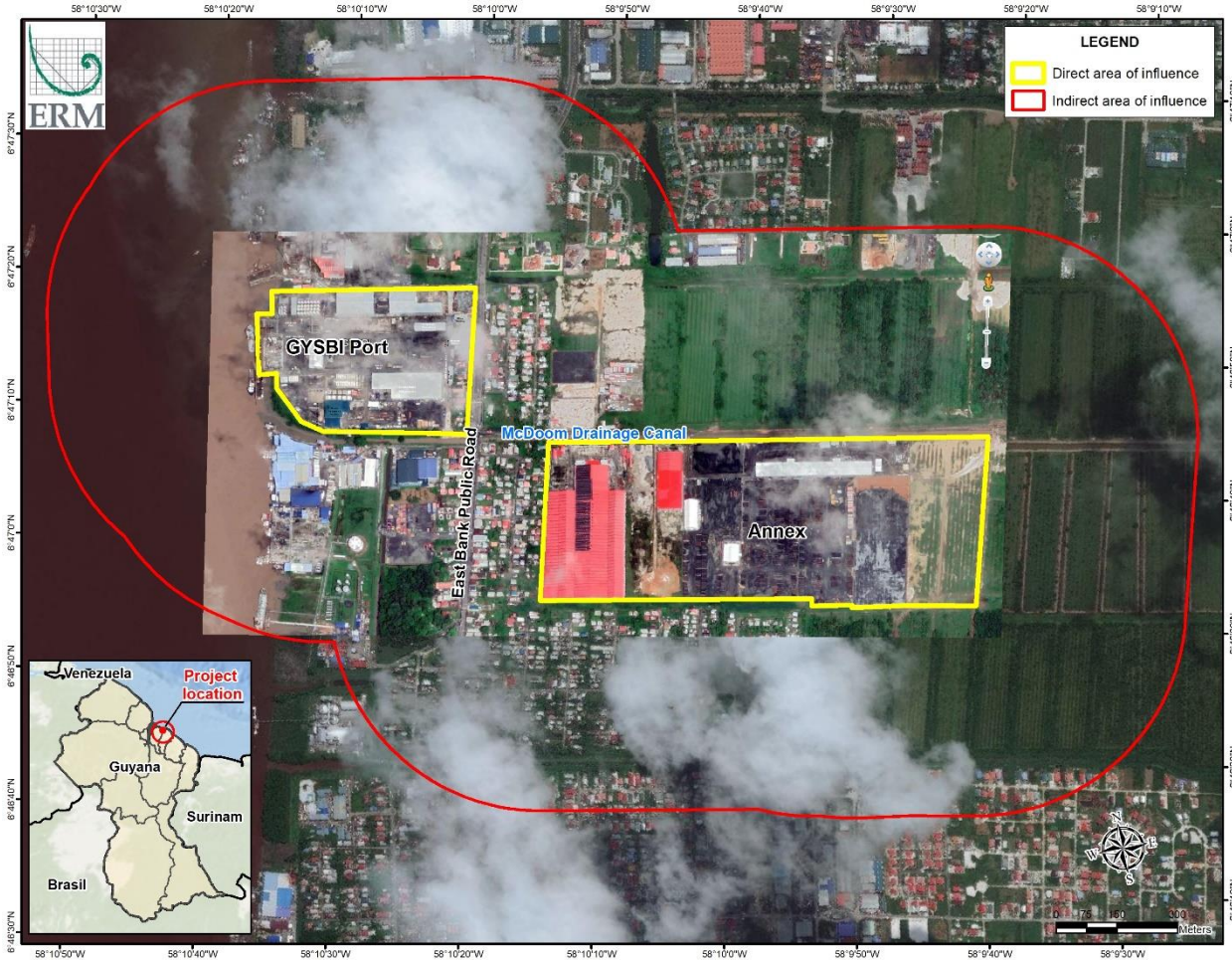


Figure 2-2: Area of Indirect Influence

2.5 Project Description

2.5.1 Project Location

The Project will take place in an area encompassing a total of 130 acres, on the eastern bank of the Demerara River, in the Houston area of Greater Georgetown as shown in

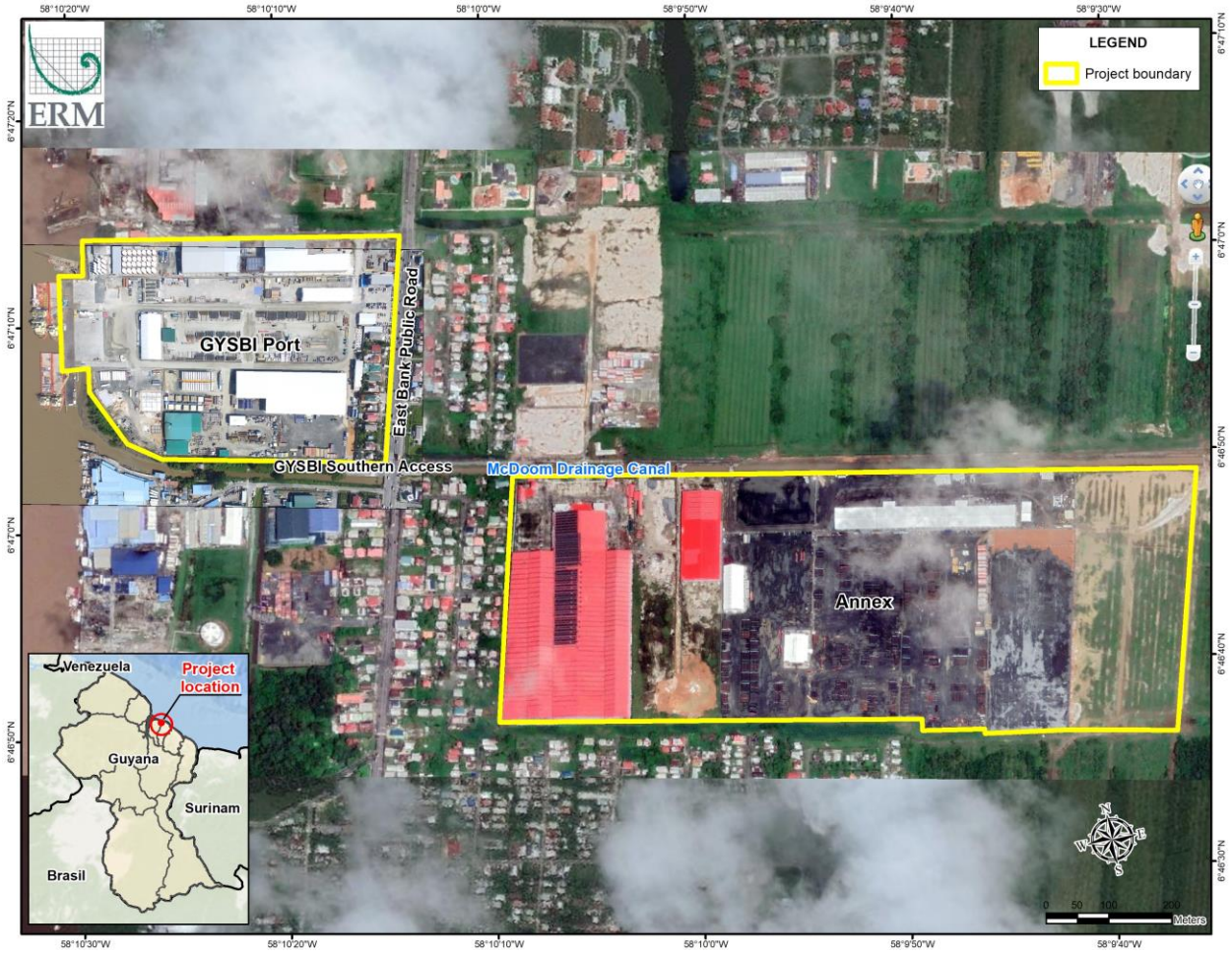


Figure 2-3and below. The Project area is relatively flat, with the Demerara River on the western boundary, a stormwater discharge channel where an access road has already been constructed, followed by more industrial development to the south, and mixed commercial and residential areas to the north and east.

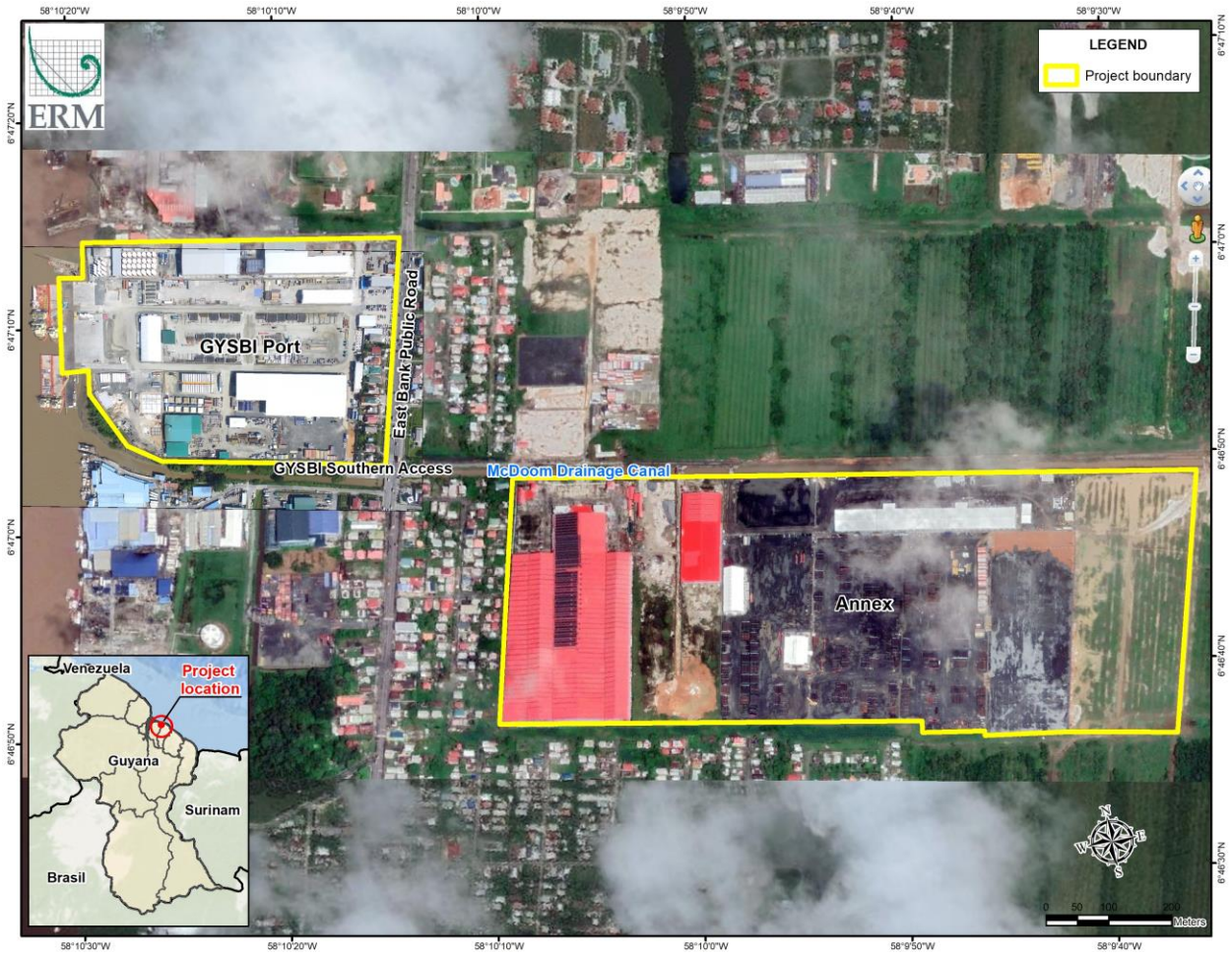


Figure 2-3: Site Location

2.5.2 Project Overview

This EA addresses the proposed improvements to the Port's transport and logistics, which can be divided into three main general activities:

1. The construction of two new berths, Berths 3 and 4, at the existing berth area
2. Development improvements to the GYSBI Port area
3. Construction of warehouses in the "Annex" area.

The following sections provide a detail description of the propose Project and associated facilities. Currently, the site is already developed as described below.

The existing berth area, owned by GYSBI partner Muneshwers, has several concrete wharfs and can accommodate 2 supply vessels as is. There are two protruding wharfs (one concrete and one timber), and a small facility on the northernmost corner which will be demolished as part of Project activities as can be seen in the demolition plan provided in the figure below.

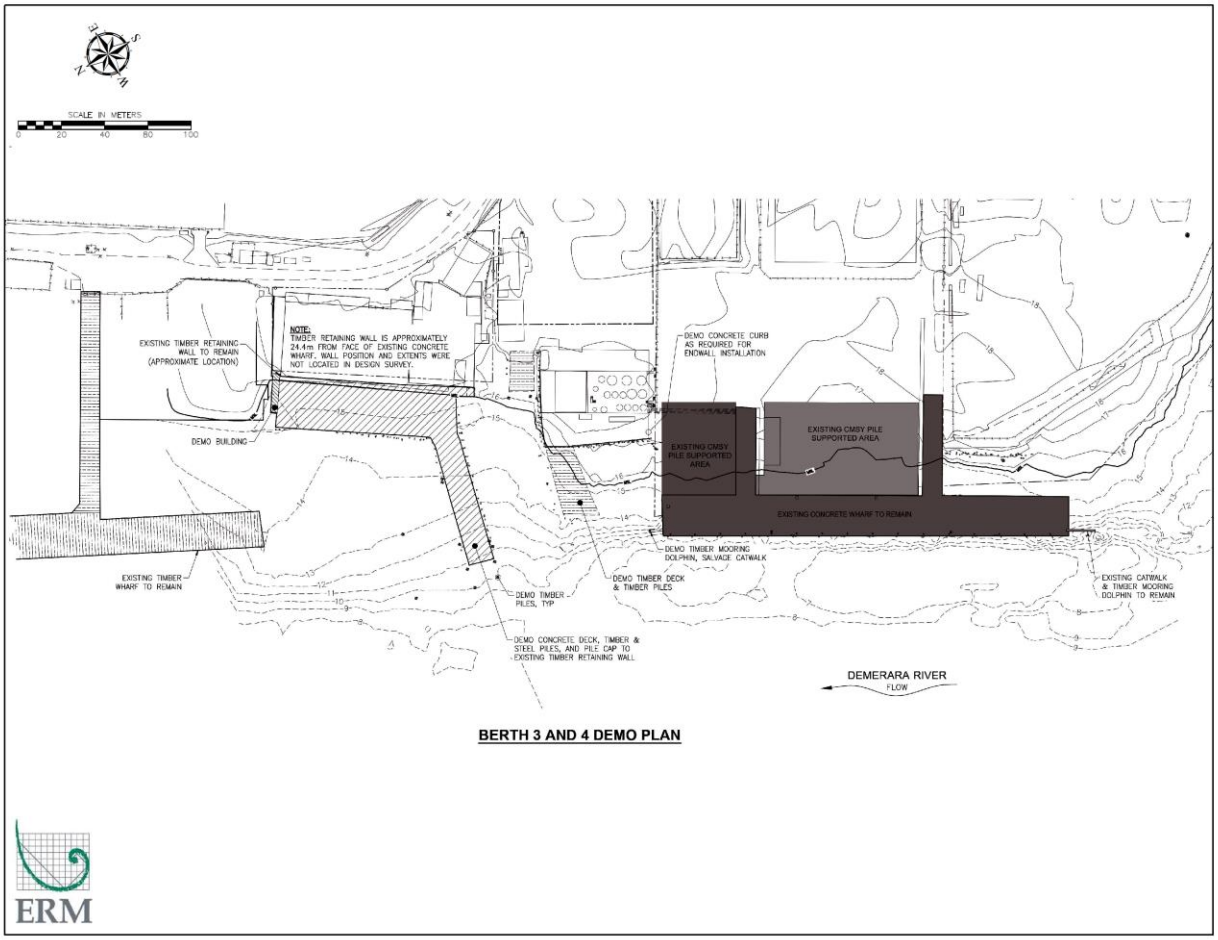


Figure 2-4: Demolition Plan for the Construction of Berths 3 and 4

The current GYSBI Port area, which encompasses approximately 30 acres owned by GYSBI partner Muneshwers, is occupied by multiple tenants and is mostly used for storage and a brand new fuel facility, as can be seen in the as-built figure and aerial provided below. The space is currently occupied by 4 tenants: Sustainable Environmental Solutions (SES) and Tiger Tanks both involved in waste management, Schlumberger for a warehouse and open yard storage, and Noble Drilling for a warehouse and open yard storage. Existing facilities in this area consist of:

- Multiple Warehouses
- Open storage yards for pipes and building materials
- Pipe laydown yard – pipes for all stages of the project
- Water well, water treatment plant, and water storage tanks
- Fuel farm
- Waste/hazardous waste treatment facility occupied by Tiger Tanks

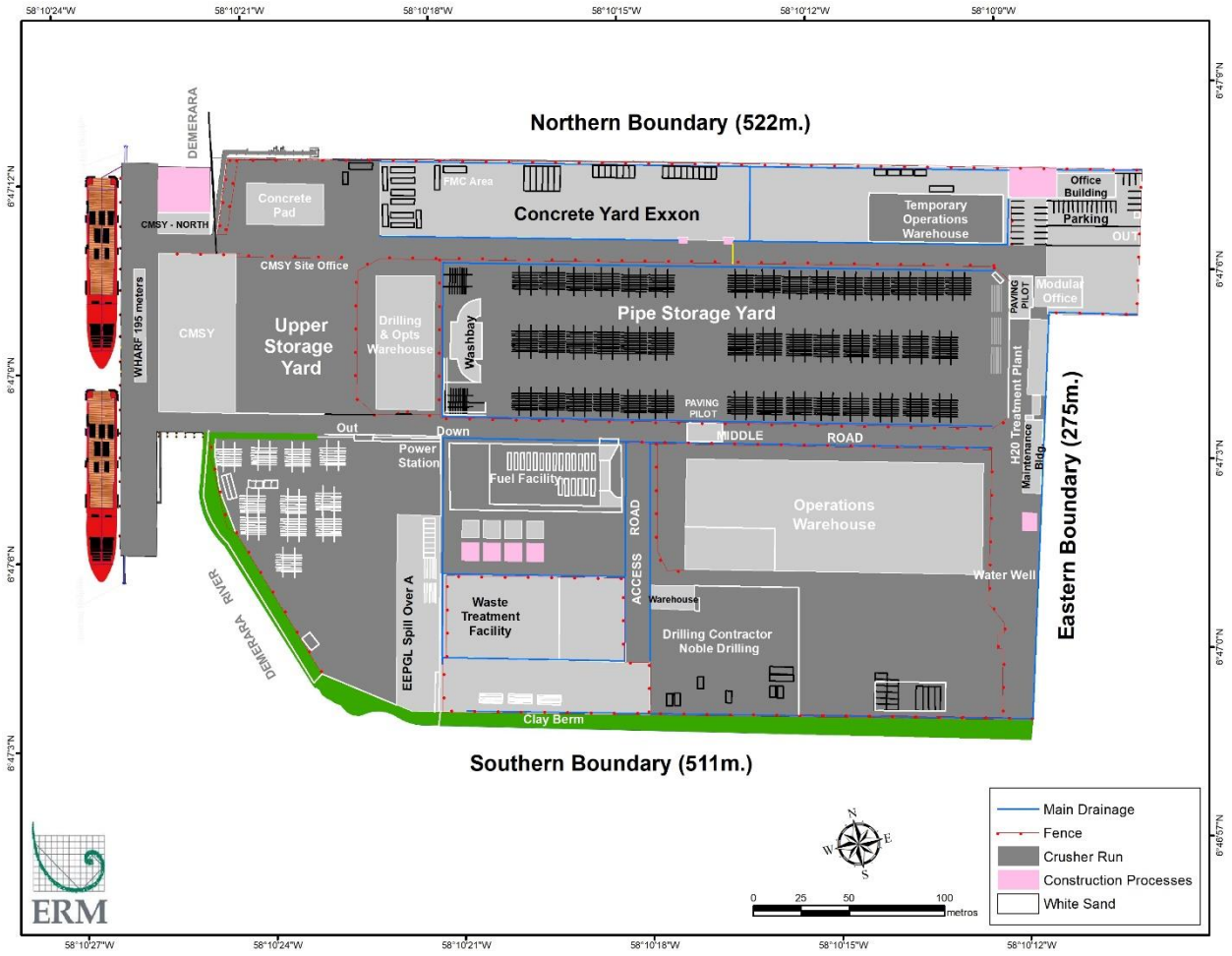


Figure 2-5: GYSBI Port Area As-built

Figure 2-6: Current Development at the GYSBI Port Area

The Annex area is comprised of approximately 100 acres which is currently leased with the option to buy from Gafoors[2]. This area is currently undeveloped; however, it is used for staging equipment and materials, with a small area of secondary growth. The area had historically been used by a plantation for sugar cane farming.

2.5.3 Project Components

The proposed Project will consist of the following main components which are explained in more detail in the following sub-sections:

- The construction Berths
  - Two new berths, Berths 3 and 4
  - Area filled to be used as ship yard (equipment storage for loading and unloading to vessels)
- GYSBI Port:
  - Expansion of the fuel farm
  - Construction of a South Entrance (already complete)
  - Water Treatment Bunkering and Expansion
  - Construction of new concrete decks at the Cargo Marshalling Storage Yard
- Annex area:

[2] Gafoors is a manufacturer of building materials

- Construction of 5 New Warehouses,
- Installation of a self-contained Washbay
- Construction of a Bridge
- Construction/preparation of covered and uncovered Staging and storage yards.

2.5.3.1 Berths 3 and 4

The construction of Berths 3 and 4 will allow the port to accommodate up to 4 vessels as can be seen in the figure below. Construction of Berths 3 and 4 will required the removal and demolition of existing facilities, dredging in the Demerara River, the installation of new bulkheads and sheet piles, and backfilling with structural fill material in order to extend Berths 3 and 4 to the same length as existing Berths 1 and 2. Once the Berths are operational, activities will con consist of:

- Loading and unloading vessels (Pipe, cargo, chemicals, drilling muds from dispensing stations, dry bulk, fuel, water)
- Warehousing (currently there are 5 warehouses on the GYSBI property, with more under construction)
- Open yard storage
- Pipe storage

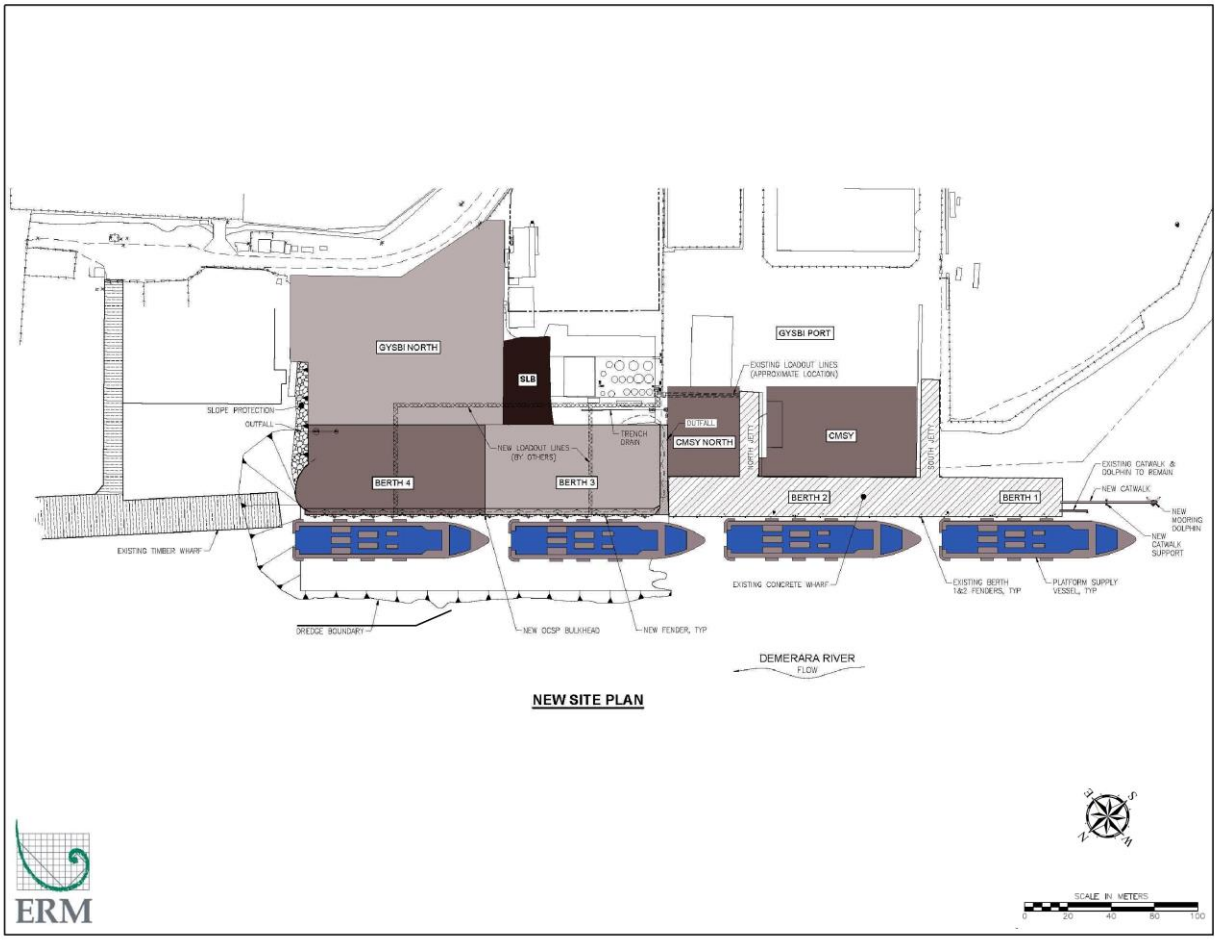


Figure 2-7: Proposed New Site Plan – Berths

The section below describes the Construction activities associated with this portion of the proposed Project in more detail.

2.5.3.2 Upgrades and Improvements to GYSBI Port

The proposed activities at GYSBI Port are shown in yellow in the figure below and are comprised mainly of improvements to the already existing facilities at this location. These activities include the expansion of the fuel farm by adding more tanks, modifications and improvements to the southern entrance, Water Treatment Bunkering and Expansion, construction of new concrete decks at the Cargo Marshalling Storage Yard, and other minor modifications throughout, such as installing new fencing and pouring concrete pads. Areas in green indicate areas where improvements have already taken place.

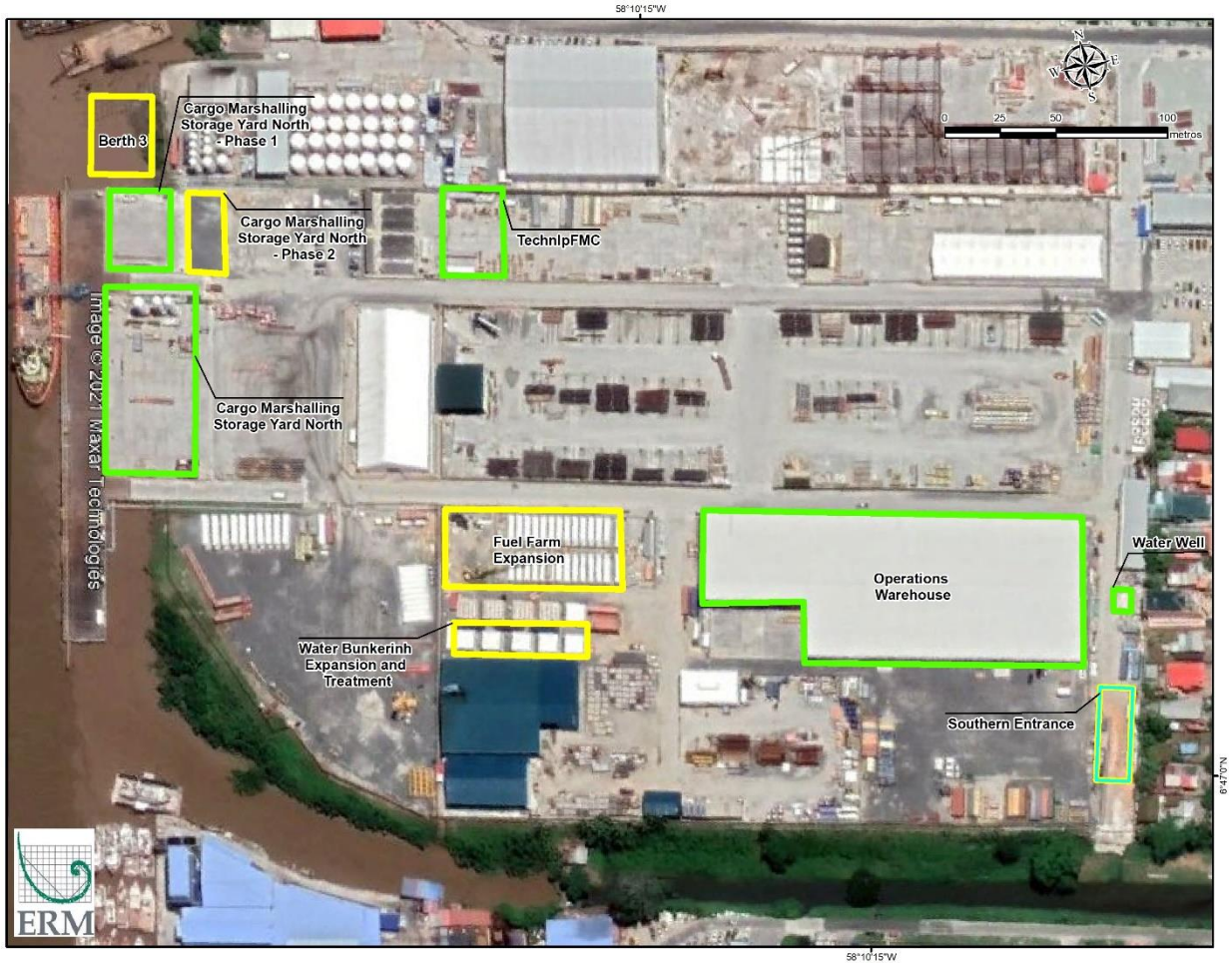


Figure 2-8: Proposed Modifications to the GYSBI Port

The fuel farm is currently made up 52 double walled interconnected tanks, stacked in two layers, with a control building, a fuel unloading pump house and a fuel loading pump house, as shown in Figure 2-9 below. The fuel farm is increasing capacity from 1 million to 3.1 million litres and is supplied by means of an underground pipeline from a nearby tank farm operated and owned by SOL Fuel Company (SOL), located to the south of the property. The fuel line is owned and operated by SOL. There is no anticipated increase in vehicle traffic due to the fuel farm storage capacity increase. The fuel farm is completely contained in case of spills.

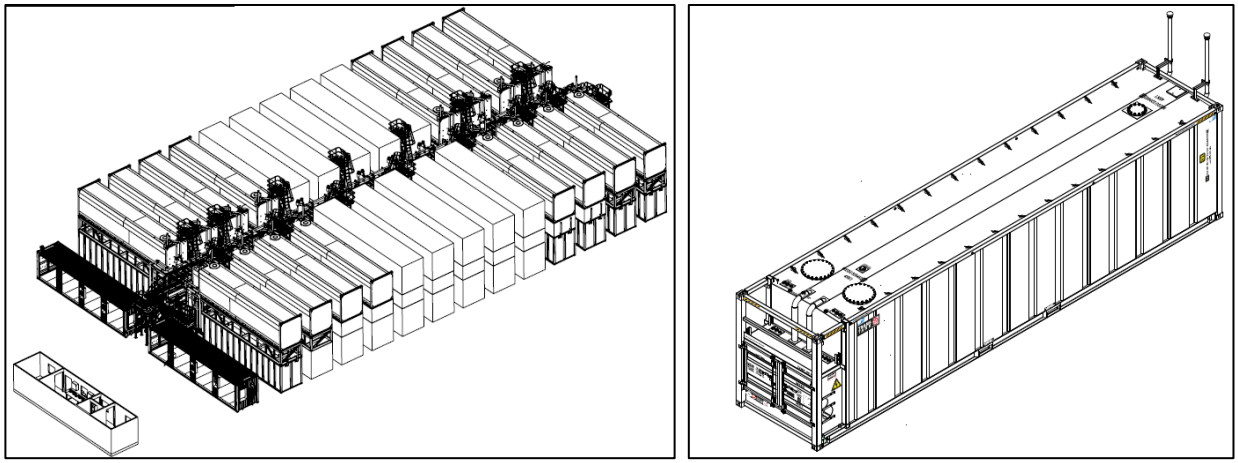


Figure 2-9: Fuel Farm and Individual Tanks

The site is currently supplied with water via an onsite water well and a water treatment plant (WTP). The Project is currently increasing the capacity of the water treatment facility as well as the storage capacity, to be able to treat up to 70 cubic meters of water per hour and store 1,440 cubic meters of treated water. The WTP will treat raw water to drinking water standards compliant with the World Health Organization and the U.S. Environmental Protection Agency. No changes will be made to the existing on-site well as a result of the WTP expansion.

As part of the improvement activities, the proposed project will also include the demolition of the old concrete deck and the construction of a new concrete deck at the Cargo Marshalling Storage Yard, which encompasses approximately 3,405 m^2.

2.5.3.3 Construction of Annex

The proposed activities at the Annex area include the construction of 5 new warehouses, the installation of a self-contained Washbay for washing pipes, the construction of a Bridge, and the construction/preparation of covered and uncovered Staging and storage yards.

In order to access the site from the existing private road, an additional bridge over the canal separating the Annex and private road is currently being constructed.

The design for the warehouses has not been finalized; however, these warehouses will likely resemble the existing warehouses at the site. Existing warehouses are comprised of a concrete slab foundation, with pre-engineered steel beam frames, insulated prefinished metal wall panels, and steel roofs. These warehouses will accommodate the storage of drilling and screen equipment. Most of the rest of the site will be allocated to the construction of a pipe laydown yard (approximately 40 acres).

A wash bay will also be constructed in this area (see Figure 2-10). The wash bay will be catered for pipe washing to remove lubes used for protecting pipes during transportation. These wash bays are pre-fabricated, self-contained bays which do not allow for wash water to be released into the environment. Water is filtered and reused (may require top off from evaporation, but no wastewater is produced). Waste generated (oily sludge and rags) will be transported to Tiger Tanks for treatment and disposal (see Section 2.5.5 on hazardous material). The figure below provides an example of these types of self-contained wash bays.

Source: Hydrokleen Wastewater Filtration Specification Sheet, Hydro Engineering, Inc. 2019

Figure 2-10: Example of a Self-Contained Wash Bay

2.5.4 Water and Utilities

2.5.4.1 Construction

Water for construction activities will come from either storage tanks onsite or from the local utility company and/or the well at the GYSBI Port property.

Wastewater generated during construction activities will consist of sanitary sewage. The Contractor will provide sufficient portable restroom facilities to accommodate construction staff. Waste accumulated in these portable facilities will be disposed of by an approved contractor offsite. Stormwater on site will be managed through the existing stormwater management features. Materials that could potentially contaminate stormwater will not be left exposed in order to prevent any stormwater contamination. No industrial wastewater effluents are anticipated during construction activities. Equipment will not be washed on-site.

Electricity required for construction activities will be facilitated by the use of generators or from the electric grid already available on-site.

2.5.4.2 Operations

The GISBY Port is equipped with an on-site WTP which draws water from the onsite ground water well, treats, and stores on site. This WTP also supplies the Berths. The WTP is currently being expanded as part of this project to treat up to 70 cubic meters of water per hour and store 1,440 cubic meters of treated water. The only waste to be generated from the treatment process will be the filter flush water which will be discharged directly to the wastewater system (wastewater will not contain any contaminants detrimental to the environment, with only high filtered iron and manganese content). Water at the Annex site will come from the local utility company. Current water use for operational activities as well as estimated future water use are provided in Table 2-1 below.

Table 2-1: Current and Estimated Water Use for Operational Activities

Activity	2018 Water Consumption (m^3/yr)	2019 Water Consumption (m^3/yr)	2020 Water Consumption (m^3/yr)	Estimate Water Consumption at Project Completion (m^3/yr)
Outbound Water to Vessels	12,032 m^3	26,217	38,870	77,740
Water used to wash pipes at Washbay	600 m^3	634	733	1,466

Wastewater at all of the Project sites will continue to be discharged to the on-site septic systems as well as portable toilets. Both are monitored and maintained daily by waste contractor. Construction at the annex will include the addition of portable toilets, also to be serviced by the same contractor.

Electricity for the GYSBI Port and Berth during operations will continue to be provided from the main grid, diesel generators (Tiger Tanks), and from solar panels. Most of the energy consumption on site is from air conditioning. Because activities at the site consist mainly of storage and lifting, energy consumption is not expected to increase. The facilities constructed at the Annex will be supplied electricity via solar panels and generators, with the bulk coming from onsite generators.

Stormwater at the GYSBI Port and Berths will collect through a series of trenches which will go to an Oil Water Separator prior to discharge to the surroundings. Stormwater at the Annex will collect through a series of drainage systems and will discharge to the stormwater canal located to the north of the property.

2.5.5 Hazardous Materials

2.5.5.1 Construction

Hazardous materials and waste generated during the construction stage could include small quantities of oils and lubricants, and chemicals such as adhesives. These materials would be drummed immediately and taken to Tiger Tanks on site for disposal via incineration (quantities anticipated are less than one 55 gal drum per week). Incinerator waste is not considered hazardous waste and is disposed at the local landfill (monitored by EPA).

Routine maintenance of cranes and excavators will produce small quantities of waste comprised of used oil, lubes, and oily rags. Maintenance activities will be conducted over drip pans and waste will be collected in drums and disposed of by Tiger Tanks on site via incineration.

Workers would be instructed in the hazardous properties of these chemicals, required protective clothing, and in the proper procedures for handling, storing, and eventual disposal of these materials.

Any hazardous waste generated during construction will be handled in accordance with the Hazardous Waste Management Plan.

2.5.5.2 Operations

During Operations, other than the materials in the Tiger Tanks Treatment Facility, the SES Facility, and the treatment chemicals at the WTP, only very minor quantities of hazardous materials are generated or

currently stored on site, hazardous materials such as drilling liquids and fuels are transported to the FPSO via supply vessels.

During operation, minor industrial waste is generated from maintenance activities (materials necessary for maintenance are typically purchased at the time of maintenance activities in quantities needed for one time use due to lack of storage space). These may include oily rags, lubes and paints. Materials are disposed onsite by the Tiger Tanks Company via incineration.

A water oil separator will be installed as part of construction activities for the berths. This oil water separator will be monitored and maintained by the waste contractor currently onsite daily. Oily sludge from the oil water separator will be taken to Tiger Tanks for recycling/disposal.

On site washbays (used for washing lube from pipes) also generate oily sludge. Oily sludge is drummed and transferred to Tiger Tanks for disposal (incineration).

Waste from minor maintenance operations and the washbays is drummed in 55 gal drums and transferred to Tiger Tanks for incineration (typically in less than one 55 gal drum per week).

There are no industrial process performed at the GYSBI Port site or at the Annex area. Materials at the Tiger Tanks Treatment Facility and SES are stored inside in secondary containment while awaiting treatment and disposal. Chemicals (including chlorine) used during the water treatment process with be stored in a bunded shed immediately adjacent to the WTP.

Esso Exploration and Production Guyana Limited (EEGPL) brings their waste on site for handling through their current contract with Tiger Tanks. SES is not currently in operation and will begin handling waste in 2021.

2.5.6 Waste

2.5.6.1 Construction

Waste generated during demolition activities for the new berths will consist of concrete and wood pilings, as well as woody debris and floating river trash and debris which as accumulated on the shores. Disposal will take place at the local landfill. Waste is disposed at the local Eccles Landfill by the construction contractor.

Waste generated during construction will include general domestic waste, including sanitary and food waste, office waste, and organic material. Petrol and diesel by-products will be generated from the transportation of goods and personnel, generators, and heavy construction equipment.

Dredge spoils will be generated from the dredging activities being done as part of construction of Berths 3 and 4. Dredging will be conducted only within the limits previously established by MARAD, to a depth of 6.5 meters below chart datum. Dredging is regulated by the Maritime Administration Department (MARAD) and the spoils are disposed in the same river they are dredged from, at a location determined by MARAD at the time of disposal. The EPC contractor will have to coordinate with MARAD for the appropriate disposal of the dredge spoils. An estimated amount of approximately 35,000 cubic meters of dredge material will have to be disposed from the Berth construction activities. Dredge spoils will consist of a loose mud layer which is replaced constantly by river flows, followed by a stiff clay undisturbed riverbed. The dredge spoils disposal site is in an area determined by MARAD, at the western side of the mouth of the Demerara River on the ocean; this site has been in use for several years by multiple users for dredge spoils disposal.

Large quantities of non-hazardous waste will be generated from packaging material, which typically arrive in wood pallets. The pallets are transferred to the Eccles landfill by the waste removal contractor (daily) where they are recycled.

Waste will be separated at source and labelled bins will be located within the Project Site for the storage of the various categories. Staff will be trained in proper waste management practices and the importance of implementing them. Cleaning staff will be trained in the safe handling and storage of waste and hazardous materials. They will also be provided with adequate personal protective equipment.

The Project will investigate the possibility of recycling non-hazardous waste. Non-recyclable, non-hazardous solid waste will be sent to the EPA licensed Eccles Landfill waste site in accordance with the Project's Management Plans.

2.5.6.2 Operations

Waste generated during operations will include general domestic waste, including sanitary and food waste, office waste, and organic material from both onsite facilities as well as vessels. For waste generated during operation activities, GYSBI has a contract with local waste management company who collects and transport waste off-site (approximately one truck load daily) to the Eccles Landfill. Wooden pallets from material packaging are also transferred to the Eccles Landfill where they are recycled by the locals (these pallets are typically in good condition).

2.5.7 Air

Due to increased vehicle traffic and earth movement activities related to the construction of the berths and the annex, increased air emissions comprised of dust (mostly for the annex) and vehicle emissions are anticipated during construction activities.

During operations, there will be an increase in air emissions from the increased number of vehicles and vessels coming to the site. In addition, there will also be increased emissions from the fuel farm expansion. Fuel to the fuel farm will be delivered via closed pipes coming from offsite. No fuel truck deliveries will be made to the site.

2.5.8 Security

During Construction, the Contractors will provide their own security or unless otherwise provided by GYSBI. The berths and the GYSBI Port are located inside a fenced complex so additional security may not be required. The Annex will need security and/or fencing around materials and equipment during construction in order to prevent theft. Security personnel are required to be unarmed.

During Operations, the GYSBI Port is fenced, with entrance only through the guardhouse with operations running 24/7. The Annex will be fenced in with no additional security. Security personnel are provided by Queensway Security and are required to be unarmed.

2.5.9 Workforce

2.5.9.1 Construction

During the construction phase, depending on scheduling, there will be an additional 50 people spread across multiple construction sites at the GYSBI complex. The Annex is developed 10 acres at a time, with approximately 20 construction employees at a time. The project will utilize local labour during construction to the extent possible.

2.5.9.2 Operations

Currently, GYSBI employs approximately 130 employees of which 30 are office staff and 100 are shift workers. Of these employees, approximately 97% are Guyanese, and approximately 5 – 10% are female. The GYSBI port operates 24 hours, with two twelve hour shifts and 1 shift on rotation. These numbers are

not expected to change much post construction activities. There are approximately 50 shift employees per Berth, so once all four Berths are operational, there will be approximately 200 shift employees plus the 30 office staff (this includes the GYSBI complex and the Annex Area).

2.5.10 Construction

2.5.10.1 Berths

Construction Activities

In general, the construction activities include the following:

1. Demolition of existing structures – small buildings; timber piles, decks, and retaining wall; concrete deck, steel piles and concrete curb. Demolition activities will take place using an excavator, with the assistance of slings and ropes. No explosives will be used for demolition.
2. Dredge area – perform initial dredging to install sheet piles. Dredging of the basin will be done using two long boom excavators and a barge followed by the hopper dredge.
3. Install Bulkhead – Install prefabricated template and then piles using a vibratory hammer from the barge using the Sany Crane.
4. Install Sheet Piles - Sheet piles will be driven on the face of the template. Each pile will be lifted by a crane with a ground release shackle and placed on the frame to be swamped after which they will be driven to the required elevation using a vibratory head.
5. Placing Fill – Filling will be done in layers. Sand will be brought in by barge load and discharged by crane and clam shell. Sand will also be brought in by road with the use of trucks. The sand will be placed in layers which can be compacted once the sand level is above the high tide level. The sand will be levelled by a loader or excavator depending on the conditions of the sand. This sand will then be compacted by the vibra-compaction method.
6. Vibra-compaction - Compaction will be done with the use an ICE Vibratory hammer attached to a probe rigged to a crane.
7. Install Wick Drains - Wick Drains will be procured from overseas and imported ahead of time. Wick drains are prefabricated geotextile filter-wrapped plastic strips with molded channels that act as drainage paths for pore water to consolidate soils faster.
8. Install Surface Course – once the desired elevation of fill is achieved, a surface course is installed. Surface course consists of geotextile and 2 layers of geocell filled with crushed stone, in layer lifts as per technical specifications.
9. Install Face Beams - Once the sheet piles have met the limit of stabilization any excess height is cut off and welded. Excess fill material is excavated to install the face beam.
10. Drive concrete piles and install pile caps - Pile caps will be poured with the use of ready mix concrete and left to cure before transition deck is installed.
11. Install reinforcements and pour concrete deck – Install support system and concrete slab deck.
12. Install drainage systems, oil grit separator, and sanitary sewer system with manholes.
13. Dredging to final desired depth – dredging of the basin to the final desired depth is done again as described above.

14. Rip-Rap installation - grade to the required slope and de-bushed. A geo-textile layer would first be placed then the larger boulders. Once the first layer of boulders are placed, fill material will then be placed to fill the voids between the rip-rap.

Design Safety Criteria

Berths 3 and 4 have been designed in accordance with the following codes and standards:

- American Association of State Highway and Transportation Officials (AASHTO) - LRFD Bridge Design Specifications, 8th Edition (2017): AASHTO LRFD 2017
- American Concrete Institute (ACI) - Building Code Requirements for Structural Concrete: ACI 318-14
- American Institute of Steel Construction (AISC) - Specification for Structural Steel Buildings: AISC 360-16 and Code of Standard Practice for Steel Buildings and Bridges: AISC 303-16
- American Society of Civil Engineers (ASCE) - Minimum Design Loads for Buildings and Other Structures: ASCE 7-16
- American Society for Testing and Materials (ASTM) - Annual Book of ASTM Standards: ASTM (Current Editions)
- American Welding Society (AWS) - Structural Welding Code – Steel: AWS D1.1/D1.1M:2015
- International Code Council (ICC) - 2012 International Building Code: IBC 2012

Materials

The following list outlines materials expected to be incorporated in the associated scope:

- Steel Sheet Pile – approximately 185 linear meters
- Rip-rap
- Structural Fill –
    - White sand – 115,710 m^3, supplied by local licensed sand dealers (by the airport).
    - Loam – 5,600 m^3
    - Crushed Stone/Crusher run – 4,000 m^3, source will depend on availability at the time of construction, only three licensed quarry operators in the area to transport either by truck or by barge.
- Wooden Piles (temporary mooring piles)
- CPEP and SDR Tubing

Materials will be brought on-site mostly by barge or by truck through the existing GYSBI Port. Suitable subgrade fill material will be obtained from the revampment of the on shore base, no permit is required for its reutilization. If suitable fill is not available in sufficient quantities, it shall be purchased from local suppliers.

Equipment

Powered Plant and Equipment required for the different types of works:

- Sheet Pile Driving / Template Construction:
    - Sumitomo CC1500 Crawler Crane (1)

  - Sany SCC750A Crawler Crane (2)
  - Sany SCC8100 Crawler Crane (2)
  - Delmag D30 & D46 Hammer
  - ICE 22-30 Vibratory Hammer
- Dredging of Basin
  - Trailing Suction Hoper dredge
  - Backhoe Dredging
- Monitoring of Control
  - Total Station
  - Benchmarks
- Removal of Timber Piles
  - Sumitomo Crane
  - ICE Vibratory Hammer
- Compaction of Sand
  - ICE 22-30 Vibratory Hammer
  - Water pump
  - Vibratory Rollers
  - Plate Compactors
- Others: Barges, Tug Boats, Supply Boats, Concrete Trucks, Drills, and Excavators.

Site Access

Site access will be done from either water or from EC Vieira old dry dock yard depending on the activity, through the existing access roads. There are no planned activities as part of site access.

Schedule

According to the construction schedule, it will take approximately 8.5 months for construction activities, from the original mobilization to the demobilization. The berths are expected to be completed by October 2021.

2.5.10.2 GYSBI Port

Construction Activities

The main construction activities at the GYSBI Port will be for the construction of a new concrete deck at the Cargo Marshalling Storage Yard. The rest of the construction activities will not be such large scale and will involve mostly purchasing prefabricated equipment for construction on site. Anticipated construction activities include:

- Mobilization: Bringing equipment, materials, and personnel onsite.
- Site Preparation: setting out and surveys, demolitions and removals. Demolition activities will take place using an excavator, with the assistance of slings and ropes.

- Soil works: excavations, backfills, placing gravel top layers
- Concrete works: Prefabricated pre-stressed concrete piles, Piling at site, Pile capping, prefabricated concrete beam sections, reinforced concrete deck, prefabricated Barriers
- Structural steel works: embedded U-beams, installation of steel ramp plates, inspection Grating, Railings
- Paintworks and surface preparations for structural steel, and
- Installation of drainage pits.

The Fuel Farm expansion involved bringing in the pre-fabricated tanks and on-site and assembling and connecting onsite. The Fuel Farm expansion is complete although it is not yet operational.

Design Safety Criteria

Construction activities and facilities on the GYSBI Port have been designed in accordance with the following codes and standards:

- Concrete pre-stressed piles shall be procured in accordance with BS EN 206-1, BS 8005, BS 6722 and BS EN 12794.
- Repairing mortar (grout): For repairing mortar A R4 mortar should be used, meeting the requirements of EN 1504-3:2005.Pilings: EN 12699 Execution of special geotechnical work displacement piles; EN 12794, Precast concrete products – Foundation piles; EN 13670, Execution of concrete structures; EN 16228 (all parts), Drilling and foundation equipment-Safety.
- Structural steel S275JR or S355JR according to EN 10025 should be used for general purposes. Structural steel S235JR according to EN 10025 can be used for minor structures.

The Fuel Farm has already received a fire service license – permitting activities included audit from fire department. Safety design features for the Fuel Farm were to prevent risk of catastrophic failure. Each tank is double walled and can be individually operated (although they are manifolded. The system currently includes fire extinguishers and manual shut down mechanism. An automated fire response system is currently being installed. This fire response system include piping for a foam system that will blanket the entire fuel system in case of a fire. Foam is produced as needed in the foam system (produced by mixing a dry product into the high pressure water system). Because of the foam system, the entire fuel system is inside a contained bunded system, as required by EPA. A comprehensive operations plan is being prepared for the system which will be operated by SOL.

Materials

Materials required for the proposed construction activities that will take place at the GYSBI Port are the typical materials needed for construction and will be acquired locally. Design details have not been finalized therefore material quantities are not yet known. In general, construction materials required are the following:

- Concrete
- Subgrade Fill Material
- Reinforced Steel/Rebar

Suitable subgrade fill material will be obtained from the revampment of the on shore base, no permit is required for its reutilization. If the suitable fill material is not available in sufficient quantities, it shall be purchased elsewhere from a local supplier.

Equipment

Construction activities at the GYSBI port are still in the design phase and a list of equipment is not yet available. Typical construction equipment includes:

- Dump trucks;
- Bobcats;
- Tractors;
- Water trucks;
- Tractor-loader-backhoes;
- Pick-up trucks; and
- Excavators.

Site Access

Site access is through the newly constructed south entrance which is off the main E Bank Public Road. In addition to the entrance, a new traffic light will also be installed at this location in order to mitigate traffic impacts to the main road. No additional modifications are needed for site access as part of the proposed Project Activities.

Schedule

The Fuel Farm expansion as well as the south entrance construction have already been completed. The berths are expected to be completed by October 2021.

2.5.10.3 Annex

Construction Activities

The Annex activities are still in the design phase and construction activities have not yet been defined. Typical construction activities for the proposed Annex construction could include:

- Site Clearing – the site will have to be graded prior to initiating construction activities. The site is already in use and only a very small portion has secondary growth which will have to be removed.
- Foundations – The facilities will require concrete slab foundations for the assembly and tie down of the warehouses.
- Bridge Construction – A concrete bridge able to withstand the heavy loads of trucks coming in and out of the facility which is part of the Project is already being constructed.
- Building Assembly – as with the rest of the warehouses at the site, the warehouses at the Annex facility will likely be pre-fabricated steel warehouses, which will need to be assembled at the site.

Equipment

The Annex activities are still in the design phase and a list of equipment is not yet available. The construction equipment will be typical of most construction activities as described in the Equipment Section for the GYSBI Port above.

Site Access

Site access to the Annex will be from the pre-existing private road to the north of the Annex, across the existing bridge over the drainage canal. This road is already in use by the site. A new bridge is currently being constructed over the canal as part of Project activities. This Bridge will have a loading factor of 100 tons, in order to accommodate the heavy loads coming in and out of the site.

Schedule

A schedule is not yet available for these project activities.

2.5.11 Operations

During operations, activities at the site will remain as they were pre-construction activities. The tenants will continue to use the site for equipment storage and laydown areas, loading and unloading of vessels at the berths, waste/hazardous waste treatment facility, and fuelling operations. Expected changes to workforce were discussed in Section 2.5.8 above.

Expected traffic between the GYSBI Complex and the Annex will be primarily trucking of items arriving at the Berths for storage. Traffic will be comprised of heavy trucks and 40 foot trailers going from the south entrance directly, across the main road to the Annex Facility.

Due to the addition of Berths 3 and 4, the number of vessels is expected to increase. The estimated number of vessels at the completion of the project is projected to increase from 1,835 vessels in 2020 to 3,670 vessels in 2022 (includes all vessel types: Commercial Vessels, Fast Supply Vessels, Multipurpose Vessels, and Platform Supply Vessels). Vessel traffic on the Demerara River is currently monitored and controlled by MARAD. Users pay for a pilotage service to navigate the river. It will be up to MARAD to continue to monitor and control the vessels.

3. POLICY, LEGAL, AND ADMINISTRATIVE FRAMEWORK

This section of the EA evaluates the existing Guyanese institutional and regulatory frameworks as well as IDB Safeguard Polices applicable to the Project.

3.1 National and International Legislation Guiding the EA

Several statutes of Guyana will be used to regulate the Project. These statutes contain requirements to be implemented to ensure compliance with the applicable laws and regulations of Guyana.

This Section reviews the relevant laws and regulations in Guyana that are applicable to the Project; the chapter is separated into three sections:

1. *National Legal Framework:* describes the laws and regulations that apply to environmental issues in a general context, such as the Constitution of Guyana, as well as national laws that focus specifically on environmental issues such as the Environmental Protection Act, as amended in 2005. This section also identifies several resource-specific environmental laws that are more narrowly focused and have either direct or indirect relevance to the Project.
2. *National Policy Framework:* describes the Government of Guyana's strategies and policies that apply to the Project. These strategies and policies articulate the Government's management goals with respect to various environmental issues.
3. *International Conventions and Protocols:* describe the international and regional conventions and protocols to which Guyana is a signatory and which are relevant to the Project.

3.1.2 National Legal Framework

The key environmental legislation, currently in force in Guyana that pertains to resources that could be affected by the Project include the following:

3.1.2.1 National Constitution of Guyana

Guyana is governed according to the Constitution of the Co-operative Republic of Guyana, which took effect in 1980 and expressly provides for protection of the environment. Article 25 establishes "improvement of the environment" as a general duty of the citizenship. In addition, Article 36 reads as follows:

"In the interests of the present and future generations, the State will protect and make rational use of its land, mineral and water resources, as well as its fauna and flora, and will take all appropriate measures to conserve and improve the environment."

3.1.2.2 Environmental Protection Act (Chapter 20:05 – 5th June, 1996[3])

In 1996, the Environmental Protection Act was enacted to implement the environmental provisions of the Constitution. The Act is Guyana's single most significant piece of environmental legislation because it articulates national policy on important environmental topics such as pollution control, the requirements for environmental review of Projects that could potentially impact the environment, and the penalties for environmental infractions. It also provides for the establishment of an environmental trust fund.

[3] http://ggmc.gov.gy/main/sites/default/files/Divisions/Environmental%20Protection%20Act.pdf

Most importantly, the Act authorizes the formation of the Environmental Protection Agency (EPA), and establishes the EPA as the leading agency on environmental matters in Guyana. The Act further mandates the EPA to oversee the effective management, conservation, protection, and improvement of the environment. It also requires the EPA to take the necessary measures to ensure the prevention and control of pollution, assessment of the impact of economic development on the environment, and sustainable use of natural resources.

3.1.2.3 The Guyana Geology and Mines Commission Act (Chapter 65:09 – 14th May, 1979[4])

Enacted in 1979, the Guyana Geology and Mines Commission Act authorized the government to establish the Guyana Geology and Mines Commission (GGMC, an agency of the Ministry of Natural Resources. The GGMC promotes and regulates the exploration and development of the country's mineral resources. The GGMC has a dedicated Petroleum Unit charged specifically with regulatory supervision of the oil and gas sector; however, petroleum related activities also occur in other divisions, such as the Geological Services Division and the Environment Division.

3.1.2.4 Protected Areas Act (ACT No. 14 of 2011 – 27th September, 2011[5])

The Protected Areas Act was enacted in 2011. It provides for protection and conservation of Guyana's natural heritage and natural capital through a national network of protected areas and creates a Protected Areas Commission to oversee the management of this network. It also highlights the importance of maintaining ecosystem services of national and global importance and public participation in protected areas and conservation and it establishes a protected areas trust fund to ensure adequate financial support for maintenance of the network.

Other functions of this act include promoting national pride in and encouraging stewardship of Guyana's natural heritage, recognizing the conservation efforts and achievements of Amerindian Villages and Amerindian Communities and promoting the recovery and rehabilitation of vulnerable, threatened, and endangered species.

3.1.2.5 Amerindian Act (ACT No. 6 of 2006 – 14th March, 2006[6])

The Amerindian Act was enacted in 2006. It provides for the recognition and protection of the collective rights of Amerindian villages and communities, the granting of lands to Amerindian villages and communities and the promotion of good governance with Amerindian villages and communities. The Ministry of Indigenous Peoples' Affairs oversees the implementation of the Act. Key aspects of the Act include the following (Ministry of Indigenous' Peoples Affairs 2018):

- The Act includes a process for the granting of land. A community can apply for land once they can prove that they have been living there for at least 25 years.
- The Ministry is not required to approve leasing of titled Amerindian land. The communities are only required to seek the advice of the Minister.

[4] http://www.guyaneselawyer.com/lawsofguyana/Laws/cap6509.pdf
[5] http://parliament.gov.gy/documents/bills/Act%20No.%2014.pdf
[6] http://parliament.gov.gy/documents/acts/4680-act_no_6_of_2006.pdf

- With respect to the use of scientific research related to Amerindian issues, the researcher must, among other things, submit to the Village Council a copy of any publication containing material derived from the research.
- The Act supports the need for the communities to use their natural resources in a way that lends support to the concept of sustainability. Impact assessments, where appropriate, are required in accordance with the Environmental Protection Act.
- Amerindians have a legal right to traditional mining with the consent of the Village Council and they must comply with the relevant legislation. With regards to forestry, the Village Council plays an integral role in determining who can use their land and on what terms.
- The Village Council is empowered to establish rules for their communities and set fines within the legal confines of the law. Money received due to the non-adherence of the rules goes into the Village Council's account, not the government.

3.1.2.6 Other Resource-Specific National Environmental and Social Laws

Several additional Guyanese environmental laws with more narrowly defined scopes pertain to specific biological or physical natural resources. Other laws that primarily have a public health related focus may also be relevant to the Project. Several of Guyana's environmental statutes were enacted prior to the Constitution and were subsequently incorporated into the newly formed national legal framework, but most were enacted after 1980 (Table 3-1).

Table 3-1: Other National Environmental and Social Laws

TITLE	OBJECTIVE	RELEVANCE TO THE PROJECT
Biological Resources		
Fisheries Act, 2002	Regulates fishing and related activities in Guyana territorial waters.	Section 33(1) of the Fisheries Act authorizes the prohibition and/or regulation of deposition or discharge of substances harmful to fish.
Wild Birds Protection Act, 1987	Protects listed wild birds in Guyana.	Sections 3 and 6 prohibit knowingly wounding or killing wild birds listed in the First and Second Schedule of the Act. Penalties are also established as part of the Act.
Species Protection Regulations, 1999	Provides for the establishment of a Management Authority and a Scientific Authority in compliance with the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).	Provides for wildlife protection, conservation, and management.
Wildlife Management and Conservation Regulations, 2013 (supplemented by passing of Wildlife Conservation and Management Act, 2016)	Provides for the establishment of a Management Authority and the management of the country's flora and fauna. Provides for classification of some species as vulnerable, endangered, or critically endangered; 2016 Act specifies that the Act applies to all species in CITES Appendices I, II and III unless otherwise reserved by Guyana.	Provides a supportive mechanism cognizant of the national goals for wildlife protection, conservation, management and sustainable use.
Environmental Protection Water Quality Regulations, 2000	Establishes that the EPA shall, at any time after the commencement of the Regulation, establish parameter limits of effluent that may be discharged into any inland or coastal waters or land of Guyana. Includes reporting requirements,	Regulates discharges of listed substances, which could include substances used as part of the Project.

TITLE	OBJECTIVE	RELEVANCE TO THE PROJECT
	penalties for violations of standards, and permitting requirements for discharges.	
Environmental Protection Air Quality Regulations, 2000	Establishes that the EPA shall, at any time after the commencement of the Regulation, establish limits for any of the contaminants specified in the Regulation. Sets ambient air quality standards, reporting requirements, penalties for violations of standards, and permitting requirements for stationary and mobile sources of air emissions.	Applicable to Project sources of air emissions (although no limits have yet been established by EPA).
Environmental Protection Hazardous Waste Regulations (2000)	Establishes requirements for generating, handling, and disposing of hazardous waste as well as penalties for violations of these requirements.	Identifies waste subject to regulation, including several types of waste that could be generated as part of the Project.
Pesticides and Toxic Chemicals Control Act Cap. 68:09 (2000, as amended in 2007)	Provides for the formation of a Pesticides and Toxic Chemicals Control Board. Establishes requirements for registration, licensing, and trade in pesticides and toxic chemicals. Amended in 2007 to provide rules for the exportation of pesticides and toxic chemicals.	Establishes regulations pertaining to the use of toxic chemicals and pesticides. Pesticides will not be required for this Project but small amounts of chemicals may be used. This Act regulates the importation, registration, and use of such chemicals. NOTE: Where a third party is involved, the Third Party shall have all the necessary permits to comply with this regulation.
Environmental Protection Noise Management Regulations, 2000	Establishes general provisions for noise avoidance and restrictions from multiple commercial and industrial sources including sound making devices, night clubs, equipment, tools, and construction activities. Authorizes EPA to set specific permissible noise levels in the future. Includes reporting requirements, penalties for violations of standards, and permitting requirements for operations that emit noise.	Regulated facilities include any offshore installation and any other installation, whether floating or resting on the seabed.
Guyana Standard, Requirements for Noise Emission into the Environment, 2010	Establishes standard used for monitoring of noise emission into the environment; sets permissible noise levels for residential, commercial, and industrial areas (day and night).	Relevant to Project-related noise levels that could be perceived in commercial, residential or industrial districts (i.e., onshore or nearshore activities)
Forests Act (2009) Act. No. 6 of 2009.	Consolidates the law relating to forests and makes provisions for sustainable forest management and forest conservation.	Covers mangroves, which are classified as a forest type and subject to protection measures under the Act.
Public Health		
Occupational Safety and Health Act (1997) Cap. 99:06	Legally defines the responsibilities of workers and management with respect to keeping workplaces safe.	Generally, applies to Project workers and Project-related activities.
Food & Drug Regulations (Food and Drug Act, 1971) Cap. 34:03	Regulates the sale, advertisement, preparation, and handling of food products; regulates the manufacture, advertisement, trade, and administration of pharmaceuticals; provides the Ministry of Health authority to facilities to establish compliance with sanitation standards.	Governs the preparation of food and provision of medications at Project facilities.

TITLE	OBJECTIVE	RELEVANCE TO THE PROJECT
Ministry of Health Act (2005)	Sets out the functions of the Ministry of Public Health (previously the Ministry of Health) and the duties of the Minister. Among the responsibilities conferred to the Ministry by the Act are to provide oversight of health care services including mental health; provide advice to government and establish policies on health; develop and ensure the implementation of the National Health Plan and other action plans and directives including human and all other resource requirements; enter into service agreements with the Regional Health Authority (RHA) and review and approve their health plans and budgets; and facilitate the accreditation and regulation of the health care professionals, hospitals, and other health facilities in the public and private sectors.	Generally, applies to health care services supplied to Project workers.
Regional Health Authority Act (2005)	Provides the RHA with the responsibility for providing for the delivery and administration of health services and health programs in specified geographic areas and for matters incidental thereto or connected therewith.	Establishes the regional regulations under which health services would be provided to Project workers.
Health Facilities Licensing Act (2007)	Under the act, all health facilities must be licensed by the Minister of Public Health. The Act also provides for inspectors who are authorized to enter any facility and conduct inspections. Offenses are outlined with fines and imprisonment upon summary conviction. Importantly, the act also provides for the Minister to make regulations related to licenses, renewals, standards for health facilities, record keeping, prescribing and governing the construction, establishment, location, equipment, maintenance, and repair of, additions and alterations to, and operations of health facilities.	Sets the requirements for health facilities at which services would be available to Project workers.
Social / Cultural Resources		
National Trust Act (1972) Cap. 20:03.	Stewardship of historic resources and places of cultural significance.	Governs the management of any building, structure, object, or other manmade or natural feature that is of historic or national cultural significance that could be impacted by the Project. Includes shipwrecks and other marine features. Would only apply to the Project in the event of a chance find, in which case the Act would require GYSBI to work cooperatively with the National Trust to manage any resources discovered.
Prevention of Discrimination Act (1997) Cap. 99:08.	Provides for the elimination of discrimination in employment, training, recruitment, and membership in professional bodies and the promotion or equal remuneration to men and women in employment who perform work of equal value.	Prevents discrimination in employment practices.
National Insurance and Social Security Act (1969) Cap. 36:01.	Establishes a system of national insurance and social security providing pecuniary payments by way of old age benefit, invalidity benefit, survivor's benefit, sickness benefit, maternity benefit, and	Provides the overarching framework for workers' insurance and other benefits.

TITLE	OBJECTIVE	RELEVANCE TO THE PROJECT
	funeral benefit, and to substitute for compensation system of insurance against injury or death caused by accident arising in the course of employment or resulting from disease due to the nature of employment; establishes a National Insurance Fund.	
Employment of Young Persons and Children Act. Cap. 99:01.	Seeks to implement certain conventions relating to the employment of young persons and children.	Restricts the ages of young persons who may be employed by the Project.
Termination of Employment and Severance Pay Act (1997, 1999) Cap. 96:01.	Makes provision for the conditions governing termination of employment and grant of redundancy or severance payment to employees.	Governs payments to employees or the termination of employment. This could be relevant to contractors and subcontractors to the Project.
Amerindian Act (2006) Cap. 29:01.	Provides for the recognition and protection of the collective rights of Amerindian villages and communities, the granting of lands to Amerindian villages and communities, and the promotion of good governance with Amerindian villages and communities.	Within the broad context of protection of the collective rights of Amerindian villages, this could include the right of use of coastal resources for traditional and subsistence activities, which could be affected in the event of an oil spill from the Project.
Social Infrastructure and Services		
Sea Defence Act (1953, 1988, 1992) Cap. 64:03.	Aims to make better provision for the maintenance and construction of sea defences in Guyana.	Covers the protection of mangroves, which serve as a natural sea defines mechanism; there are fines and penalties for the unpermitted destruction of mangroves. Relevant to the Project in the event of an oil spill reaching the shore and causing mangrove damage.
Town and Country Planning Act (1996) Cap. 20:01.	Provides for the orderly and progressive development of urban and rural lands and the preservation and improvement of amenities pertaining to such development. Development under the Act is restricted to buildings and roadworks incidental to buildings.	Could be relevant if the Project builds commercial, industrial or residential structures. It would also be relevant for the land use clearance process (within the building permit process) within the Central Housing and Planning Authority.
Water and Sewerage Act (2002) Cap. 30:01.	Provides for the ownership, management, control, protection and conservation of water resources, the provision of safe water, sewerage and advisory services and the regulation thereof.	Has no direct applicability to the Project, as water resources are defined as water systems, conservancies, canals and water from rainfall or runoff from the land.
Maritime Use and Transportation		
Guyana Shipping Act (1998) Cap. 49:01.	Establishes the framework for the regulation of vessels and sets out the Maritime Administration Department (MARAD) and its functions.	MARAD is the principal regulator for vessels operating in the marine environment and all vessels associated with the Project will fall under the purview of MARAD.
Maritime Zones Act (2010) Cap. 63:01.	Incorporates certain provisions of the United Nations Convention on the Law of the Sea and the United Nations Educational, Scientific and Cultural Organization (UNESCO) Convention on the Protection of the Underwater Cultural Heritage, to provide for marine scientific research, maritime cultural area, ecotourism, marine parks and reserves and mariculture, the protection and preservation of the marine environment and for related matters.	Relevant to the Project as it makes provisions for passage in the territorial sea, and the discharge of harmful substances and hazardous waste. In addition, relevant when specific maritime zones are established for the protection and preservation of the marine environment and for mariculture activities.

Source: ERM, 2018.

3.1.3 National Policy Framework

Guyana's government has articulated national policies on several environmental and social topics that are relevant to the Project. This section provides an overview of the key government environmental and social policies applicable to the Project.

3.1.3.1 Low Carbon Development Strategy and the Green Economy

In June 2009, the Government of Guyana announced the Low Carbon Development Strategy (LCDS). The LCDS aims to protect and maintain the forests in an effort to reduce global carbon emissions and at the same time attract payments from developed countries for the climate services that the forests provide. In 2013, the LCDS was updated to focus on two main goals:

Transforming the national economy to deliver greater economic and social development by following a low carbon development path while simultaneously combating climate change; and

Providing a model for the world of how climate change can be addressed through low-carbon development in developing countries. The LCDS identifies Reducing Deforestation and Forest Degradation Plus as a primary mechanism for achieving the goals of the strategy. Although there is no formal government plan for achieving a green economy, the Government of Guyana has expressed interest in the concept. President David Granger has defined the green economy as consisting of the four pillars of energy, environmental security, ecological services, and enterprise and employment (Kaieteur News 2016). The LCDS provides the conceptual framework for implementing the green economy.

3.1.3.2 Green State Development Strategy

Launched in June 2017, the Framework of the Green State Development Strategy was the paradigm for national development activities in Guyana from 2018-2020. The Framework outlines Vision 2030 for "greening" Guyana. It encompasses seven key thematic areas as follows, structural transformation, resilient infrastructure, sustainable management of natural resources, transitioning to renewable energy, human health and wellbeing, governance, and international cooperation. The framework was the focus of national consultations by the Government of Guyana in 2018.
The Green State Development Strategy: Vision 2040 is aligned with the country's commitments under the United Nations Sustainable Development Agenda and Goals (SDGs). Several of the SDGs address environmental and social imperatives. Specifically, SDG-13 Climate Action seeks to, "Take urgent action to combat climate change and its impacts", whilst SDGs 14 and 15 seeks to "Conserve and sustainably use the oceans, seas and marine resources for sustainable development" and "Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification and halt and reverse land degradation and halt biodiversity loss."

3.1.3.3 Draft National Development Strategy

The Draft National Development Strategy (NDS) developed in 1997 was one of Guyana's early attempts at setting priorities for Guyana's economic and social development policies The six volumes of the NDS contains technical analysis of problems and future prospects in all sectors of the economy and in areas of social concern. It also contains governmental policies with regard to the environment as well as social and gender equity.
It identifies 12 distinct features of Guyana's natural resources and environment, and sets policies governing the management of each feature. Features covered under Volume 3 with relevance to the Project include the coastal zone, fisheries, waste management, pollution control, and environmental impacts of private-sector activities (NDS 1997).

Volume 5 is relevant as it relates in part to the energy sector. It describes the energy sector in Guyana, reviews past government policies related to the energy sector, identifies challenges facing the energy sector in Guyana, and describes the government's vision for future development and regulation of the sector into the future (NDS 1997).

3.1.3.4 National Environmental Action Plan

Guyana's National Environmental Action Plan (NEAP) articulates the government's approach to managing the environment from the perspective of economic development. The NEAP considers the issues of environmental management, economic development, social justice, and public health to be inextricably linked. It identifies deforestation, pollution, and unregulated gold mining as historically minor but with growing environmental problems, and identifies private sector investment as one of the primary opportunities to generate the necessary capacity within Guyana to:

1. Provide an appropriate level of public services to its citizens;
2. Reduce and/or eliminate the avoidable environmental degradation that occurs when resource development occurs without appropriate regulation; and
3. Reduce unsustainable development of natural resources due to the socioeconomic pressures of widespread poverty.

The NEAP is relevant to the Project in several ways. It identifies the coastal zone as an area in need of focused management action due to the concentrated human population along the coast and the susceptibility of the coastal environment to both natural and human-induced degradation. Additionally, it cites private sector-led development Projects as a mechanism to build capacity and ultimately support more responsible environmental management. Finally, it identifies petroleum resources as a potential target for development.

3.1.3.5 National Land Use Plan

The 2013 National Land Use Plan is Guyana's strategic framework for land development in Guyana. The plan lays out the various primary development options for various geographical locations in Guyana including the Coastal Plain, the location of the project area. The plan is anchored in several national policies and strategies and seeks to provide a spatial element to development planning in Guyana. Another major objective is the decentralization of land use planning from the national level to the regional levels.

3.1.3.6 Integrated Coastal Zone Management Action Plan

Guyana's Integrated Coastal Zone Management (ICZM) process is part of an ongoing initiative to promote the wise use, development, and protection of coastal and marine resources; enhance collaboration among sectorial agencies; and promote economic development. In 2000, after two years of study, the ICZM committee produced an ICZM Action Plan, which was approved by the Cabinet in 2001.

The ICZM Action Plan addresses policy development, analysis, planning, coordination, public awareness building and education, control and compliance, monitoring and measurement, and information management (EPA 2000).

Other coastal-zone related tasks currently being undertaken by the Government include: strengthening the institutional setup for ICZM; conducting a public awareness campaign to increase public understanding of the vulnerability of the coastal zone to sea level rise and climate change; and creating a database of coastal resources to facilitate improved ICZM. Currently, the EPA is mandated to coordinate

the ICZM program and coordinate the development of the ICZM Action Plan through the ICZM Committee.

Under the *Caribbean Planning for Adaptation to Climate Change Project*, Guyana has also conducted a socioeconomic assessment of sea-level rise as part of a wider vulnerability assessment and developed a Climate Change Adaptation Policy and Implementation Strategy for coastal and low-lying areas.

3.1.3.7 Guyana's National Biodiversity Strategy and Action Plan

Guyana's current National Biodiversity Strategy and Action Plan (NBSAP) was formally adopted in 2015 and is in its third iteration. It establishes the national vision for biodiversity, which is to sustainably utilize, manage, and mainstream biodiversity in all national plans and sectors by 2030, thereby contributing to the advancement of Guyana's bio-security, and socioeconomic and low carbon development. The plan is the main tool for integration of biodiversity in national policies through 2020. The NBSAP recognizes the importance of biodiversity to the fledgling ecotourism industry and other economic sectors. The NBSAP sets forth nine strategic objectives intended to promote conservation and sustainability on a national scale, improve biodiversity monitoring, harmonize legal and policy-based mechanisms across all levels of government to support biodiversity conservation, and prioritize funding to meet these objectives. The NBSAP is aligned with Guyana's commitment to the United Nations Convention on Biodiversity (UNCB) which the country has ratified.

3.1.3.8 Guyana Energy Agency's Strategic Plan

The Guyana Energy Agency (GEA) was established by the Guyana Energy Agency Act of 1997 (as amended) with a mandate to advise the Prime Minister on energy-related issues, develop a national energy policy, improve energy efficiency, monitor the energy sector, and educate the public on energy efficiency and renewable energy. The GEA's Strategic Plan for 2014-2018 specifically charges the GEA with monitoring the production, importation, distribution, and utilization of petroleum and petroleum products (GEA, 2014).

3.1.4 Draft National Energy Policy

An update of the 1994 National Energy Policy, the Draft National Energy Policy, reflects the national, regional and international commitments of the Government of Guyana in the energy sector. It describes the specific objectives for the energy sector of the country. Policy objectives include the following:

- Position the energy sector as a catalyst for national economic growth in-line with the GSDS and SDGs;
- Minimize the foreign exchange cost of energy to Guyana's economy;
- Increase the efficiency of energy use per unit Gross Domestic Product;
- Minimize the local and global negative impacts of Guyana's energy sector; and
- Develop the oil and gas sector for export.

3.1.5 Gender and Social Inclusion Policy

In 2018, the Government of Guyana formulated its intentions regarding gender equality and gender mainstreaming in it National Gender and Social Inclusion Policy. The policy articulates the vision for Guyana in becoming an inclusive society with gender mainstreaming in all sectors. The plan proposes to tackle all forms of gender discrimination against women and girls in Guyana especially gender-based violence. The plan also included measures for achieving economic development and inclusion, wellness, and health care and advocates for education, training and skills development for all Guyanese.

3.1.6 Applicable International Conventions and Agreements

Guyana is signatory to a number of international agreements and conventions relating to environmental management and community rights, although not all of these agreements have been translated into national legislation.

Guyana is a member state of two organizations that administer multiple international treaties and conventions: The International Labour Organization (ILO) and the International Maritime Organization (IMO). The ILO has established eight fundamental conventions that provide certain general protections to workers in signatory states such as the right to organize, standards for remuneration, restrictions on child labour (including minimum ages to work), and protection from forced labour. In addition to these fundamental agreements, Guyana is signatory to several specific agreements that will govern certain specific aspects of the Project as they relate to labour.

The IMO is a similar organization whose member states have agreed to one or more conventions related to maritime activities. These include three key conventions (the International Convention for the Safety of Life at Sea [SOLAS], the International Convention for the Prevention of Pollution from Ships [MARPOL], and the International Convention on Standards of Training, Certification and Watch keeping for Seafarers [STCW]), as well as several other agreements concerning more specific aspects of maritime activity such as safety and security at sea, maritime pollution, management of ballast water, and liability for maritime casualties.

The Guyana Maritime Administration Department (MARAD) manages compliance with the requirements of the IMO agreements to which Guyana is a signatory, with technical assistance from the IMO's Regional Maritime Advisory Office in Port of Spain, Trinidad. Guyana also belongs to other international organizations such as the Organization of American State, the International Monetary Fund, and the Caribbean Community. To highlight Guyana's adherence to international standards and guidelines relevant to the oil and gas sector, in May 2010, the country announced its commitment to the implementation of the Extractive Industries Transparency Initiative (EITI) and most recently, in September 2015, the country recommitted its support to the ILO. EITI is a global standard to promote the open and accountable management of the extractives resources; it seeks to strengthen government and company systems, inform the public, and promote industry understanding. It was founded in 2003 with an aim of protecting the interests of developing or frontier countries such as Guyana (EITI, 2018).

In October 2017, Guyana became the 53rd candidate country in the EITI. To gain membership status, Guyana was required to assemble a multi-stakeholder group, which included equal representation from the government, civil society, and industry. The goal was to develop a consensus reporting system that applied to all extractive companies operating in the country and to make that report public every year. Guyana is now tasked with producing its first report in the next 18 months; these reports will be audited by a third party and distributed publicly for review.

3.1.6.1 United Nations Convention on Migratory Species[7]

This text serves as an accord between Contracting Parties where they agree to comply with different articles regarding activities that may affect migratory species when executing the Project.

[7] Convention on the Conservation of Migratory Species of Wild Animals – Bonn, Germany on 23 June, 1979.

3.1.6.2 The Hazardous Chemicals and Waste Conventions

Guyana is a signatory to several international conventions that addresses chemicals and waste management including reduction of the movement of hazardous waste between nations, and specifically to prevent transfer of hazardous waste from developed to less developed countries. Among these conventions are the Basel, Stockholm Convention, Montreal Protocol, Rotterdam and Minamata conventions. The Basel convention specifically addresses the transboundary movement of chemicals and waste. The Montreal Protocol seeks to protect the stratospheric ozone layer by establishing guidelines for countries on substances that deplete the ozone layer. The Stockholm Convention addresses the issue of Persistent Organic Pollutants and the Rotterdam Convention focuses on the Prior and Informed Consent for certain hazardous substances in international trade. Finally, national mercury uses, and its disposal is the focus of the Minamata Convention.

3.1.6.3 Rio Conventions

The three United Nations Conventions, the United Nations Convention on Biological Diversity, (UNCBD, United Nations Framework Convention on Climate Change, UNFCC and the United Nations Convention to Combat Desertification UNCCD aims to address issues related to climate change, biodiversity and conservation and desertification and land loss. Guyana as ratified all three conventions. The Rio Conventions, particularly the UNFCC and the UNCBD are important to Guyana. The UNFCC establishes Guyana's commitments to climate change including is Nationally Determined Contributions NDC

3.1.6.4 International Standards Applicable to the Project Activities

Table 3-2 shows the performance criteria to be applied regarding different aspects that are related to the Project activities in accordance with different international standards:

Table 3-2: Summary of Key Environmental and Socioeconomic Performance Criteria to be used by the Project

Aspect	Performance Criteria to be Applied	International Standard Which References Applied Performance Criteria
Air Quality	Comply with requirements.	World Health Organization's Air Quality Guidelines for Particulate Matter, Ozone, Nitrogen Dioxide and Sulphur Dioxide; Air Quality Guidelines for Europe; World Bank Air Quality Standards
Ballast Water	Comply with requirements.	International Convention for the Control and Management of Ships' Ballast Water and Sediments
Bilge Water	Comply with requirements.	International Convention for the Prevention of Pollution from Ships MARPOL 73/78
Cumulative Impacts	The cumulative impact assessment for the Project has been conducted in general accordance with international best practice guidance of the International Finance Corporation (IFC).	IFC's Good Practice Handbook - Cumulative Impact Assessment and Management: Guidance for Private Sector in Emerging Markets

Source: ERM, 2018.

3.1.7 Inter-American Investment Corporation (IDB Invest) Sustainability Framework

The IDB Invest Sustainability Framework consists of the following elements:

- The Environmental and Social Sustainability Policy; and
- The Access to Information Policy.

The purpose of the IDB Invest Environmental and Social Sustainability Policy is to enhance the environmental and social sustainability of investment projects financed by IDB Invest through the application of robust environmental and social risk management standards. It also conveys IDB Invest's commitment to sustainable development, as the foundation of its approach to risk management, as well as its development mandate. The Sustainability Policy applies to all activities undertaken and operations financed by IDB Invest (IDB Invest, 2020), and includes the Performance Standards (PS) on Environmental and Social Sustainability of the International Finance Corporation (IFC) and the World Bank/IFC Environmental Health and Safety (EHS) Guidelines (including both General EHS guidelines and Industry Sector EHS Guidelines).

The Access to information Policy, reaffirms the IDB's Invest commitment to transparency in the exercise of its activities and strengthens its governance and responsibility, while reflecting the Access to Information standards adopted by international financial Institutions with emphasis on private sector issues.

IDB Invest requires its projects to apply the set of eight Performance Standards (PS) plus specific provisions for gender and climate change risks management. The PS are summarized in Table 3-3.

Table 3-3: IFC Performance Standards

IFC PS	Objective
PS 1 – Assessment and Management of Social Risks and Impacts	• To identify and evaluate environmental and social risks and impacts of the project. • To adopt a mitigation hierarchy to anticipate and avoid, or where avoidance is not possible, minimize, and, where residual impacts remain, compensate/offset for risks and impacts to workers, Affected Communities, and the environment.
PS2 – Labour and Working Conditions	• To promote the fair treatment, non-discrimination, and equal opportunity of workers. • To establish, maintain, and improve the worker-management relationship. • To promote compliance with national employment and labour laws. • To protect workers, including vulnerable categories of workers such as children, migrant workers, workers engaged by third parties, and workers in the client's supply chain. • To promote safe and healthy working conditions, and the health of workers. • To avoid the use of forced labour.
PS 3 – Resource Efficiency and Pollution prevention	• To avoid or minimize adverse impacts on human health and the environment by avoiding or minimizing pollution from project activities. • To promote more sustainable use of resources, including energy and water. • To reduce project related GHG emissions.
PS 4 – Community Health, Safety and Security	• To anticipate and avoid adverse impacts on the health and safety of the Affected Community during the project life from both routine and non-routine circumstances. • To ensure that the safeguarding of personnel and property is carried out in accordance with relevant human rights principles and in a manner that avoids or minimizes risks to the Affected Communities.
PS 5 – Land Acquisition and Involuntary Resettlement	• To anticipate and avoid, or where avoidance is not possible, minimize adverse social and economic impacts from land acquisition or restrictions on land use by (i) providing compensation for loss of assets at replacement cost (ii) ensuring that resettlement activities are implemented with appropriate disclosure of information, consultation, and the informed participation of those affected. • To improve, or restore, the livelihoods and standards of living of displaced persons. • To improve living conditions among physically displaced persons through the provision of adequate housing with security of tenure at resettlement sites.
PS 6 – Biodiversity Conservation and Sustainable Management of Living Natural Resources	• To protect and conserve biodiversity. • To maintain the benefits from ecosystem services. • To promote the sustainable management of living natural resources through the adoption of practices that integrate conservation needs and development priorities.
PS 7 – Indigenous People	• To ensure that the development process fosters full respect for the human rights, dignity, aspirations, culture, and natural resource-based livelihoods of Indigenous Peoples. • To anticipate and avoid adverse impacts of projects on communities of Indigenous Peoples, or when avoidance is not possible, to minimize and/or compensate for such impacts. • To promote sustainable development benefits and opportunities for Indigenous Peoples in a culturally appropriate manner.

IFC PS	Objective
	• To establish and maintain an ongoing relationship based on Informed Consultation and Participation (ICP) with the Indigenous Peoples affected by a project throughout the project's life-cycle. • To ensure the Free, Prior, and Informed Consent (FPIC) of the Affected Communities of Indigenous Peoples when the circumstances described in this Performance Standard are present. • To respect and preserve the culture, knowledge, and practices of Indigenous Peoples.
PS 8 – Cultural Heritage	• To protect cultural heritage from the adverse impacts of project activities and support its preservation. • To promote the equitable sharing of benefits from the use of cultural heritage.

Gender Risk Management provisions require to: (i) to identify and address gender-related risks in IDB Invest-supported investments, by avoiding gender-based exclusion, gender-based violence, sexual exploitation, human trafficking and sexually transmitted diseases, and including by having the client define and put in place specific measures to prevent and address these risks if the assessment indicates a risk of gender-based violence or other gender-related risks; and (ii) ensure the inclusion of all genders in the consultation processes in accordance with the Performance Standards.

Climate change management provisions require the screening and assessment of climate-related risks that may affect IDB Invest investments (particularly when an investment is located in an area highly prone to disasters) in accordance with PS 1, 3 and 4. In addition to the emergency preparedness and response requirements in PS 1, IDB Invest also requires that clients disclose information on their emergency preparedness and response activities to Affected Communities, relevant government agencies, or other relevant parties in the planning and operational phases and to provide information promptly in the case that an emergency or disaster occurs.

3.2 Environmental Permits

The following permits have been issued for the project (Table 3-4).

Table 3-4: Project Environmental Permits

Permit Name / Permit Holder	Authority	Issued	Expiration	Permit Ref. No.
Construction and Operations of a Port Facility / Muneshwers Limited	Environmental Protection Agency	10/6/2017	August 2022	20160307-MLPFO (40B-EPA Permit)
Permission to Demolish Facilities / GYSBI	Maritime Administration Department	9/4/2020	None	40C-MARAD Permit
Permission to Utilize Houston, East Demerara Bank / Muneshwers Ltd.	Maritime Administration Department	5/10/2017	None	40D-MARAD Permit
Extension to Existing Concrete Wharf Structure at Guyana Shore Base Inc.	Ministry of Public Works	8/13/2018	None	SDB R4006 18 08/06/2018

Facility, Houston, East Bank Demerara / Muneshwers Limited	Sea and River Defence Board			(40E-SRDB Permit)
Approval to Initiate Construction Works on Shore Base Expansion Project at GYSBI Facility, Houston, Greater Georgetown / Guyana Shore Base Inc.	Ministry of Public Works Sea and River Defence Board	10/14/2020	None	SDB R40015 14-10-2020 (40F-SRDB Permit)
Construction and Operations of Port Facility at Houston, East Bank Demerara / Muneshwers Limited	Ministry of Public Works Sea and River Defence Board	10/28/2016	None	SDB R4007-16 28/10/2016 (40G-SRDB Permit)
Expansion of Shore Base Facilities at Houston, Greater Georgetown / Guyana Shore Base Inc.	Ministry of Public Works Sea and River Defence Board	03/23/2020	None	SDB R4006-23-03-2020

A copy of the permits listed above are included in Appendix A.

3.3 National Institutions

The main authorities that oversee the environmental operations/Projects that currently exist or are registered in the Cooperative Republic of Guyana in order to keep protection of the environment and the country's resources are highlighted below.

3.3.1 The Environmental Protection Agency (EPA)

The Environmental Protection Agency (EPA) was legally established by the Environmental Protection Act in 1996. It has the responsibility to take the necessary measures to manage, conserve, protect and improve environment. This entails that the Agency takes actions to prevent and control pollution; assess the impact of economic development on the environment; and ensure the sustainable use of Guyana's natural resources. The EPA is under the umbrella of the Department of Environment, Ministry of Presidency. The Agency is regulatory with authority to grant or not grant permits for developmental project that will impact on the environment. As a regulator, the Agency is also required to monitor activities of development and to enforce the provisions of the Act.

3.3.2 The National Drainage and Irrigation Authority (NDIA)

The National Drainage and Irrigation Authority (NDIA) functions as Guyana's apex organization dealing with all public matters pertaining to management, improvement, extension and provision of drainage, irrigation and flood control infrastructure and services in declared areas of the country. Established in 2006 by an Act of Parliament, No. 10 of 2 004, the Drainage and Irrigation Act, the Authority has developed an institutional structure in terms of water resources management strategy and water use planning for the primary purpose of locating, evaluating, conserving and distributing water resources of the country for agricultural purposes. In meeting its mandate, the NDIA has focused on improving and upgrading drainage and irrigation services countywide, thereby enhancing the competitiveness of the various sectors and improving productivity.

3.3.3 Sea and River Defence Board

Sea and River Defence Board was established in 1953. The board was charged with the care, maintenance, management and construction of the sea defences of Guyana. In 1986 the act that established the Sea Defence Board was amended. The board became The Guyana Sea and River Defence Advisory Board, for the proper development and construction of the sea and river defences of Guyana.

The objectives of the Board are as stated in the Act:

- To enquire into, report and advise upon any matter relating to sea and river defences of Guyana, which may be referred to it by the Minister;
- To examine sea and river defences for ultimate development and future needs;
- To ensure that sea and river defences works would be constructed so that danger from flooding by the sea and inland waters would be negligible;
- Generally to advise and make representation to the Minister on any matter pertaining to the planning, financing, construction, development and administration of the sea and river defences of Guyana; and
- To do such other acts as may be expedient or necessary for the attainment of the objects of the Board

3.3.4 Central Housing and Planning Authority

The Central Housing and Planning Authority (CH&PA) was established in 1948 to address the housing needs of the citizens of Guyana. The agency is under purview of the Ministry of Housing and Water and has the primary objectives:

- Divestment of Government land to eligible Guyanese for residential use.
- Development of housing schemes and regularization and upgrade of squatter settlements. Orderly and progressive development of Land, Cities, Towns, Urban and Rural areas.
- Granting security of tenure, (Transports and Certificates of Title to Land).
- Preparation of development plans for urban centres.
- Provision of services (access roads, internal road networks, water distribution networks, drainage, electricity).
- Collaboration with stakeholders for the development of sustainable housing.

3.3.5 Maritime Administration Department

This department operates under the Ministry of Public Works and in accordance with the International Maritime Organization (IMO), and was established and regulated in 2003 under the 1997 Merchant Shipping Act.

Key responsibilities of the Maritime Administration Department include:

- Registering and licensing ships.
- Pilotage of Hydrographic surveys.
- Accident Investigation.
- Search and Rescue.

MARAD is party to 3 key IMO Conventions, which are: Safety of Life at Sea (SOLAS); Standard of Training, Certification and Watch keeping Of Seafarers (STCW) and Marine Pollution (MARPOL). Plus its

additional maritime conventions associated to safety, pollution and liabilities[8]. The Department also offers around-the-clock pilotage service.

3.3.6 The Fisheries Department

The Fisheries Department (Ministry of Agriculture) is responsible for managing, regulating and promoting the sustainable development of the nation's fishery resources for the benefit of the participants in the sector and the national economy. The Fisheries sector is made up of three primary components: Marine Fishery, Aquaculture and Inland Fishery. The department achieves its mission through the following divisions:

- Administration: To provide the relevant support services necessary for the development and maintenance of fisheries programmers and activities.
- Statistical Unit: To collect and analyse data and conduct surveys to provide scientific and social-economic information for policy determination, planning and resource management. Key responsibilities include: Market Survey Activity, Management of Data Entry and Storage, Production and Management of Individual Export Licenses.
- Legal and Inspectorate Unit: To ensure the observance of all legal and administrative requirements by all entities in the fishery sub-sector and recommended appropriate changes to existing regulations, which govern the Sector.
- Key responsibilities include: Registration and Licensing of fishing vessels; Licensing and Inspection of fish processing plant; Conduct of enforcement and surveillance activities of fishing vessels; Monitoring of the industrial fleet/artisanal compliance with license conditions; Monitoring and conciliation of complaints and disputes in the centre and the regions; Issuing of export licenses for fish and fish products; Ensuring the collection of revenue under the Fisheries Act 2002 and Maritime Act of 1977.
- Aquaculture: To ensure that aquaculture is developed in a sustainable and controlled manner optimizing economic and environmental benefits.

3.3.7 Protected Areas Commission

The Protected Areas Commission (PAC) was created by Act of Parliament on July 07, 2011. The PAC is mandated to manage, maintain, promote and expand the national protected areas system in Guyana including the Shell Beach Protected Area on the Region 1 coast.

3.3.8 Guyana Defence Force Coast Guard

The Guyana Defence Force (GDF) came into existence on the 1st of November 1965, when training began under a team of instructors from the United Kingdom. Recruits for the new Force were drawn from the British Guiana Volunteer Force (BGVF), Special Service Unit (SSU), British Guyana Police Force (BGPF) and Civilian Volunteers.

The main role of the Coast Guard is to conduct Maritime Surveillance of Guyana's Exclusive Economic Zone (EEZ) whilst enforcing all Maritime Laws on and under the high seas and waters subject to the jurisdiction of Guyana. The Coast Guard also conduct operations in support of land forces.

[8] Additional maritime conventions associated to safety, pollution and liabilities can be found in the following link: http://www.imo.org/en/About/Conventions/ListOfConventions/Pages/Default.aspx

3.3.9 Gender Affairs Bureau

Located in the Ministry of Social Protection, the Gender Affairs Bureau (GAB) is the national machinery for the mainstreaming of gender in national policies and plans. The Bureau is composed of Men and Women Affairs Bureaus. The agency implements national plans and programs for the attainment of gender equality in the Guyana.

3.3.10 The Civil Defence Commission (CDC)

The Civil Defence Commission (CDC) was established in 1982 to make plans and conduct operations to deal with all types of disasters in Guyana. By 1985, a comprehensive National Disaster Preparedness Plan had been implemented.

At the time of its establishment, the Commission operated under the authority of the Office of the Prime Minister. Responsibility for the CDC was subsequently moved to the Office of the President in 1992. In September 2001, Standard Operations Procedures for the National Emergency Operations Centre were upgraded to meet new challenges of the worsening domestic and international disaster situation.

The CDC of Guyana is a full member of the Caribbean Disaster Emergence Management Agency (CDEMA).

The Commission functions as follows:

- Service Provider – Promoting its role of providing services to local authorities/communities and for that purpose, to develop programs designed to enhance those services.
- Planning and Implementation – Ensuring the promotion and development at national level of disaster planning and management and, in co-operation with local authorities, facilitating the implementation of disaster management measures for the purpose of emergency relief and support;
- Loss Reduction and Mitigation – Promoting the adoption of disaster loss reduction and mitigation policies and practices at the national and local authority level;
- Voluntary Service – The promotion and development of voluntary service as an integral aspect of disaster management;
- Training and Education – To establish and promote the development, maintenance and improvement of the tenants of disaster management training and education; and
- Permanent Staffing – Maintaining a permanent body to enhance the national capacity for disaster management services.

Responsibility for disaster management in Guyana extends to every individual, family, community, government and private sector organizations. The Civil Defence Commission coordinates the national system with these bodies and is committed to initiating and supporting the disaster management process throughout Guyana.

4. ANALYSIS OF ALTERNATIVES

4.1 Current Conditions

Guyana, with the advent of the oil and gas sector, has entered a new level and set to lead in global economic growth. As previously described in Section 1.0 of this report, Guyana is rapidly expanding its oil and gas industry. According to the Chief Development Planner of CH&PA, the Houston area on the East Bank of the Demerara River has been transformed over the past few years into a hub for stakeholders in the oil and gas sector, and, in order to ensure that potential investors can further establish their facilities there, the Central Housing and Planning Authority (CH&PA) has started to redevelop the area. The authority is preparing by redeveloping Houston as part of the Georgetown Development Master Plan for the oil and gas industry (Guyana Chronicle, 2019[9]).

4.2 No Action Alternative

As one of the main shore bases that serve as support for the rapidly expanding oil and gas industry in the country, due to the size of their facility, GYSBI cannot currently comply with the services required by Exxon Mobil (see Figure 2-1 and Figure 2-2).

The no action alternative would leave current conditions as they are, impacting Guyana's economic growth. In addition, access to the site will continue to be a safety hazard and continue to impact traffic along the E Bank Public Road. The no action alternative would impact current users of the road systems (including public transport), because congestion at the entrance to the Port would continue and is projected to worsen with all of the development happening in the Houston area.

4.3 Alternatives Assessment

4.3.1 Additional Berths

The current Berths are not enough to meet the growing demand of the oil and gas sector. Building additional berths elsewhere would require brand new construction as well as traveling longer distances by trucks. Due to the availability of space which is already owned by GYSBI partner Muneshwers, and the fact that all of the utilities and facilities already exist at the GYSBI Port, building the berths somewhere else were not a feasible option.

4.3.2 Port Operations Assessment

Due to the lack of available land around the GISBY Port, not a lot alternatives were available with regards to improvements to Port Operations. Internal improvements will allow for better flow of vehicles inside (to improve safety and congestion), while improvements to facilities were proposed for existing facilities in order to minimize impacts.

Improvements to the water treatment plant will allow for the site to be completely independent of the municipal potable water system in order limit demand impacts to the local water treatment plant as well as the local community. The local potable water system is old and in disrepair and is currently being upgraded under a separate program (see Section 7, Cumulative Impact Assessment).

[9] Unknown Author, Guyana Chronicle News Paper. *Lands at Houston Being Redeveloped for O&G Sector.* December 31, 2019. Accessed March 2021.
https://guyanachronicle.com/2019/12/31/lands-at-houston-being-redeveloped-for-og-sector/

4.3.3 Annex Area Improvements

The Annex Area is already being used by GYSBI. Improvements to the Annex Area will allow the appropriate development and use of the area and limit impacts to the surrounding communities.

Port operations require the need to frequently move trucks and long trailers between the shore base and the Annex, therefore a location was required which would not only reduce travel time, but also the complexity of manoeuvring through other traffic, across junctions and sharp turns. The selection of the Annex was further premised on the installation of the traffic lights at its junction with the East Bank Demerara Public Road and the construction of the new GYSBI Southern Access, which together allow trucks to travel in a fairly straight line with one signalized junction. Therefore, access road improvements should improve the safety conditions in the community as well as improve congestion by allowing trucks traveling from the Port to the Annex to stay off the main East Bank Demerara Public Road.

Development improvements at the Annex will allow for the construction of stormwater management systems that would limit potential impacts to the water and soil resources in the surrounding areas.

4.3.4 Other Location Alternatives

Although other locations were considered, in order to account for the growing demand, brand new facilities would have to be constructed in previously undeveloped land away from the existing port, increasing the potential for environmental and social impacts. These lands would have to be acquired and could require resettlement and/or rezoning.

Lands further away from the shore base are typically not zoned ‘industrial’ – although zones can be changed, this process can be lengthy and is subject to stakeholder agreements.

4.4 Alternatives Conclusion

Based on the fact that the GYSBI Port is already operational, there are only three main alternatives for the Project:

- Expansion and improvements at the existing location,
- Brand new construction elsewhere; and
- No Project alternative.

Although the expansion and improvement option is limited based on the amount of space available in the Project area, it is able to meet the immediate needs of GYSBI and will not result in any major potential impacts with the implementation of the appropriate management measures. A new construction, although dependent on location, would likely mean more impacts and impacts of higher magnitude and severity. The no Project alternative will leave the site unable to meet the demands of the rapidly expanding oil and gas industry, which go towards meeting the economic growth goals of Guyana. Therefore, to meet growing demands, the expansion and improvements Project option was selected.

5. DESCRIPTION OF THE EXISTING ENVIRONMENT

This section of the EA describes the existing conditions within the vicinity of the proposed Project improvement area. It is divided into three major sections: physical resources, biological resources, and socio-economic and cultural resources. This Section describes the baseline environmental conditions against which the predicted impacts of the Project are measured in Section 6.0.

5.1 Physical Resources

5.1.1 Climate

Guyana's climate is influenced by the following major elements:

- Seasonal shifts in the Inter -Tropical Convergence Zone (ITCZ);
- Tropical Waves;
- Upper Level Troughs;
- Southern Hemisphere Upper Troughs; and
- El Niño Southern Oscillation (ENSO) Events.

Guyana has a wet tropical climate characterized by two pronounced wet seasons and year-round warm temperatures. The bimodal wet/dry regime is caused by the annual migration of the ITCZ, which changes latitude based on the Earth's position and angle in relation to the sun. In the areas closest to the ITCZ, one can expect increased thunderstorm activity and heavy rainfall between mid-April and the end of July, with peak rainfall in June. This period is known in Guyana as the primary wet season. The secondary wet season occurs during the southward migration of the ITCZ from mid-November to the end of January, with peak rainfall in December.

According the World Bank Group climate change knowledge portal (WBG, 2021[10]), the mean temperature in Guyana is 25-27.5 degrees Celsius (°C) throughout the year in most regions except the upland regions in the west, where mean temperature is 20-23°C. Guyana experiences two wet seasons; most of the country receives 250-450 millimetres (mm) per month between May and July, and the second wet season affects mainly the northern, coastal regions which receive around 150-300 mm per month in November to January. El Niño episodes lead to dry conditions throughout the year, and bring warmer temperatures between June and August and La Niña years bring wetter and cooler conditions than normal during the long wet season (McSweeney et al., 2010). Relative humidity averages around 70% in the Savannahs, 80% on the coast and 88% in the rainforest. Morning fog can be widespread and persistent in the hinterland districts.

Because of Guyana's proximity to the equator, there is little variation in the hours of daylight. It varies from a minimum of 11.6 hours per day in December to a maximum of 12.5 hours per day in June. Bright sunshine is inversely proportional to rainfall. It therefore varies from an annual average of 4.5 hours per day in the Pakaraima Mountains to 7.0 hours per day on the coast. During the wet seasons, it can average as low as 3.0 hours and 6.0 hours per day respectively at these locations.

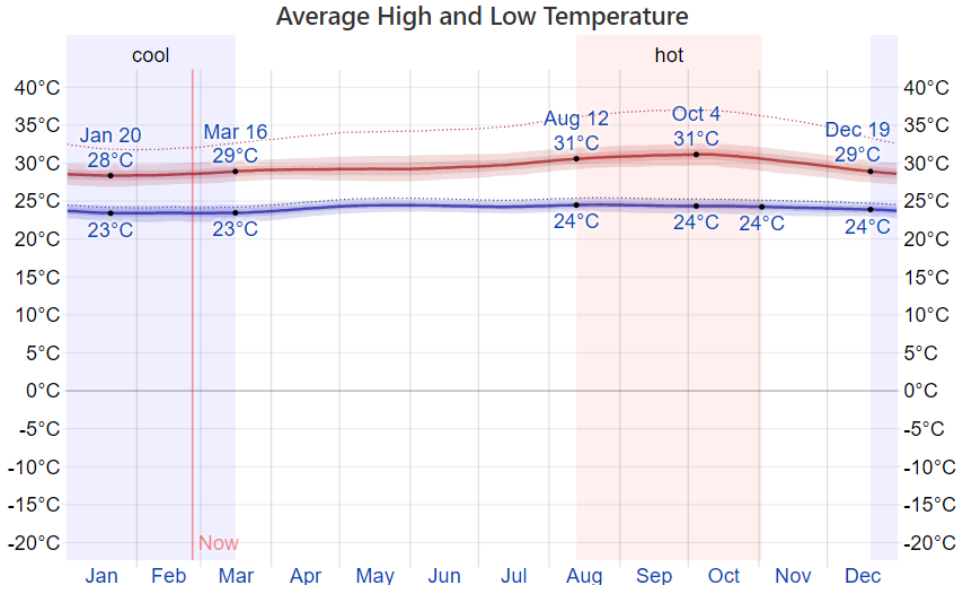
Average wind speeds for Guyana are typically 6 meters per second (m/s). However, between July and August, stronger westerly winds, which influence the prevailing wave climate, are experienced. Wind speeds also vary seasonally. During the dry season, the strongest winds are experienced between

[10] World Bank Group: https://climateknowledgeportal.worldbank.org/country/guyana/climate-data-historical

January and April when the northeast Trade Winds dominate. Wind speeds range, on average, between 9 kilometre per hour (km/h) (wet season) and 12 km/h (dry season).

The Project is located within the urban footprint of downtown Georgetown, where the hot season lasts approximately for 2.7 months, from August 12 to November 2, with an average daily high temperature above 31°C. The cool season lasts approximately for 2.9 months, from December 19 to March 16, with an average daily high temperature below 29°C (see Figure 5-1). In Georgetown approximately 2,400 mm of rain fall per year. The wettest month is June, with 345 mm and the driest is September, with 90 mm (see Figure 5-2).

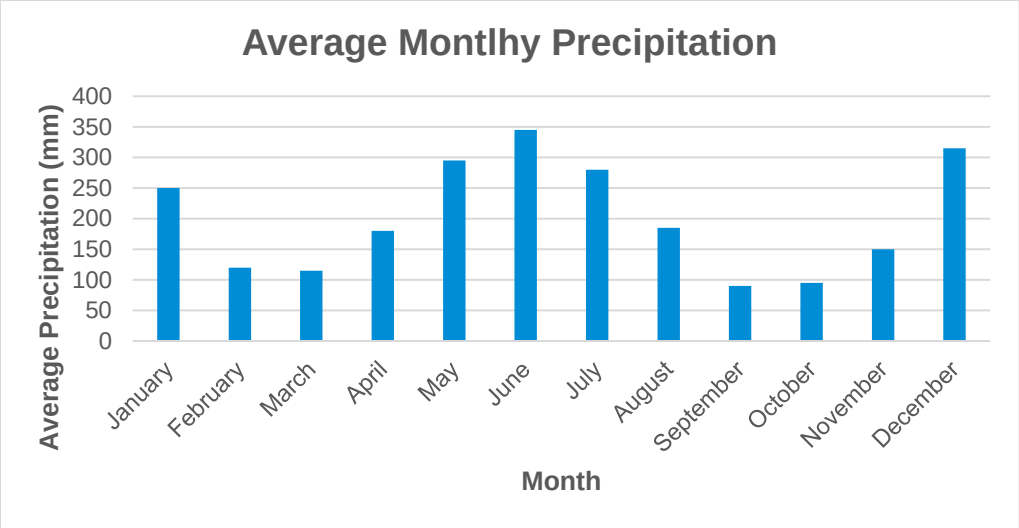
In the central-eastern parts of the coast, where Georgetown is located, between the two relatively dry seasons, in September-October (when 90/95 mm or 3.5/3.7 inches of rain fall per month), it rains just a little less than in February-March, so the difference is not significant. Here, therefore, there is no real dry season. In Georgetown, 2,400 mm (94.5 in) of rain fall per year. The wettest month is June, with 345 mm (13.5 in) of rain. Here is the average precipitation.



The daily average low (blue) and high (red) temperature with percentile bands (inner band from 25th to 75th percentile, utter band from 10th to 90th percentile).

Source: Cedar Lake Ventures, 2021.

Figure 5-1: Daily Average Temperature for Georgetown



ERM, 2021. Adapted from Climates to Travel – https://www.climatestotravel.com/climate/guyana

Figure 5-2: Average Monthly Precipitation for Georgetown

5.1.2 Air Quality

Air quality baseline data (gaseous pollutants and dust) are currently not available in the Project Area. The major air emission sources in the Project Area are attributable to port and logistics infrastructure related activities at the GYSBI facility (truck and maritime traffic, cranes, forklifts, waste management, warehousing, fuel bunkering, pipe storage, water treatment and potable water storage, etc.) and heavy traffic on roadways leading to the facility, particularly East Bank Road and its access roads. Therefore, it can be presumed that average air quality in the Project Area is medium and typical of an urban environment with dense traffic. The major air pollutants likely to be present in the Project Area include inhalable particulate matter (mostly smoking in public places), and combustion/exhaust emissions such as carbon monoxide (CO), sulphur dioxide (SO_2), nitrogen dioxide (NO_2), and volatile organic compounds (VOC). Most of the roads are paved, which results in low dust generation.

The most significant existing air pollution sources in the Project Area are likely to include:

- Vehicles movement or idling on East Bank Road and its access roads (cars, trucks, buses, and motor cycles);
- Port facility-related activities (container trucks, loading ships, support vessels, tug boats, cranes, forklifts, etc.); and
- Tobacco smoking in public places (indoor and outdoor).

Traffic activity, wind speed, and direction can have a big influence on pollutant concentrations. Generally, the more traffic, the higher the emissions; however, certain activities like congestion, stop-and-go movement or high-speed operations can increase emissions of certain pollutants. The traffic congestion and stop-and-go movements on the access roads leading to the port restricts the proper dispersion of vehicle exhaust emissions, which further increases emissions of some pollutants in the Project Area.

The Project Area is surrounded mostly by commercial and residential receptors, with the residential population closer to the road improvement areas.

5.1.3 Noise

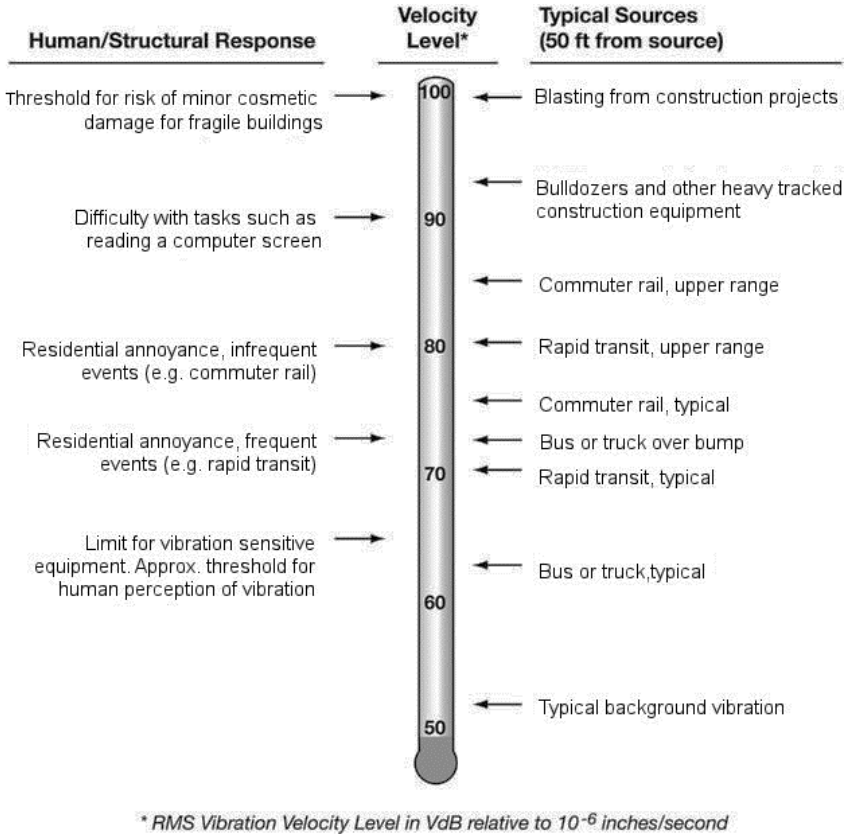
Noise baseline data are currently not available in the Project Area. The major noise sources in the Project Area are attributable to port and logistics infrastructure related activities at the GYSBI facility and nearby other commercial infrastructure and heavy traffic (including warning horns/alarms) on roadways leading to the facility, particularly along the East Bank Road and its access roads. Therefore, it can be presumed that the average noise level in the Project Area is medium and typical of an urban environment with dense traffic.

The most significant existing sources of noise pollution in the Project Area are likely to include:

- Vehicle movement on East Bank Road and its access roads (passenger cars, trucks, buses, and motor cycles);
- Port, infrastructure and logistics and other support related activities (container trucks, loading ships, support vessels, tug boats, cranes, forklifts, etc.); and
- Backup alarms from trucks on access roads leading to the Port and within the Port area.

The Project Area is surrounded mostly by commercial and residential receptors, with the residential population closer to the road improvement areas. The nearest residential area is approximately 200 m northeast of the GYSBI port.

Figure 5-3 shows typical day-night sound levels for different land uses and transit sources.



Source: FTA, 2006.

Figure 5-3: Typical Day-Night Sound Levels

5.1.4 Geology and Physiography

In general, Guyana is comprised of four main physiography Regions: Coastal Plain, Hilly Sand and Clay, Interior Savannahs, and Forested Highlands Regions (Guyana Lands and Survey Commission, 2013). The Project site is located in the Coastal Plain Region.

The Coastal Plain is a narrow belt, ranging between 8 and 65 kilometres (km) in width, with a length of

440 km that stretches from the Corentyne River in the east to Waini Point in the west, and providing most of the agricultural production in the country. East of the Essequibo River the plain consists of recent and old sediments with recent deltaic and fluvio-marine clays and silts occurring on the coast with silty clays and sands inland.

Many areas of the coastal plain are below sea level while other areas are man-made and built-up to raise them above the surrounding land level. An elaborate system of sea defences, along with irrigation and drainage canals, is required to protect the area from flooding (see Section 5.1.5).

The stratigraphy geology of the Coastal Plain is comprised of four formations:

- The Demerara and Coropina Clay Formations: The average thickness is of these formations is approximately 45 m and they are commonly known as the uppermost clay, overlying the White Sand Series. The Coropina Formation or old coastal plain is a reddish-yellowish compact clay overlain by the recent grey-brown Demerara Clay, which extends seaward approximately 15 km. The area covered by the above clays is poorly drained and marshes and coastal lagoons are developed on it. The clays, which contain brackish water, confine the upper part of the White Sand complex.
- White Sand Series Formation: This formation consists of up to 1500 m of a clastic sequence that extends from the Essequibo River in the west to the Corentyne River in the southeast, through Suriname. Laterally, the formation is comprised of the following series: loose angular quartz sands; intermediate clays and sands; lower sands; alternating sand and clay beds; and the B sands.
- Berbice Formation: Metamorphic, magmatic and volcanic rocks of Precambrian age form the basement complex of the Guiana Shield. The exposed contacts between the basement and the White Sand Series delineate the boundary of the coastal artesian basin.

These four formations are essentially comprised of a sequence of unconsolidated sediments considered to be of Plio-Pleistocene to recent age overlying a Precambrian age basement complex of metamorphic, magmatic and volcanic rocks of the Guiana Shield (Bleackley, 1956).

5.1.5 Hydrology

Guyana has an extensive network of rivers and streams that have many rapids and waterfalls, with an absence of naturally occurring lakes. Surface water (which is extracted from shallow reservoirs, streams, or drainage canals) is primarily used for agricultural and industrial purposes (Figure 5-4). Only about 10% of the country's drinking water comes from surface water. Guyana faces the typical water pollution problems of developing countries in tropical regions. Biological and chemical contamination of surface water varies in magnitude according to location but is increasing with population growth and land use demands (USACE, 1998).

According to the USACE (1998) excess water is a major concern in the coastal lowlands where the land surface is below sea level. The lower elevations of the country along the coast, where most of the population is located, are threatened by tidal flooding, especially during high spring tides. The coastal lowlands are drained of water through a series of canals. During low tide, the gates or kokers of these

canals are opened to allow the water to drain into the adjacent rivers or into the Atlantic Ocean. Large-capacity pumps are also used at various sites to drain the canals. Short-term localized flooding is common when heavy rains coincide with high tide, forcing the influx of water out of the canal banks until the gates are opened again.

Fresh groundwater is the most reliable and important source of water for public use and is abundant along the coastal lowlands and foothills to the immediate south where most of the population resides. Throughout the country, nearly 60% of the ground water produced from drilled wells is used for domestic water supply. With a growing demand on surface water for agricultural and industrial needs, ground water is becoming an increasingly important water source.

Source: USAC, 1998, modified by ERM, 2021.

Figure 5-4: Guyana Surface Water Resources

5.1.6 Natural Disasters and Risks

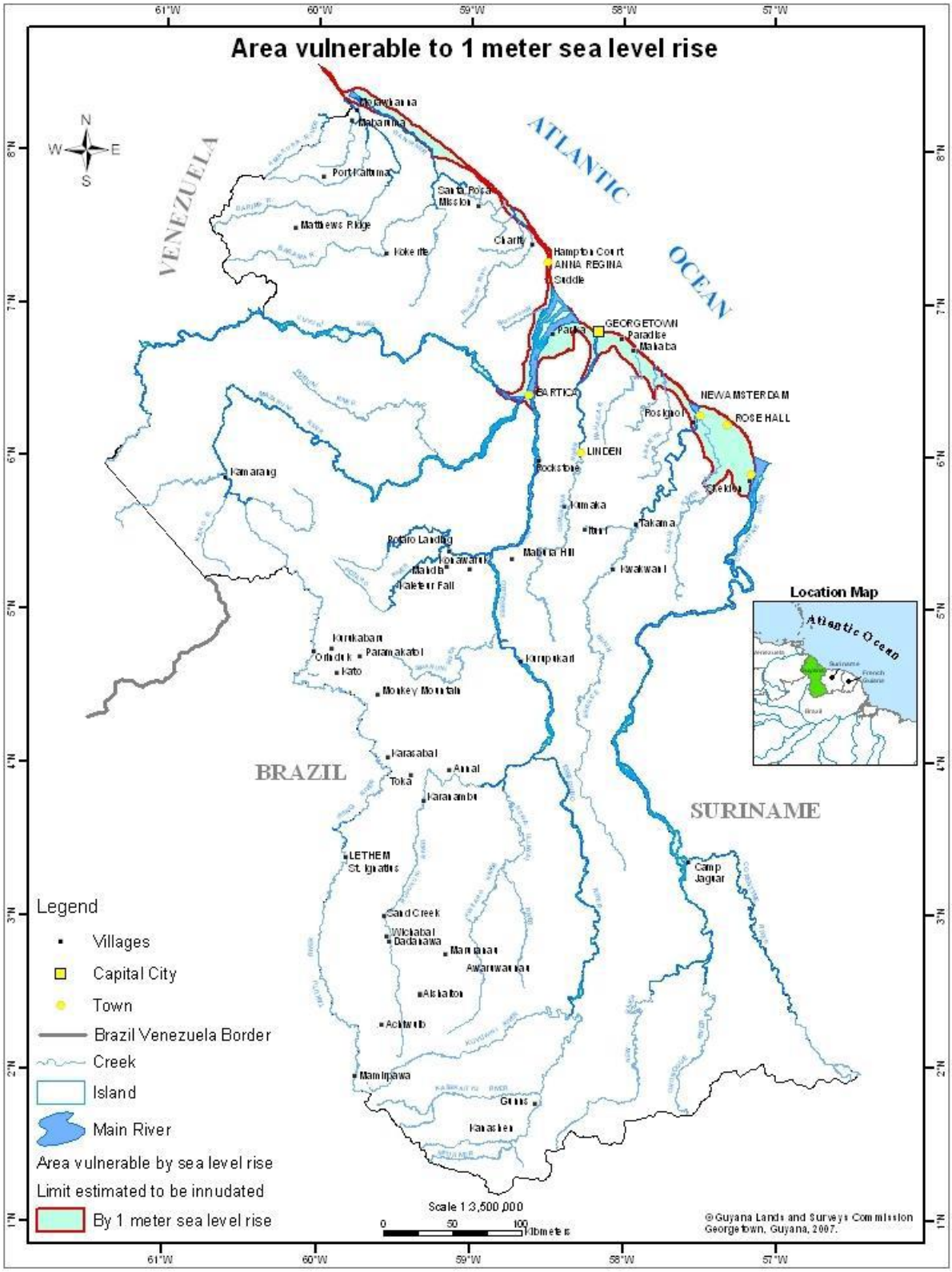
The World Bank Group's Think Hazard! tool is a high-level, on-line, natural hazard risk data base for emerging market countries (the web-based tool developed by the Global Facility for Disaster Relocation and Recovery (GFDRR) in partnership with the World Bank Group and other institutions, and with data contributed by numerous organizations around the world) (WBG, 2021). This tool was queried to assess relative risk ratings for a suite of potential natural hazards for the Georgetown area, Guyana. The relevant risk categories identified for the Georgetown area are listed in decreasing order of risk:

- River flooding (high);
- Coastal flood (high);
- Urban flooding (low);
- Tsunami (low);
- Climate change (moderate);
- Hurricane (low); and
- Earthquake (very low).

Flooding risks are described below in the context of Georgetown and the Project Area. In addition to the risks of extreme storms and high winds. The risks for the occurrences of urban flooding, tsunamis, hurricane, and earthquakes are not discussed as these risks are not considered to be relevant for the country.

According to ThinkHazard.org tool, the Project Area's risk to river and coastal flood hazard is classified as *High* based on modelled flood information currently available. This means that potentially damaging and life-threatening river floods and coastal waves are expected to flood the coast and riverine areas at least once in the next 10 years. Based on this information, the impact of coastal and river floods must be considered in different phases of the project for any activities located near the coast and river. Project planning decisions, project design, and construction methods must take into account the level of coastal and river flood hazard. Further detailed information should be obtained to adequately account for the level of hazard.

Short-term weather variability such as high intensity rainfall or wind or tidal/wave activity is the usual cause of floods, while sustained periods without rain cause droughts. The extent of flooding is also influenced by human factors such as the management of solid waste, and the maintenance of physical infrastructure for drainage and irrigation, conservancies and sea defences (UNDP, 2012). Figure 5-5 shows hazard areas vulnerable to one meter sea level rise due to climate change. The most destructive of these was the flood of January 2005, heavy rainfall caused catastrophic flooding along Guyana's coasts, affecting 290,000 people – almost half of Guyana's population. Total flood damage was estimated at $465 million, or nearly 60% of the country's GDP, prompting the government to work towards increasing its capacity to manage flood risk.



Source: UNDP, 2013.

Figure 5-5: Flood Hazard Map for Guyana

5.2 Biodiversity

The Project is located within the East Demerara River of the East Demerara Coastal Plain. The coastal plain is characterized by cultivated fields and secondary vegetation (Huber et. al., 1995)[11] . Human activities, current and historic, have modified the primary ecological functions and species composition, resulting in fragmentation and loss of natural habitats through agriculture, urbanization, and industrial activities. Only species that easily adapt and thrive successfully to rapidly changing environments are present within the modified coastal habitats.

The East Demerara Coastal Plain consists of habitats that include urban areas and the extensive landscape east and southeast of the Project site previously used for sugar cane cultivation. Habitats typical of the East Bank of the Demerara River include: mangroves (Protected Habitats); salt/brackish marsh lands; mudflats; cultivated/abandon sugar cane fields; pasture and secondary forest lands; urban areas; and drainage canals.

In the area of the Annex, terrestrial vegetation includes: introduced species as bamboo, and Jamun (*Syzygium cumini*); common broad leaved sedges such as the Heliconia (*Heliconia psittacorum*), wild eddo (*Caladium bicolor*), moko (*Montrichardia* sp.), bracken-fern (*Pteridium aquilinum*), giant shame bush (*Neptunia prostrate*) baby sumutoo (*Passiflora foetida*), gripe weed (*Phyllanthus rinaria*); grass species such as Bahama grass (*Cynodon dactylon*), nut grass (*Cyperus rotundus*), carpet grass (*Axonopus compressus*), para grass (*Brachiaria mutica*), burr grass (*Cenchrus echinatus*) Jew grass (*Imperata brasiliensis*), sour grass (*Paspalum conjugatum*), razor grass (*Paspalum virgatum*), iron grass (*Sporobolus jacquemonti*); woody perennial shrubs like the black sage (*Cordia macrostachya*), and Antidesma (*Antidesma ghaesambilla*).

Faunal species typical of the landscape are predominantly species that adapt easily to human disturbed habitats. Birds known to occur in the landscape of the Project include the Kiskadee (*Pitambus sulphuratus*), Cattle egret (*Bubulkus ibis*), Blue sackie (*Thraupis episcopus*), humming bird (*Amazilia fimbriata*), Wattled Jacana (*Jacana jacana*), Yellow Plantain (*Icterus nigrogularis*), herons, common flycatchers, doves (*Columbigallina passerina*), kingfishers, parrots, and vultures.

Common fish species include cichlids such as the Patwa (*Cichlasoma bimaculatum*), and Sunfish (*Grenicichla alata*), the Hassar (*Hoplosternum littorale*), piraucu (*Arapaima gigas*) and the freshwater barracudas or Houri (*Hoplias malabaricus*). Herpetofaunal species such as caimans (*Caiman crocodilus*), the Crapaud (*Bufo marinus*), gecko (*Thecadactylus rapicauda*), salipenta (*Tupinambus teguixin*), and the common Frog (*Hyla minuta*) are known to occur, as well as several snake species. Domesticated animals such as sheep and cattle are common in disturbed secondary forests, but none are present in the Project area.

5.2.1 Demerara River

The Demerara River originates in the northern slopes of the Makari Mountain and flows north for 346 km until it reaches the Atlantic Ocean in Georgetown. The river flows through a huge area of the hilly sand and clay belt, mainly covered by forest, and the last part of the river lies in the flat alluvial coastal plain, with the most economic activities (mostly sugar) and highly populated areas. This part has a completely man made water management system, engineered by the Dutch in the 18th and 19th centuries to control the water in the low lying regions. The substrate consists predominantly of fine white sand, with some clay and organic matter.

The shoreline along the Demerara River near GYSBI is largely developed with impervious surfaces comprised of marinas, businesses (mostly fishing), and industrial sites. Patches of significantly

[11] Huber et al., 1995; Vegetation Map of Guyana; Centre for the Study of Biological Diversity, University of Guyana

fragmented and/or degraded riparian habitats characterize the banks where there are no developments. Much of the natural habitats are degraded due to Georgetown's poor stormwater drainage infrastructure as well as untreated sewage discharge. Untreated stormwater and sewage typically flows directly into the Demerara River and nearby canals, polluting the waterbodies. Mining operations upriver, leaching from agricultural activities, and indiscriminate disposal of solid waste also add to the pollution of the River. Due to the River's urban location and its high concentration of pollution, including garbage and raw sewage, it supports minimal flora and fauna biodiverse habitats, and in the Georgetown area, is practically devoid of any benthic, flora or fauna communities. The Cecropia (*Cecropia* spp.) tree is a common vegetation species that grows in disturbed areas throughout Guyana. Similarly, the spectacled caiman (*Caiman crocodilus*) is a common (and IUCN Least Concern) reptile species that is typically found in slow moving waterways and wetlands. Common green iguanas (*Iguana iguana*) are also found throughout the urban environment near and in Georgetown.

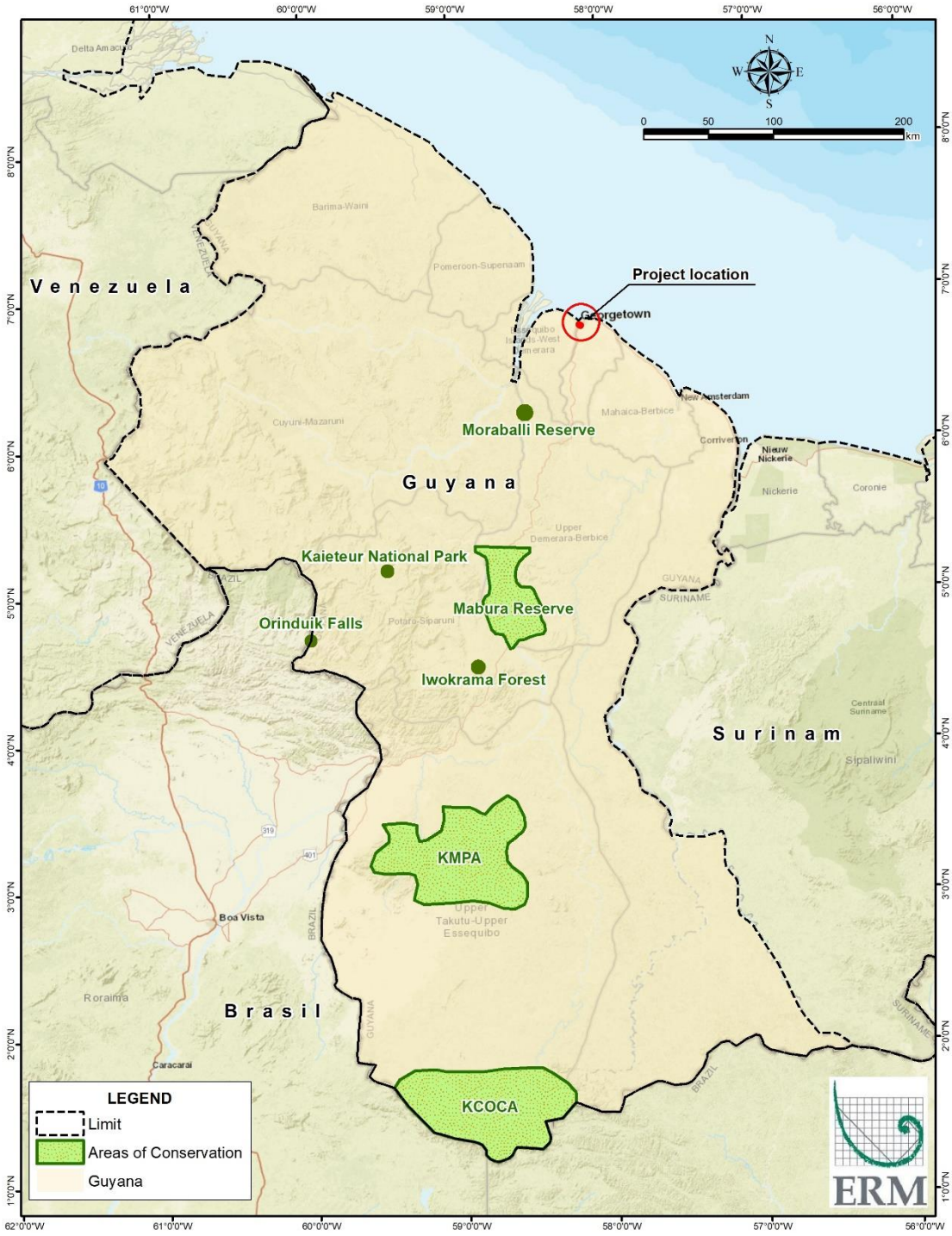
5.2.2 Special Status Species

The Project area is largely modified and is not known to contain any endangered species. Three IUCN Red List species are known to occur within wetlands of the East Demerara River (the East Demerara Water Conservancy, EDWC), located over 2 km south from the IAI. The species are: giant river otter (*Pteronura brasiliensis*) (Endangered), the blue-cheeked parrot (*Amazona dufresniana*) (Near threatened), the Brazilian tapir (*Tapirus terrestris*) (Vulnerable), and the endangered tucuxi (*Sotalia fluviatilis*). Only the tucuxi could potentially be found in the Demerara River, within the Project's IAI.

5.2.3 Areas of Conservation

The area of the Project has not been identified by the Government of Guyana (GOG) as a priority for conservation interest. The conservation initiatives in Guyana are largely focused on the larger forested landscapes of central and southern Guyana or in the Rupununi Savannah region.

The conservation priority sites identified by the GOG include the legally protected areas of the Kanuku Mountains (KMPA), the Shell Beach Protected Area (SBPA), the Kaieteur National Park, the Iwokrama Rainforest Reserve, and the Community Owned Conservation Area at Konashen (KCOCA), and other areas of biological interest not legally protected including the Guyana Forestry Commission Moraballi and Mabura Reserves, the Orinduik Falls and Roraima Mountains (see Figure 5-6), and the D'urban Park, the Botanical Gardens and National Park in Georgetown and the Joe Vieira Park on the West Bank of Demerara (see Figure 5-7). None of the legally protected areas and other areas of biological interest are located within the area of influence of the Project.



Source: Prepared by ERM, 2021.

Figure 5-6: Guyana Areas of Conservation

Source: Prepared by ERM, 2021.

Figure 5-7: Areas of Conservation in Georgetown

5.2.4 Ecosystem Services

Ecosystem services are the benefits that ecosystems provide to people, including many resources that underpin basic human health and survival needs, support economic activities and provide cultural fulfilment.

Ecosystem services fall into one of four main types:

1. Provisioning services, referring to the goods or products obtained from ecosystems such as food, timber, fuel and freshwater;
2. Regulating services referring to the ecosystem's control of natural processes such as erosion prevention, protection from natural hazards, and disease control;
3. Cultural services referring to an ecosystem's non-material contributions to human well-being, such as recreational or spiritual uses, or aesthetic enjoyment; and
4. Supporting services referring to natural processes such as primary production and nutrient cycling, which are necessary to maintain other services (World Resources Institute, 2013).

The most important ecosystem services in Guyana's coastal environment are discussed below.

5.2.4.2 Provisioning Services

The Guyanese population makes use of a range of provisioning services provided by the coastal environment, though the level of dependence of different communities on these resources varies. Indigenous communities in Region 1 tend to have a higher level of dependence on natural resources due to their remote nature and adherence to more traditional livelihood activities. However, there are also many non-indigenous households in regions 2, 3, 5 and 6 that depend exclusively on fishing and/or agricultural activities for their livelihoods.

As described previously, fish and shellfish are an important source of protein and income for many coastal communities. Management of fisheries is the responsibility of the Fisheries Department of the Ministry of Agriculture and Fisheries, whose responsibilities include licensing and development of a Fisheries Management Plan which may include the rationale for limits on licensing or imposition of closed seasons.

At this time, only seabob fishing is subject to a closed season, which is seven weeks (typically between August and October, with exact timing determined each year according to the drop-off in catch rate) (Department of Fisheries. Marine Fisheries Management Plan, 2013-2018).

The nearshore environment, including mangroves are important as nursery areas for commercially important fish and shellfish species, and some areas are also used for crabbing and collection of snails at specific times of the year. The mangrove forests and inland waterways are also important hunting and trapping areas for game animals such as iguanas, labba, agouti, wild ducks, deer and tapir.

Fishing is also undertaken in inland waterways, mostly for subsistence.

Some hunting of sea turtles and collection of their eggs still occurs along the coast, but these practices have declined considerably as a result of education and awareness campaigns over the last decade or so (Protected Areas Commission, 2014).

Agriculture is another critically important provisioning service provided by the coastal environment, with commercial and subsistence-scale crop farming including rice, sugar and coconut, and livestock raising along the coast.

A variety of wild plant products are also used by coastal communities. Mangrove wood is used for firewood, building material, and fishing poles. Some indigenous communities in Region 1 harvest manicole (heart of palm) which is sold as food. Crabwood seeds are processed for oil which is used for cosmetic and medicinal purposes, and other wild plants including noni are collected for medicinal use (Protected Areas Commission, 2014).

5.2.4.3 Regulating Services

A critical service rendered by coastal mangrove forests is their protection of the coastline by dampening wave energy and stabilizing shoreline substrate. Mangroves also play an important role in carbon sequestration. The 2010 National Mangrove Management Action Plan identifies mangroves as the most effective protection from coastal flooding in Guyana. Much of Guyana’s coastal mangrove forest has been lost to human development and overharvesting. In recent years governmental and non-profit groups have been working together to restore mangroves along the Guyanese coast, with the implementation of a Mangrove Restoration Project executed during 2010-2013 whereby mangrove planting and protection initiatives were implemented at ten locations along the coast.

5.2.4.4 Cultural Services

The seashore has historical significance in Guyana as the landing place for Amerindians, then subsequently the Europeans, Africans, Indians and Chinese.

The coastal area is also of religious importance for Hindustani community – religious cleansing rituals (poojas) are performed all along the coast, often in an impromptu manner and also during special holidays such as kartik snan (October to November). Hindu religious cremation ceremonies, including disposal of ashes in the ocean, also take place at crematorium facilities along the coast.

The SBPA is important due to its aesthetic value and tourism potential. At the present time there is little tourism infrastructure and visits to the area are limited; however as a sea turtle nesting area, it is considered to have considerable potential for ecotourism.

5.2.4.5 Supporting Services

Mangrove forests play an important role in nutrient cycling and provide habitat for a diversity of flora and fauna, some of which are exploited by humans as provisioning services, and some of which have tourism value. Aquatic ecosystems are important producers of oxygen through phytoplankton photosynthesis and estuarine sediments and mudflats contribute to nutrient cycling.

5.3 Socioeconomic and Cultural Resources

This baseline was developed using desktop information sources from various agencies such as the Bureau of Statistics Guyana (BSG), Private Sector Commission (PSC), and the Ministry of Agriculture, as well as information from other publicly available EIAs.

It is noted that although all efforts were made to locate recent data, in some cases, the available data are relatively dated (e.g. the most recent census was conducted in 2012).

5.3.1 Administrative Structure

Guyana is divided into 10 administrative regions, pictured on Figure 5-8. The regions are overseen by Regional Democratic Councils (RDCs). Regions 2-10 are further subdivided into Neighbourhood Democratic Councils (NDCs), of which there are 65 in total. Region 1 is subdivided into Community Development Councils and Town Councils.

Source: Prepared by ERM, 2021.

Figure 5-8: Administrative Regions and Townships of Guyana

Within the NDCs are villages, the smallest administrative unit. In addition, there is one city that serves as the capital (Georgetown), and nine townships. Four of these townships were designated as new townships by the Ministry of Communities in 2015 as part of an administrative decentralization effort.

Each of the nine townships has its own mayor and council, and is intended to serve as an administrative hub for government services, such as passports and driver's licenses, as well as providing utilities and public services such as water and sanitation.

5.3.2 Historical Context

The first human inhabitants of Guyana are thought to have entered the highlands during the first millennium BCE and were most likely from the Arawak, Carib and Warao tribes, who engaged in shifting agriculture and hunting for their livelihoods. The indigenous peoples' name for the land (Guiana, meaning "land of water"), gave the country its name.

Although the Guyana coast was claimed by the Spanish after Christopher Columbus sighted it in 1498, it was the Dutch who began establishing colonial settlements in 1580, and by the mid-1600s they were importing African slaves to tend sugarcane plantations.

From 1792 to 1815 Guyana changed hands multiple times, with occupations by the French, Dutch, and British. As a result, the country bears place names in all three languages, as well as those derived from indigenous languages.

The country mostly remained in British possession after 1796, and after purchase of other adjoining areas (Demerara, Berbice and Essequibo), became consolidated as the colony of British Guiana. After the abolishment of slavery in 1807 and full emancipation in 1838, freed slaves established their own settlements in the coastal plain. Plantation owners imported indentured workers from India to replace the slave labour.

Universal adult suffrage was introduced in 1953 as part of a new constitution. The political history from then has been rocky and often split along ethnic lines, with tensions between Guyanese of African and East Indian descent that have sometimes led to bloody conflicts.

Independence was achieved after a new electoral system of proportional representation was introduced by the British. Guyana was proclaimed a cooperative republic within the Commonwealth in 1970.

5.3.3 Social and Political Context

5.3.3.1 Poverty and Development

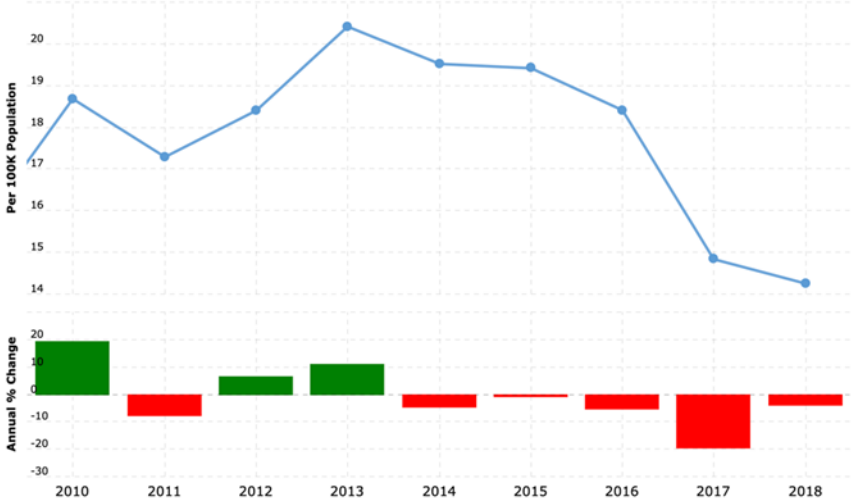
Guyana has long been one of the poorest countries in South America, though there have been significant improvements in reducing the incidence and severity of poverty since the 1980s and early 1990s.

Poor economic performance and the resulting social decline during the time between independence and the late 1980s is attributed by the World Bank to a period of "cooperative socialism", during which time the economy lost competitiveness, real incomes decreased and the government became increasingly unable to provide economic services.

An economic recovery program was launched in 1988 to establish a market-oriented economy, leading to a gradual reversal of the decline (World Bank, 1994). Poverty remains a problem, however, with the latest available data (2006) showing a poverty rate of over 35% (Ministry of the Presidency, 2017).

In 2020, Guyana ranked 122 out of 189 ranked countries for human development, falling into the "Medium Human Development" category. The country's Human Development Index (HDI) score in 2020 was

0.682, in comparison with an overall 2018 Latin America and the Caribbean (LAC) score of 0.758 (UNDP, 2021). Trend data for Guyana shows a slow but positive trend in recent years (see Figure 5-9).



Source: U.S. Department of State, Guyana Crime and Safety Report, 2020

Figure 5-9: Guyana Murder/Homicide Rate

From 1964 to 1992, the PNC controlled the reins of the national government dominated Guyana's politics. The PNC lengthy regime was followed by a national election in 1992 which saw the PPP victorious. PPP manned the country for 23 years of rule by the PPP. In 2015, retired army general David Granger with his multi-ethnic coalition A Partnership for National Unity and the Alliance for Change (APNU) beat out incumbent president Donald Ramotar, pledging to end the racial divisions that have plagued the country's politics since independence.

However, in December of 2018 the APNU lost a parliamentary no-confidence vote, triggering new elections within 90 days. The main dispute leading to the no-confidence vote was the opposition's accusation that the government has mismanaged the country's oil resources by granting overly generous contract terms to ExxonMobil (Reuters, 2019. "Guyana government to challenge no-confidence vote in court). Elections were not held within the 90-day period with the Guyana Elections Commission saying that preparations would take at least 148 days (Kaieteur News, 2019. "Elections unlikely within 90 days"). Elections were finally held in March 2020 with international and local observers. International observers included teams from the Carter Centre, Organization of American States (OAS), the Commonwealth, CARICOM and the European Union. The elections were deemed free and fair by both national and international observers (Caribbean Elections 2020). However, the tabulation of Region 4 results which would have determined the outcome of the elections was marred with controversy (OAS 2020). The incumbent refused to accept defeat and sought the courts interventions in the matter. This resulted in a recount supervised by CARICOM and several excursions to the national and regional courts. The courts dismissed the several elections related cases and paved the way for the previous PPP administration to take up the seat of power. This resulted in 40 year old Irfaan Ali sworn in as the Executive President of Guyana on August 2nd 2020.

The reinstated PPP promises an inclusive government and an inclusive economically prosperous Guyana using the revenue derived from the country's natural resources (Stabroek News August 3, 2020)

5.3.3.2 National Development Goals

The 2015 discovery of large oil and gas reserves offshore Guyana has led to some mixed signals on the country's ongoing plans for transitioning to a green economy. However, the government remains committed to moving ahead with these plans, incorporating a sustainable oil and gas industry as part of that strategy.

In line with these green economy goals, Guyana launched a low-carbon development strategy (LCDS) in 2009, and established a partnership with Norway for a Reducing Emissions of Deforestation and Degradation, and fostering conservation, sustainable management of forests, and enhancement of carbon stocks (REDD+) "payment for forest conservation" agreement.

The government also developed in 2018 developed a Green State Development Strategy (GSDS) to guide the country's economic and socio-cultural development over the next 15 years. The GSDS included principles for the gradual decoupling of economic growth from environmental degradation, aiming for transition to 100% renewable energy by 2025, and redirecting investment to green economic sectors. However, since the defeat of the previous administration at the polls, the new government has reverted to using the LCDS as the overarching developmental paradigm for the country (Ministry of the Presidency, 2017).

5.3.4 Population and Demographics

5.3.4.1 Population Distribution and Migration

Most of Guyana's population is located in the six coastal regions, and according to the 2012 national census, nearly half of the country's population lives in Region 4 (Demerara-Mahaica), which includes the capital city of Georgetown.

Georgetown is the only population centre in the country with a population over 50,000. It is home to about 248,849 residents.

The next largest city is Linden with 29,298 people (Bureau of Statistics Guyana, 2012). 90% of Guyana's population lives on the coastal strip, which accounts for only 10% of the country's total land area and is just 40 miles across at its widest point (World Bank, 2016). This coastland is properly called "the low coastal plain" as most of it is below sea level by more than 1 meter.

Table 5-1 summarizes the distribution of population within Guyana's 10 regions in 2012, the last year for which complete census data are available.

Table 5-1: Regional Population Distribution in Guyana

Region		Population 2002	Population 2012	Population change since 2002	Percent of Guyana's Total Population
1	Barima-Waini	24,275	27,643	+13.9%	3.7%
2	Pomeroon – Supenaam	49,253	46,810	-5.0%	6.3%
3	Essequibo Islands - West Demerara	103,061	107,785	+4.6%	14.4%
4	Demerara-Mahaica	310,320	311,563	+0.4%	41.7%
5	Mahaica – Berbice	52,428	49,820	-5.0%	6.7%
6	East Berbice – Corentyne	123,695	109,652	-11.4%	14.7%
7	Cuyuni-Mazaruni	17,597	18,375	+4.4%	2.5%
8	Potaro – Siparuni	10,095	11,077	+9.7%	1.5%

Region		Population 2002	Population 2012	Population change since 2002	Percent of Guyana's Total Population
9	Upper Takutu - Upper Essequibo	19,387	24,238	+25.0%	3.2%
10	Upper Demerara – Berbice	41,112	39,992	-2.7%	5.3%
	Guyana	748,084	746,955	-0.6%	100.00%

Source: Bureau of Statistics Guyana, 2012; Bureau of Statistics Guyana, 2002.

Of the total population taken in the 2012 census, 49.8% were male and 50.2% were female (Bureau of Statistics Guyana, 2012). On average, the population density has remained constant (between 3.8 to 3.9 persons) per square kilometre from 2012 to 2017 (World Bank Data). In reality, however, large parts of the country, particularly the hinterland, are still uninhabited or have a very sparse population.

In terms of age distribution, the population below 40 years (aged 0-39 years) was about 76.5 percent (574,779 people) of the total population in 2002, but by the 2012 Census, their total share of the entire population had dropped to 70.9 percent (529,457 people).

Overall this decline was 7.9 percent during the intercensal period. Young children under 10 years, representing those born from 2003 to 2012, showed the greatest portion of the decline. The percentage share for those above 40 years in the total population increased from 23.5 percent (176,445) in 2002 to 29.1 percent (217,498) in 2012 Census (Compendium 2 Report, Bureau of Statistics, 2016).

According to the Bureau of Statistics, possible reasons for this change in the population age structure include general decline of the birth rate during the intercensal period, and the outward migration of persons aged 20-39 years who are in their prime working years. With respect to the older age groups, evidence suggests it is likely that Guyanese returning home to stay are older people who have retired after completing their working lives abroad (Compendium 2 Report, Bureau of Statistics, 2016).

The site of the project is in the administrative region of Region Four with a population of 296, 409. Specifically, the project site is along the East Bank of the Demerara River corridor. This area has a total population of 61,295 persons according to the 2012 National Population Census. Villages in the area of influence of the project site include Golden Grove (14, 058); Great Diamond (9,071); Soesdyke (4,114); Timehri (4,433); Eccles (3,585), and Herstelling (3,255). The major sources of employment (occupations and livelihoods) recorded in these communities along the East Bank Corridor are service and sales workers, skilled agricultural, forestry and fishery, craft and related trades, plant & machine operators & assemblers, and elementary occupation. A tiny portion of persons has employment in the armed forces managerial and professional occupations (National Population Census).

The Project will be located in the Houston Village, an old plantation that has seen recent rapid development as a result of the oil and gas industry emergence in Guyana. Access can be granted to Houston village, by navigating the East Bank Public Road, passing several villages on the east and west of the Project area. The villages or communities along the main East Bank Highway include McDoom, Agricola, Eccles, Bagotstown, Peter's Hall, Ramsburg, Arcadia, Mocha, Two Friends, Herstelling, Jardin De Provence, Farm, and Vreed En Rust. The population of the main villages is shown below in Table 5-2 and Table 5-3. It is reasonable to expect that the population would have increased in these villages since 2012 as a result of pull migration to that area and the opening up of several planned settlements.

Table 5-2: Population statistics of the villages that may be indirectly impacted by the proposed Project

Village Number	Village Name	Population			
		Male	Female	Total	Percentage of the total population
1	Houston	477	522	999	5.4%
2	McDoom	421	422	843	4.5%
3	Agricola Village	1,148	1,356	2,504	13.6%
4	Eccles	1,745	1,840	3,585	25.7%
5	Bagotstown	678	765	1,443	10.3%
6	Peter's Hall	613	648	1,261	9.0%
7	Providence	296	325	621	4.4%
8	Ramsburg	71	83	154	1.1%
9	Arcadia	859	934	1,793	12.9%
10	Mocha, Two Friends	616	613	1,229	8.8%
11	Herstelling	1,608	1,647	3,255	23.4%
12	Jardin De Provence, Farm	248	208	456	3.2%
13	Vreed En Rust	118	135	253	1.8%

Source: Bureau of Statistics, 2016

The gender breakdown of the population of the villages, similar to that of the national level is an almost equal number of males and females. Average household numbers also reflect similar numbers to the national average with 4-5 persons per household. Head of household statistics is lacking for the areas.

Table 5-3: Population Age Breakdown of Villages in the Area of Direct Influence

Village	15-19	20-24	25-29	30-34
Houston	87	70	75	63
McDoom	87	71	50	79
Agricola	281	218	200	173
Eccles	353	340	300	288
Bagotstown	134	94	113	126
Peters Hall	98	99	84	89
Providence	69	63	39	44
Ramsburg	11	6	8	7
Arcadia	206	177	158	119
Mocha, Two Friends	146	100	72	86
Herstelling	311	269	252	297
Jardin de Provence, Farm	61	39	31	44
Vreed-En-Rust	18	15	13	31

Source: Bureau of Statistics, 2016

5.3.4.2 Ethnicity

The present population of Guyana is ethnically heterogeneous and reflective of its colonial history. The population is composed primarily of an indigenous population (referred to in Guyana as Amerindian), together with the descendants of slaves brought from Africa, and indentured labourers brought from India.

Data from the 2012 census indicate that the majority of the country's population are belong to two ethnic groups, those of East Indian descent (39.8 percent) and those of African descent (29.3 percent). These are followed by populations of mixed ethnicity (19.9 percent) and indigenous peoples who, in Guyana, are referred to as Amerindians (10.5 percent). Other ethnicities, including Chinese (0.2 per cent), White, and Portuguese (0.3 per cent), collectively make up less than one percent of the population (Minority Rights.org, 2012).

With respect to the changes in the ethnic composition during the intercensal periods (1980, 1991, 2002 and 2012), the two main groups recording the highest percentage growth since 1980 have been the Amerindian and the 'Mixed Heritage' groups. The numbers of each of these two groups have nearly doubled since 1980 and have almost offset the absolute decline noted for the same period in the two major ethnic groups. With the reduction in the size of the entire population, the relative shares of the ethnic groups have expectedly changed with the two groups (Mixed and Amerindians) which have been consistently growing now accounting for a greater share of the population at the expense of the two traditional dominant groups, namely: the East Indian and African groups.

Of interest among the smallest ethnic groups, the census results have shown an absolute increase of 412 persons from 1498 in 2002 to 1910 in 2012 census for persons of Portuguese descent after continuous decline in their population size from 1980 to 2002. This finding supports that there is an overseas migration problem, where the results of the overseas migration patterns can be categorized in two forms of geographical groupings: positive net inflow of persons from abroad into the Hinterland Regions and negative net outflow of persons residing in the Coastland Regions (Compendium 2 Report, Bureau of Statistics, 2016).

These groups of diverse backgrounds have been brought together by a common language, that is, English. English serves as Guyana's national as well as its official language. However, other languages such as Hindi/Urdu, and an English-based Creole known as Guyanese Creole are widely used, as well as indigenous languages which are also spoken by some populations in the country. For example, Macushi is the most widespread of the Caribbean indigenous languages with 30,000 speakers across Guyana and Brazil. Macushi's other names are Teweya, Macusi, Makushi, Macussi, Makuxi, and Makusi.

The Kapong language is popular in the area of the Upper Mazaruni. Most Kapong speakers do not reside in villages, but there are several population centres including Kako, Kamarang, Waramadong, and Jawalla (Sawe, E., World Atlas, 2017). Much of the language refers back to the indigenous beliefs of sun spirits and sun worship.

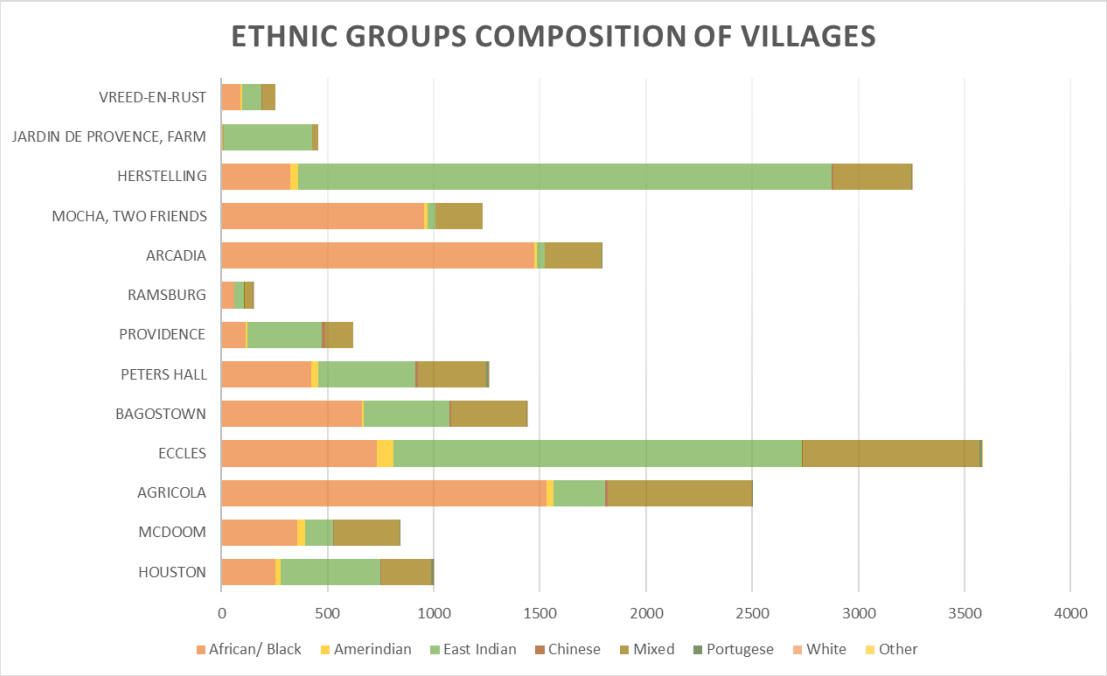
The Wai language is used by a few hundred speakers in Guyana, and it is also called Uaiuai or Ouayeone. Some Arawakan dialects are also used in Guyana including Arawak and Wapishana (Sawe, E., World Atlas, 2017).

The Warao language has approximately 28,000 speakers spread across Guyana, Suriname, and northern Venezuela. Other native languages of Guyana are Pemon, Arecuna and Taurepan, and Mapidian (Sawe, E., World Atlas, 2017).

The more populated and urban Regions 3, 4, 5, and 6 are dominated by populations of East Indian and African descent, followed by populations of mixed ethnicity. Amerindian population numbers in these regions are low. However, the majority of population residing in the more remote Regions 1, 8, and 9 is of Amerindian ethnicity. 90 per cent of Amerindian communities are located in the interior of the country.

Source: Bureau of Statistics Guyana, 2012

Figure 5-10 shows the ethnic composition of each of the villages nearby the project.



Source: Bureau of Statistics Guyana, 2012

Figure 5-10: Distribution of Ethnicity in Villages, 2012

5.3.4.3 Vulnerable Populations

In 2019, it was reported that 11,713 persons living with disability in Regions 2, 3, 5, and 10 with Region 3 having the highest numbers with 3896 persons. The survey did not cover Region 4. However, the 2002 Census identifies the population of persons living with a disability as 48,419 or 6.4% citizens. A gender breakdown of the population indicates that females marginally outnumber males – with 51.1 percent compared to 48.8 percent disabled males. In 2002 there were 42,577 disabled persons in the working-age groups, 22 percent were in the labour force, while an impressive 86 percent who sought work were employed, and 14 percent were unemployed. 7.4 percent (3,483) of the disabled population was currently attending school either full-time or part-time. There was no gender disparity in the enrolment rate. The proportion of elderly females who had disabilities (56.4 percent) is higher than the males (43.6 percent). Generally, females with disabilities in every category were moderately higher than males.

Women and Children

Women and children in Guyana are vulnerable due to widespread violence, often in the form of domestic abuse, which frequently goes unpunished. According to UNICEF data, 10% of men and 10% of women justify wife beating (UNICEF, Multiple Indicator Cluster Surveys, 2014). Although laws and policies are in place, such as the Sexual Offenses Act from 2010 and the national policy on domestic violence for the period 2008-13 under the slogan “Break the Cycle Take Control”; they are often deemed insufficiently enforced.

In July 2012, the UN Women, concluding observations of the Committee on the Elimination of Discrimination against Women in Guyana, expressed their concern about the persistence of harmful norms, practices and traditions, patriarchal attitudes and deep-rooted stereotypes regarding the roles, responsibilities and identities of women and men in all spheres of life.

The Committee was concerned that such customs and practices perpetuate discrimination against women and girls, that they are reflected in women’s disadvantaged and unequal status in many areas, including education, public life and decision-making. In addition, the Committee expressed their concern at the high prevalence of violence against women, which is culturally accepted and in many cases remains underreported (UN Women, Guyana: Concluding Observations Report, July 2012).

In addition, despite relatively high levels of female education, gender discrimination in the workforce is prevalent.

Guyana’s Gender Inequality Index (GII), calculated by the UNDP based on a range of women’s reproductive health, empowerment and labour market indicators, was 0.961[12] in 2020. This placed Guyana at 122 out of 160 ranked countries. In comparison, Belize and Suriname ranked 89 and 99, respectively on the GII index that same year.

According to the UNICEF data about child protection, 18% of children aged 5-17 years old are engaged in child labour; and 70% of children aged 1 to 14 years old have experienced violent discipline (psychological aggression and/ or physical punishment) in the past month (UNICEF, Multiple Indicator Cluster Surveys, 2014).

[12] The GII is scored from 0 to 1. A score of zero would represent a situation in which women and men fare equally, while a score of 1 would indicate one gender faring as poorly as possible for all dimensions of disadvantage.

More information on gender inequality and discrimination in Guyana is provided in Section 5.3.12 Human Rights Context, while additional information on maternal health is provided in Section 5.3.12.1 Health Status.

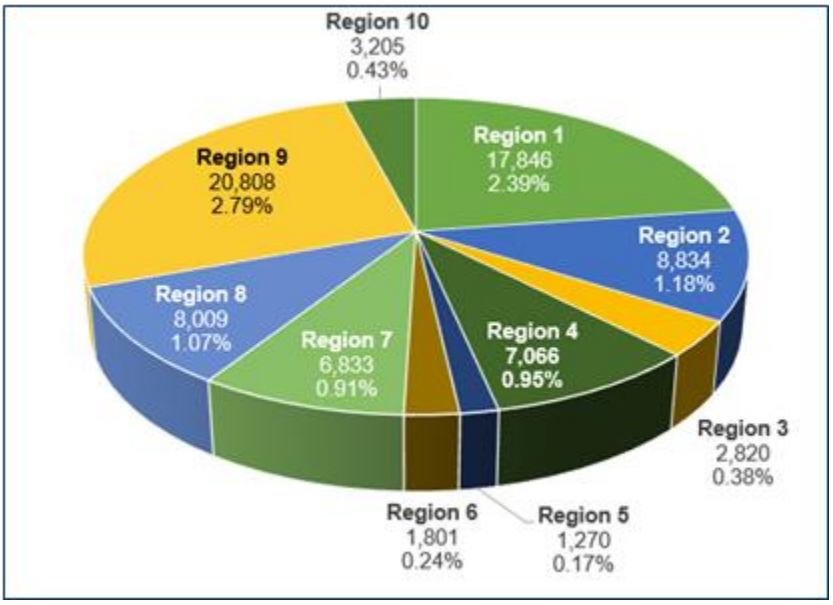
Indigenous Peoples

Amerindians in Guyana numbered 78,492 as of the 2012 census, and their population is on the rise, with growth of 12.8 percent seen in the period 2002-2012. The Amerindian Act (2006) provides for the recognition and protection of the collective rights of Amerindian villages and communities in Guyana, including the granting of lands to such villages and communities.

According to Minority Rights Group International (2008), there are nine main Amerindian groups in Guyana, of which three are coastal: the Carib, Warao, and Arawak tribes. Other groups tend to inhabit the country's hinterland regions.

Many of the Amerindians in Guyana, particularly in the coastal area, have undergone cultural integration with the general population and share much of the same culture as the Afro- and Indo-Guyanese population. Over the centuries there has been significant intermarriage between the coastal indigenous communities and Afro-Guyanese, and after decades of European contact indigenous peoples have also been considerably influenced by the efforts of Christian missionaries (Minority Rights.org).

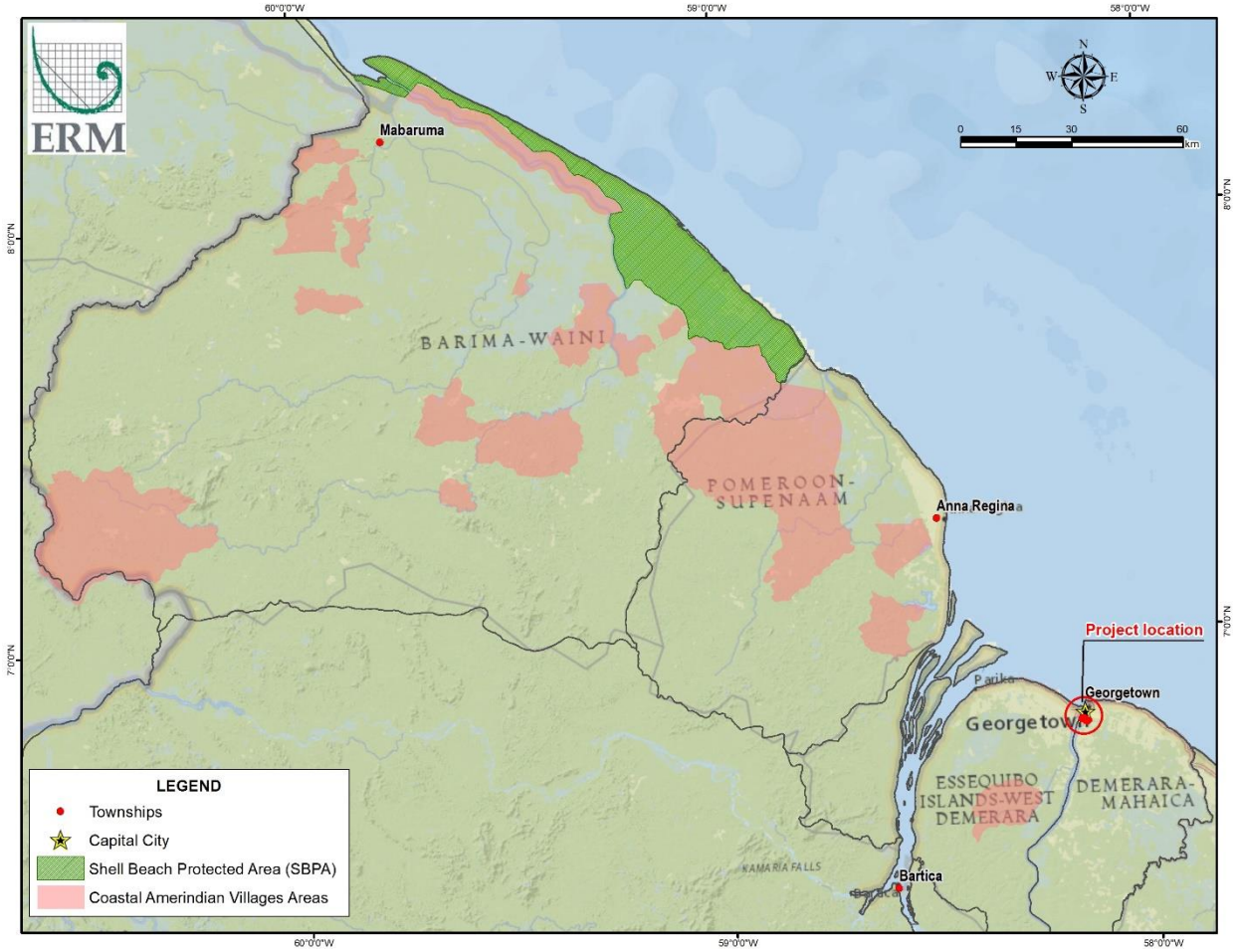
However, as a whole, the standard of living for the Amerindian population in Guyana is lower than for the general population, particularly for those in remote areas where provision of infrastructure and services is a challenge. Additional information on disparities experienced by the indigenous population in Guyana is provided in Section 5.3.12 Human Rights Context. The distribution of Amerindian population among the regions is shown on Figure 5-11.



Source: Bureau of Statistics, Guyana, 2016

Figure 5-11: Amerindian Population and Percent Distribution by Region, 2012

In the Project area, the Amerindian communities of note are those residing in and around the Shell Beach Protected Area (SBPA) in the coastal area of Region 1 (see Figure 5-12).



Source: Prepared by ERM, 2021

Figure 5-12: Location of Shell Beach Protected Area, and Amerindian Coastal Communities

Lesbian, Gay, Bisexual, Transgender, Queer, and Others (LGBTQ+) Populations

This sub-population is at high risk due to Guyanese laws criminalizing same-sex sexual activity, and a lack of anti-discrimination laws. More information is provided in Section 5.3.12 Human Rights Context.

Informal Households

In the 1980s and 90s, 'squatter' communities proliferated in Georgetown as more and more individuals and families built makeshift homes on lands to which they had no legal rights. Often this consisted of government lands reserved for maintenance of public infrastructure, or lands on top of levees that are not considered safe for human habitation due to the city's high flood risk (IDB, 2016).

This phenomenon was due to shortages of affordable land and housing for low-income families, as well as long wait times for registering property and obtaining construction permits (IDB, 2016).

The Guyanese Central Housing and Planning Authority (CHPA) has made recent efforts to “regularize” informal settlements in some areas by adding roads and utilities infrastructure, and has also relocated many settlers of areas considered unsafe for habitation to newly built social housing schemes.

While progress has been made in the regularization process, there are still hundreds of people in Georgetown living in settlements without basic infrastructure such as electricity, potable water, sanitation and roads, and some are in areas at constant risk for flood damage (IDB, 2016; McHardy & Donovan, 2016). These populations are considered to have a higher level of vulnerability than the general population (Figure 5-13).

Source: ERM, 2017.

Figure 5-13: Informal Housing Built on Drainage Canal Reserves, Georgetown

5.3.5 Land Use

Guyana is divided into the following four main geographic zones:

- The flat, low-lying coastal plain that is about 4.5 feet below sea level and which comprises about 5 percent of the country’s land area. This zone stretches 440 kilometres (273 miles) from the Corentyne River in the east to Waini Point in the west and ranges from approximately 5 km to 65 kilometres (~3 to 40 miles) wide along the coast;
- The “white sand belt”, a largely vegetated zone dominated by white sandy soils lying inland from the coastal zone, ranging from approximately 150 km to 250 km (~93 mi to 155 mi) wide and containing most of the country’s mineral deposits;
- The interior highlands that extend from the white sand belt to the country’s southern borders and makes up the largest land area in the country; and
- The Interior Savannahs, which consist of two main savannah complexes: the Rupununi Savannahs and the Intermediate Savannahs. The Rupununi Savannahs cover 15,540 square kilometres (km^2) (6,000 square miles [mi^2]) and lie in the southwestern part of the country. The Intermediate Savannahs cover over 5,180 km^2 (2,000 mi^2) and lie 97 kilometres (60 miles) from the mouth of the Berbice River.

As described above, Guyana is a sparsely populated country, with the majority of the population concentrated in the coastal plain region. In 2012, the cultivated area in Guyana was estimated at 1,107,000 acres. Cultivated land is also concentrated in the coastal plain, where the majority of the population resides (FAO, 2015). Agriculture in these areas is dominated by sugar, rice, and coconut plantations, interspersed with smaller scale establishments of non-traditional crops and livestock.

The Shell Beach Protected Area (SBPA) is a notable feature in the coastal zone. It was designated a Protected Area with the passage of the Protected Areas Act of 2011, and is the only Protected Area on Guyana's coast. More information on the SBPA is provided in Section 5.4.3 Protected Areas.

Figure 5-14 below shows the land use in the DAI and IAI of the Project.

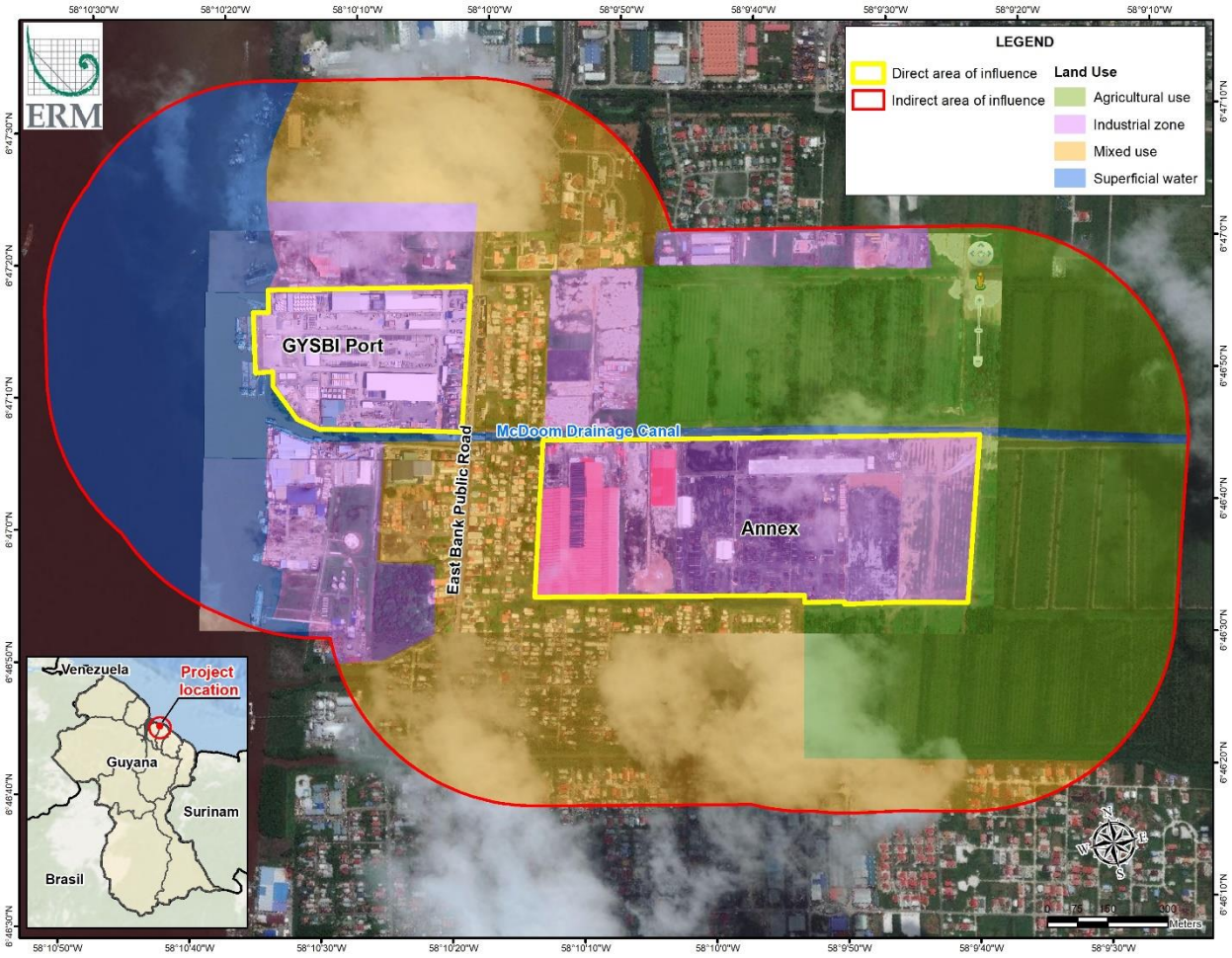


Figure 5-14: Land Use in the Project DAI and IAI

5.3.5.1 Land Ownership

The pattern of land ownership in Guyana today is approximately 85% government-owned, approximately 14 percent Amerindian-owned, and one to two percent privately owned. There are two land markets: one consisting of freehold properties[13] and one consisting of the lease of state-owned land. Amerindian lands

[13] Lands that are titled to an individual

are owned collectively and are not subject to transfer or sale. Approximately half of the farms in the coastal area are freehold properties and these tend to be small properties of 5-15 acres each (Government of Guyana, 1997). Leases of government-owned lands are issued by the Guyana Lands and Surveys Commission (GLSC).

Despite the country's low population density, there are housing shortages that have resulted in large measure from skewed land ownership patterns whereby the Guyana Sugar Company (GuySuCo) and the government collectively own the large majority of available land in the coastal plain. Particularly in the 80s and 90s this resulted in a shortage of developable land in the Georgetown area, which was hemmed in by sugar estate lands. As described in Section 5.5.3, this led to a proliferation of squatting in the 1990s. Since that time the government has made extensive efforts to both divest public lands, and to regularize squatter communities (IDB 2016).

According to a study of the land registration system in Guyana conducted by the Inter-American Development Bank (IDB), the country's dual property registration system (title registration and deed registration) has regulations that overlap and conflict, and is considered complex and bureaucratic. The systems are also considered ineffective in managing and enforcing rights. As a result, a large number of land owners do not register their properties or do not keep their ownership rights up to date (IDB, 2010).

More recent sources, such as Export.gov's Guyana Country Commercial Guide (which provides U.S. export companies with relevant information for their business) seems to agree with the statement above, noting that Guyana's property rights system is generally overly bureaucratic and complex, with regulations that are overlapping, competing, and no transparent (Export.gov, 2018).

5.3.6 Education

5.3.6.1 Education policy

School attendance is compulsory up to the age of 15, and primary and secondary school are free. The Ministry of Education is responsible for education budgets, policies, and standards and administers these by district. The country is divided into eleven education districts, ten of which correspond with the administrative regions, while the city of Georgetown makes up the eleventh district.

The Ministry of Education, in its "Guyana Education Sector Plan 2014-2018" confirms that "the education as a percentage of the national budget has been maintained at an average of 15% (or approximately 4.7 percent of GDP) in the last five years, and there is every reason to expect that this will be maintained and even increased in the future" (Ministry of Education, 2014).

The total cost of this plan over the five-year period, beginning in 2014 was GYD 214 billion. 55 per cent was recurrent cost while 45 per cent was capital cost associated with new/ rehabilitated/ maintenance of infrastructure, purchase of equipment and tools, and developmental Projects. This Plan had two priorities: 1) increase learning outcomes for all levels of education and all sub-groups; and 2) decrease disparities in learning outcomes between sub-groups, especially between students in coastal and hinterland schools.

Near the project areas are four primary schools; Providence Primary, Eccles Primary, St. Anne's Primary, and Agricola Primary, and three nursery schools; Eccles Nursery, Houston Nursery, and Mocha Arcadia Nursery. There is also a private medical school known as Texila American University (TAU) close to the project site. See Table 5-4 for the student population of the villages in the Project vicinity.

Region Four ranks high in the national out-of-school rate for children with a minimal (0.1 percent) among primary school-aged children and 1.1 percent secondary school-aged children (UNICEF, 2017). In addition, 1.2 percent of grade 7 students are at serious risk of dropping out of school, while, 7.3 percent are at moderate risk; 1.7 percent of grade 8 students are at serious risk of dropping out, while, 4.1 percent are at moderate risk and 1.9 percent of grade 9 students are at serious risk of dropping out and

10.0 percent are at moderate risk (UNICEF 2017). According to the Bureau of Statistics in 2012, there was an 11.6 percent enrolment into tertiary education and the female to male ratio was approximately 2:1. . In 2020, the University of Guyana reported that females outnumber males at the University of Guyana. Of the 8291 students, approximately 37 percent of the student population were men. Women outnumber men in all of the faculties, except Agriculture and Forestry, and Engineering and Technology.

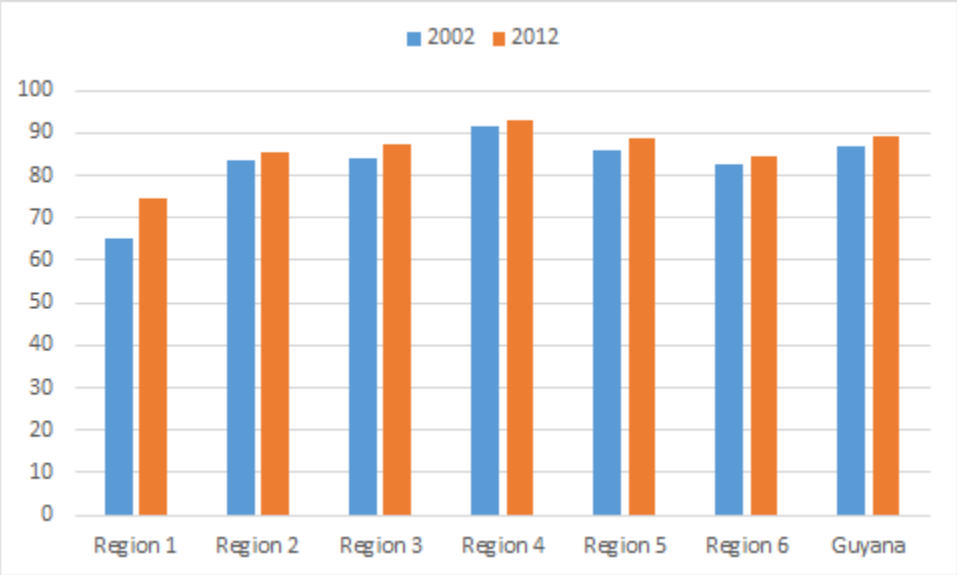
5.3.6.2 Literacy

The adult literacy rate (defined as the percent of population age 15 and above that can read and write) in Guyana increased by 2.5 percent between the 2002 and 2012 censuses (Bureau of Statistics Guyana, 2012). The lowest level of literacy occurs in Region 1, but the region saw considerable improvement over the 10-year intercensal period with a 9.4 percent increase (Figure 5-15).

Table 5-4: Student Population of the Villages in the Project Vicinity

Village	None	Prep A/ B, Grade 1 and 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Grade 9	Grade 10	Grade 11	Grade 12	Post-Secondary/ Tertiary/ University	Total
Houston	57	28	25	32	39	75	43	49	100	103	216	10	179	958
McDoom	54	26	12	21	36	78	22	34	94	142	171	5	100	796
Agricola	135	95	54	87	93	227	95	165	257	387	413	11	345	2366
Eccles	181	104	69	104	152	332	151	168	299	423	896	20	501	3400
Bagotstown	72	45	27	36	49	107	62	79	146	194	213	3	337	1370
Peters Hall	83	45	32	33	37	123	42	61	95	113	282	16	250	1212
Providence	28	19	17	32	18	59	45	50	90	100	98	4	33	595
Ramsburg	6	8	3	4	5	10	9	6	4	5	32	4	55	152
Arcadia	110	45	35	51	73	167	69	77	187	270	386	6	221	1699
Mocha	76	40	42	45	51	114	85	119	81	179	174	4	141	1152
Herstelling	179	99	111	168	178	450	234	253	394	319	588	11	102	3088
Jardin de Province	28	9	11	15	21	142	37	43	53	44	37	0	2	442
Vreed-En-Rust	12	17	9	5	18	12	7	6	14	21	46	4	67	239

Source: UNICEF, 2004



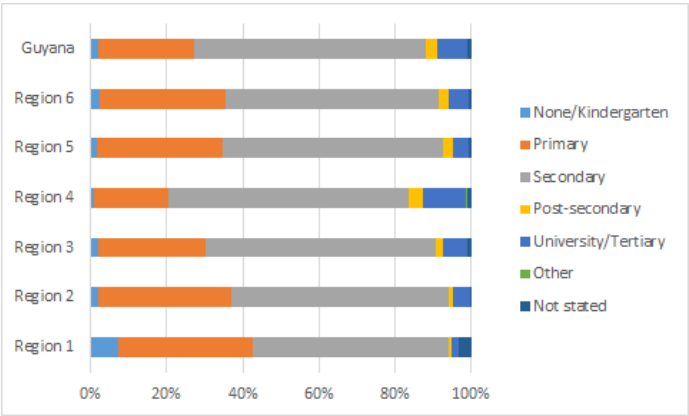
Source: Bureau of Statistics Guyana, 2012

Figure 5-15: Adult Literacy Rate by Region, 2002 and 2012

Literacy levels in Guyana segregated by gender show similar levels among females and males. Literacy rates for young women ages 15-24 edge out young men by one percent at 98.0 percent, with the literacy rate of region four being 98.2 percent, while, the overall literacy rate for young men is 97.7 percent and 97.4 in region four (UNICEF, 2014). At the secondary level, females account for 88%, 7% higher than males at 81% (Ibid).).

5.3.6.3 Educational Attainment

Data on the highest level of education attained by the adult population indicate that the majority of adults in Guyana attained the secondary level. Of the coastal regions, educational attainment is lowest in Region 1, where access to education at all levels poses a challenge due to the communities' remote nature (Figure 5-16).



Source: Bureau of Statistics Guyana, 2012

Figure 5-16: Educational Attainment by Region, 2012

The levels of primary education for the indigenous population are typically lower than non-indigenous groups of the population. In Amerindian communities, the attendance rate at primary schools has been reported to be 50 percent lower than the country average (Minority Rights International, 2008). This is partly attributable to a shortage of infrastructure, utilities and qualified teachers (Ministry of Education, 2014), as well as standardized teaching methods and curriculum which limit appreciation for indigenous culture and values.

Whilst access to education in Amerindian communities continues to be limited, the stated government policy is to provide indigenous children with the same educational opportunities available to the rest of the population (Minority Rights International, 2008). The Ministry of Education in an effort to address the disparity between coastal and hinterland schools have launched several initiatives including tele and distance learning using smart classrooms and a pilot program of instruction in indigenous languages. This government effort to improve education was reflected in the “Guyana Secondary Education Improvement Project” as part of the Ministry of Education’s Amerindian Peoples Plan (Government of Guyana, March, 2014). The objective of this Project was to increase the number of students with access to secondary school mathematics teachers benefiting from continuous professional development nationwide and to increase the number of students in secondary schools with improved learning conditions in targeted regions.

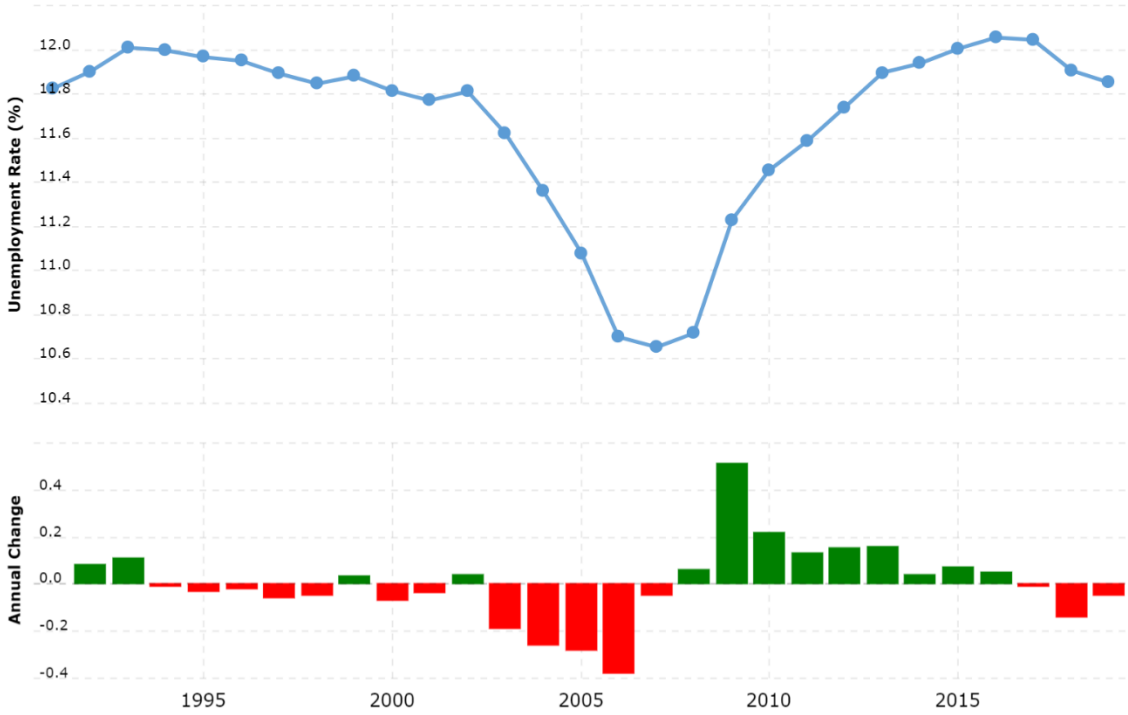
5.3.7 Employment

Results of the most recent national census indicate that 87.5 percent of the labour force was employed and 12.5 percent was unemployed at this time (2012). Data from the previous census in 2002 indicate that the unemployment rate did not change in this 10-year period (BSG 2012; BSG 2002). In 2019, unemployment rate was 11.85%, according to the World Bank which rose significantly in 2020 due to the COVID-19 pandemic. According to data from the World Bank, the GDP per person employed (constant 1990 PPP $) was US $20,198 in 2016 (World Bank Data, 2016). The labour force participation rate in 2016 (% of total population ages 15+, modelled by the International Labour Organization estimate) was 57.6% (0.3 million).

According to the Guyana Times, a national newspaper, a quarterly labour force survey[14] done during the period of July to September 2017 revealed that the unemployment rate for persons aged 15 and above was 12%, with the situation for women being substantially worse than for men (Guyana Times, March 16, 2018). According to the findings of the survey, unemployment among women was 15.3 percent and among men 9.9 per cent. The youth unemployment rate among 15 to 24-year-olds was almost twice that of adults, at 21.6 percent.

Figure 5-17 below presents the unemployment rates for the youth and female population in Guyana from 1991 to 2021. The percentage of female unemployment has not shown much variation, remaining above the total unemployment percentage rates. Conversely, in the case of youth unemployment, the percentage decreased from 30 percent to almost 20 percent by 2016, although it remains high and presents a concern for the country’s labour market situation.

[14] The survey was done from a total population of 550,831 persons 15 years and above, with some 72.2% living in urban areas.



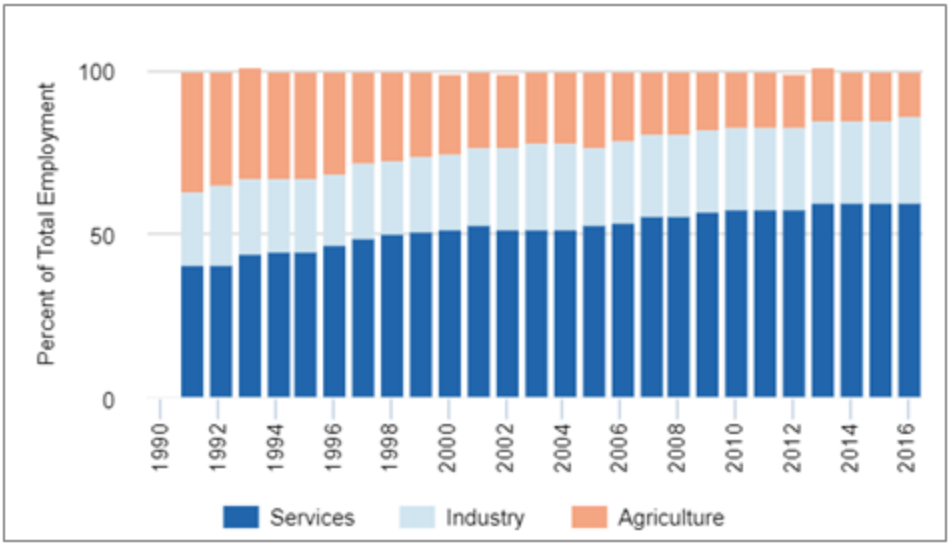
Source: World Bank, 2021[15].

Figure 5-17: Unemployment Rates, 1991-2021

In 2012, the unemployment rate in Region 1 was the highest in the country at 19.3 percent of the labour force. Region 2 had the lowest rate of unemployment in the country at this time, at 10.6 percent. Regions 3 and 4 had rates of 11.8 percent and 11.3 percent, respectively.

Figure 5-18 displays the percent of total employment in the services, industry and agriculture sectors in Guyana. As observed, the predominant sector is the services sector, which has been growing since 1991. The industry sector has remained steady, but the percent of employed persons in the agriculture sector has decreased. This is a reflection of a global trend of urbanization whereby more and more people are moving to bigger cities.

[15] Guyana Unemployment Rate 1991-2021. www.macrotrends.net. Retrieved 2021-03-15



Source: ILO, KILM database.

Figure 5-18: Employment Rates by Sector, 1991-2016

However, statistics from the 2012 census indicate that the agricultural sector remains important for rural populations in Guyana. The data show that 23.0%of the employed population 15 years of age and over in Region 1, 27.9% in Region 2, 18.8% in Region 3, 6.9% in Region 4, 35.2% in Region 5 and 35.0% in Region 6 had occupations in the Agriculture, Forestry, and Fishing industry group in 2012 (BSG, 2016). This was the industry group employing the largest number of workers in Regions 2, 3, 5 and 6, while in Region 1 this group was second to Mining and Quarrying. It should be noted that the Agriculture, Forestry, and Fishing industry group, and the primary sector[16] in general, is dominated by male workers, with female workers making up less than ten percent of the workers employed in this industry group in these regions.

Census data show that tertiary (service) sector jobs such as wholesale and retail trade, public administration, and accommodation and food services are dominant in Region 4 (including Georgetown), making up 67.0% of jobs there . Female representation in this sector is high, with women making up 48.2% of workers in the sector (BSG, 2016). Secondary and primary sector jobs make up 21.0 % and 12.0% of employment in Region 4, respectively.

Given the newness of the oil and gas sector in Guyana, identifying adequate local workforce resources has been challenging, with the government working simultaneously toward establishing local content policies, then finding ways to ensure that such policies can be met, for example through workforce development programs and strengthening of academic institutions (OilNow. 2018. “Local content expert says policy must capture capabilities of Guyanese workforce”. May 29, 2018).

As of May 2018, one of the major oil and gas companies working in Guyana had 585 Guyanese nationals employed in country, and had provided 61,000 training hours to workers. They had also used 309

[16] According to the BSG, the primary sector industries (e.g., agriculture, fishing, forestry, and mining) make direct use of natural resources and include the production of raw materials and basic foods. The secondary sector is engaged in manufacturing using raw products from the primary sector and includes processing, construction, textile production, brewing and bottling, etc. The tertiary sector provides services to the general population and businesses, including retail and wholesale trade, transportation and distribution, entertainment, tourism, healthcare, etc.

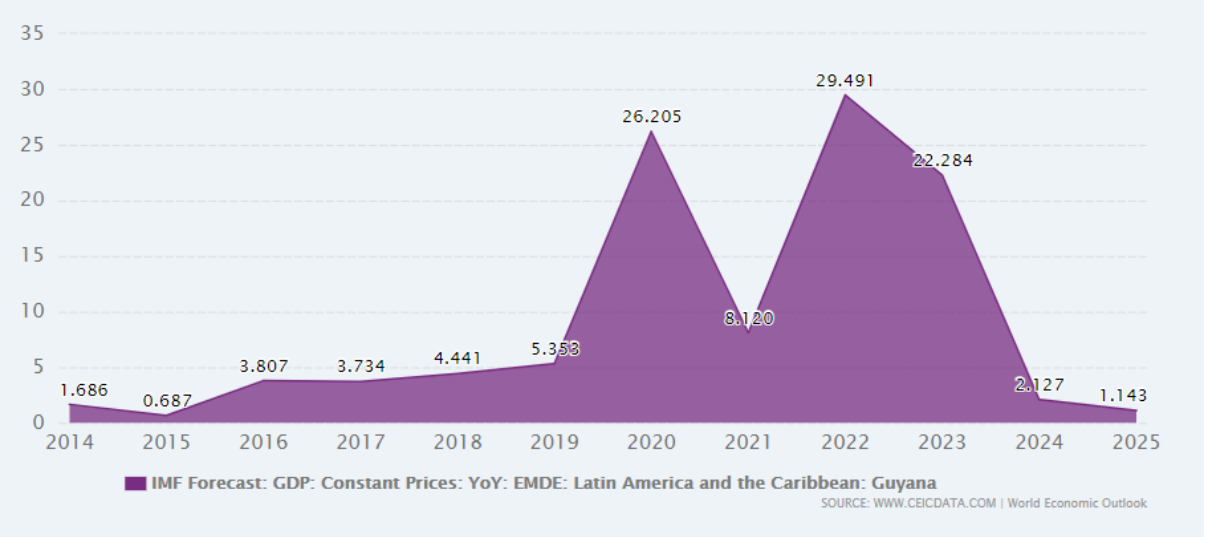
Guyanese-owned companies in its supply chain as of the end of 2017, and continue to build local supplier capacity through training programs offered at its Centre for Local Business Development (OilNow, 2018. “Over 500 Guyanese gain employment through ExxonMobil operations”).

Region Four being the administrative centre of Georgetown resulted in the majority of persons employed and living within the Project Area, according to the Census Report (2012), employed in the tertiary sector (67.0 percent, with a majority of the workers being females (89.0 percent females to 54.4 males).

The tertiary sector is followed by the primary sector, which accounts for 12.0 percent of the workforce with the majority of the workers being males (17.3 percent male to 2.8 percent females).

5.3.8 Socio-Economic Activity and Organization

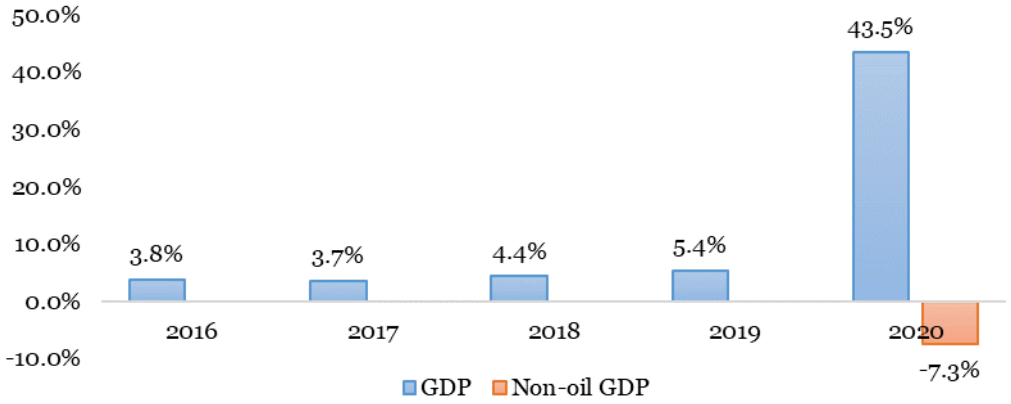
Guyana is at the cusp of unprecedented economic growth and transformation as shown in the graph below (Figure 5-19). Guyana’s nominal GDP in 2020 was $ 6.8 billion U.S. dollars (USD)[17]. The per capita GDP in 2019 was $ 6,609.6 USD (see Figure 5-20) (World Bank Data, 2020). Guyana was reclassified by the World Bank from a lower middle income to an upper middle income country in 2016 (World Bank, 2016). The dominance of the agricultural sector as the main contributor to the GDP of the country has been declining for a number of years being replaced by the services sector initially and now oil production. Guyana’s main sectors by contribution to GDP are summarized in Figure 5-21 and Figure 5-22.



Source: IMF, 2020.

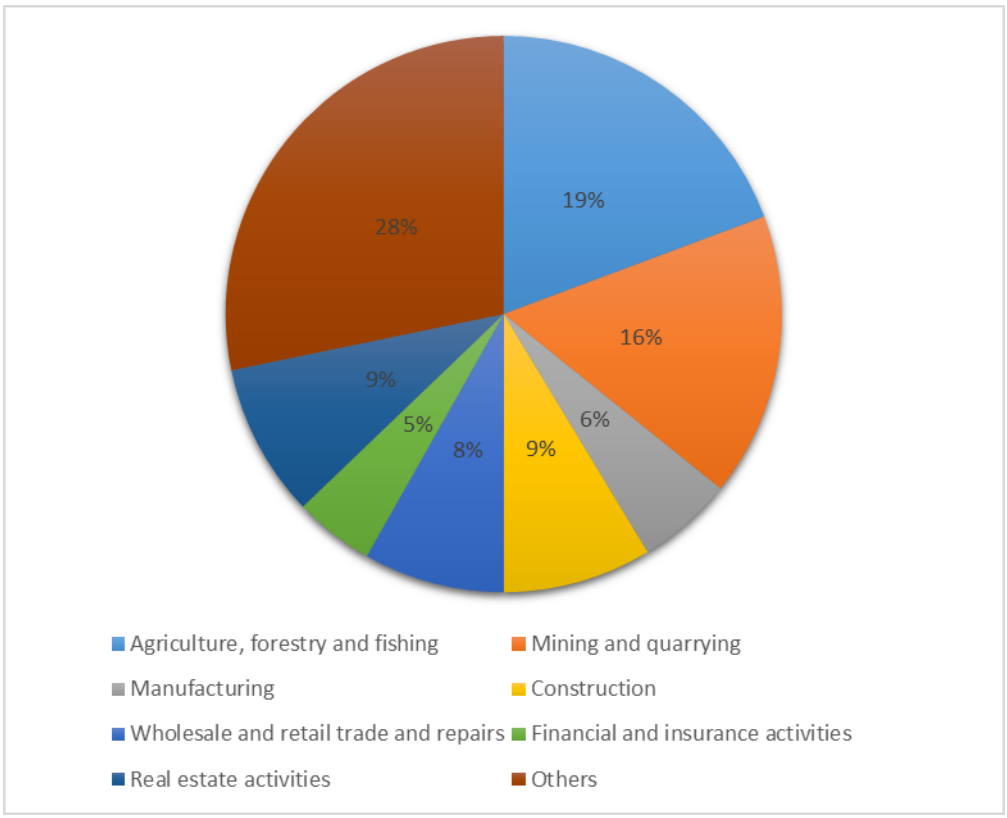
Figure 5-19: Projected Economic Growth in Guyana

[17] As per IMF estimate for 2020.



Source: Extracted from Guyana's National Budget Speech, 2021

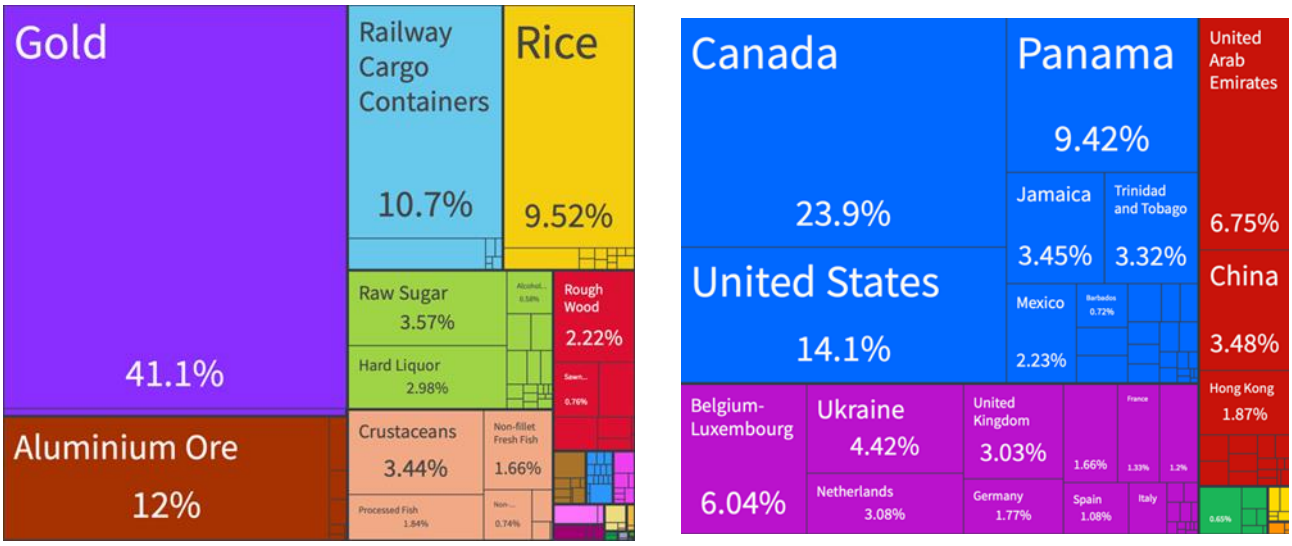
Figure 5-20: Overall Growth Rate, 2016 – 2020



Source: Bureau of Statistics, Rebased Gross Domestic Product Series (2012 Prices)[18]
Note: Percentages add to more than 100 due to rounding.

Figure 5-21: Economic Sectors and Contribution to GDP, 2019

[18] https://statisticsguyana.gov.gy/subjects/national-accounts-and-production/



Source: OEC, 2021

Figure 5-22: Guyana's Exports (left) and Export Destinations (right), 2021[19]

These sectors represent businesses of varying scales from small locally owned establishments to multinational corporations.

Guyana relies heavily on trade, with exports totalling $3.981.Billion USD) in 2019, up from $1.377 Billion USD in 2010 (Guyana Bureau of Statistics, 2018, 2015 OEC 2021). The main export products for the country in 2018 in order of dominance is raw gold, rice, shrimp and prawns, timber, prepared foods, and bottled rum and spirits (FAO, 2019).

As a result of high export commodity prices, the country saw an extended period of relatively high economic growth averaging 4.7% annually between 2005 and 2013. Following a drop in GDP growth to 3% in 2015, the country's economic growth returned to levels of around 4% in 2016 and 2017 (IDB, 2017). In 2018 and 2019 the economic growth rate was 4.4 and 5.4 % respectively. In 2020, the economic growth increased tenfold to 43.5 % mainly as a result of oil production. The non-oil GDP actually decreased by 7.3 percent in 2020. The decrease can be attributed to impacts of the global COVID-19 pandemic on the economy.

Guyana may be among the countries most significantly impacted by the oil crisis (low oil prices), owing to the rapid reduction of global oil prices. Prior to the crisis, GDP growth was projected at over 80 percent for 2020, with an assumed oil price of over $60 per barrel. With oil prices trading as low as $20 per barrel recently, the report presents a simulation suggesting that if prices were to remain in this range, Guyana's economic growth could fall to less than half of its pre-crisis projected level. In this context, the government has taken actions to improve the public economic sector's capacity to respond, but the implementation of broader fiscal measures has been complicated by the current political situation (Ministry of Finance, 2020).

Sectors that are uniquely tied to the coastal environment in Guyana, as well as the mining sector, are described in further detail below.

[19] https://oec.world/en/profile/country/guy

5.3.8.1 Agriculture

According to the Private Sector Commission, Guyana has a relatively strong agricultural sector and is the only net exporter of food in the Caribbean. In 2017, agriculture, fishing and forestry accounted for 16 percent of the country's GDP, or $67.4 billion GYD (approximately $321.3 million USD).

Agriculture, Forestry & Fishing generally showed positive growth during the earlier part of the current decade. In 2014, the sector recorded the highest growth of 5.7%, however, during 2016, the sector contacted by 10.3%, where there were industrial constraints and restructuring in sub-sectors. Nevertheless, this sector remains critical to the Guyanese economy, contributing considerably both to employment and to the economy with a value of GYD $94.9 billion in 2017.

Agriculture is a major export earner for Guyana and employs a significant portion of the population. Agriculture in 2019 contributed 18% to GDP. The agriculture sector in Guyana has stagnated, driven by the divestiture of the sugar industry by the previous government. Agriculture remains a significant employer of the labour force in Guyana. The new government signalled its intent to diversify the economy, including the agriculture sector, with a promise to revitalize the sugar industry and not be fallen by Dutch Disease[20]. Guyana's tropical climate and topography incentivizes production of crops that differ largely from those grown in the cooler climates of the United States. Guyana's proximity to the United States makes it an ideal investment destination for agriculture.

Guyana's endowment of large arable land and favourable climatic conditions provides opportunities for investors. Many former employees of the defunct sugar estates remain unemployed, affording international investors access to cheap labour. The new government seeks to diversify the economy with potential heavy investment in the agriculture sector. The COVID-19 pandemic did not disrupt local supply chains from production. The reduction in cargo flight did affect exports negatively. In 2020, the Agriculture sector estimated to have grown by 4.1%, this improved position is largely on account for growth in rice, other crops and livestock which offset the contractions recorded in sugar, forestry and fishing. The sugar industry contracted by 3.7% with production falling to an all-time low. The forestry sector contracted by 7.1%, while the fishing sector contracted by 17.1%, according to the Finance Minister, Dr. Ashni Singh[21].

In addition, the livestock industry contributed more than $US58 M to Guyana's economy in 2012, playing a significant role in furthering Guyana's economic and social development. Livestock includes dairy and beef cattle, swine, poultry, sheep, goats, and other livestock such as rabbits and bees. Guyana is "self-sufficient" in fresh meats, but not in milk. Some sub-sectors, such as swine and small ruminants, operate at a subsistence level. The following table (Table 5-5) provides an overview of livestock production from 2009 to 2013.

Table 5-5: Livestock Production in Guyana, 2009-2013

	Unit	2009	2010	2011	2012	2013
Poultry meat	Kg	27,086,086	24,969,212	25,573,466	30,452,761	29,280,260
Table Eggs	Each	18,914,422	14,169,197	23,508,323	21,234,317	17,964,574
Beef	Kg	2,110,394	2,260,339	2,153,320	1,635,374	2,262,373

[20] A term that broadly refers to the harmful consequences of large increases in a country's income

[21] Poor performance recorded in non-oil sectors; Overall Economy still grew by 43.5% - News Source Guyana (newssourcegy.com)

Mutton	Kg	95,017	99,750	167,080	129,391	125,551
Pork	Kg	265,906	304,639	202,599	199,048	571,962
Milk	Litres	30,900,000	26,800,000	34,175,857	39,191,368	46,483,931

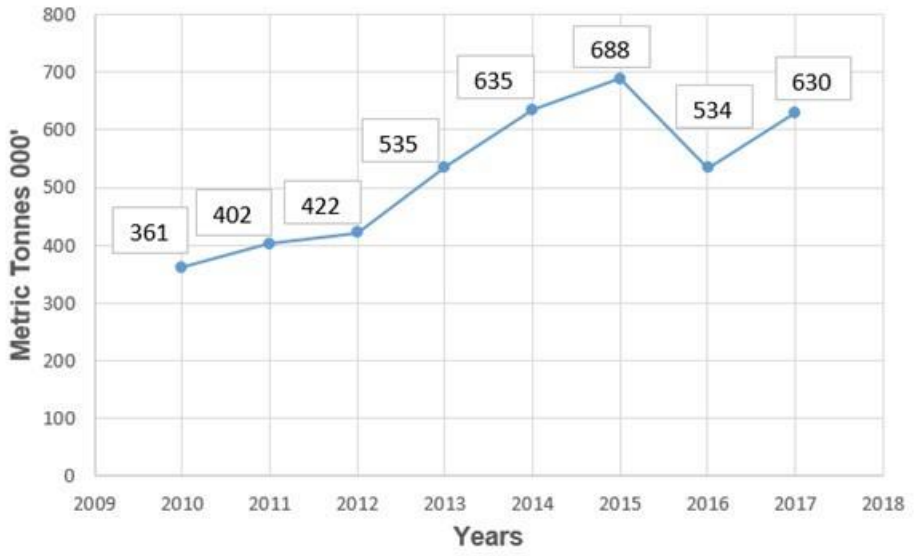
Source: Ministry of Agriculture, A National Strategy for Agriculture in Guyana 2013-2020, from: http://www.ptccb.org.gy/documents/MoA%20Agriculture%20Strategy%202013-2020%20.pdf

Despite the increase in most of the livestock production observed over the years, the Ministry of Agriculture highlights that it is still well below potential capacity (Ministry of Agriculture, A National Strategy for Agriculture in Guyana 2013-2020).

Rice

As observed on Figure 5-23, having witnessed a decline of 22.3% in 2016, attributed to El Niño-related dry weather, as well as an early arrival of the rainy season (Ministry of Finance, 2016), the rice sub-sector recovered in 2017 with a growth rate of 17.9%. This recovery was due to new rice markets that were secured in Cuba and Mexico. According to 2018 FAO statistics, Guyana has the highest production of rice per capita in the world - ten times more than India. Guyana ranks in twenty-first place for rice yields and thirty-ninth for global production. Guyana continues investment in research and development for rice through its Guyana Rice Development Board (GRDB 2020). The rice sector in Guyana despite COVID expanded by 4.8 percent in 2020.

Rice production increased in 2017 to 630,104 metric tons surpassing the 534,450 metric tons recorded during 2016. The rice sector accounted for 3.4% of Guyana's GDP during 2017 with a value contribution of GYD$ 13.9 billion, while its share in Guyana's GDP during the same period for 2016 was 3% with a value contribution of GYD$ 11.8 billion (PSC, 2017).



Source: PSC, 2017

Figure 5-23: Annual Rice Production, 2010-2017

Rice farming is the predominant agricultural activity in the coastal areas of Regions 2 and 3. Rice fields dominate the landscape in many coastal areas in these regions (Figure 5-24).

Source: Prepared by ERM, 2016.

Figure 5-24: Rice Field in Region 2 Pomeroon-Supenaam

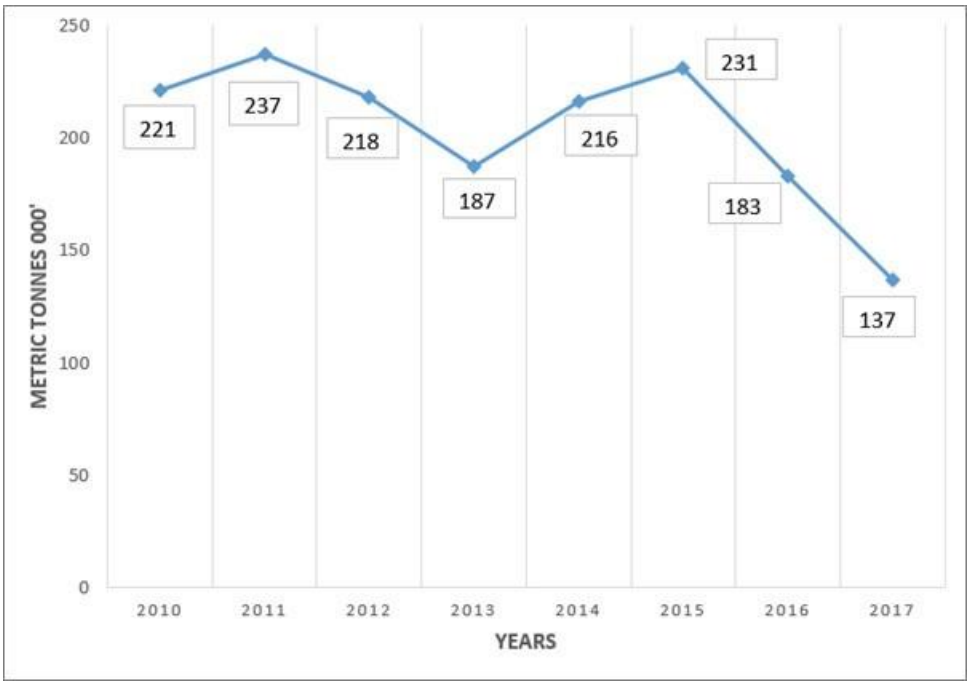
Sugar

Guyana's sugar industry was nationalized as the Guyana Sugar Corporation (GuySuCo) between 1975 and 1976, at which time there were 11 sugar plantations nationwide producing 337,776 tons of sugar with a workforce of 28,406. This made it the largest employer in the country and a large contributor to foreign exchange at the time.

However in the 1990s GuySuCo began to display chronic problems including loss of experienced and skilled managers, exhaustion of cash reserves, deteriorating infrastructure and adversarial industrial relations. In the meantime, global trends including the increasing popularity of artificial sweeteners further depressed sugar revenues (Guyana Chronicle, Assessing the Future of the Sugar Industry, March 26, 2017; Ministry of Agriculture, State Paper on the Future of the Sugar Industry, May 8, 2017).

In 2017, sugar production declined to 137,307 metric tons from 183,491 metric tons for the same period in 2016 (see Figure 5-25). This decline represented a 25.2% contraction in the sugar industry, a result of the Government's actions to review and close various estates, and pursue privatization of the industry. Four estates closed in the period 2016-2018, resulting in the retrenchment of 4,733 workers and causing economic crisis in communities that have historically been economically dependent on the industry (iNews Guyana, $2.4B in severance payments included: Wales sugar workers also included, November 1, 2018).

Sugar accounted for 2% of Guyana's GDP with a value contribution of GYD$ 8.08 billion during the year 2017 in comparison to 2.7% in 2016 with a value contribution of GYD$ 10.8 billion. The sugar growing sector, is estimated to have contracted by 3.7 percent, with production falling to a low of 88,868 tonnes in 2020. This was primarily due to a shortfall of more than 17,000 tonnes in the second crop which, in turn, resulted from the protracted lack of capital investment in factories which caused downtime, and reduced the volume of sugar extracted from canes. Additionally, high rainfall in November and December resulted in the flooding of some fields and restricted access to canes.



Source: Private Sector Commission 2017

Figure 5-25: Annual Sugar Production, 2010-2017

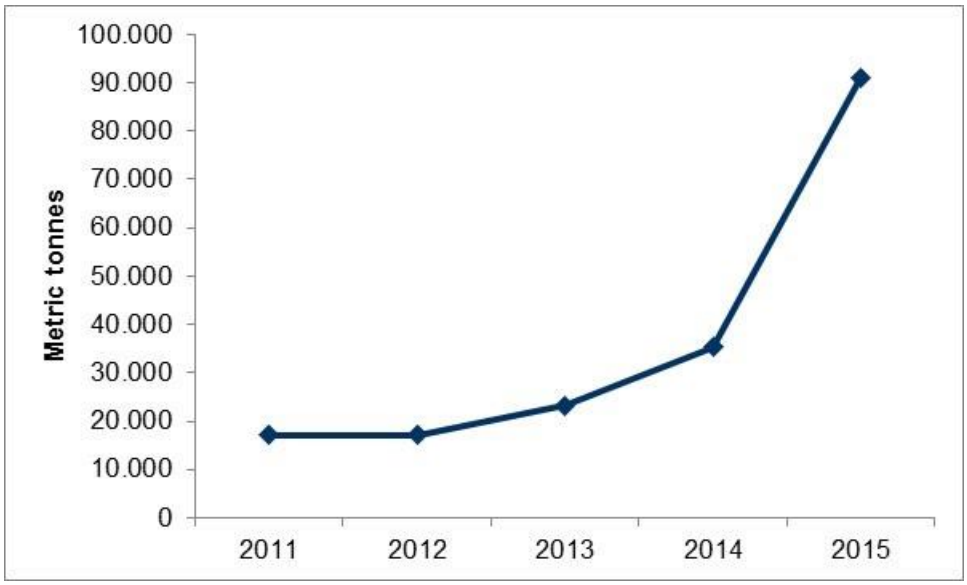
Coconut

The coconut industry in Guyana has grown in recent years (Figure 5-26) and shows potential for continued growth due to high international demand for products such as coconut oil and coconut water. Other products that are made locally using the various components of the coconut include roofing tiles made from the husk, coconut based wine, coconut butter, coconut flakes, ornaments, jewellery, and kitchen utensils (Newsroom.gy, June 2016).

Given these developments, the government has emphasized further development of the coconut and cassava subsectors (IDB, 2017).

The coconut industry ranks third after rice and sugar in terms of acreage cultivated and is grown primarily in the coastal regions, including along the Pomeroon River and the Essequibo Coast in Region 2.

According to recent news media articles, the amount of land in the Pomeroon area being converted to coconut cultivation is increasing (Guyana Chronicle, 2016; Stabroek News, 2016).



Source: Ministry of Agriculture, 2016a

Figure 5-26: Annual Coconut Production, 2011-2015

Other Cash Crops

Non-traditional crops (crops other than sugar cane and rice) grown in Guyana include: tubers such as cassava, sweet potato, and eddo; vegetables such as eggplant, pumpkin, and okra; spices such as hot peppers, sweet peppers, and ginger; and fruits including banana, papaya, mango, and pineapple. Data from the Ministry of Agriculture (2016a) show that production for most tuber and vegetable crops has increased in recent years, while yields for fruits have been more variable, with some fruit crops showing declines from 2014 to 2015.

Guyana has signed protocols for exporting fruits and vegetables to Caribbean countries, particularly to Barbados. The Agriculture Export Diversification Program, which was implemented between 2007 and 2014, was established to increase production and processing of non-traditional products by building packaging facilities and strengthening the New Guyana Marketing Corporation, the government agency in charge of marketing and promoting non-traditional crops (IDB, 2017).

5.3.8.2 Fisheries and Aquaculture

Marine Fisheries

Marine fisheries in Guyana are well developed. This industry contributes significantly to the nation‘s economy in terms of providing employment, earning foreign exchange and providing food for the nation. The FAO-IICA’s 2018 Outlook for Agricultural and Rural Development in the Americas notes that the Guyanese population’s fish consumption has risen in recent years, amounting to a quantity well above the minimum recommended by international health organizations (35 kg/capita/year, versus the recommended 12 kg/capita/year). Fisheries exports were also reported to be the 3rd greatest contributor to GDP in 2017, and is estimated to employ 15,000 people in the country (SeafoodSource, 2018).

There are four main types of marine fisheries in Guyana (Ministry of Agriculture 2013), as differentiated by the species targeted, gear types used, and the depth of water where the fishing takes place. Table 5-6 summarizes the characteristics of these fisheries. Tuna, such as yellowfin tuna (*Thunnus albacares*) and

skipjack tuna (*Katsuwonus pelamis*), have also been identified as a potential oceanic target species of commercial interest. The industrial and artisanal components of Guyana's marine fishing together accounts for over 90% of the country's total landings (mostly finfish and shrimp).

Table 5-6: Primary Characteristics of Marine Fisheries in Guyana

Type of Fishery	Species	Gear	Depth
Industrial	Seabob, shrimps, and prawns	Trawls	Primarily between 13-16 m, but can occur from 0-75 m
Semi-industrial	Red snapper and vermillion snapper	Fish traps and lines	Edge of continental shelf
Artisanal	Mixed fish and shrimp	Gillnets, seines, and others	0–18 m
Shark	Various	Trawls, gillnets, and hook and line	Throughout the continental shelf waters

Source: Department of Fisheries, 2013.

The industrial fishing fleet consists of about 145 trawlers (about 21 m in length) and involves six shrimp/fish processing plants and numerous wharves and dry-docking facilities. Ice and freezing facilities servicing this industry are owned and operated by participants within and outside the fishery sector.

Artisanal fishing consists of approximately 1,129 vessels ranging in size from 6 to 18 meters propelled by sails, outboard or inboard engines and using gear that includes the Chinese seine (a fyke net), which targets whitebelly shrimp (*Nematopalaemon schmitti*) and seabob shrimp (*Xiphopenaeus kroyeri*). Other gear types (described in Table 5-7 below), such as the pin seine cadell lines and gill nets primarily capture finfish.

The larger vessels have ice boxes and their operations are either tidal or diurnal. Except for the large handliners or trap boats and drift seiners, which may or may not be decked, most artisanal vessels are flat-bottomed dory type with little draft, which affords great maneuverability over shallow muddy and sandy bottoms.

Table 5-7: Gear Types used in Guyana's Artisanal Marine Fish

Gear type	Dimensions	Description	Targeted species	Est. no. of operations
Pin seine or beach seine	2 m high and up to 2,000 m long with a stretched mesh size of up to 9cm.	The net is set at high tide in the inter-tidal zone and trapped fish are retrieved from the mudflats with the use of small boats or catamarans.	Mullet (*Mugil curema*), queriman (*Mugil brasiliensis*), snook (*Centropomus undecimalis*), bangamary (*Macrodon ancyclodon*), croaker (*Micropogonias furneiri*) and catfishes (*Arius* sp.).	>50
Chinese seine	16 m long and 4-8 meters wide at the mouth. The mesh size gradually drops from 8 cm at the mouth to 1 cm at the funnel.	The net is attached to poles and set on mud-banks; river and tidal currents sweep the fish and shrimp into the seines.	Catch includes whitebelly shrimp (*Nematopalaemon Schmitti*), seabob (*Xiphopenaeus kryoyeri*), bangamary (*Macrodon ancylodon*), butterfish (*Nebris microps*) and catfishes.	>400
Cadell lines	Length varies	Demersal long-lines consisting of a ground line anchored at each end, with a series of about 800 dangling lines, set with baited hooks, at 2 metre intervals.	Gillbacker (*Arius parkeri*), cuirass (*Arius proops*), other catfishes and sharks including hammerheads, black tip and tiger shark, among others.	>120

Gear type	Dimensions	Description	Targeted species	Est. no. of operations
Polyethylene gillnets (also referred to as drift seines)	Ranges in length from 1,000 to 1,600 meters. 4 meters deep with a stretched mesh size of 20 cm.	Nets are set and hauled manually from boats.	Gray snapper (*Cynoscion acupa*), seatrout (*Cynoscion virescens*), cuffum (*Tarpon atlanticus*), gillbacker (*Arius parkeri*), mackerel (*Scomberomorus cavalla* and *S. brasilensis*) and sharks.	>400
Nylon gillnets (also referred to as drift seines)	300 meters long and with 8 cm mesh size	Used near the shore to catch mainly catfishes.	Catfishes	~200

Source: Environmental Sciences Ltd, 2012.

Artisanal fishing is of critical importance for all six coastal Regions, though dependence on the activity and the scale at which it occurs varies by community. For example, in Region 1 and at the western end of Region 2 fishing occurs at a relatively small scale; only artisanal boats can land in this region due to the coastal mudflats. These boats travel only a few kilometres out to sea and are typically out for one day. Catches are therefore limited and fish is typically sold locally from the backs of vehicles or at roadside stands.

Conversely, industrial-scale boats operate farther east in Region 2 and in Region 3. These boats venture out farther, spend longer periods of time at sea, and may sell parts of their catches wholesale for resale in Georgetown.

In general, however, in all of the coastal regions 2 through 6, fishing provides direct employment and income for numerous fishing folk and indirect employment for numerous others in supporting services.

In Region 1, fishing is important for subsistence across most coastal villages, as well as small-scale commercial sale of catches where market access exists. Although fishing takes place year-round, there are seasonal fluctuations whereby yields are greatest in the months June through August, and catches are reduced in October through January due to high winds. Many coastal communities also engage in crabbing in the mangrove forests (ERM/EMC/GSEC, 2018).

According to data from the PSC and the Ministry of Agriculture, the fishing sub-sector increased marginally by 1% during 2017 following 18.1% growth in 2016. Although fish output declined by 7.5% to 18,777 tons in 2017 from 20,296 tons in 2016, the seafood sector was buoyed by an increased shrimp output by 13%. Prawn and small shrimp (seabob) catches grew by 45% and 12.3% respectively during the year. The fishing sector contributed 2% to Guyana's GDP in 2017 with a value contribution of GYD$ 11,434 million (PSC, 2017).

The industrial seabob shrimp sector continues to be an important commercial fishery, and industry leaders have been pursuing Marine Sustainability Council certification (an internationally recognized voluntary process used to assess and certify the sustainability of wild-capture marine and freshwater species).

In October-November 2018 the conformity body of the MSC conducted a compliance assessment of Guyana's seabob trawl sector to advance the process of certification (Stabroek News, 2018). The seabob fleet currently operates under a voluntary management plan (the only fishery-specific management plan for fisheries operating in Guyana's territorial waters) that calls for a 7-week-long closed season each year.

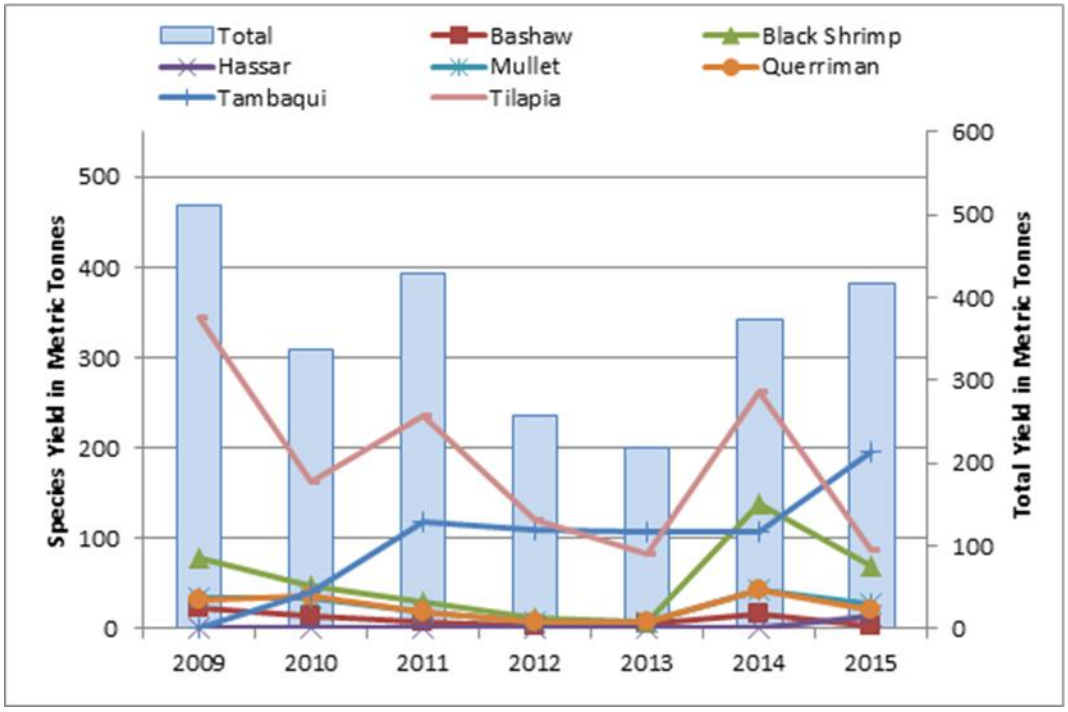
However fisheries industry experts in Guyana highlight the importance of achieving internationally recognized sustainability credentials in order to maintain their customer base in the United States (SeafoodSource News, 2018).

Bycatch of endangered turtles, sharks, and rays as a result of fishing operations represents a recognized challenge for the industry and is the subject of increasing targeted study (Kolmann *et al*. 2017; Garstin and Oxford 2018).

Aquaculture occurs in various communities along the coast, with operations typically set up in abandoned rice fields. Use of the same water supply and drainage configuration used for rice production, allows aquaculture operations to avoid dependency on brackish water. They are therefore able to raise freshwater species despite their coastal locations (ERM/EMC/GSEC, 2018).

According to data from the Ministry of Agriculture (2016a), the main species produced in aquaculture establishments are the bashaw, hassar, mullet, querriman, tambaqui, tilapia, and black shrimp. Data show that tilapia once dominated aquacultural yields, but have declined in production, while yields of tambaqui and black shrimp have increased considerably in recent years (Figure 5-27).

The total yield of aquaculture product has been variable in the period from 2009-2015. The data also suggest that aquaculture is still a small industry in Guyana. Given its growing importance in the international economy, the Ministry of Agriculture has made recent efforts to further develop the sector in Guyana, for example through a recent training program for 56 participants, offered by aquaculture expert from China (DPI, 2018).



Source: Ministry of Agriculture, 2016.

Figure 5-27: Fish Yields from Aquaculture, 2009-2015

Fishing Institutions

The institutions and organizations that have responsibility for the management of marine biodiversity include the Ministry of Agriculture and its Fisheries Department (fishing management and development in both marine and inland waters), the Guyana Defence Force Coast Guard and Guyana Police Force Marine Police (fisheries enforcement), the EPA (Natural Resources Management which includes Biodiversity, Wildlife and Protected Areas), the Fishermen's Cooperative Societies (artisanal fishermen) and regional/international agencies such as the Caribbean Regional Fisheries Mechanism (CRFM), the International Committee for the Conservation of Atlantic Tunas (ICCAT), and FAO's Western Central Atlantic Fishery Commission (WECAFC).

Fishing cooperatives in the country vary in their structure and level of oversight, with some having essentially disbanded due to lack of leadership, and others remaining active. Some former fishing cooperative complexes built along the coast with financing from the government, CIDA and the EU, continue to be used by local fishermen for docking, vessel repairs and other activities but with little or no collective organization or coordination.

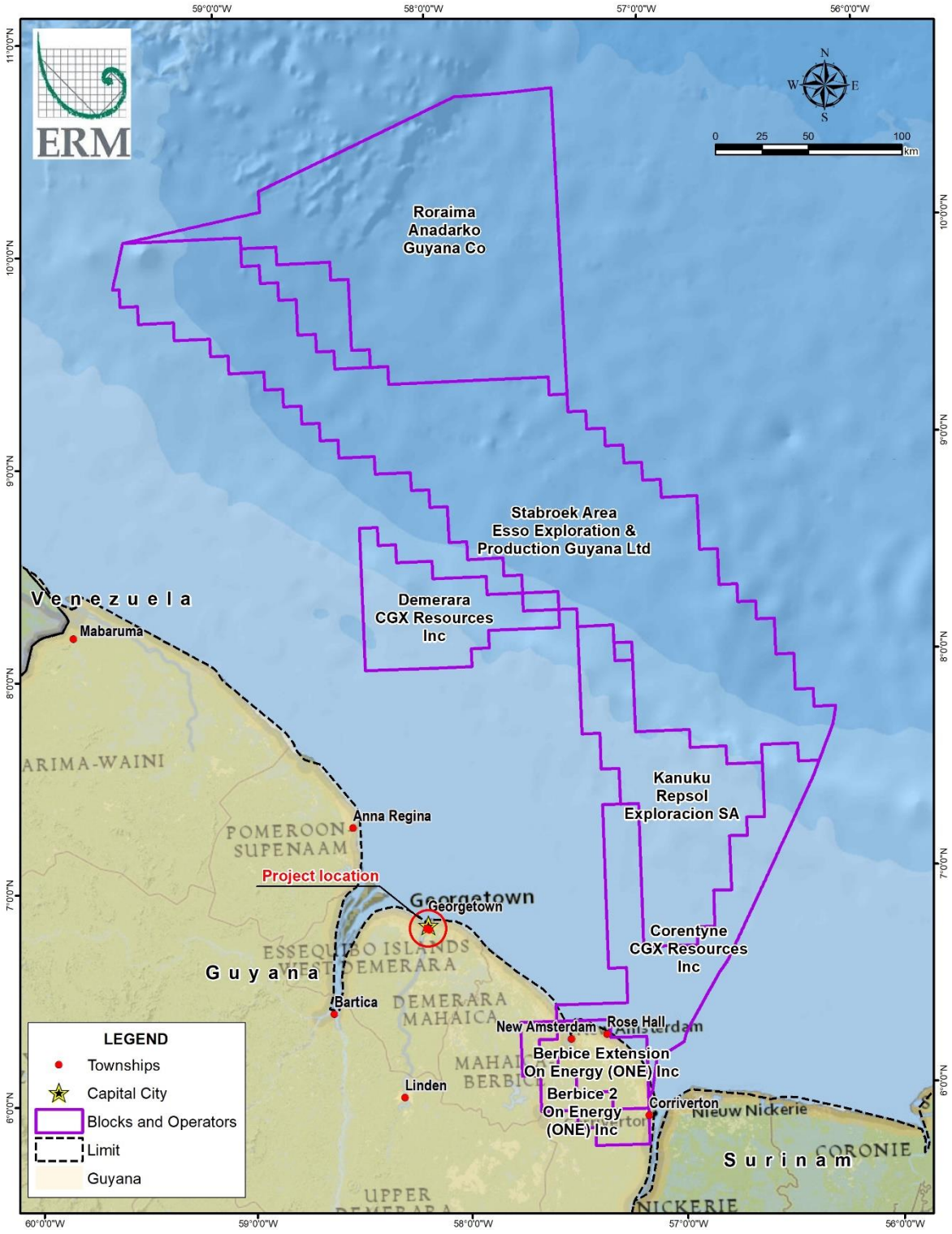
Others such as the Upper Corentyne Fishermen's Cooperative Society (UCFCS) and Greater Georgetown Fishermen Cooperative Society provide their members with ice, twine, fishing equipment, fuel, docking facilities and market areas (FAO 2005. Republic of Guyana Fisheries Profile; Guyana Chronicle, Upper Corentyne Fishermen's Co-op Society persevering despite challenges, December 11, 2013).

5.3.8.3 Mining and Quarrying

2016 was a pivotal year for this sector as it recorded the largest growth rate during the period 2007-2017. This was largely driven by a 58.0 percent increase in gold output that year. However, in 2017, all sub-sectors showed declines, including bauxite, and diamond outputs. Total diamond declaration decreased by 62.7% from 139,889.6 metric carats during 2016 to 52,161 metric carats at the end of 2017. However, crushed stone output increased in 2017 by 11% as output was recorded at 453,136 tons, up from 408,405 in the previous year (PSC, 2017).

5.3.8.4 Oil and Gas Extraction

The establishment of the oil and gas sector in Guyana is a relatively recent development. In 2000, the U.S. Geological Survey (USGS) identified the Guyana-Suriname Basin as having the second highest resource potential among unexplored oil basins in the world and estimated the mean recoverable oil and gas reserves at more than 13.6 billion barrels of oil and 32 trillion cubic feet of gas. A number of international oil and gas companies (IOCs), including Esso Exploration and Production Guyana Limited, Repsol (Spain) and CGX Energy (Canada) have been participating in exploration and drilling activities. Figure 5-28 shows active blocks offshore and on the coast, and identifies block operators.



Source: Prepared by ERM, 2021.

Figure 5-28: Active Oil Blocks Offshore and Coastal Guyana

Esso Exploration and Production Guyana Limited's May 2015 discovery with the Liza wells in its Stabroek block and the further exploration in 2017, signalled a new era for the country's energy sector and economy. It presents a transformative opportunity to put in place the structures and capacity needed to oversee the sector's long-term development, effectively manage revenue streams, and ensure proper stewardship of what are finite hydrocarbon resources for future generations of citizens in Guyana (Export.gov, 2018).

In 2016 the Government of Guyana commenced a review and update of Guyana's National Energy Policy in order to develop a cohesive and broad-based national energy policy to move Guyana from an economy that was inefficient in its energy use and wholly dependent on imported fuels, to efficient energy natural resources like biomass, sun, wind and water (Guyana Energy Agency, Annual Report 2016). In addition, very recently, in August 2018 a fully functional Department of Energy (DoE) was established within the Ministry of the Presidency, assuming the responsibility of the oil and gas sector from the Natural Resources Ministry (DPI, 2018).

As of early 2019, no oil refineries exist in Guyana. Discussions on the feasibility of building such a facility, specifically a modular refinery, have been ongoing since 2018 when news that the Petrotrin refinery in Trinidad and Tobago would shut down in late 2018. In light of the shutdown, development of a refinery in Guyana is thought by some to represent an opportunity to both meet its local consumption needs and to become the next oil producing country in the Caribbean region.

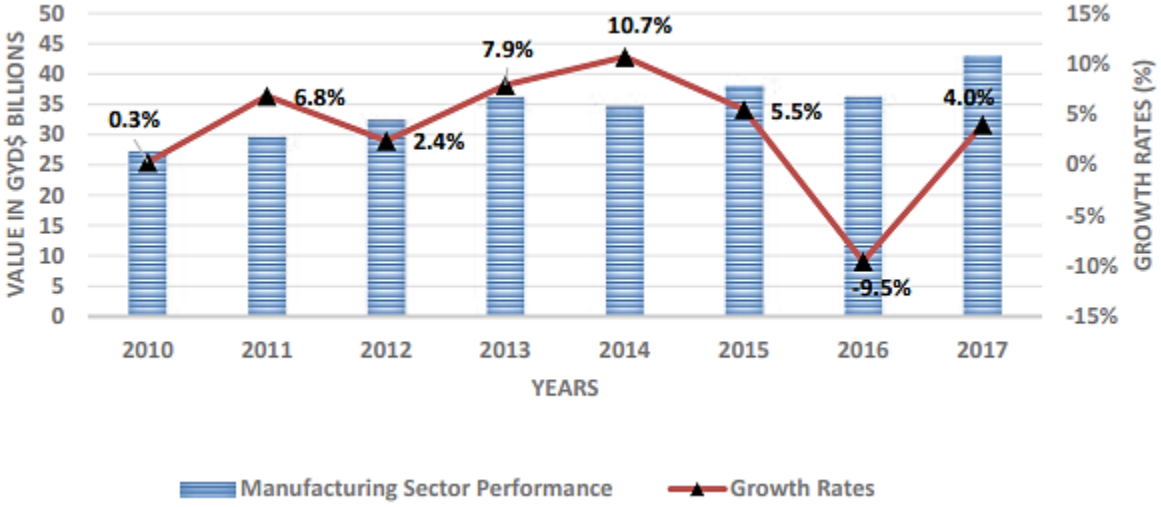
Continued hydrocarbon finds offshore Guyana have offered and will continue to offer significant opportunities to the country including fast-tracked economic development, employment opportunities and local development. For example, around 50% of the workers, contractors and subcontractors working in Guyana, for one of the main oil & gas companies, are Guyanese, approximately US $24 million were spent with more than 300 local suppliers in 2017, and the Centre for the Development of Local Businesses in Georgetown.

The Government of Guyana is currently in the process of developing a Local Content Policy for the oil and gas sector that would guide the State in allowing preferential treatment for local companies, rather than being bypassed in favour of foreign companies and workers. The latest version of the draft Policy was public released in January 2020 and is under review by the government.

Guyana is currently producing more than 100 thousand barrels/day in production. By 2022, it expects that to move to more than 300 thousand barrels/day.

5.3.8.5 Manufacturing

According to the PSC, the manufacturing sector improved significantly during 2017, growing by 4.0% compared to the 9.5% negative growth of the previous year. Figure 5-29 displays the annual growth rates for the manufacturing sector from 2010 to 2017 along with the sector's contribution to Guyana GDP for the corresponding years.

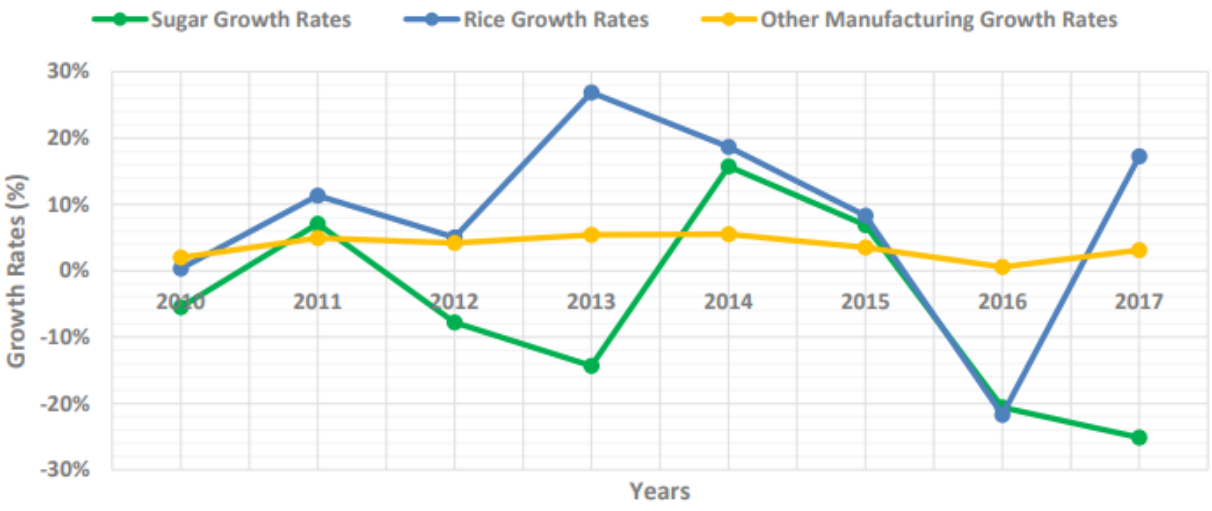


Source: PSC, 2017.

Figure 5-29: Manufacturing Sector Performance, 2010-2017

As of December 2017, the manufacturing sector accounted for 5.7% (GYD$ 42,922 Million) of Guyana's GDP.

The main sub-sectors in the sector include rice milling, and value-added sugar products. Figure 5-30 shows the performance of these three subsectors over the last seven years with regards to the respective growth rates.



Source: PSC, 2017.

Figure 5-30: Growth Rates in the Manufacturing Sub-sectors, 2010-2017

It is evident that much of the sector's growth was ascribed to the huge recovery in rice milling activities, which grew by 17.3% during 2017 in comparison to 2016. On the other hand, manufacturing in the sugar industry declined significantly in 2017 by 25.2%. Other manufacturing or light manufacturing grew by 3.1% as at December 2017 with the sector contributing heavily towards Guyana's GDP adding 3% (GYD$ 22,420 Million) while rice and sugar contributed 2.3% (GYD$ 17,366 Million) and 0.4% (GYD$ 3,135 Million) respectively during 2017.

5.3.8.6 Tourism

According to the World Travel and Tourism Council, travel and tourism directly contributed 19.5 billion GYD to the country's GDP in 2017, representing 2.6% of the country's GDP. This is projected to rise by 4.3% in 2018. Direct employment from the travel and tourism sector is estimated at 8,500 jobs (2.9% of the country's total employment). Total employment from travel and tourism including indirect jobs is estimated at 22,000 jobs (7.3% of all employment).

Many of Guyana's tourist attractions are located in the country's hinterland. Tourism based in Guyana offers nature, culture, and adventure-based experiences such as trips to waterfalls (Figure 5-31), Amerindian villages and eco-lodges, mostly in the country's interior. It is expected that if ecotourism attractions can be developed appropriately, they may contribute to the conservation of the country's largely intact interior environment.

Georgetown also has a number of popular tourist attractions such as museums, parks, public gardens, the zoo, and Stabroek Market

Source: ERM, 2018

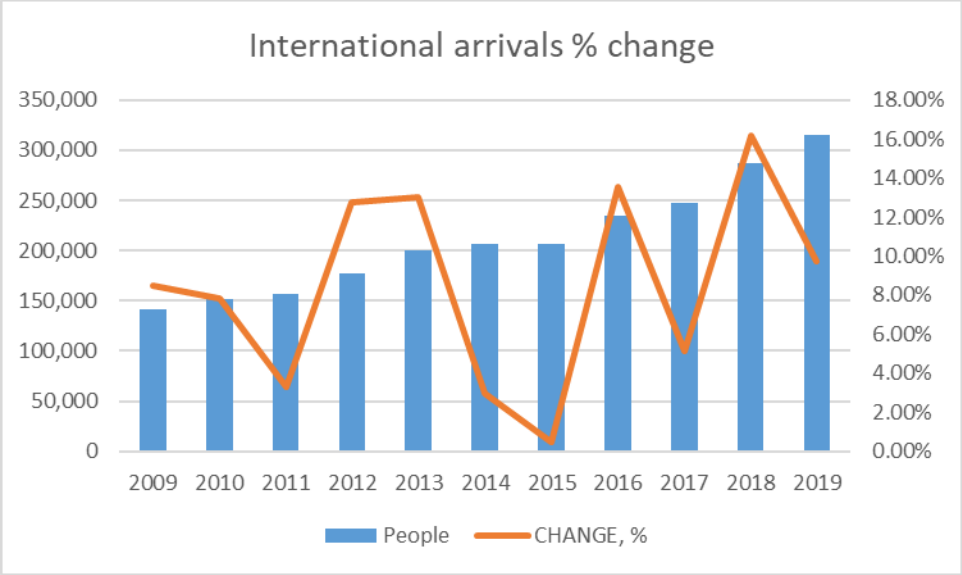
Figure 5-31: Kaieteur Falls

The Georgetown area is also known for its many historic buildings dating from the late eighteenth through the mid-nineteenth century. Guided tours of Georgetown's historic buildings and sites are available, as are guided tours of the Essequibo River, the El Dorado Rum Factory, the Georgetown City Centre, and other attractions (Figure 5-32).

Source: ERM, 2016.

Figure 5-32: Stabroek Market, Georgetown

Data from the World Bank (2021) indicate that the number of international visitors to Guyana has doubled since the early 2000s (see Figure 5-33), with the largest number of visitors originating from the United States, followed by the Caribbean, Canada, and Central and South America. Because the majority of visitors consist of Guyanese expatriates returning to visit family, visitor numbers peak during the summer vacation (July and August) and key holidays (e.g., Christmas in December).



Source: Guyana Tourism Authority, 2021.

Figure 5-33: Annual International Visitors to Guyana, 2009-2019

5.3.9 Services, Facilities and Infrastructure

The villages of the project area have the benefit of the major utilities. These include electricity, potable water, and telephone and telecommunications services. A combination of Government and Private utility companies, provides these utilities. Guyana Water Incorporated (GWI) is a public company that provides water services at a cost to consumers. Water supply includes piped water, septic tanks, and wells.

According to the GWI, in Region Four and in the sub-region of the East Bank, Demerara there is a population of 58,294 customers and its operational areas ranged from Eccles on the East Bank of Demerara to Timehri and the Linden Highway up to Silver Hill with 17,574 households and 19,631 customers servicing 2,442, 1,669, and 2,987 customers respectively with service to twenty-one (21) communities.

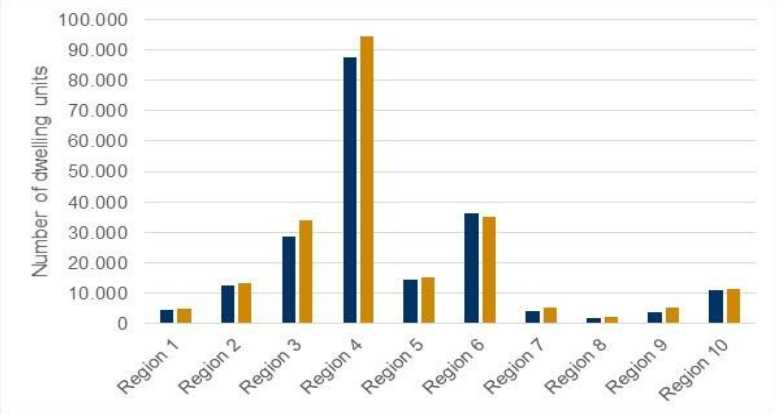
There are 13 pump stations that service thirty (30) communities and four (4) State facilities at Timehri. The operations provided service to 509 commercial, 18,989 domestic, 84 industrial, and 49 institutional. There are 14 Schools and 8 Health Centres that utilize the public water company. GWI ensured that the regional health facilities and schools were provided with a reliable supply of safe potable water from pumps that operated 24 hours daily supplying water to the treatment plants which operated booster pumps for between 14 to 16 hours daily (Guyana Water Incorporated, 2017)

UNICEF through its 2014 MICS report, stated the 83 percent of households in Region 4 had access to both an improved source of drinking water and improved sanitation facilities (90 percent for urban populations, 81 percent for rural, 88 percent for coastal, and 55 percent for interior). An estimated 87 percent of households used a sanitation facility that was not shared (Ibid). Notably, water contamination in the distribution system in Guyana remained a significant problem.

5.3.9.1 Housing

According to the most recent census, there were 221,741 dwelling units in Guyana in 2012, with the highest number of units in the most populated regions 3, 4 and 6 (see Figure 5-34). When compared with

the 2002 census, the data show an increase of 8.1% in the number of housing units over the 10-year intercensal period. The data further indicate that only about 3 percent of available housing units were vacant, giving further indication of the short supply of housing in the country as described in Section 5.5.4.3. As described in that section, some households have established informal housing in 'squatter' settlements in response to these difficulties in obtaining land and housing, however data on their number and characteristics are not available.

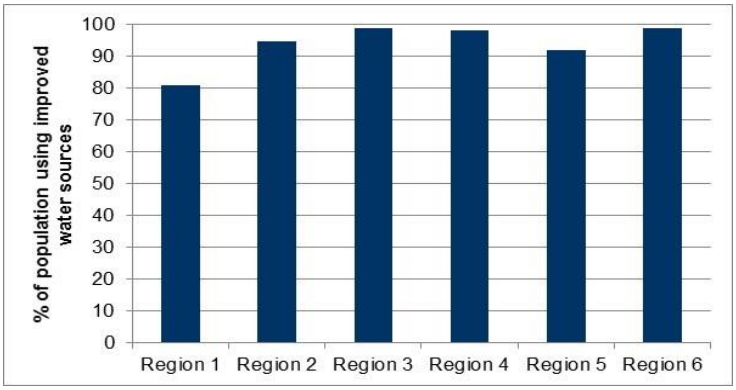


Source: BSG, 2016.

Figure 5-34: Regional Distribution of Dwelling Units, 2002 and 2012

5.3.9.2 Water and Sanitation

According to the most recent Guyana Multiple Indicator Cluster Survey (MICS)[22], 94 percent of Guyana's population had sustainable access to improved drinking water sources[23] as of 2014, and 95.4 percent used an improved sanitation facility (UNICEF 2014).Figure 5-35 shows the percentage of the population with access to improved sources of drinking water, by region. However, while access to improved water sources has improved over the years, wastewater and sanitation coverage and infrastructure in the country are limited, thus hampering efforts to improve health conditions (World Bank 2016).



[22] The MICS program was developed by the United Nations Children's Fund and serves as an international household survey program to collect internationally comparable data on a wide range of indicators on the situation of children and women.
[23] Improved water sources refer to any of the following types of supply: piped water into dwelling, compound, yard, to neighbor, or to public tap/standpipe; tube well/borehole; protected well; protected spring; and rainwater collection. Bottled water is considered as an improved water source only if the household is using an improved water source for handwashing and cooking.

Source: UNICEF 2014.

Figure 5-35: Percent of Population with Access to Improved Water Sources by Region, 2014

In 2012, approximately 97 percent of the population in both urban and rural areas used an improved drinking-water source (as compared to 83 percent in rural areas in 2000). However, an assessment conducted by multilateral partners in 2014 points out that the quality of water supply services is hindered by decaying distribution networks, with 50 percent to 70 percent of wastewater going unaccounted for at the national level (and more than 70 percent in Georgetown) (World Bank 2016).

Wastewater at the all of the Project sites will continued to be discharged to the on-site septic systems as well as portable toilets. Both are monitored and maintained daily by waste contractor. Construction at the annex will include the addition of portable toilets, also to be serviced by the same contractor. Stormwater at the GYSBI Port and Berths will collect through a series of trenches which will go to an Oil Water Separator prior to discharge to the surroundings. Stormwater at the Annex will collect through a series of drainage systems and will discharge to the stormwater canal located to the north of the property.

5.3.9.3 Waste Management

Currently Guyana's primary methods of waste disposal are legal and illegal dumping, and burning. Legal dumping is primarily undertaken by sanitary service companies that truck waste to permitted dumpsites. Each region has at least one dumpsite which receives municipal waste from households, and are also used for the disposal of commercial and industrial waste. The dumpsites are intended only for the disposal of non-hazardous wastes, however it is likely that hazardous waste is sometimes included among the received waste since control over incoming waste is generally not rigorous.

The Haags Bosch engineered municipal landfill site in Georgetown is the only permitted sanitary landfill site in the country. After its opening in 2011 the facility had operational problems, including a fire in 2015. It was also the subject of several non-compliance notices from the EPA relating primarily to leachate management.

Since then, a new operator has been appointed and remediation of the site and upgrading of the operation is underway. The landfill is lined and now has a leachate collection system and a leachate treatment system.

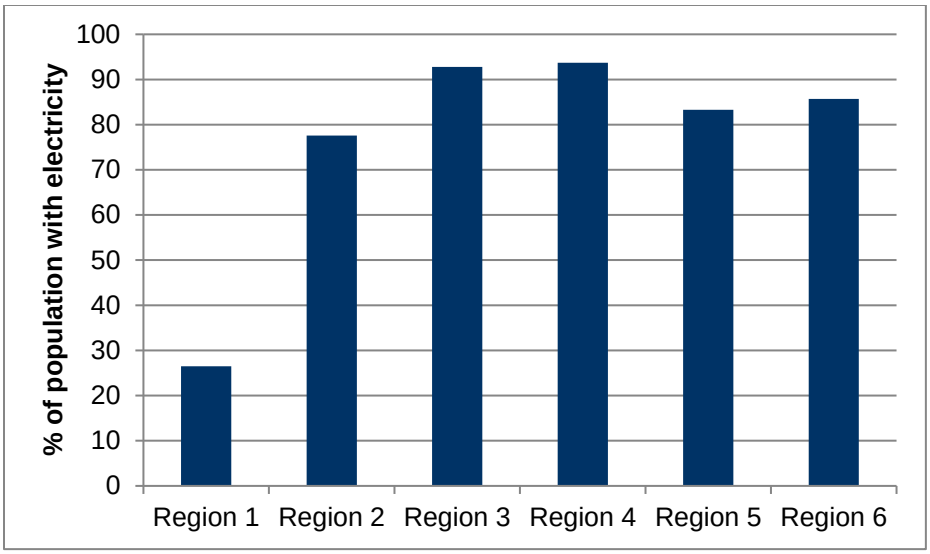
Although waste pickers are operating at the site, controls have been put in place by the landfill operator to minimize the health and safety risks of their activities and to reduce their interference with the operations of the site. Other controls (e.g., safe venting of landfill gas) and environmental monitoring are also planned for the site (Stabroek News, 2017).

At the present time there is only one existing facility for the treatment of hazardous waste in the country, Tiger Tanks Guyana located at Muneshwers' support base at the Georgetown Port. This facility has the ability to treat solid and semi-solid /sludge wastes with oil, and can manage small quantities of completion fluids. Interest in developing more such facilities is growing following the planned expansion of oil and gas activities.

Guyana's Ministry of Communities has developed a National Solid Waste Management Strategy (NSWMS) aimed at integrating the country's efforts to improve waste management infrastructure, enforce existing waste management legislation, including a shift in the country's culture of littering and other unlawful disposal, and promote waste-to-energy initiatives.

5.3.9.4 Power

Results of the MICS indicate that an estimated 91.2 percent of the coastal population and 56.2 percent of the interior population have access to electricity. Figure 5-36 shows the percent of the population with electricity in each of the coastal regions.



Source: UNICEF 2014.

Figure 5-36: Percent of Population with Electricity by Region, 2014

The state-owned Guyana Power and Light (GPL) provides electricity to most areas of the country's coastal plain (GPL, n.d. Our Business). The large majority of the country's installed power generation capacity is represented by thermoelectric diesel generators.

5.3.9.5 Transportation Infrastructure

The transport sector comprises the physical facilities, terminals, fleets and ancillary equipment of all the various modes of transport operating in Guyana, as well as the transport services, agencies providing these services, organizations and people who plan, build, maintain, and operate the system, and the policies that shape its development.

Although there exists a fairly good road network in the more densely populated areas of the coast, transportation needs still exist in all parts of the country. As a result, rivers still provide an invaluable and crucial means of transport where roads are absent.

Roads

Guyana's road network consists of approximately 3,990 kilometres of road including six main national roads which are paved and each have two lanes, with the exception of some four-lane segments along the East Bank and East Coast Demerara. The road network is used by the approximately 100,000 vehicles in the country, and relies on a system of bridges and culverts that allow for crossings over the system of canals, drains and sluices along the coast.

The main coastal roads are, from west to east: the Essequibo Coast Road, the Parika to Vreed en Hoop Road, the East Coast Demerara and West Coast Berbice Roads, and the Corentyne Highway from New Amsterdam to Moleson Creek. All of these roads are paved. South of Georgetown, the primary road is the East Bank Demerara Road, which runs from Georgetown to the Port area and then further to Timehri, where the Cheddi Jagan International Airport is located.

Georgetown has a compact, grid-based network. Traffic congestion is a chronic problem in the Georgetown area, with many different transportation modes including cars, trucks, mini-buses, horse-drawn carts, bicycles, motorcycles, scooters and pedestrians all sharing the same travel lanes.

The East Bank Demerara Road in particular sees considerable congestion due to back-ups from the Demerara Harbour Bridge, which provides the only road crossing over the Demerara River. The bridge is opened daily for about one hour to allow passage of ocean-going vessels, and this causes severe traffic congestion at both ends of the bridge. The Government of Guyana is in the process of investigating different options for replacement of the bridge with a larger bridge that will both allow for more efficient road traffic flow, thus precluding the need to open the bridge (e.g. a high-span fixed bridge, or a bridge with a moving section allowing for passage of ships) (Demerara Waves, 2018).

Air Transport

Guyana has one international airport (Cheddi Jagan International Airport, Timehri); one regional airport (Eugene F. Correira Airport, commonly known as Ogle Airport); and about 90 airstrips, 9 of which have paved runways. Several local airlines depart from both Ogle Airport on the East Coast Demerara, 6 mi (9.7 km) southeast of Georgetown and from Cheddi Jagan International Airport, at Timehri, 25 mi (40 km) southwest of Georgetown.

Guyana ranks 131 out of 211 countries on the Air Connectivity Index (World Bank 2011), and 49 out of 141 economies for the quality of its air transportation infrastructure (World Economic Forum 2015). International passengers are moved to and from the country almost entirely by air. In addition, the potential of this mode of transport for the movement of cargo, especially exports, continues to increase.

Air transport plays a vital role in the development of Guyana. Within the country, it provides a link between the coastal areas and communities in the hinterland, many of which are inaccessible by other modes of transportation. Thus, the economic and social wellbeing of these areas and their integration into the fabric of the nation are critically dependent on the availability of air transport.

Marine Transport

Guyana's Transport and Harbour Department provides scheduled ferry services between the shores of in the Essequibo, Demerara and Berbice Rivers. Small privately owned speedboats supplement these services.

Virtually all of Guyana's exports and imports are transported by sea. The main port of Georgetown, located at the mouth of the Demerara River, has more than 40 wharves, including six primary cargo wharves and a number of privately owned facilities. According to Marine Traffic, in the 30 days prior to January 16, 2019, 41.4% of ships arriving at the Port of Georgetown consisted of cargo vessels, 13.8% of tankers, 42.1% special crafts and 2.1% tug vessels (Marine Traffic, 2018). The commercial ports of Guyana are located at Georgetown, Port Kaituma, and New Amsterdam.

A shipping channel with a dredged depth of 5.9 meters is maintained on the lower Demerara River, used by private, commercial and military vessels. Pilotage is provided by the Harbour Master.

There are fishing ports and landing sites all along the coast in Regions 2-6. While the majority of fishing occurs well inshore from the continental shelf, some tuna fishing occurs at the edge of the shelf, about 150 kilometres from shore.

5.3.9.6 Sea Defences

Guyana's coastal plain is situated at one-meter below sea-level to sea-level, making it highly vulnerable to erosion and salinization especially during spring tides (GMRP, 2010). Approximately 90 percent of the population, infrastructure, and economic activities are concentrated in the coastal plain, so protection from sea level rise and coastal flooding is a national priority. As a result, Guyana's national government has established a network of coastal protection measures that consist of a combination of hardscapes and natural buffers. This network is known collectively in Guyana as the "sea defences."

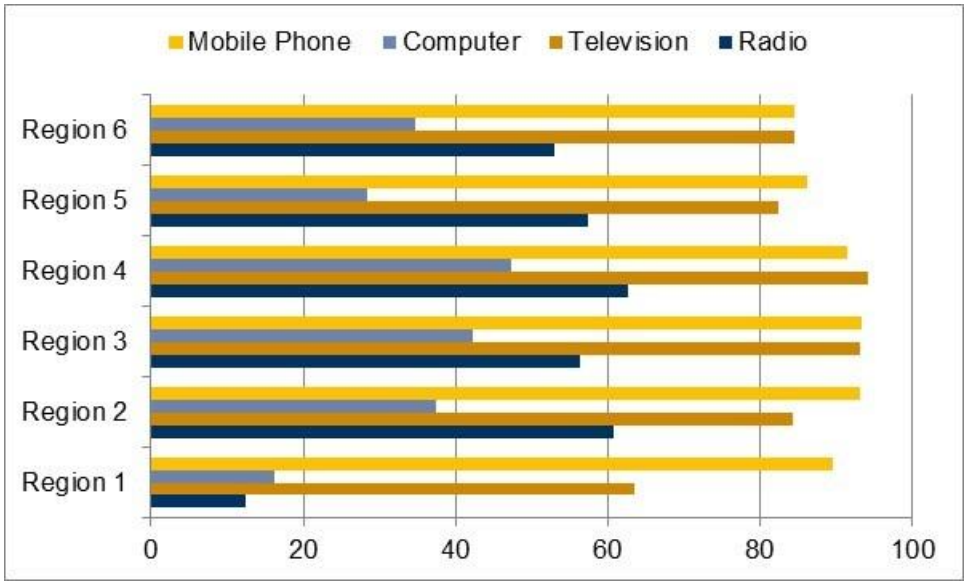
Hardscaped defences generally consist of an earthen embankment protected on the seaward side by a concrete slab and/or a (coping) wave wall or by rock armouring (rip-rap) (Royal Haskoning, 2004. Institutional Capacity Building Activities on Guyana Sea Defences, Volume 1 Executive Summary.). Most of the existing hard structures are between 30 and 70 years old, and many are in need of repair.

The natural sea defences are a combination of mud-banks and mangrove forests along the Guyana coastline. The mud-banks are comprised of fine sediments that originate from the Amazon, and are carried by the North Brazil Current along the northern coast of South America. Waves from the Atlantic Ocean (swell) break on the mud-banks, protecting part of the coastline from wave attack (Royal Haskoning, 2004. Institutional Capacity Building Activities on Guyana Sea Defences, Volume 1 Executive Summary.). The mud-banks also promote further sediment accretion and mangrove growth, thereby enhancing the resilience of the natural sea defines network.

5.3.9.7 Telecommunications

Results of the 2014 MICS show that the majority of households in the coastal regions have access to mobile phone service, with an average of 88.6 percent of households in the country having at least one member with a mobile phone.

There is more disparity in other forms of telecommunications, with Region 1 in particular showing lower levels of access to computers, television, and radio relative to other regions. However, the lack of 4G network access has been a major barrier to increased business investment in Guyana, and an issue that the PSC has prioritized. In 2016, the first 4G network in the country was installed (Figure 5-37).



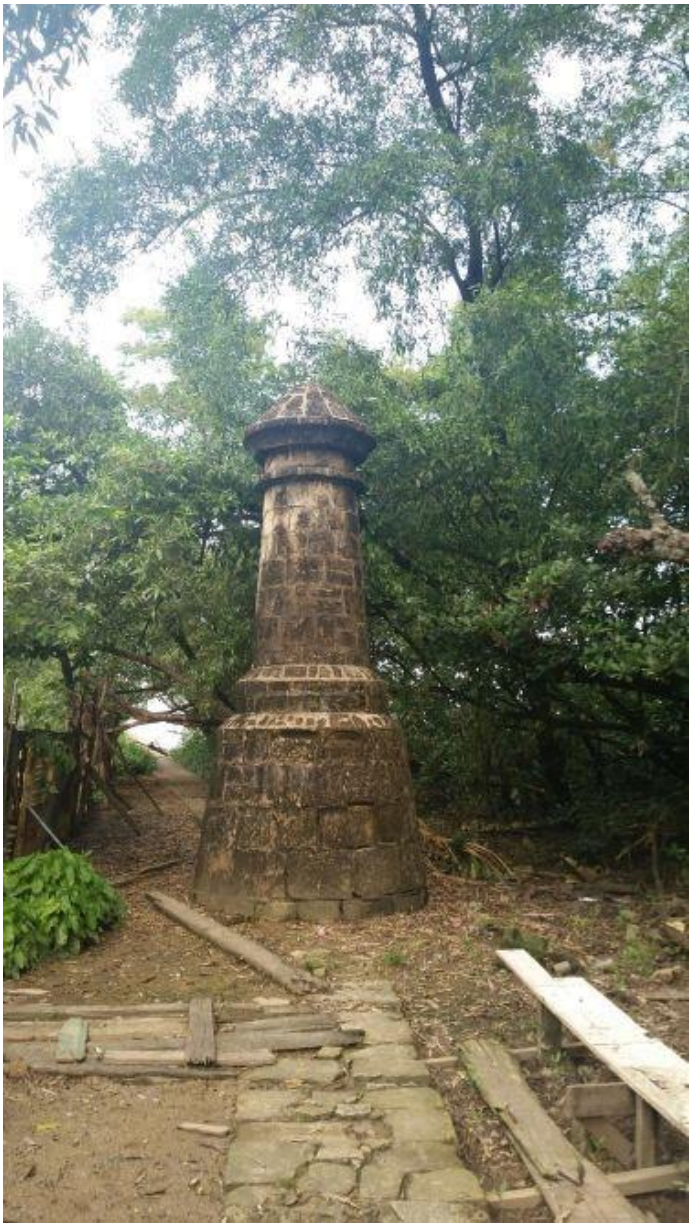
Source: UNICEF, 2014

Figure 5-37: Household Access to Telecommunications, 2014

5.3.10 Cultural Heritage

Guyana's National Trust Act of 1972 protects national monuments, defined as resources of "historic, architectural or archaeological interest attaching to it or its national importance." According to this law, the National Trust of Guyana is responsible for designating resources as national monuments.

As described previously, Guyana's coastlands hold significant history as the landing place for Amerindians followed by the Europeans, Africans, Indians and Chinese A few historic sites are preserved along the coast and they currently function as tourist attraction sites. Other sites of interest are not officially designated or preserved but are still visited as sites of interest (see example in Figure 5-38).



Source: Prepared by ERM, 2017.

Figure 5-38: Colonial Era Structure on the Guyana Coast

Data from the National Trust of Guyana show the presence of several shell mounds, seashell deposits, quarries, and ceramic/pottery sites (i.e., scatters) along the Guyana coast, including archaeological sites found near Moruka, Uitvlugt, Stewartville, and Leonora. These sites are of significant cultural value to both the people of Guyana and researchers, as they offer insight into the material culture of native peoples inhabiting the land before, during, and after contact with Europeans. However, only two of these ceramic/pottery sites are shown to be located near the shoreline.

In addition, shell mounds and ceramic pottery can be found at the Mabaruma mainland (Region 1) estimated to be over 10,000 years old. To date, significant indigenous cultural or heritage sites have not been identified thus far on the coastlands, documented by the National Trust. The documented sites are mostly found inland of Guyana along the rivers and in caves.

There are a range of historic buildings and monuments in Georgetown including the City Hall, St. George's Cathedral and the Red House. Georgetown is also home to cultural institutions housing collections of artefacts of national significance, such as the National Museum and the Walter Roth Museum of Anthropology. The Walter Roth Museum of Anthropology, the first museum of anthropology in the English-speaking Caribbean. Its collections include excavated artefacts from all of the ten Regions of Guyana (Exploreguyana.org, 2018).

According to World Monuments Fund, the heritage sector in Guyana faces many challenges, including unplanned rapid urbanization, limited or no documentation of heritage resources, demands to modernize historic structures, the notion of "in with the new, out with the old" and the idea that heritage is a hindrance to progress (WMF, 2017).

There are numerous living heritage structures such as churches and mosques integrated into the urban landscape, and potentially built heritage structures that could have historic or aesthetic value to local communities in the project area.

5.3.11 Health Context

Data from the Ministry of Public Health suggest that health outcomes in Guyana are continuing to improve steadily. Life expectancy increased by 13.6 percent between 2002 and 2017. In 2019, life expectancy at birth for Guyana was 70 years. The gender breakdown of life expectancy for women averages at 73, while for men it is 67 years (United Nations Development Programme, 2018). No specific data is available on life expectancy for the Project area.

Region Four, the project's administrative region infant mortality rate is "16 per 1,000 births" (UNICEF, 2016), while, the national average is 32 per 1000 live births. (Bureau of Statistics, 2016). Analysis by the 'Guyana Help the Kids Foundation' (GHTK) suggests that the IMR "has declined significantly over the past seven to eight years" due to the provision and improvements of facilities (Staff Reporter, 2019).

The Healthcare sector in Guyana is a mix of public and free health care and private facilities that patients are required to pay at market costs out of pocket. Patients that contribute to the National Insurance Scheme, are refunded part of their medical expenses if they decide to use private facilities. The public and private health sector positive incline in the past decade are notable. In the project area several health facilities including a regional hospital complex, a medical school, and several health centres, all 9 km away from the Project site. The country's free national hospital, the Georgetown Public Hospital is also less than 9 Km away from the project site. Also, the Diamond Diagnostic Centre (DDC) which is approximately 6.3 km from the Project site has been identified as a candidate to be upgraded to a 'Smart' hospital (Wendella Davidson, 2019), the Texila American University (TAU) is situated west of the Project site, the Georgetown Public Hospital Complex (GPHC) and some private hospital complexes, including Woodlands, Balwant Singh and Mercy are located roughly 8.8 km from the Project site. These facilities are well equipped to service the population needs with primary health care and training, thus their presence within striking distance of the Project site indicates that the site and its potential users be well taken care of and trained if needed.

The coronavirus that causes COVID-19 was first confirmed in Guyana on March 11, 2020. As of April 7 2021, there have been 10,853 reported cases with 252 deaths (see Figure 5-39).

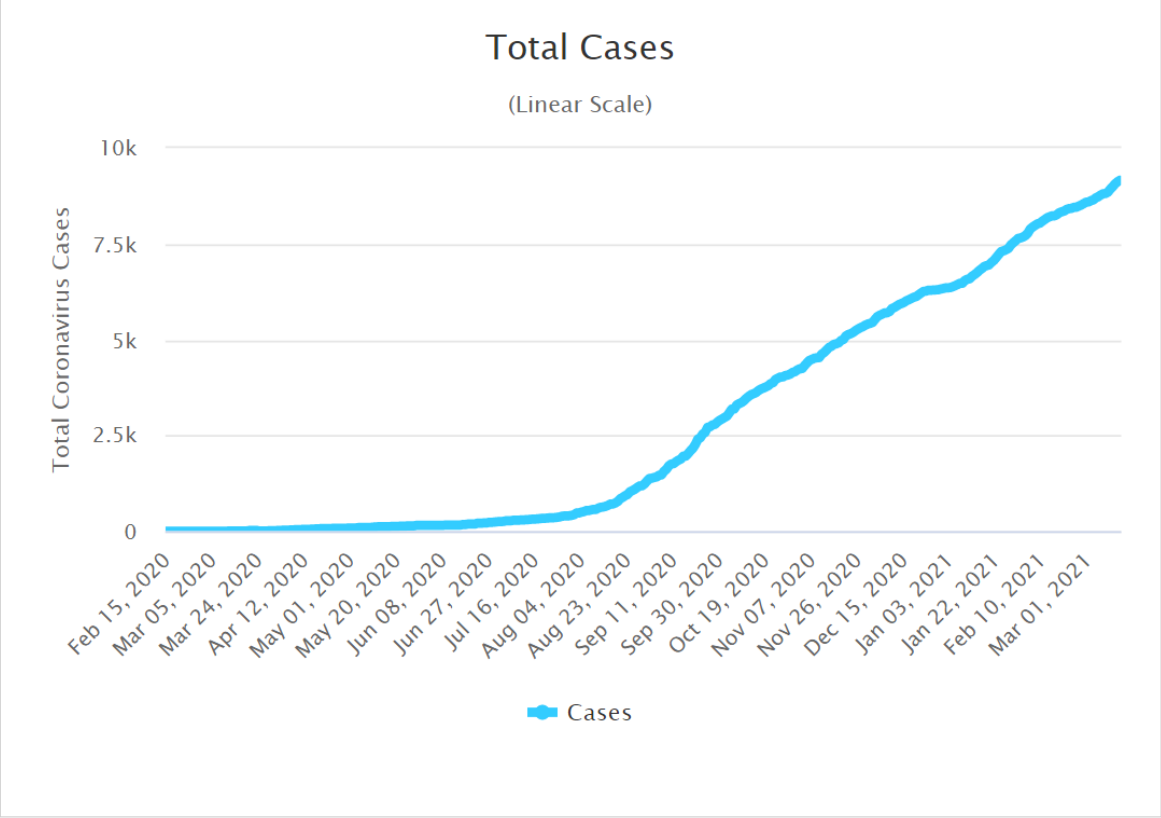


Figure 5-39: Total Coronavirus Cases in Guyana, 2020 - 2021

5.3.11.1 Health Status

Common Diseases and Health Problems

As with many other developing countries, Guyana is undergoing an epidemiological transition by which non-communicable diseases are beginning to replace communicable diseases as the leading causes of illness and mortality. This shift is largely due to trends toward more sedentary occupations and lifestyles, as well as unhealthy diets and habits such as tobacco and alcohol use.

The most common non-communicable diseases and causes of illness and mortality in 2013 were diabetes, cardiovascular diseases, heart diseases, hypertension, cancers, chronic lung diseases, gastroenteritis and liver disease, accidents, violence-related injuries, and mental illnesses (Persaud, 2013.).

Obesity is on the rise in the country, along with other forms of malnutrition. Although Guyana is considered self-sufficient for food, accessibility and utilization of the right types of food to maintain health are of concern, leading the Ministry of Agriculture to develop the Guyana Food and Nutrition Security Strategy 2011-2020 Plan. This plan aims, among other goals, to integrate agricultural practices with improved food security and nutrition (Ministry of Public Health 2013a).

According to the Ministry of Public Health, in 2013, 6.2 percent of the population had been diagnosed with diabetes, with an estimated incidence rate of 4,000 new cases annually. Type 2 (non-insulin dependent)

diabetes accounted for 92 percent, with Type 1 (insulin-dependent) making up the other 8 percent (Persaud, 2013).

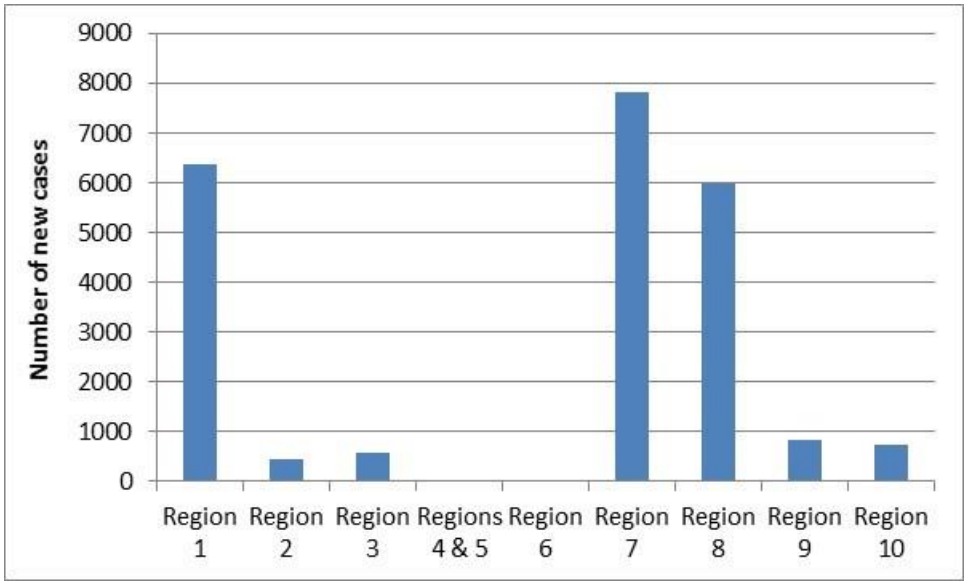
Hypertension is also on the rise, with a 2013 prevalence rate of 9 percent of the population over 30 years old and with an estimated 16,000 new cases reporting annually. Hypertension is the major contributing cause of strokes for persons over 40, as well as for heart attacks, disability, and others health issues affecting productivity of working age adults (Persaud, 2013).

Communicable diseases also continue to impact productivity, quality of life, and wellbeing in Guyana, particularly in the hinterland regions. This is due to a number of interrelated factors including poverty, nutritional deficiency, and inadequate access to health services. In 2012, the most common communicable diseases were malaria (31,876 cases), tuberculosis (725 cases), and human immunodeficiency virus (8,263 cases) (Persaud, 2013).

Malaria is found in much of Guyana and is most prevalent in Regions 1, 7, 8, and 9. Malaria control efforts, such as distribution of insecticide-treated bed nets and indoor residual spraying[24], have been ongoing in these regions for decades. After an initial reduction in malaria prevalence in the early 2000s, the number of cases increased from 2007 to 2012. Data indicate a correlation with mining activities in the hinterland areas, and the country's Central Vector Control Service now sends mobile teams to work directly with populations residing in mining camps (USAID 2014). There was a decrease in 2013, with figures released by the Ministry of Public Health showing that in 2013, there were 23,489 reported cases of malaria, compared to 31,876 for the previous year (Persaud, 2013). Figure 5-40 shows the number of reported new malaria cases for each region in 2010, the most recent year for which data broken down by region are available.

Dengue fever, chikungunya, lymphatic filariasis, and Zika are also locally transmitted in Guyana. Unlike malaria, transmission of these diseases tends to be common in populated and urbanized areas.

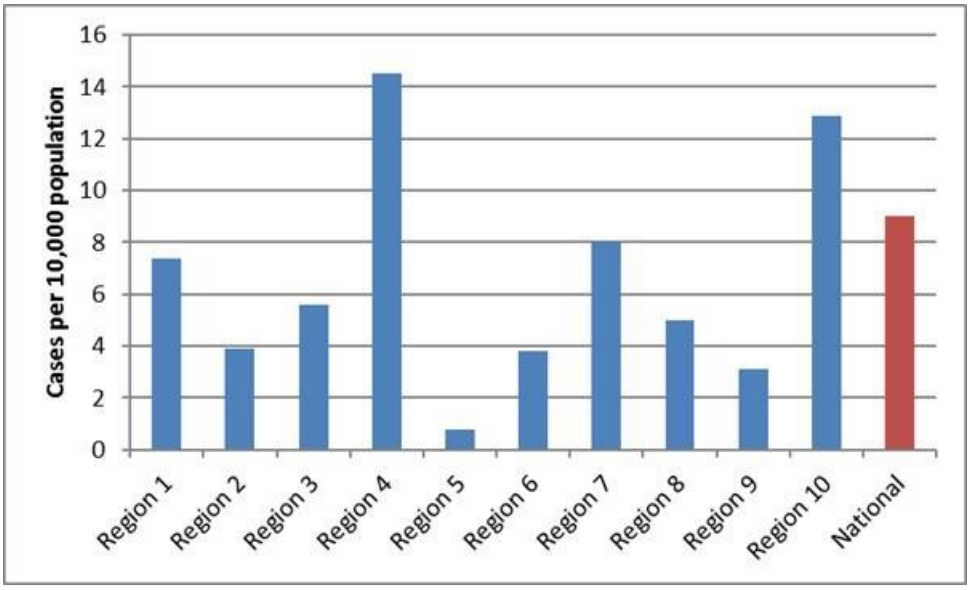
[24] Indoor residual spraying involves coating the walls and other surfaces of a house with an insecticide that has residual activity (i.e., continues to work over several months, killing mosquitos on contact with the sprayed surfaces) (Centers for Disease Control and Prevention 2012).



Source: Ministry of Public Health, 2013b

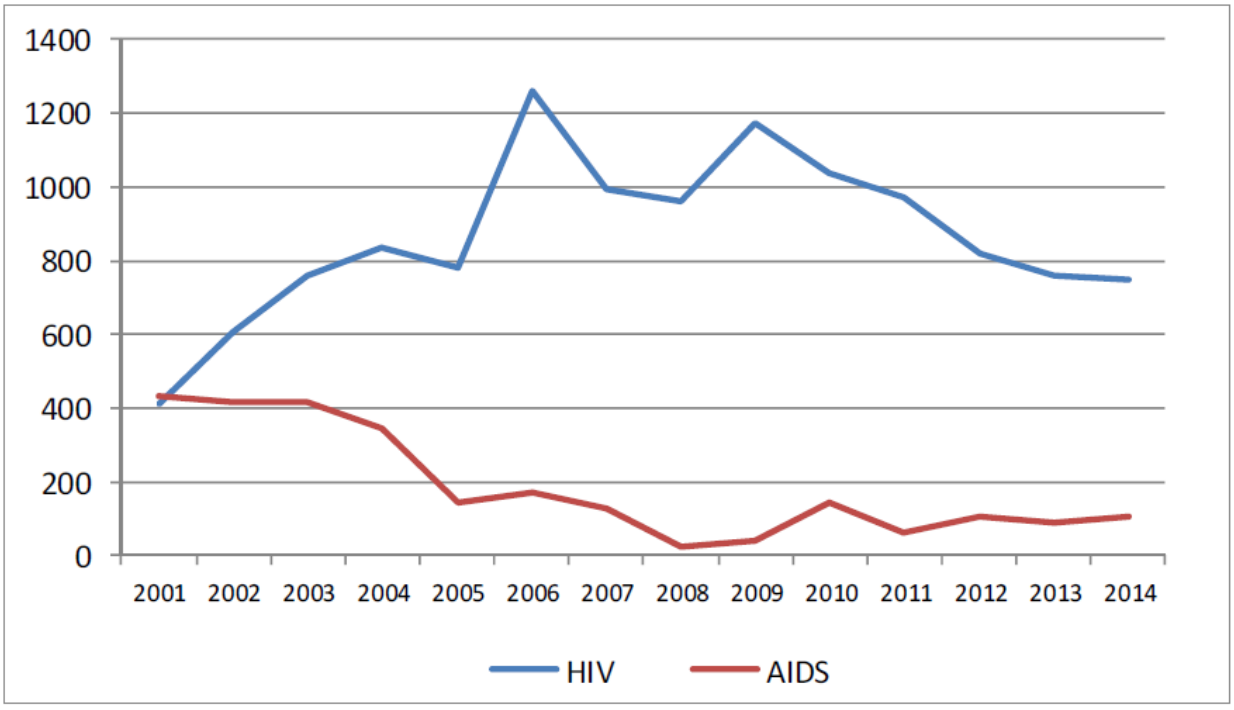
Figure 5-40: Malaria Incidence by Region, 2010

Tuberculosis (TB) continues to be a priority health concern in Guyana. It was nearly eradicated in the 1980s, but saw resurgence in the 1990s due to its association with the HIV/ AIDS epidemic. In 2014, the national average for TB incidence was 10.3 per 10,000 people. Regional distribution of cases in 2010 is shown on Figure 5-41. In 2016, the number of people living with HIV in Guyana was estimated at 8,500, and the prevalence rate in the population aged 15 to 49 was 1.6 percent. According to the Joint United Nations Program on HIV/AIDS (UNAIDS, 2015), progress has been made in addressing the HIV epidemic in the country, with a reduction in the number of HIV cases reported since 2009, as well as a reduction in the number of AIDS cases (Figure 5-42) and AIDS-related deaths.



Source: Ministry of Public Health, 2013b

Figure 5-41: TB Incidence by Region, 2010



Source: UNAIDS, 2015

Figure 5-42: Annual Number of HIV and AIDS Cases, 2001-2014

The tropical diseases lymphatic filariasis and soil-transmitted helminthiasis continue to be problematic in Guyana, leading to deformity, malnutrition, and social stigma in impacted populations.

Efforts to combat these diseases in the country include mass drug administration campaigns and improvements in sanitation in endemic areas.

Maternal and Child Health

Guyana has made improvements in maternal and child health in recent years, but has not achieved its Millennium Development Goal targets of reducing child mortality rates by two thirds, and maternal mortality ratio by three quarters between 1990 and 2015. The crude birth rate[25] is down from 22.8 per 1,000 persons in 2003 to 17.7 per 1,000 persons in 2011, and the infant mortality rate has also declined from 17 to 15.1 per 1,000 live births during this same time period (Persaud, 2013). However, marked disparities exist in rural and hinterland areas, with the rate of under age 5 mortality at 48 per 1,000 live births in rural areas and 11 per 1,000 live births in urban areas (BSG *et al*., 2015).

The primary causes of infant death at birth include premature birth and respiratory distress, both of which are preventable, with the secondary causes being congenital deformity and birth defects that are not preventable (Persaud, 2013).

Mental Health

Guyana has a high suicide rate but has seen notable decreases in recent years. According to the WHO, Guyana had the highest rate of suicide of any country in the world in 2014, at 44.2 deaths per 100,000 people, versus the global average of 16 deaths per 100,000 people (WHO, 2014). However, this dropped to 29 deaths per 100,000 people in 2015, against a global average of 10.7 deaths per 100,000 people (WHO 2016). This decline can be attributed to several initiatives being implemented by the Ministry of Public Health with support from WHO/Pan American Health Organization, including a National Mental Health Action Plan for 2015–2020 and a national suicide prevention plan.

5.3.11.2 Health Care System

The Ministry of Public Health is responsible for setting national policy, regulation, and standards; building and refurbishing of healthcare facilities; and financing the employment of doctors, nurses, and emergency response workers. At the regional level, the Regional Health Authorities have the autonomy to assess, plan, and implement health services and manage the facilities for a defined population in a defined geographic area, including day-to-day management of the facilities and employment of all other staff working in the health sector.

The country's main framework for health is the Health Vision 2020, which sets the strategy and overall planning for the health sector. Government health spending compares favourably with that of other Latin American and Caribbean countries, and has averaged about 3 percent of GDP in recent years, equivalent to $11.5 billion GYD annually ($55.6 million USD) (Ministry of Public Health, 2013b).

The healthcare system in the country is highly decentralized, with RDCs and Regional Health Authorities managing, financing, and providing health services. However, the system continues to have a number of challenges related to human resources capacity and infrastructure capacity, which is especially acute in remote areas, such as Region 1.

[25] The crude birth rate is the number of live births occurring among the population of a given geographical area during a given year, per 1,000 mid-year total population of the given geographical area during the same year (OECD 2013a).

The Ministry of Public Health established priorities in 2013 for the national healthcare system to increase financial and technical support to improve the following (Persaud, 2013):

- Family health (child, adolescence, women, men, elderly);
- Disease eradication and mental health;
- Violence, accidents, and injury rates;
- Healthcare facilities at all levels (community centres to city hospitals);
- Nutrition and food security; and • Access to health for frontier, migrant, remote, and vulnerable populations.
- Health Facilities

Health care facilities in the coastal regions are summarized in Table 5-8 below. In addition to these facilities, there is one National Ophthalmology Centre and one National Psychiatric Hospital in the country, both located in Region 6.

Table 5-8: Health Facilities in the Coastal Regions

Region	Regional Hospital	District Hospital	Diagnostic Centre	Health Centre	Health Post
Region 1	1	4	-	4	44
Region 2	-	2	1	11	17
Region 3	1	2	1	17	22
Region 4	1	1	1	39	7
Region 5	-	1	1	14	1
Region 6	1	3	-	21	2

Source: Ministry of Public Health, 2016

Healthcare Professionals

Retention of healthcare professionals in Guyana is a challenge, as in many other developing skilled workers routinely emigrate to more to developed countries. The most recent available statistics from the Ministry of Public Health indicate that there were nine physicians and 13.3 nurses per 10,000 people in the country in 2012 (Ministry of Public Health, 2013a).

Guyana currently has a Health Human Resource Action Plan for Guyana 2011-2016 that is aimed at addressing this issue. Additionally, this plan supports the Health Vision 2013-2020[26] which sets out the plan for long term health planning aimed at consolidating the progress made to date in health outcomes and system strengthening in Guyana

5.3.11.3 Natural Hazards

The biggest weakness of Guyana is its low-lying coastal plain, the northern areas of Regions 1 to 6, which face severe risk of flooding. The World Bank (2016) estimates that Guyana is one of the most vulnerable countries to global climate change due to the low-lying coastal areas, many below mean sea level, and a high percentage of the population and critical infrastructure located along the coast. The CDC and IDB (2013) also consider the country's limited land management, environmental degradation, and

[26] https://www.paho.org/guy/index.php?option=com_docman&view=download&category_slug=health-systems-and-services&alias=123-guy-healthvision-2013-2020&Itemid=291

unprepared populations and institutions as factors that increase the country's vulnerability to natural disasters.

A recent study identified Guyana as exhibiting high climate vulnerability to effects on fishing and food security (Ding *et al*., 2017). Both changes in rainfall patterns and predicted sea-level rise associated with climate change pose threats to the Guyanese population and its livelihoods. This is exacerbated due to the country's outdated and insufficient drainage systems. Human factors such as inefficient management of solid waste and lack of regular maintenance of existing drainage and irrigation infrastructure add to these risks.

Recognising this, the country invests continuously in the construction and maintenance of sea and river defences infrastructure, as well as a system of reclaimed lands, drainage and irrigation canals, pumping stations, and conservancy dams to protect agriculture in the vulnerable coastal areas. Despite this investment, floods continue to threaten public safety and infrastructure along the coast. In 2005, torrential rains caused many rivers and water conservancies in the coastal plain to overflow, causing severe flooding in Regions 1, 2, 3, 5, and 6. The floods resulted in the direct or indirect deaths of 19 people, from either drowning, acute dehydration, or succumbing to an outbreak of leptospirosis that occurred in the aftermath of the flooding (PAHO, 2005). Direct economic losses of agricultural crops, livestock, fisheries, forestry, and roads in the coastal area were estimated to total over $10 billion GYD (approximately $48 million USD) (ECLAC, 2005).

More recently, in early March 2018, floodwaters breached the sea defines network in the West Coast Demerara area, damaging local businesses and homes and forcing the temporary evacuation of some residents (Kaieteur News, 2018).

5.3.12 Human Rights Context

According to the U.S. Department of State's 2017 Human Rights Report for Guyana, the most concerning human rights issues in the country are harsh prison conditions and the existence of national laws criminalizing same-sex sexual activity (U.S. Department of State, 2017). Amnesty International also concludes that there is ongoing concern regarding excessive use of force by the police, violence against women and girls, and discrimination and violence towards LGBTI people (Amnesty International, 2018).

There were no recent reports of politically motivated killings in Guyana as of 2017, nor practices of torture or other inhumane punishing, other than the aforementioned excessive use of force and poor conditions for prison inmates.

The most significant human rights issues in Guyana are described further below.

5.3.12.1 Prison and Detention Centre Conditions

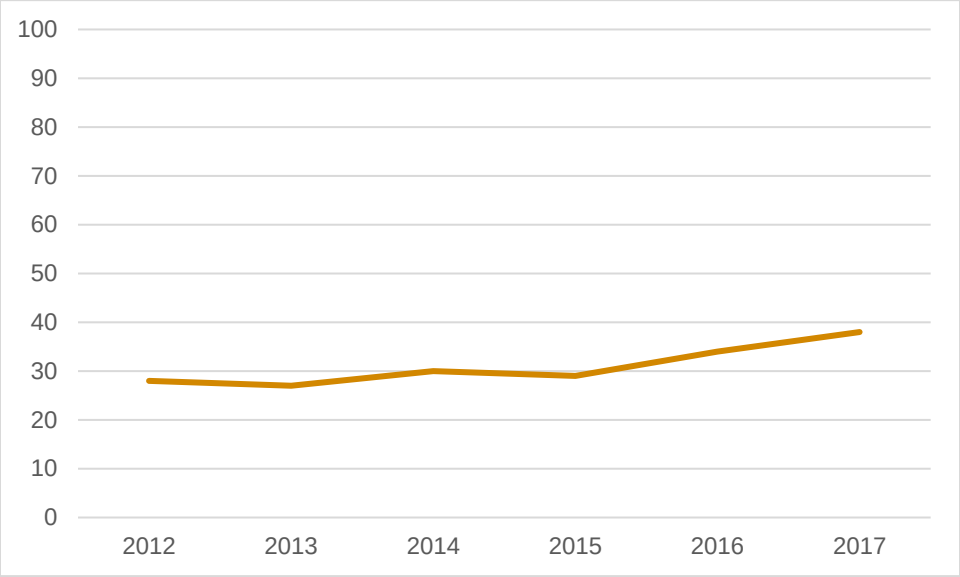
Prison and jail conditions, particularly in police holding cells, are reportedly harsh and potentially life threatening due to overcrowding, physical abuse, and inadequate sanitary conditions and medical care

In September the Guyana Prison Service reported there were 2,004 prisoners in five facilities with a combined design capacity of 1,179. As of July a total of 1,018 prisoners were in Georgetown's Camp Street Prison, designed to hold 550 inmates. Overcrowding was in large part due to a backlog of pre-trial detainees, who constituted approximately 30 percent of the total prison population (U.S. Department of State, 2017).

5.3.12.2 Corruption

The law criminalizes corruption by public officials; these laws are generally considered to be effectively implemented. Some cases of government corruption were reported over the course of 2017, all of which were investigated or otherwise responded to by the government.

Public perceptions of widespread corruption remain; however Transparency International's Corruption Perceptions Index (CPI) suggest that the situation is improving. Guyana's CPI score[27] for 2017 was 38, with a ranking of 91st out of 180 ranked countries. Previous years' data indicate there has been overall improvement in recent years (Figure 5-43).



Source: Transparency International, 2017.

Figure 5-43: Corruption Perceptions Index Trend for Guyana, 2012-2017

5.3.12.3 Treatment of Vulnerable Groups

Women

The U.S. Department of State 2017 Human Rights Report highlights that domestic violence and violence against women, including spousal abuse, is widespread.

Although rape is criminalized and there are stringent penalties provided by law, there are few successful rape prosecution cases. The law also prohibits domestic violence, with penalties ranging from fines of 10,000 GYD (about US$48) to 12 months' imprisonment. However cases of police accepting bribes from perpetrators have been reported.

Although the law specifies that women are entitled to the same legal status and rights as men, gender-related discrimination in employment is widespread, both in hiring practices as well as incomes between men and women for equal work (U.S. Department of State, 2017 Human Rights Report).

[27] The CPI consists of a 100-point scale from 0 (highly corrupt) to 100 (very clean).

Children

Physical and sexual abuse of children is considered a widespread problem. NGOs report that, as in cases of domestic abuse, police and magistrates are sometimes bribed to overlook cases of child abuse (U.S. Department of State, 2017 Human Rights Report).

Indigenous People

With respect to indigenous people, the 2017 Human Rights Report highlights that the standard of living in indigenous communities was lower than that of the general population, plus they had limited access to education and health care. A UN study found that pregnant women in indigenous communities were not receiving mandatory HIV tests (U.S. Department of State, 2017).

Underlying many of these problems is the continued threat posed to indigenous communal territory, even titled land, by mining concessions. While the 2006 Amerindian Act was supposed to resolve these issues, problems persist with weak implementation and continued obstruction by authorities to community claims. (Minority Rights Organization, 2018).

Members of the indigenous population claim to be discriminated against by the two main ethnic groups in the country and by the government, with claims of insufficient government resources going to the development of indigenous communities (Cultural Survival, 2015. Indigenous Rights Violations in Guyana; Guyana Times, 2016 “Discrimination against Amerindians rampant – Nandlall”. September 26, 2016).

LGBTQ+ Populations

Homosexual activity between adult men is illegal under the law and is punishable by up to two years in prison. No anti-discrimination legislation exists to protect persons from discrimination based on sexual orientation or gender identity, and NGOs reports noted widespread discrimination and harassment in employment, access to education and medical care, and in public spaces (U.S. Department of State, 2017).

6. IMPACT ASSESSMENT

6.1 General Methodology

The primary purpose of an Environmental Assessment (EA) is to predict the impacts resulting from the proposed project. Impacts can be direct, indirect, or induced, as defined in Table 6-1.

Table 6-1: Impact Designation Definitions

Designation	Definition
Direct	Impacts that result from a direct interaction between the Project and a resource/receptor (e.g., between disturbance of a plot of land and the habitats on that plot of land that are affected).
Indirect	Impacts that follow from the direct interactions between the Project and its environment as a result of subsequent interactions within the environment (e.g., viability of a species population resulting from loss of part of a habitat as a result of the Project occupying a plot of land).
Induced	Impacts that result from other activities (which are not part of the Project) that happen as a consequence of the Project (e.g., influx of camp followers resulting from the presence of a large Project workforce).

The assessment of impacts proceeds through an iterative process that considers four questions as illustrated in Figure 6-1.

Source: Prepared by ERM, 2021

Figure 6-1: Impact Prediction and Evaluation Process

These questions are expanded in Steps 1 through 4 below.

6.1.1 Step 1: Predict Impacts

An ESIA evaluates potential project impacts by predicting and quantifying to the extent possible the magnitude of impacts on resources (e.g., water and air) or receptors (e.g., people, communities, wildlife species, habitats). Magnitude is a function of the following impact characteristics:

- Type of impact (i.e., direct, indirect, induced).
- Nature of the change (what is affected and how).
- Size, scale, or intensity.
- Geographical extent and distribution (e.g., local, regional, international).
- Duration and/or frequency (e.g., temporary, short term, long term, cyclic, permanent).

Magnitude describes the actual change that is predicted to occur in the resource or receptor. The magnitude of an impact takes into account all the various dimensions of a particular impact in order to make a determination as to where the impact falls on the spectrum (in the case of adverse impacts) from Negligible to Large. Some impacts can result in changes to the environment that may be immeasurable, undetectable, or within the range of normal natural variation. Such changes can be regarded as essentially having no impact, and are thus characterized as having a Negligible magnitude. In determining the magnitude of impacts on resources and receptors, embedded controls (i.e., physical or procedural controls that are planned as part of the project design) are taken into consideration (e.g., the magnitude of impacts on stream water quality from construction take into consideration the effectiveness of proposed sediment and erosion control measures).

In addition to characterizing the magnitude of impact, the sensitivity/ vulnerability/importance of the impacted resource/receptor is characterized. A range of factors is taken into account when defining the sensitivity/ vulnerability/importance of the resource/receptor. Where the resource is physical (e.g., a waterbody), its sensitivity (to change) and importance (on a local, national, and international scale) are considered. Where the resource/receptor is biological or cultural (e.g., the marine environment or a coral reef), its importance (e.g., its local, regional, national, or international importance) and its sensitivity to the specific type of impact are considered. Where the receptor is human, the vulnerability of the individual, community, or wider societal group is considered. Other factors may also be considered when characterizing sensitivity/vulnerability/importance, such as legal protection, government policy, stakeholder views, and economic value.

As in the case of magnitude, the sensitivity/vulnerability/importance designations themselves are universally consistent (i.e., Low, Medium, and High), but the definitions for these designations would vary on a resource/receptor basis.

6.1.2 Step 2: Evaluate Impacts

An ESIA evaluates the significance of a potential project impact by considering, in combination, the magnitude of the impact and the sensitivity/vulnerability/importance of the impacted resource or receptor. The assignment of a significance rating facilitates decision-makers and stakeholders to understand how much weight should be given to the issue in their process. In the case of positive impacts, the significance is assigned as Positive.

Significance was assigned for each impact using the matrix shown in Table 6-2. This matrix applies universally to all resources/receptors.

Table 6-2: Evaluation of Significance of Impacts

Impact Significance Matrix		**Sensitivity/Vulnerability/Importance of Resource/Receptor**		
		Low	**Medium**	**High**
Negative Impacts				
Magnitude of Impact	Negligible	Negligible	Negligible	Negligible
	Small	Negligible	Minor	Moderate
	Medium	Minor	Moderate	Major
	Large	Moderate	Major	Major
Positive Impacts				
Magnitude of Impact	NA	Positive	Positive	Positive

In terms of what the various significance designations represent, the following considerations are provided:

- An impact of Negligible significance is one where a resource/receptor (including people) would not be affected by a particular activity, or the predicted effect is deemed to be imperceptible or is indistinguishable from natural background variations.
- An impact of Minor significance is one where a resource/receptor would experience a noticeable effect, but the impact magnitude is sufficiently Small (with or without mitigation) and/or the resource/receptor is of Low sensitivity/vulnerability/importance. In either case, the magnitude should be well within applicable standards.
- An impact of Moderate significance has an impact magnitude that is within applicable standards but falls somewhere in the range from a threshold below which the impact is Minor, up to a level that might be just short of breaching a legal limit. To design an activity so that its effects only just avoid breaking a law and/or cause a major impact is not best practice. The emphasis for Moderate impacts is therefore on demonstrating that the impact has been reduced to a level that is as low as reasonably practicable. This does not necessarily mean that impacts of Moderate significance have to be reduced to Minor, but rather that Moderate impacts are being managed effectively and efficiently.
- An impact of Major significance is one where an accepted limit or standard may be exceeded, or Large magnitude impacts occur to highly valued/sensitive resources/receptors.
- An impact of Positive significance is one that has been identified as having a positive effect on the receptor/resource. Generally, this EA does not attempt to characterize magnitude for positive impacts.

A goal of an impact assessment is to get to a position where a project does not have any Major residual impacts (i.e., after management measures are considered), certainly not ones that would endure into the long term or extend over a large area. However, for some aspects, there may be Major residual impacts after all practicable management options have been exhausted. An example might be the visual impact of a facility. It is then the function of the decision-makers and stakeholders to weigh such negative factors against the positive ones, such as employment, in coming to a decision on a project, and to promote offsets or compensation.

6.1.3 Step 3: Management and Enhancement

An ESIA process aims to ensure that project decisions are made in full knowledge of their likely impacts on the environment and society. A vital step within the ESIA process is therefore the identification of measures that could be taken to mitigate potential impacts of the project being assessed.

This process involves identifying where potentially significant impacts could occur and identifying ways of mitigating those impacts as far as reasonably possible. The mitigation hierarchy was used for this EA, in which preference was given to trying to avoid or minimize the impact before considering other types of mitigation (i.e., remedy, compensate, offset):

- Avoid —remove the source of the impact
- Minimize —reduce the magnitude of the impact
- Mitigate—“repair” the results of the impact after it has occurred
- Compensate/offset—address the loss or change to a resource by replacing the loss/change in kind or with a different resource of equal value

6.1.4 Step 4: Residual Impacts

Once management measures are determined, the next step in the impact assessment process is to determine the residual impact significance. Residual impacts are the impacts that are predicted to remain after both embedded controls and committed management has been taken into consideration. In most cases, the sensitivity/vulnerability/importance of a receptor is unaffected by proposed management measures: the management measure is typically intended to reduce the magnitude of a predicted impact, thereby reducing its overall significance.

6.2 Physical Resources Impact Assessment

6.2.1 Air Quality

This section assesses the Project's construction and operations impacts on air quality and it considers the magnitude and sensitivity of the affected receptors. No quantitative assessment of potential impacts from Project construction and operations has been undertaken (i.e., no air dispersion modelling), due to the absence of detailed equipment specifications and logistics information at the time of this report. Therefore, a qualitative air quality assessment was performed. For air quality, the general population is considered to be of Medium Sensitivity. This rating reflects the fact that air quality standards are inherently conservative and are designed to protect the large majority of people in the general population. High sensitivity would only apply to a small number of receptors, such as hospitals, day-care centres, and nursing homes for seniors, where vulnerable individuals are located (children, elderly, people with breathing problems, etc.). These high-risk receptors are not located within the Project's immediate vicinity (i.e., DAI). As indicated in Section 2.5, the Project area is surrounded mostly by commercial and industrial receptors, with some residential receptors within the (see Figure 2-2).

6.2.1.1 Construction Phase

Dust accumulation and combustion/exhaust emissions during the Project construction would increase air pollution and may create a health nuisance for sensitive receptors near the Project area.

The potential direct impact to air quality during the construction phase of the port expansion and improvements construction include:

- Emissions of dust from construction and dredging activities and movement of vehicles and heavy machinery over unpaved surfaces; and
- Increases in combustion/exhaust emissions.

The potential for dust emissions is higher during dry and windy weather and it is less of an issue during the wet season.

Port Expansion Activities and Impacts

The following Project components would generate air emissions during the port expansion construction:

- Construction of two new berths.
    - Construction of Berths 3 and 4.
    - Area filled to be used as ship yard.
- Upgrades and improvements to the GYSBI Port.
    - Expansion of the fuel farm.
    - Water Treatment Bunkering and Expansion.

  - Demolition of the old concrete deck and construction of new concrete deck at the Marshalling Storage Yard.

- Construction of warehouses in the “Annex.
  - Construction of 5 New Warehouses.
  - Installation of a self-contained Washbay.
  - Construction of bridge over the canal.
  - Construction/preparation of covered uncovered staging and storage area,

The construction activities associated with the Port upgrades and improvements would result in emission increases in the immediate vicinity. However, considering the Project’s activities would be localized, intermittent, and occur over a period of 8.5 months, the impacts on air quality is expected to be *Moderate* (medium magnitude and medium sensitivity).

Air Quality Management Measures during Construction Phase

The air quality impacts associated with the construction of the port expansion could be minimized using the following management measures:

- Maintain all construction equipment in accordance with manufacturer’s specifications.
- Suppress dust as needed in unpaved areas (e.g., use of water sprays).
- Avoid burning non-vegetative wastes (refuse, etc.) at construction sites.
- Avoid unnecessary idling of construction equipment or delivery trucks when not in use.
- Keep work vehicles clean (particularly tires) to avoid tracking dirt around and off the site.
- Cover work vehicles transporting friable materials to prevent materials being spread around and off the site.
- Minimize drop heights of materials.
- Develop and implement a grievance procedure in the event of any dust and/or exhaust emissions complaints being received.

Residual Impact

Implementation of the management measures described above is expected to reduce construction air impact from *Moderate* to *Minor*.

6.2.1.2 Operations Phase

During the operations phase, combustion emissions form vehicle or truck traffic volumes within the port and along port access roads are not expected to change significantly as to affect the air quality of area. However, air quality may be affected by combustion exhaust emissions that occur mainly from the operations of the port from diesel engines used for the propulsion of ships, and ship-based auxiliary engines and boilers for power generation. In addition, combustion exhaust emissions are generated from land-based activities involving the use of cargo handling equipment, and other engines and boilers.

Overall, the Project operations are expected to have a *Moderate to Minor* impact on the surrounding air quality due the efficiency in the operations and the use of embedded (in-built) controls.

Air Quality Management Measures during Operations Phase

No specific mitigation/management measures are proposed in relation to air quality during operations of the Project. However, volatile organic compounds (VOC) emissions from fuel storage, and transfer activities should be minimized through the use of embedded controls, such as the use of the vapour recovery systems for fuel storage, loading/ offloading, and fuelling activities, the use of floating top storage tanks, and the adoption of management practices such as limiting or eliminating loading/unloading activities during poor air quality conditions and implementing tank and piping leak detection and repair programs, among others.

Residual Impact

Implementation of the management measures described above is expected to reduce air impact from Moderate to *Minor* to *Minor* to *Negligible.*

6.2.2 Noise

This section assesses the Project's construction and operations impacts on noise quality and it considers the magnitude and sensitivity of the affected receptors. For noise, however, it is usually possible to predict noise levels quantitatively and compare them against standards that are resource/receptor-specific and inherently take into account resource/receptor sensitivity. No quantitative assessment of potential impacts from Project construction and operations has been undertaken (i.e., no noise propagation modelling), due to the absence of detailed equipment specifications and logistics information at the time of writing. Therefore, a qualitative noise assessment was performed. For noise quality, all residential areas, places of worship, schools, and healthcare facilities are considered to be of Medium Sensitivity. Less noise sensitive receptors such as commercial and industrial areas are considered to be of Low Sensitivity. High sensitivity would only apply to a small number of receptors, such as pristine areas and national parks where natural sounds, scenery and wildlife are considered a precious natural resource worthy of protection for future generations. These high-risk receptors are not located within the Project's immediate vicinity. As indicated in Section 2.5, the Project area is surrounded mostly by commercial and industrial receptors.

6.2.2.1 Construction Phase

The potential direct impact to noise quality during the construction phases of the port expansion and improvements include increases in noise emissions from use of heavy construction equipment and vehicles.

Table 6-3 provides a list of typical construction equipment at their typical noise levels at 15 m (50 ft.).

Table 6-3: Construction Equipment Noise Emission Levels

Equipment	Typical Noise Level (dBA), 15 m from Source
Air Compressor	81
Backhoe	80
Compactor	82
Concrete Mixer	85
Concrete Pump	82
Crane, Mobile	83
Dozer	85
Generator	81

Equipment	Typical Noise Level (dBA), 15 m from Source
Grader	85
Jack Hammer	88
Loader	85
Paver	89
Pneumatic Tool	85
Pump	76
Roller	74
Scrapper	89
Shovel	82
Truck	88

dBA = A-weighted decibel

Source: US DOT 2006 (Transit Noise and Vibration Impact Assessment, Federal Transit Administration, May 2006).

According to the 2017 EPA Permit (20160307-MLPFO) in Appendix A, the Project has to comply with the Guyana National Bureau of Standards (GNBS) *Guidelines for Noise Emissions into the Environment.* Sound levels from noise-making devices should not exceed the limits below, at a distance of 15 m (50 feet) from the source or property boundary, whichever is closer. The construction noise limits are 90 decibel (dB) during the daytime (6am to 6pm) and 75 dB during the night (6pm to 6am).

Port Expansion Activities and Impacts

The following Project components would generate noise emissions during the port expansion construction:

- Construction of Berths 3 and 4 will required the removal and demolition of existing facilities, dredging in the Demerara River, the installation of new bulkheads and sheet piles, and backfilling with structural fill material in order to extend Berths 3 and 4 to the same length as existing Berths 1 and 2.
- Upgrades and improvements of the Port include the expansion of the fuel farm by adding more tanks, modifications, Water Treatment Bunkering and Expansion, construction of new concrete decks at the Cargo Marshalling Storage Yard, and other minor modifications throughout, such as installing new fencing and pouring concrete pads.
- Annex area include the construction of 5 new warehouses, the installation of a self-contained Washbay, the construction of a Bridge, and the construction/preparation of covered and uncovered Staging and storage yards.

The construction activities associated with the port upgrades and improvements would result to noise increases in the immediate vicinity. However, considering the Projects activities would be localized, intermittent, and occur over an 8.5-month time period, the impacts on noise quality is expected to be *Moderate* (medium magnitude and medium sensitivity).

Management Measures

The noise impacts associated with the construction of the port expansion and improvements could be minimized using the following measures:

- Maintain all construction equipment in accordance with manufacturer’s specifications.

- Schedule construction, modification, and rehabilitation work during daylight hours when increased noise levels are more tolerable.
- Develop and implement a Construction Communications Plan to inform adjacent receptors (e.g., commercial and industrial businesses) of construction activities.
- Provide acoustic enclosures, if necessary.
- Install broadband spectrum backup alarms on construction vehicles as opposed to the typical single-tone frequency alarms (broadband alarms attenuate more quickly over distance due to the incorporation of higher frequencies).
- Avoid unnecessary idling of construction equipment and trucks.

During construction, a grievance mechanism will be implemented (see Section 8.5.5) to receive complaints from the community, and regular noise monitoring at a least three locations nearest sensitive receptors from the port and the annex will be performed.

Residual Impact

Implementation of the management measures above is expected to reduce construction noise impact from *Moderate* to *Minor*.

6.2.2.2 Operations Phase

During the operations phase, vehicle traffic volumes within the port and along port access roads and are not expected to increase significantly, including noise levels from the normal operations of the port. Therefore, the Project operations is expected to have a *Minor* (medium magnitude and low sensitivity) and impact on the surrounding noise environment.

Management Measures

Although the Project is not expected to cause adverse noise impacts on nearby sensitive receptors, the following general measures are recommended during the Operations to minimize the risks of noise as part of a good industry practice.

- Ensure all fixed and mobile equipment are in good working order and are maintained regularly in accordance with manufacturer's specifications. Machinery found to produce, excessive noise and compared to industry normal standard should be removed from the site or stood down until repairs or modifications have been made.
- Install sound suppressive devices such as silencers and mufflers on port equipment as necessary.
- Keep all engine covers closed while equipment is operating.
- Where practical, operate machinery at low speeds or power and switch off when not in use to avoid unnecessary idling.

Residual Impact

Implementation of the management measures above is expected to reduce operations noise impact from *Minor* to *Minor* to *Negligible*.

6.2.3 Geology and Physiography

In general, the proposed Project would have negligible effects on the upland geology and topography at site during the construction and operations phases of the Project. The upland areas are flat and already disturbed by the existing commercial and industrial operations at the site. The Proposed project would not modify the underlying geology or significantly alter the topography of the upland areas.

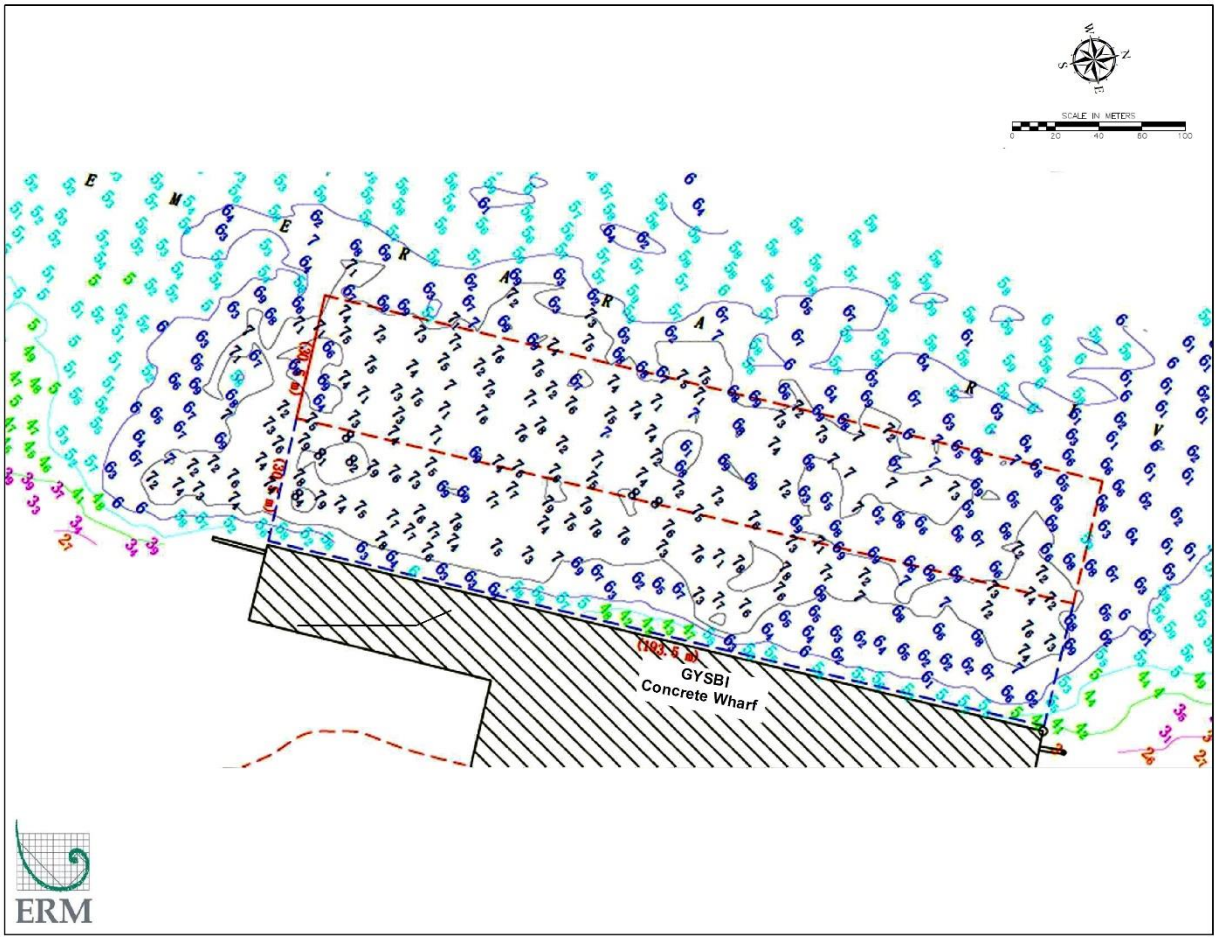
6.2.4 Soil and Water Resources

Part of the construction of the new berths include dredging activities in the Demerara River. Two main impacts resulting from the dredging activities are increased turbidity and the movement of pollutants found at the bottom of the river. Dredging activities will be necessary during construction and then again during operations, resulting in mobilization of suspended materials into the water body, raising turbidity, the movement of pollutants found at the bottom of the bay, and causing potential impacts to fish and biodiversity. Dredging in harbour and industrial areas often releases contaminants to the water column; however, since the authority (MARAD) did not require it, there is no sediment or suspended solids analysis performed in the areas to be dredged along the Demerara River. The location where berths 3 and 4 will be built is currently a shipyard with an existing timber wharf that is also regularly dredged, and there is no qualitative or quantitative sediment quality data available. A baseline survey of sediment quality in the area to be dredged by GYSBI is recommended in order to determine if any contamination is present and may be resuspended and dispersed when dredged.

The sediments to be removed from the bottom of the river are a hard clay that will be excavated out by excavators on barges. The limits of the dredging activities are as follows:

- Berths 1 and 2: 220m x 60m (to a depth of 6.5m)
- Berths 3 and 4: 184m x 60m (to a depth of 6.5m)

Maintenance dredging is proposed to occur twice a year, and hydrographic surveys (see Figure 6-2) will be done 6 times a year.



Source: GYSBI, 2021. Prepared by ERM, 2021.

Figure 6-2: Hydrographic Survey of GYSBI Berths 1 and 2

The Demerara River in the Project area is narrow with a very rapid flowrate that maintains a 5-to-6-metre-deep direct channel to the ocean by its scouring action. The river's deep brown colour is primarily the result of the massive quantities of silt carried from upriver by the powerful currents. These currents are so powerful that the ocean retains the Demerara's brown colour for a considerable distance out to sea. The controlled transport of inert materials from dredging by an authorized company to the disposal site permitted by MARAD (oceanside on the western side of the mouth of the river are not expected to create any additional impacts. MARAD is the authority that determines where dredge materials can be disposed. These areas are already degraded areas utilized for dumping dredged materials from multiple sources/projects. There is no public information available for the dumping site.

Sediment concentrations in the project area are naturally high that dredging during construction and operations will have a *moderate* impact (medium magnitude and low sensitivity due to the already turbid waters of the river and canal; however, the potential contamination of the sediments elevate the impact to a large magnitude).

6.2.4.1 Management Measures

The common management measures for dredging activities include:

- An anti-turbidity barrier to confine the affected area preventing the dispersion of potentially contaminated suspended solids beyond the immediate area of the dredging
- ;
- Monitor water quality for potential contamination during dredging activities.

.

As mentioned above, the turbidity of the Demerara River and the McDoom Drainage Canal is already elevated beyond established thresholds, deeming the above measures impractical. The potential remobilization of contaminants to the water column may occur during dredging, and a baseline assessment of the sediments in the areas to be dredged is recommended. During dredging, monitoring of the water quality is also recommended.

6.2.4.2 Residual Impact

It is expected that the potential impacts from dredging to the Project will be reduced to *Minor.*

6.2.5 Natural Disasters and Risks

According to a Global Assessment Report on Disaster Risk Reduction prepared by the United Nations, a hazard is a dangerous phenomenon, human activity, or condition that may cause loss of life, injury, or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage (UNISDR, 2009). A disaster is defined as a serious disruption of the functioning of a community or a society involving widespread, human, material, economic, or environmental losses and impacts that exceeds the ability of the affected community or society to cope using its own resources.

As described in Section 5.1.6, the Project itself would be exposed to natural events, such as floods (river and coastal flooding), which could be induced or exacerbated by climate change and affect it during both construction and operations. For example:

- **Construction Phase**: Flooding could impact construction activities and could result in damage to Project components (e.g., damage to construction sites and equipment).
- **Operations Phase:** Flooding could impact the Port and infrastructure and roads.

Careful attention in the design of Project components must be taken to ensure the Project is resilient to these natural disasters.

As part of and in addition to, risk prevention measures, there will be plans in place to assure emergency preparedness and response. During Project activities, GYSBI will implement and follow an Emergency Response Plan that describes procedures to be implemented both in the event of a forecasted event (e.g., tropical storm with a risks of causing flooding). This will involve securing equipment and materials, stabilizing disturbed areas, and similar actions as well as procedures for site evacuation.

6.2.5.1 Management Measures

Careful attention in the design of the Project components and controls should be taken into consideration (i.e., road drains, ditches and culverts) to ensure the Project is resilient to flooding events. ERM recommends applying the following design considerations:

- All new construction and improvements should include properly a designed drainage systems intended to remove water efficiently from the roads and other Project improvement sites.
- Construct properly engineered drainage structures for all of the Project components.

As part of, and in addition to, risk prevention measures described above, there should be plans in place to assure emergency preparedness and response. During Project construction activities, the contractor should implement an Emergency Response Plan that describes procedures to be implemented both in the event of a forecasted event (e.g., floods) or an unanticipated event (e.g., a severe storm). This would involve securing equipment and materials, stabilizing disturbed areas, and similar actions as well as procedures for site evacuation.

6.2.5.2 Residual Impact

It is expected that the implementation of these Project control measures would reduce the potential impact from natural disasters to the Project to *Minor*.

6.2.6 Waste

Waste associated with the Project is limited to the construction phase and comprised of general construction waste. Construction waste consists of general food and office waste, personal protection equipment, paper, cardboard, plastic, pallets, wood, scrap steel and other demolition materials (e.g., concrete), etc. General construction waste generated on-site will be collected in waste bins/receptacles, or store on secure areas to be hauled offsite by a licensed waste hauler and disposed of accordingly in approved landfills. No changes to current waste generating conditions are expected during the operations phase of the Project. The controlled transport of inert materials from dredging by an authorized company to the disposal site permitted by MARAD (oceanside on the western side of the mouth of the river) are expected to be minor.

Construction activities would occur over a period of 8.5 moths, and the amount of waste to be generated is expected to be low; during operations of the facilities, waste will be separated at source and labelled bins will be located within the Project Site for the storage of the various categories. Staff will be trained in proper waste management practices and the importance of implementing them. Cleaning staff will be trained in the safe handling and storage of waste and hazardous materials. They will also be provided with adequate personal protective equipment the impacts related to waste generation and disposal of the Project are expected to be *Moderate to Minor* (medium magnitude and low medium to low sensitivity).

6.2.6.1 Management Measures

The impacts associated with the construction waste generated during the Port expansion and improvements could be minimized using the following measures:

- Provide appropriate waste bins, secure areas, type, volumes and service frequency to accommodate anticipated waste streams.
- All loads arriving or leaving the site will be appropriately secured.
- Provide information regarding waste management in site specific inductions, including waste separation and importance of securing vehicle loads.
- Ensure licensed contractors are used to collect controlled wastes

6.2.6.2 Residual Impact

Because the quantity of waste to be generated is expected to be low, the residual impact significance if all management measures are applied, is expected to be *Minor*.

6.3 Biodiversity Impact Assessment

The existing disturbed/degraded natural habitat conditions at the Port-site and the roadway portions slated for improvement limit the significance of the Project's impacts on biodiversity. Overall, impacts to biodiversity related to implementation of the Project during the construction phases would be temporary, minor, and easily managed through implementation of standard management measures, and construction good practice. No net loss or improvement on natural habitat is proposed. The potential direct and indirect impacts to biodiversity from implementation of the Project include:

- Terrestrial and Water Resources Associated with the Port and access roads Improvements:
    - Loss or Degradation of Vegetation;
    - Increase of Surface Water Runoff from Vegetation Clearing;
    - Degradation of Aquatic Habitat; and
    - Wildlife Injury or Mortality.

6.3.1 Vegetation Removal

6.3.1.1 Annex

Vegetation clearing on the previously disturbed, low species diversity area would likely occur within the proposed Annex site slated for improvement. The western portion of the Annex has two warehouses and storage areas surrounded by impervious surfaces. The eastern portion of the Annex slated for construction with proposed offices, warehouse areas, and pipe storage areas is proposed to occur on a previously disturbed fallow field. Disturbance and minor loss of this vegetation community would be temporary during construction, and disturbed areas would revegetate quickly and impacts are expected to be *Minor* to *Negligible* (low magnitude and medium sensitivity).

Management Measures

Minimization of the construction footprint and avoidance of vegetation disturbance to the extent possible would minimize the impacts to vegetation to a negligible level.

Residual Impact

The potential impact rating is *Negligible* (negligible magnitude and low sensitivity, vulnerability, importance).

6.3.1.2 Vieira Estates Access Road Bridge

Narrow areas of maintained lawn and landscaped areas vegetate along the Vieira Estates Access Road. The degraded riparian vegetation associated with the McDoom Drainage Canal occurs in the immediate vicinity of the proposed roadway improvement associated with the bridge over the McDoom Drainage Canal in the Annex area. The vegetation community in and along the edges of the Canal is of low quality due to the low species diversity, proximity of human activity, polluted water in the Canal, and presence of invasive vegetative species. Minor loss and disturbance of this vegetation community would be temporary during construction and disturbed areas would revegetate quickly. Impacts to vegetation during the construction phase of the Project are expected to be *Minor* (medium magnitude and low sensitivity of the resource).

Management Measures

Minimization of the construction footprint, the installation of sediment and erosion controls, and the avoidance of vegetation disturbance to the extent possible would minimize the impacts to vegetation. Other measures include:

- Demarcation of work area with fencing to minimize disturbance or removal of natural vegetation;
- Minimization of temporary and permanent construction footprints during the design phase.

Residual Impact

Implementation of the above mentioned management measures would reduce impact rating to a *Negligible* level.

6.3.2 Increased Surface Water Runoff from Vegetation Clearing

6.3.2.1 Port and Annex Improvements

The limited vegetation clearing within the proposed Annex slated for improvements will increase the likelihood of surface water runoff. The conversion of the disturbed field and the adjacent landscape areas to impervious surface would enable stormwater to surface flow into the nearby McDoom Drainage Canal, Demerara River during both the construction and operations phases of the Project. Surface water runoff impacts from the Project are expected to be *Minor* (medium magnitude and low sensitivity/vulnerability of resource).

Management

The installation of sediment and erosion controls and the avoidance of vegetation disturbance to the extent possible during construction, would minimize the impacts to vegetation. All new construction and improvements should include a properly designed drainage system intended to direct surface runoff to the appropriate stormwater systems or to stormwater best management practices.

Residual Impact

Implementation of the above mentioned management measures would reduce impact rating to a *Negligible* level.

6.3.3 Degradation of Aquatic Habitat

6.3.3.1 Port and Annex Improvements

Transport, handling and storage of fuels and reagents during construction and operations of the Project could impact aquatic habitat if a spill occurs. Pollutants of concern that could potentially be spilled include petroleum-based products (i.e., motor fuels, oils, lubricants, etc.). These materials could potentially be harmful to water quality and therefore aquatic habitat and aquatic resources, depending on the volume and location of the spill.. The area around the berths is likely to have low benthic and fish diversity due to the constant disturbance of the area by ships, and regular maintenance dredging. The area is also subject to the reception of contaminated water from the existing drainage canals. The dredge spoils dumping site is an already disturbed and degraded area as it has been in use for several years as a dredge disposal site for multiple users. The impacts of the Project on aquatic ecosystems will mostly fall on an already degraded aquatic ecosystem due to the history of land use and maritime activities in Georgetown and the Demerara River.

Impacts from the Project to the aquatic habitats could be *Moderate* (medium magnitude and medium sensitivity).

Management

The Project proposes to implement several management measures to control spills within and surrounding the Port, including an Erosion and Sediment Control Management Plan (to be developed by EPC). The Erosion and Sediment Control Management Plan are to include specific measures such as sediment control procedures during in-water works to minimize the release of potentially contaminated sediments to waterways and recommends work to occur during low flow periods and/or dry periods for the Demerara River and McDoom Drainage Canal during the months of August to November. The Project will also implement a Spill Prevention, Control and Countermeasures Plan (to be developed by EPC) that would minimize the impacts to aquatic habitat.

Residual Impact

Implementation of the above mentioned management measures would reduce impact rating to a *Negligible* level.

6.3.4 Underwater Noise

During construction and operation, noise levels would be temporarily elevated in the area, which may potentially impact estuarine and marine mammals (the area is in the range of the Tucuxi dolphin (*Sotalia guyanensis*) whose preferred habitat includes the estuaries in the region), birds, and fish. When analysing the auditory effects of noise exposure, noise is categorized as either being impulsive (high peak sound pressure, short duration, fast rise-time, and broad frequency content) or non-impulsive (steady-state). For example, sonars, vessel, engines and vibratory pile driving are considered to be non-impulsive sources, while explosives, impact pile driving, and air guns are treated as impulsive sources. Aquatic species generally have lower thresholds for damage associated with impulsive noise than non-impulsive sources as a result of the high peak levels associated with impulsive noise (Popper et. al. 2014). Impacts to aquatic organisms from noise are generally defined as those causing permanent hearing loss and loss of hearing sensitivity (permanent threshold shift [PTS]), those causing a temporary impact to an organism's hearing abilities with a return to normal hearing (temporary threshold shift [TTS]), and those causing a change in an organism's behaviour (NMFS 2018). Another important metric is the sound exposure level (SEL), which is a measure of energy that incorporates both received level of sound and duration of exposure. SEL serves as an index for accumulated sound energy (Popper et. al. 2014). When SEL is used as an index for total energy over the duration of a sound making activity (i.e. all pile strikes for one day of driving), it is referred to as cumulative SEL (SELcum) (Popper et. al. 2014).

Project construction will include noise generating activities. The most significant of these sources include the following:

- Dredging
- Vibratory pile driving
- Impact pile driving

During operations, the project will contain noise generating components from the vessel activity.

The effects of underwater noise on estuarine/marine mammals can be behavioral (e.g., manmade noise masks the noises used by cetaceans for communication) or physiological (e.g., very loud anthropogenic noise can damage the internal hearing organs). Although physiological damage is primarily associated with very loud, impulsive noise sources (e.g., seismic surveys) offshore activities such as vessel

movements, piling and construction can cause behavioral disturbance to estuarine and marine animals (Popper and Hastings, 2009). Animals are not equally sensitive to noise at all frequencies, therefore auditory weighting functions are used. These functions are applied to the noise before the SEL is calculated. Marine mammals are separated into different frequency categories to capture the diversity in their hearing abilities.

Table 6-4: Summary of Marine Mammal Hearing Ranges and PTS Onset Thresholds (Received Level) for Non-Impulsive Noise[1, 2]

Hearing Group	Peak SPL (dB re 1 uPa)	Cumulative SEL (dB re 1uPa)
Low-Frequency Cetaceans	219	199
Mid-Frequency Cetaceans	230	198
High-Frequency Cetaceans	202	173

Source: NMFS 2018.

Acronyms: dB = decibel; re 1 µPa = referenced to 1 microPascal; SEL = sound exposure level; SPL = sound pressure level.
Notes:
[1] If a non-impulsive sound may exceed peak SPL thresholds associated with impulsive sounds, these thresholds should also be considered; therefore, peak SPL thresholds are also provided.
[2] All cumulative SEL acoustic threshold levels (re 1 µPa^{2}s) incorporate marine mammal auditory weighting functions, while peak SPL thresholds should not be weighted.

Because the noise associated with construction and operations will only affect potential localized individuals over a short period of time, the magnitude of the impact in evaluated as *Small*. The resource sensitivity of in the Project area is evaluated to be *Medium* because the Tucuxi is endangered. Therefore, the pre-management significance of noise associated with construction and operations is evaluated at Minor

All fishes have ears to detect sound. Otolith organs within the ear respond to particle motion of the surrounding fluid (Popper et. al. 2014). Fishes can also detect sound pressure through their swim bladder, a gas-filled organ which helps the fish maintain its buoyancy within the water column, although this is selective to certain species. Additionally, hearing range and sensitives to underwater sound varies among species. Mortality, recoverable injury, TTS, and behavior were analyzed as possible effects from sound exposure. Fish were separated into two hearing groups (1) fish with no swim bladders and (2) fish with a swim bladder associated with hearing. Because there were no threshold criteria for non-impulsive noise in the literature available for fish, the thresholds for impulsive sounds were used. Criteria for these interim thresholds (shown in Table 6-5) were taken from Popper et al. 2014, *Sound Exposure Guidelines for Fishes and Sea Turtles.*

Table 6-5: Interim Thresholds for Onset of Injury and Behavioral Effects in Fish from Underwater Noise

Hearing Group	Peak SPL (dB re 1 µPa)	Cumulative SEL (dB re 1 µPa^{2}s)
Fish without swim bladder		
Mortality	213	219
Mortality	213	219
Recoverable Injury	213	216
TTS	186	N/A
Behavioural effect	N/A	150

Fish with swim bladder associated with hearing		
Mortality	207	207
Recoverable Injury	207	203
TTS	186	N/A
Behavioural effect	N/A	150

Popper et al. 2014

Acronyms: dB = decibel; N/A = no data available; re 1 µPa = referenced to 1 microPascal; re 1 µPa^{2}s = referenced to 1 microPascal squared per second; SEL = sound exposure level; SPL = sound pressure level.
Note: There are no formal criteria for continuous noise. The impulse noise thresholds are commonly applied for continuous noise in the absence of a specific threshold.

Because the noise associated with construction and operations will only affect potential localized individuals over a short period of time, the magnitude of the impact in evaluated as Small. The resource sensitivity of both fish with no swim bladder and fish with a swim bladder associated with hearing in the Project area is evaluated to be Medium. Therefore, the pre-management significance of noise associated with dredging is evaluated at *Minor*.

Management Measures

The following measures will assist in managing and controlling the potential impacts of noise on estuarine and marine ecology from construction activities:

- Maintain functional mufflers on all diesel operated equipment;
- Installation of a cofferdam to provide a platform for welding joints or pipe pile and a barrier for noise/vibration and to reduce the potential for behavioral impacts on estuarine and marine mammals, and fish species;
- Ensure vessel operators undergo awareness training;
- A “soft start” procedure shall be used during all pile driving activities to give aquatic mammals, birds and fish species an opportunity to move out of the area and away from the sound source
- Ensure project areas (within a 500 m radius) are monitored for presence of mammals; and
- Record all mammal observations.

Residual Impact

Implementation of the above mentioned management measures would reduce impact rating to a *Negligible* level.

6.3.5 Wildlife Injury or Mortality

6.3.5.1 Port Improvements

With the exception of birds in the vicinity and common disturbance-tolerant aquatic species that inhabit the River itself, wildlife within the vicinity of the Project are very limited and restricted primarily to transient birds and occasional reptiles occurring in strips of vegetation along the River. For the most part, wildlife will move away from work areas during construction, avoiding injury or mortality from Project activities, and return to the area once construction activities are complete. Impacts from the construction phase of the Project to area wildlife are expected to be *Minor (*small impact and medium sensitivity). No additional impacts from current conditions are expected to wildlife during the operations phase of the Project.

Management Measures

Increases in vehicular and heavy equipment traffic would pose risks to wildlife but limiting work to daylight hours, effectively managing the construction workforce, and limiting vegetative clearing to distinct zones will reduce the significance of these impacts. Other measures include:

- Conduct works outside the water birds breeding season (April – Sept);
- Minimize lighting.

Residual Impact

Together, the management and construction management measures described in the ESMPs in Section 8.4 will help ensure that the Project has *Negligible* impacts on terrestrial biodiversity.

6.3.6 Additional Management/Enhancement Measures for Biodiversity

The following additional management measures would further help reduce the potential impacts of the Project on biodiversity:

- Demarcate work area with fencing to minimize disturbance or removal of natural vegetation;
- Plan equipment access locations that minimize impacts to riparian areas, where possible; avoid areas with less stable structure such as steep banks; and
- Minimize temporary stockpiling and place stockpiles outside of the active floodplain. Prevent runoff from stockpiles from entering creeks by using erosion control measures such as silt fences and/or straw wattles.

6.4 Socioeconomic and Cultural Heritage Impact Assessment

6.4.1 Impacts to Livelihoods

This section assesses potential impacts of the Project to livelihoods of affected households, communities and sectors in Guyana over the construction and operations phases of the Project. During construction, the Port and Annex upgrades described in Section 2.5 could generate impacts that may disrupt livelihood activities locally. However, it is envisioned that over the long run, the Project will have beneficial, indirect livelihood impacts for a much larger and widely dispersed population in Guyana, via improved efficiency of the Port leading to enhanced global competitiveness in the country.

6.4.1.1 Construction Phase

Construction of the Project would require excavation along the Vieira Estates Access Road and the GYSBI Southern Access, and would generate traffic in and out of the Project area for movement of construction materials, supplies, wastes, and workers. The volume of traffic that will be generated, and the extent of disruption to different roadways over the Project duration, will be temporary and of short duration. However, it is expected that construction activities and traffic could disrupt both formal and informal commercial activities around the Project area. As described in Section 5.3, there are businesses of varying scales from informal vegetable stands to multinational companies present along the affected roadways. Disruption could occur through the increased truck traffic temporarily while construction is underway, deterring would-be patrons due to increased traffic congestion or safety risks, or otherwise creating challenges to gaining access to the establishments. Local livelihoods could also be affected if entrepreneurs' assets are accidentally damaged in the course of construction activities, for example, delivery vehicles or wooden food stands by the roadside.

Considering that the Project activities would be localized to specific streets and occur over the short term 8.5 months), impacts to local livelihoods are expected to range from *Minor* to *Negligible* depending on the size of the business enterprise. The possibility of accidental damage to private assets is reflected in this rating, with management measures including development of a Livelihoods Restoration Framework and grievance mechanism that would be used as needed if such losses were to occur.

Management/Enhancement Measures

All efforts should be made to avoid economic displacement by phasing construction activities, and by creating alternate entrances, walkways, detours and parking areas if needed. This will require advance engagement of the *engineering procurement and construction (EPC)* contractor with affected businesses to understand peak hours and existing constraints, and thereby jointly develop managements appropriate to each establishment.

Although the aim is to avoid any economic displacement, a Livelihoods Restoration Framework has been developed to guide development of a Project-specific Livelihoods Restoration Plan, should it be required. The Framework outlines the process for conducting a census to inventory all affected businesses and to establish an appropriate compensation scheme. The Livelihoods Restoration Framework is provided in Section 7.4.4.

Positive (though temporary) livelihood impacts may be realized if opportunities for local employment are provided during Project construction. This can be done by including stipulations for the contracted EPC to hire a target percentage of workers from the local community.

Regular and timely communication should be maintained with affected business owners through development and implementation of a Stakeholder Engagement Plan (SEP), including a grievance mechanism that provides a reliable and consistent process to seek remedy in the event of unforeseen accidents that could affect livelihoods. When developing and implementing the stakeholder engagement plan, and designing and publicizing the grievance mechanism it is necessary to consider any special needs of vulnerable subpopulations. For example, it should be determined whether the heads of women-headed households may require alternative forms of project communication to attendance at a public stakeholder meeting, and whether indigenous households may be best reached via cultural organizations.

Residual Impact

It is expected that implementation of the proposed management and enhancement measures would reduce the significance of livelihood impacts to *Negligible* for medium and large businesses, and *Minor* for small enterprises or individual entrepreneurs.

6.4.1.2 Operations Phase

The Project's objective is to improve efficiency of the Port operations by eliminating logistical bottlenecks, which is envisioned to in turn enhance Guyana's global competitiveness, particularly in the oil and gas economic sectors.. As such, socioeconomic impacts of the Project over the long term are expected to be positive for much of the Guyanese population that will experience indirect benefits from improved economic diversification and performance. The overall impact to livelihoods during the operations phase is therefore *Positive* and is not qualified further.

Management/Enhancement Measures

Given the positive nature of the impact, no additional management or enhancement measures are required.

6.4.2 Impacts to Community Health and Safety

This section assesses potential health and safety impacts for affected communities during the Project's construction and operations phases. During construction the port and roadway upgrades described in Section 2.4.3 will generate activities that may cause heightened health and safety risks for road users and for populations of adjacent neighbourhoods. However, it is envisioned that over the long term the Project will be beneficial from a safety perspective due to improvements in traffic efficiency and safety, and better accommodation of non-motorized modes of transport like pedestrians and bicycles.

6.4.2.1 Construction Phase

A range of the impacts described in Section 6.2 (air quality, noise, and traffic) could have implications for the health and safety of the communities adjacent to the Project footprint. In addition to the increase in traffic congestion, improper management of construction activities, including inadequate securing of equipment and machinery, can lead to unforeseen incidents potentially causing injury or death.

It is assumed for the purposes of this assessment that the majority of Project construction workers will be Guyanese nationals rather than imported labour. As such, influx-related health and safety impacts are not assessed.

Given that noise, air quality and traffic impacts are all expected to be minor to negligible with application of the relevant management measures, it is expected that associated impacts on community health and safety from these will also be minor to negligible. However, given the high-density character of the Project environment, risk for injury-causing construction accidents are considered to be *Moderate* (medium magnitude, medium sensitivity).

Management/Enhancement Measures

To reduce health and safety risks to the community, construction contractors should be required to develop robust Health and Safety Plans that are in alignment with construction industry best practices. Monitoring of compliance with these plans should be ongoing for the duration of construction.

Appropriate and timely engagement of stakeholders, including communities adjacent to the Project footprint areas, should be undertaken to ensure that they are well-informed of the nature and duration of Project activities, and have a good understanding of associated safety risks. Additional efforts should be made for stakeholder outreach to vulnerable subpopulations or to those responsible for maintaining their safety, for example schools, day-cares, hospitals and senior homes present in the Project area.

A grievance mechanism for the Project construction phase should be established and publicized to ensure that stakeholders are provided with a consistent process to voice any concerns regarding health and safety risks from Project activities. Again, extra efforts may be required to ensure the grievance mechanism is adequately publicized to vulnerable subpopulations.

Residual Impact

With implementation of the recommended management measures, the residual impact to community health and safety would be reduced from *Moderate* to *Minor*.

6.4.2.2 Operations Phase

During the operations phase, no activities distinguishable from baseline will be conducted. Rather, the regular operational activities of the Port including associated road traffic should occur more efficiently and safely than before the Project, including reducing the amount of time spent on the road by users of the roads in the vicinity of the port. This will have beneficial health and safety effects by reducing stress and

fatigue, reducing the amount of time road users are exposed to exhaust fumes, freeing time that may then be spent on more productive or health-promoting activities, and potentially increasing the number of road users choosing the less sedentary options of pedestrianism and bicycling due to safer road conditions. Therefore impacts of the operations phase of the Project are expected to be *Positive*.

Management/Enhancement Measures

Given the positive nature of the impact, no additional management or enhancement measures are required.

6.4.3 Cultural Heritage

This section assesses the impact on cultural heritage resources in the Project Area. There are no listed monuments in the Project footprint, and the improvements will occur in industrial or high-density mixed-use areas where potential for undiscovered cultural heritage is expected to be low. However, there are numerous living heritage structures such as churches and mosques integrated into the urban landscape, and potentially built heritage structures that could have historic or aesthetic value to local communities.

6.4.3.1 Construction Phase

As described in Section 5.3.2, construction activities will be in areas that have already undergone a high degree of human disturbance. None of the proposed Project activities are considered to be more intrusive than those activities that were necessary in the initial development of the current existing facilities and infrastructure. As such, it is unlikely that undiscovered subsurface cultural heritage would be discovered or damaged.

Since the activities will not alter the character of the landscape or skyline, it is also not anticipated that the Project would have any visual effects on the Project's DAI or IAI.

As described in Section 5.3.2, the mixed-use environment in which the Project is situated includes places of worship including evangelical churches and at least one mosque. These are considered living heritage sites of moderate importance given the large populations they are likely to serve in these densely populated areas.

The significance of impact on cultural heritage is considered to be *Moderate* – medium magnitude of impact particularly for possible disruption to the use of living heritage sites, and medium sensitivity since users of such sites are likely to have limited alternatives in the vicinity.

Management/Enhancement Measures

As discussed previously, it is recommended that an exhaustive inventory of buildings and structures in the Project area be conducted prior to the onset of construction. In addition, meaningful stakeholder engagement with affected communities should be undertaken. This will allow for the identification of living heritage and other structures, places and features that may have historical, cultural or aesthetic importance to members of the community. Once such features are identified, plans should be developed in consultation with stakeholders to ensure their protection during the construction phase.

In the case of living heritage sites such as churches, mosques and mandirs, engagement with the administrators of these institutions should be undertaken to understand their operating and peak hours and regular events such as worship services. This will allow for coordination and planning to avoid or minimize undue disruptions. Key points of contact and a predefined protocol should also be established for the living heritage site administrators to alert the Project of any impromptu events such as funerals so that provisions can be made to avoid disruptions.

It is considered unlikely that undiscovered, underground cultural heritage would be discovered in the Project Area. However, since it is still a possibility, the EPC should develop a simple Chance Finds Procedure that outlines a protocol to stop work and notify the Directorate of Culture under the Ministry of Education, Science and Culture if anything resembling archaeological resources is found during excavation activities.

Residual Impact

With the implementation of the recommended management measures, the significance of impact would be reduced from *Moderate* to *Minor*.

6.4.3.2 Operations Phase

No activities with the potential to change levels of access to living heritage sites, or cause damage or alteration to built heritage or other forms of cultural heritage are anticipated during the operations phase.

Management/Enhancement Measures

As no impact is expected to cultural heritage resources, no management or enhancement measures are recommended during operations.

6.4.4 Road Traffic

Traffic is expected to increase between the Annex and the Port, via the Vieira Estates Access Road and the improved GYSBI Southern Access, as materials offloaded from ships are stored in the Annex, and vice versa, as materials stored in the Annex are uploaded onto the vessels. The already congested traffic in the throughway of the East Bank Public Road will increase due to the installation of a traffic light in the corner with the Vieira Estates Access Road, but it will also lead to enhanced safety along the corridor – traffic accidents due to the uncontrolled crossing of trucks will decrease. As such, the impact related to traffic is expected to be *Minor* (small magnitude and medium sensitivity).

6.4.4.1 Management Measures

The impacts associated with the traffic during the Port expansion and improvements and operations could be minimized using the following measures:

- During the construction and operations phases, maintain the traffic and schedule activities, to the extent possible, to be conducted not during peak times (e.g., early in the morning or night).
- Deploy traffic, safety, and road detour signs in close cooperation with the authorities.
- Coordinate the delivery of construction materials at times that minimize impacts to the existing traffic.

6.4.4.2 Residual Impact

Because the installation of a traffic light and the other management measures will be positive, the residual impact significance if all management measures are applied, is expected to be *Negligible*.

6.4.5 River Traffic

The use of construction vessels could pose risks for small vessels operating in the vicinity of the Project; vessel operators will be subject to rigorous training and safety protocols, and an exclusion zone may

need to be enforced. Increases in vessel traffic with the proposed project and other reasonably foreseeable development projects could increase erosion caused by vessel wakes, particularly in areas where the shoreline is not strengthened with riprap or other armouring. A vessel incident could result in an inadvertent release of fuels, oil, or other hazardous material to the River. As such, the magnitude of the impact and sensitivity of the receptor during the construction activities (fishermen, small vessel operators) is expected to be *moderate*.

GYSBI currently berths approximately 1,835 vessels every year (includes all vessel types: Commercial Vessels, Fast Supply Vessels, Multipurpose Vessels, and Platform Supply Vessels), with the goal of doubling that to 3,670 in 2022. The traffic in the Demerara River will double during operations, thus increasing the risk of vessel collision. The volume of traffic generated will likely be mitigated by the fact that the Demerara River is over 1 km wide at the Project Site, with its widest point being approximately 2.4 km north of the Site at the mouth of the river); and including the implementation of a River Traffic Management Plan. Even though the River is 1 km wide from the mouth to the Port, this width will likely accommodate the increase traffic at the site. Therefore, the impact of increased vessel traffic during operations of the Project is expected to be *Moderate*.

6.4.5.1 Management Measures

The impacts associated with the river traffic during the Port expansion and improvements and operations could be minimized using the following measures:

- All vessel crew are to be qualified vessel operators;
- The ships will operate in agreement with the standard procedures and protocols currently used by GYSBI. For example, the port pilot will determine the navigation speed in the access channel depending on the meteorological circumstances. The Project will collaborate and inform authorities in order to avoid riverine traffic accidents.
- Placement of temporary navigation aids to support safe navigation during construction and to demarcate exclusion zones if required.
- The Project will also comply with the safety rules and regulations of MARAD, in particular, the Guyana Shipping (Ship and Port Facility Security) Regulations (2016).

6.4.5.2 Residual Impact

After the application of the management measures stated above, the residual impact is considered *minor* during construction and operations.

7. CUMULATIVE IMPACT ASSESSMENT (CIA)

This chapter focuses on potential cumulative impacts from the Project. Cumulative impacts are defined as the successive, incremental, and/or combined effects of a Project or activity, accumulated with other Projects or activities. Given that the Project is complying with the IFC PS, potential cumulative impacts are evaluated pursuant to IFC's Cumulative Impact Assessment (CIA) guidance - Good Practice Handbook - Cumulative Impact Assessment and Management: Guidance for Private Sector in Emerging Markets (IFC, 2013).

7.1 Key Terminology

The following are definitions for key terminology used in the CIA.

Cumulative Impact: Impacts that result from the successive, incremental, and/or combined effects of an action, project, or activity added to other existing, planned, and/or reasonably anticipated actions, projects, or activities. For practical reasons, the identification, assessment, and management of cumulative impacts are limited to those effects generally recognized as important on the basis of scientific concern and/or concerns of Project-Affected Communities (PACs)[28].

CIA: Process to identify and evaluate cumulative impacts.

Other Projects: Existing, planned, or reasonably expected future developments, projects and/or activities potentially affecting Valued Environmental Components (VECs).

External Drivers: Sources or conditions that could affect or cause physical, biological, or social stress on VECs, such as natural environmental and social drivers, human activities, and external stressors. These can include climate change, population influx, natural disasters or deforestation, among others. These are typically less defined and planned than Other Projects.

Valued Environmental Components (VECs): Environmental and social components considered as important by the scientific community and/or potential PACs. VECs may include:

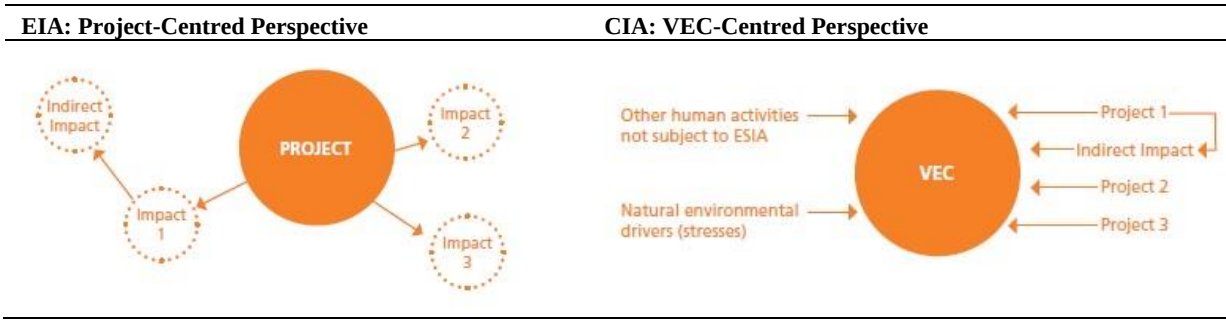
- Physical features, habitats, wildlife populations (e.g., biodiversity, water supply);
- Ecosystem services (e.g., protection from natural hazards, provision of food);
- Natural processes (e.g., water and nutrient cycles, microclimate);
- Social conditions (e.g., community health, economic conditions); and
- Cultural heritage or cultural resources aspects (e.g., archaeological, historic, traditional sites).

VECs reflect the public and scientific community's "concern" or special interest about environmental, social, cultural, economic, or aesthetic values (IFC, 2013). According to the IFC's methodology, VECs are considered the ultimate recipients of cumulative impacts because they tend to be at the ends of ecological pathways.

7.2 Approach

Unlike the rest of the ESIA, which focuses on the Project as a generator of impacts on various environmental and social receptors, the CIA focuses on VECs as the receptors of impacts from different projects and activities (see Figure 7-1). In the CIA, the overall resulting condition of the VEC and its related viability are assessed.

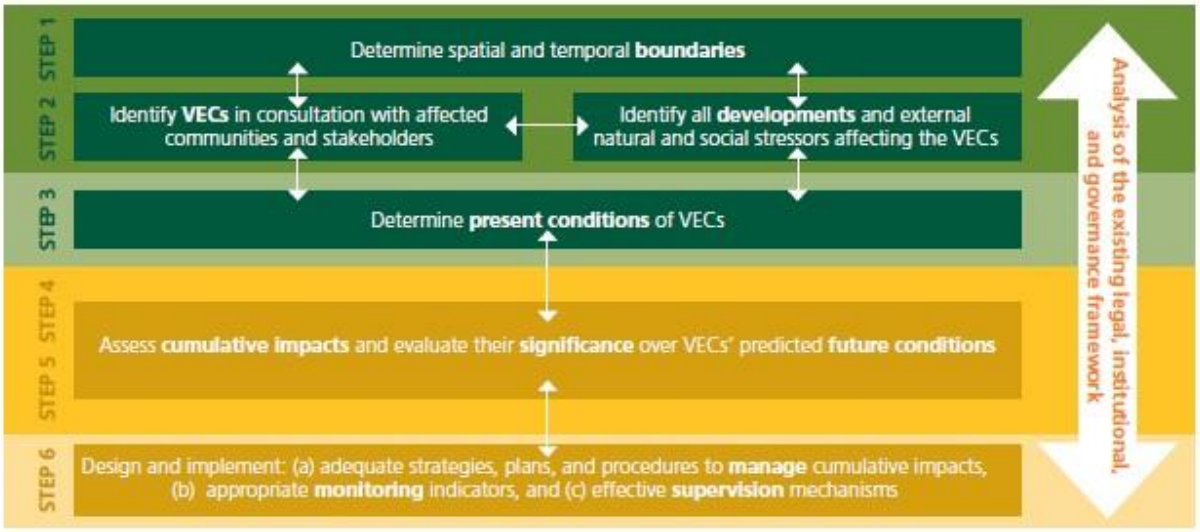
[28] PACs are defined as local communities potentially directly affected by the Project (consistent with IFC Performance Standard 1, paragraph 1 [IFC 2012a]).



Source: IFC, 2013.

Figure 7-1: Comparing ESIA and CIA

The CIA was derived from desktop reviews of publicly available information, information obtained during the ESIA process, and information provided by GYSBI. The assessment follows the six steps for a CIA (see Figure 7-2). The process is iterative and flexible, with some steps having to be revisited in response to the results of others. For example, the VEC selection step usually needs to be adjusted after the potential impacts of the Project are identified. The steps are described in detail below.



Source: IFC, 2013.

Figure 7-2: Summary of the Cumulative Impact Assessment Methodology

7.3 Limitations

The IFC CIA Handbook methodology takes into consideration the limitations that a private developer may face carrying out a CIA. The limitations applicable to this CIA include: (1) incomplete information about other projects and activities (e.g., the information is not available in the public domain); (2) uncertainty with respect to the implementation of future projects; and (3) difficulty in establishing thresholds or limits of acceptable change for VECs, and therefore the significance of cumulative impacts.

7.4 Determination of Spatial and Temporal Boundaries

The Project includes the construction of two berths (Berths 3 and 4), modifications to the existing GYSBI Port, and the construction of several facilities at the Annex area. The components are located within the Houston Area of Greater Georgetown which is highly industrial with a mix of residential and commercial use.

Based on an assessment of the VECs for the CIA, it was determined that using the Houston Area and the Demerara River (from the mouth to the Demerara Harbour Bridge) will be appropriate to serve as the spatial boundary of the CIA, in that it covers: (1) the extent of the selected VECs, and (2) the extent of the potential impacts from the Project, other projects, and external drivers.

Temporal delimitation for a CIA is future focused and therefore frequently a challenge due to the uncertainty inherent to potential future other projects. For this reason, good international industry practice suggests consideration of a three-year temporal boundary when conducting a CIA (IFC, 2013), and revisiting the CIA periodically (every 3-5 years) to identify changes in proposed projects and external drivers and therefore expected cumulative impacts. Based on the expected timeline of the Project, the construction of the Port and its facilities is estimated to take between 18 to 24 months. The CIA uses an extended five-year temporal boundary, 2022 – 2027, to cover the Project construction and initiation of Project operations activities.

7.5 Other Projects

Through a thorough review of publicly available information and interviews with GYSBI personnel, ERM identified existing and future planned projects located within the spatial and temporal boundaries of the CIA, having the potential to result in cumulative impacts on identified VECs. The sources researched to identify other existing or planned projects for this CIA included:

- IDB and IDB Invest websites
- Central Housing & Planning Authority (CH&PA) website and interviews
- Maritime Administration Department (MARAD) website and interviews
- Environmental Protection Agency of Guyana website
- Ministry of Local Government and Regional Development
- Caribbean Investment Fund
- World Bank Group website
- Development Finance Corporation website

There is one other development of this type (construction of a Wharf) on the opposite bank of the Demerara River; however, none other major developments in the Houston area of Greater Georgetown.

Other projects that have been identified nearby are:

- Tristar Wharf - Construction of a Wharf by Tristar Incorporated across the river on the west bank of the Demerara River at Versailles/Malgre Tout. Construction date for this wharf is currently unknown; however,
- Hilton Hotel - Construction of a Hilton Hotel (Hilton Garden Inn and Homewood Suites Development) to the west of the Annex Area, between the Annex Area and GYSBI Port. This construction is expected to begin in August 2021.

- Water Project - Program to Improve Water and Sanitation Infrastructure and Supply (IDB): Improvements to water treatment plants and potable water distribution system in Georgetown (to the north) and in the Diamond Area (to the south)

1. Road Project - Road Network Upgrade and Improvement Program (IDB) includes the improvements of roads in Georgetown. Identified roads are located in areas to north, east and south of the Project but not in the immediate vicinity, and
2. Flood Project - Flood Risk Management Project on the East Demerara River (World Bank) – Multiple project components include upgrading critical parts of the EDWC dams, Investments in the East Coast Demerara Drainage System (completed), and Institutional Strengthening and management support.

7.6 External Drivers

ERM identified the following external drivers: natural hazards, climate change, and the rapid growth of the oil and gas industry which is leading to rapid development both on land and on the shores. Please see Section 5.1.6 for a description of natural hazards including flooding, extreme storms, and high winds. The relevant high-risk categories for natural hazards identified for the Georgetown area are:

- River flooding (high)
- Coastal flood (high)

The risk to the Project itself could be induced or exacerbated by climate change. According Guyana's Office of Climate Change, Guyana's coasts are at risk of some of the effects of climate change including:

- Floods – rising sea levels and severe weather events cause flooding and damage to homes, businesses, roads and other infrastructure.
- Health Risks – extreme heat waves, floods, and drought results in increased illness, pests and diseases.

Over the last century Guyana has observed significant changes in climate. Guyana's Initial National Communication (INC) in Response to its Commitments to the UNFCCC (2002), provided an analysis of these changes, as described below:

- An increase by 1.0°C in the mean annual temperature in Georgetown within the last century (1909-1998).
- Below average rainfall since 1960.
- A mean relative sea level rise of 10.2 mm per year for the period of 1951 to 1979. This is more than five times the global average over a similar period.

Guyana's vulnerability to the effects of climate change is due to many reasons, including:

- Approximately 90% of the country's population resides on the Coastal Plain, approximately 0.5 to 1 meter below mean sea level.
- The coast is relatively flat, favouring rapid accumulation of rainfall runoff and making natural drainage into the ocean difficult and presenting challenges to the drainage and irrigation systems. Over the years, high levels of flooding have been observed, especially along the coast and in some inland areas. Climate change is likely to increase the frequency and intensity of flooding events.
- Approximately 75% of the country's economic activities are located on the coastal area, where the major economic activities, such as agriculture, fisheries and industries are found. These sectors are extremely sensitive to extreme weather events and sea-level rise and are therefore highly vulnerable to changes in climate.

- The country has already suffered greatly over the last decade from weather related disasters (OCC, 2020).

The oil and gas industry is also very rapidly growing in Guyana. As previously described in Section 5.3.8.4, Oil and Gas Extraction, above, the Guyana-Suriname Basin was identified as having the second highest resource potential among unexplored oil basins in the world. A number of international oil and gas companies (IOCs), including Esso Exploration and Production Guyana Limited, Repsol (Spain) and CGX Energy (Canada) have been participating in exploration and drilling activities. Continued hydrocarbon finds offshore Guyana have offered and will continue to offer significant opportunities to the country including fast-tracked economic development, employment opportunities and local development.

7.7 VEC Selection and Description

7.7.1 Selection of VECs

To be included, VECs must be a subset of the environmental components likely to be affected the project under evaluation (i.e., Construction of the Berths and the Annex) and also by other projects and external drivers. The identification of VECs was based on social and environmental receptors identified in the assessment of impacts of the ESIA, other known activities in the Project area, supplemented with information obtained during the baseline, and the consultation process.

The studies conducted as part of this ESIA concluded that most of the resources affected by the Project will incur *Minor* or *Negligible* impacts that were very localized in extent and duration. The major environmental and social concerns related to the Project include the risk of flooding, and community health and safety related to traffic (road and river) and construction activities. Chapter 5 of this Report describes the baseline conditions of the existing environment, and Chapter 6 describes the potential impacts.

All potentially eligible VECs were analysed against the following criteria: (1) confirmed to be valued by an identifiable stakeholder group; (2) reasonably expected to be impacted by the Project (i.e., at least one potential impact significance rating of Minor or above); ***and*** (3) reasonably expected to be potentially impacted by some combination of other projects and external drivers. To be included in the CIA, the VEC had to meet all three criteria. Table 7-1 presents the results of this analysis, and highlights the VECs that are selected in the CIA. These VECs are a subset of environmental and social components potentially impacted by the Project.

Table 7-1: Selection of VECs

VEC	Valued by Stakeholders	Potentially Affected by the Project [a]	Potentially Affected by One or More Other Projects	Potentially Affected by One or More External Drivers
River Traffic	Yes	Yes	Yes	Yes
Land Traffic	Yes	Yes	Yes	Yes
Aquatic Flora and Fauna	Yes	Yes	Yes	Yes
Community Health and Safety	Yes	Yes	Yes	Yes

[a] *At least one potential impact significance rating of Minor or above.*

7.7.2 Description of VEC Conditions

The baseline conditions of the selected VECs were previously described (see Chapters 5 of this ESIA). The VEC baselines provide information on the VECs' current conditions, the anticipated resilience against

external stressors and potential impacts (cumulative impacts and sources of stress), and thus provide an indication of their viability and sustainability.

7.7.3 Assessment of Cumulative Impacts

CIAs are future-oriented and Project contributions are assessed as the difference between the expected future condition of the VEC in the context of all possible known stressors and that condition plus the Project under evaluation. This step of the CIA assesses the future conditions of the VECs, considering the impacts from the Project, other projects, and external drivers. The potential impacts to VECs were established from the results of the Project ESIA and other available information. If no impact information was available (e.g., for other projects), ERM assumed common sector-based impacts.

The results of the CIA are presented in tabular format. The significance of cumulative impacts is not evaluated in terms of the magnitude of change but in terms of VEC response and the resulting condition and sustainability. If cumulative impacts do not exceed the VEC threshold, the development of the project under assessment is considered acceptable. Given the intrinsic limitations of Project-driven CIAs, the present assessment was not intended to obtain sufficient baseline information to establish thresholds of the selected VECs and therefore establish the significance of the cumulative impacts. Instead, based on the publicly available information and the findings of the stakeholder interviews, cumulative impacts were categorized by priority using the following definitions:

High Priority: The VEC is expected to or is currently being adversely impacted by other projects and/or external drivers and the future addition of the Project could incrementally contribute to the adverse impact. Actions will be implemented in the short term to mitigate potential adverse cumulative impacts on the VEC.

Medium Priority: The VEC could potentially be impacted by other projects and/or external drivers, and the Project could potentially contribute to the adverse impact. Actions will be implemented in the medium term to mitigate potential adverse cumulative impacts on the VEC.

Low Priority: The VEC is not expected to be potentially impacted significantly by other projects and/or external drivers, and therefore the Project impacts will not be expected to contribute to an adverse cumulative impact. No actions are required to mitigate potential adverse cumulative impacts on the VEC beyond proposed Project management measures.

Table 7-2 summarizes the results of the assessment of cumulative impacts identified for the selected VECs. The potential impacts from other projects that are within the same industry or sector are discussed together. Based on the potential cumulative impacts, a priority ranking is established for each VEC.

In summary, all of the VECs are deemed as Low priority cumulative impacts.

Table 7-2: Summary of Cumulative Impact Assessment

VEC	Potential Impacts from the Site Improvement Components of the Project	Potential Impacts from Other Projects	Potential Impacts from External Drivers	Cumulative Impact	Priority Ranking
River Traffic	During Construction, there will be an increase in the volume of vessel traffic in order to bring the necessary construction equipment to the Site. This increase in vessel traffic can disturb other users of the River and can lead to River accidents. The volume of traffic generated will likely be mitigated by the fact that the Demerara River is over 1 km wide at the Project Site, with its narrowest point (approximately 8 km wide) being approximately 2.4 km north of the Site at the mouth of the river); and the implementation of the management measures mentioned in Section 6.4.5. Therefore, the impacts during Construction will be **Minor**. During Operations: Vessel traffic will be related to regular operations activities, and is expected to double in numbers to approximately 3,670 vessels per year. Because of the size of the River and the management measures to be implemented, Operations impacts will be **Minor**.	*Tristar Wharf:* The Tristar Wharf will be constructed on the western bank of the river, although exact construction dates are unknown. Vessel traffic will increase during both the construction and operations of the Tristar Wharf; however, design details for this project are unknown at this time. *Hilton Hotel Construction:* No impact to River Traffic. *Water Project*: No impact to River Traffic. *Road Project:* No impact to River Traffic. *Flood Project:* The flood project involves improvements to the EDWC dams located upriver from the Site. During construction, vessels carrying equipment could increase in the area of the Project.	*Climate Change and Natural Hazards*: To the extent the frequency or intensity of severe storms and flooding could be influenced by climate change, these could potentially damage some the berths and the facilities and make River traffic unsafe. Natural disasters may also result in damages to the facilities. *O&G Sector Growth:* Growth in the O&G Sector will lead to the development of more ports and berths which is expected to increase vessel traffic in the Demerara River.	The Project and other projects could contribute to the potential negative impacts on this VEC by increasing vessel traffic in the River which could result in cumulative impacts related to increased potential for general navigation incidents, such as collisions. The external driver could exacerbate safety conditions in the River due to potential flooding and current changes as well as additional river traffic for the O&G Sector. Because of the size of the River and the management measures proposed, the Project will appropriately mitigate the negative impacts and contribution (**Minor** for the short-term construction and then **Minor** for operations). In addition, River traffic is monitored and controlled by the	**Low**

				MARAD. In sum, the Project could potentially contribute incrementally to the adverse impact, but VEC conversion and/or degradation is not likely to occur, or the Project's contribution will be expected to be **Minor**.	
Land Traffic	During Construction, there will be an increase in the volume of land traffic, consisting of cars and light trucks transporting equipment and parts. This increase in road traffic can affect the conditions of road infrastructure, disturb users of adjacent properties, lead to traffic delays, and possibly have public safety implications. The volume of traffic generated will likely be mitigated by the implementation of a traffic management plan and the finished construction of the south entrance to the site which will ease congestion entering the Site. Therefore, the impacts during Construction will be **Minor**. During Operations: Most traffic will be related to regular operations activities, including daily commute of Port personnel and transportation of equipment between the Port and the	*Tristar Wharf:* Because the Tristar Wharf is located on the western bank of the river, it is not expected to impact land traffic at the project Site. *Hilton Hotel Construction:* Construction activities could cause increased vehicle traffic for a defined period of time. *Water Project*: During construction, transport of personnel, heavy trucks delivering or picking up equipment and machinery, and maintenance vehicles could cause congestion. *Road Project:* During construction some roads may be partially closed or blocked, increasing traffic through other roads for a defined period of time. Additionally, transport of	*Climate Change and Natural Hazards*: To the extent the frequency or intensity of severe storms and flooding could be influenced by climate change, these could potentially damage some roads. Natural disasters may also result in damaged roads. O&G Sector Growth: Increased construction activities are expected to increase traffic in all of Georgetown. Especially on the main roads, including the East Bank Public Road to the east of the GYSBI Port site.	The Project and other projects could contribute to the potential negative impacts on this VEC by increasing land traffic. The external driver could exacerbate traffic due to potential damages to road infrastructure. The management measures proposed by the Project will appropriately mitigate the negative impacts and contribution (**Minor** for the short-term construction and then **Negligible** for operations). In sum, the Project could potentially contribute incrementally to the adverse impact, but VEC conversion and/or degradation is not likely to occur, or the Project's contribution will be	**Low**

	Annex Area. The improvements already done to the port entrance will alleviate traffic on the main road - East Bank Public Road to the east of the and maintain vehicles going from the port to the annex off main roads and on less used side roads which will alleviate traffic in the vicinity. The impacts during Operations will be **Negligible**.	personnel, heavy trucks delivering or picking up equipment and machinery, and maintenance vehicles could cause congestion. *Flood Project:* The only remaining tasks for this project will take place at the dam which is outside of the area analysed for the Project.		expected to be negligible.	
Aquatic Flora and Fauna	During Construction, there will be increased river traffic as well as increased river turbidity during dredging activities at the site and at the material disposal site. According to the impact assessment, sediment concentrations in the Project area are naturally very high; with silt and mud coming from the Amazon upstream. Vessel traffic (volume and speed) is closely monitored and controlled by MARAD and discharges from vessels are not allowed. Dredging activities and increased vessel traffic are anticipated to have a M**inor** impacts on the local aquatic flora and fauna. During Operations, increased vessel traffic could potentially impact the local aquatic flora and fauna. As with the construction phase, vessel traffic (volume and speed) is	*Tristar Wharf:* Dredging activities as well increased traffic during the construction of the Tristar Wharf can lead to increased impacts to the aquatic flora and fauna in the area of the project. Tristar Wharf's environmental permit requires them to implement suspended solids management measures as well as to carry out monitoring during construction activities. In addition, as is the case with the Project, sediment concentrations in the Project area are naturally very high; with silt and mud coming from the Amazon upstream. Vessel traffic (volume and speed) is closely monitored and controlled by MARAD and discharges from vessels	*Climate Change and Natural Hazards:* Rising temperatures as well as increased rain events can lead to additional degradation of the water quality in the Demerara River which can potentially impact aquatic flora and fauna. *O&G Sector Growth*: Development activities from the O&G sector growth can lead to increased vessel traffic in the Demerara River, construction activities on the shores/banks of the river which could require dredging, as well as onshore activities (such as fuelling, fuel and chemical storage, and maintenance activities that could potentially impact the water	The Project and other projects could contribute to the potential negative impacts on this VEC by increasing sediments and contaminants in the River. The external drivers could exacerbate the contaminants in the River due to continued growth and increased discharges. The management measures proposed by the Project will appropriately mitigate the negative impacts and contribution from the Project (**Minor** for the short-term construction and then **Minor** for operations). In sum, the Project could	**Low**

	closely monitored and controlled by MARAD and discharges are prohibited. Increased vessel traffic is anticipated to have a **Minor – Negligible** impacts on the local aquatic flora and fauna.	are not allowed. This also applies during operation. *Hilton Hotel Construction:* During construction, earth movement and heavy machinery could lead to potential impacts to aquatic flora and fauna from accidental spills and releases and erosion. *Water Project*: During construction, earth movement and heavy machinery could lead to potential impacts to aquatic flora and fauna from accidental spills and releases and erosion. During operation, these projects are expected to improve the sanitary sewer systems; therefore having a positive impact on local aquatic flora and fauna by reducing pollutants discharged. *Road Project:* During construction, earth movement and heavy machinery could lead to potential impacts to aquatic flora and fauna from accidental spills and releases and erosion. *Flood Project:* The only remaining tasks for this project will take place at	quality, and the flora and fauna of the Demerara River.	potentially contribute incrementally to the adverse impact, but VEC conversion and/or degradation due to Project's contribution will be expected to be **minor to negligible**	

		the dam which 15 miles south of the Site and outside of the area analysed for the Project.			
Community Health and Safety	During Construction, air quality and noise could be negatively affected by activities related to earth movement and terrain preparation, movement of heavy machinery and increased land traffic in surrounding areas. These activities could increase the amount of dust and certain gases (CO_2) in the environment as well as noise levels in the area. These potential impacts will be localized and short term, and with the application of the proposed management measures (such as equipment maintenance and hour restrictions on vehicle movement activities, the impact will be **Minor**. During Operations, there will be no emissions that will negatively affect air quality, apart from workers' travel to the site, trucks traveling from the Port area to the Annex, as well as emissions from the fuel tank farm on the site. The fuel tank farm will be fed via an underground pipe coming from the existing SOL facility to the south of the site, across the canal. Potential air emissions and noise impacts during	*Tristar Wharf:* Because the Tristar Wharf is located on the western bank of the river, it is not expected to impact the community at the Project Site *Hilton Hotel Construction:* During Construction, air quality could be negatively affected by activities related to earth movement, which will generate dust, and by emissions from diesel engines combustion gases. Additionally, movement of heavy machinery and increased land traffic in surrounding areas are expected which in turn will increase noise levels. Construction of the Hilton Hotel is projected to begin after August 2021, at which time site activities may still be ongoing. *Water Project*: Based on the documents reviewed, the locations of these water improvement projects were located spread around the city (non in the vicinity of the	*Climate Change and Natural Hazards*: Rising temperatures associated with longer-term global climate change could potentially affect the dispersion and thermodynamics of pollutants emitted to the air as well as increase the number of illness, pests and diseases. *O&G Sector Growth*: Increased construction activities are expected to occur all over Guyana, and all over Georgetown. The area surrounding the site is already highly developed and it is unlikely that O&G Sector growth will take place in the immediate vicinity of the site.	The Project, other projects, and external drivers could contribute to the potential negative impacts on this VEC: decreased quality of the air shed, increased noise levels, and potential safety concerns due to increased vehicle traffic. However, with the exception of the Hilton Hotel, the other projects are not in the immediate vicinity of the Project and it is unknown if construction activities will be concurrent. Both construction activities at the site, as well as for the Hilton Hotel, have construction permit restrictions for vehicle movements depending on the time of day. With regards to Project activities, the bulk of the activities at the GYSBI Port will take place at the Berths, and most of that traffic will be via the Demerara River.	**Low**

	operations are considered **Negligible**.	Project). During Construction, air quality could be negatively affected by activities related to earth movement, which will generate dust, and by emissions from diesel engines combustion gases. Additionally, movement of heavy machinery and increased land traffic in surrounding areas are expected. *Road Project:* During Construction, air quality could be negatively affected by activities related to earth movement, which will generate dust, and by emissions from diesel engines combustion gases. Additionally, movement of heavy machinery and increased land traffic in surrounding areas are expected. *Flood Project:* The only remaining tasks for this project will take place at the dam which is outside of the area analysed for the Project.		Activities at the Annex will be comprised of assembly of pre-fabricated facilities and likely not lead to major construction vehicle traffic to and from the site. The new bridge at the Annex areas has been completed; therefore vehicle traffic for the Annex will not use the same entry road/bridge as the Hilton Hotel. The Project's embedded controls and management measures proposed will appropriately mitigate the negative impacts and contribution (**Minor** or **Negligible**). In sum, the Project could potentially contribute incrementally to the adverse impact, but further VEC conversion and/or degradation is not likely to occur, or the Project's contribution will be expected to be negligible.	

7.8 Cumulative Impacts Management Framework

Although there are other projects taking place in the area, the Project area is already highly industrial and these impacts are already considered in the Project's baseline; therefore, the Project itself is not anticipated to result in significant cumulative social impacts.

However, the importance of ongoing proper stakeholder engagement, understanding of community concerns, and the provision of (where possible and appropriate) training and employment opportunities to community members becomes paramount.

Internationally recognized good practices for managing cumulative impacts include:

- Effective application of the management hierarchy (avoid, reduce, and remedy) in the environmental and social management of the specific contributions of a project to expected cumulative impacts; and
- Undertaking best efforts to engage, leverage, and/or contribute in multi-stakeholder collaborative initiatives or discussion groups to implement management measures that are beyond the capacity and responsibility of any individual project developer (IFC, 2013), specially with regards to the potential impacts and risks associated with the rapid development in the oil and gas sector.

The embedded controls and management measures included in the ESIA provide a means to mitigate the specific contributions of the Project to effects on VECs, following the mitigation hierarchy. Supplementing these controls and management measures, the CIA provides a framework of additional actions that GYSBI could apply in the regional and Project context to manage potential cumulative impacts on these VECs.

7.8.1 Project Level

Effective application of the mitigation hierarchy (avoid, reduce, remedy) to manage individual contributions of cumulative impacts will be applied as best practice. GYSBI has incorporated a number of physical or procedural embedded controls in the Project design. These are considered from the very start of the impact assessment process as part of the Project, and are factored into the pre-management impact significance ratings. In addition, a number of management measures detailed in the ESIA have been proposed to address potential impacts from the Project. The ESIA also includes an Environmental and Social Management Plan (see Section 8), which summarizes the management and monitoring measures for all environmental parameters, including the VECs assessed in this CIA.

At the Project level, the above measures are considered sufficient to address the contributions of the Project to cumulative impacts on the identified VECs.

7.8.2 Regional Level

Ultimately, the management of cumulative impacts is the responsibility of government and regional planners. However, it is considered best international practice that private-sector developers make best efforts to engage relevant stakeholders and promote management of cumulative impacts in their project areas (IFC, 2013; Franks, 2010).

The CIA identified low priority cumulative impacts on the following VECs: River and Land Traffic and Community Health and Safety. Therefore, no additional mitigation measures are recommended.

7.9 Conclusion

The results of the environmental and social impact assessment presented in this ESIA are valid insofar as the design of the Project remains the same. Given the results of the CIA, no mitigation plan is needed.

Should the design of the Project or any of its components change, then the results presented in this Report may have to be updated to reflect the changes.

8. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

8.1 Introduction

This impact assessment has identified a range of potential environmental, socioeconomic, and cultural impacts related to implementation of the Project components, as described in Section 6.0 Impact Assessment. As part of the environmental and social management requirements established by IDB and according to industry good practice, an Environmental and Social Management Plan (ESMP) must be developed and implemented for the Project.

This ESMP describes the approach that the Project proponent and other involved parties (e.g., contractors) would follow to manage, mitigate, and monitor the potential impacts of the Project. It includes the Project commitments and management measures as identified in Section 6.0, Impact Assessment.

8.2 Environmental and Social Management Plan Guiding Principles

8.2.1 Plan, Do, Check, Review

Industry good practice follows the general principles of the “Plan, Do, Check, Review” cycle as described below, and outlined in Figure 8-1.

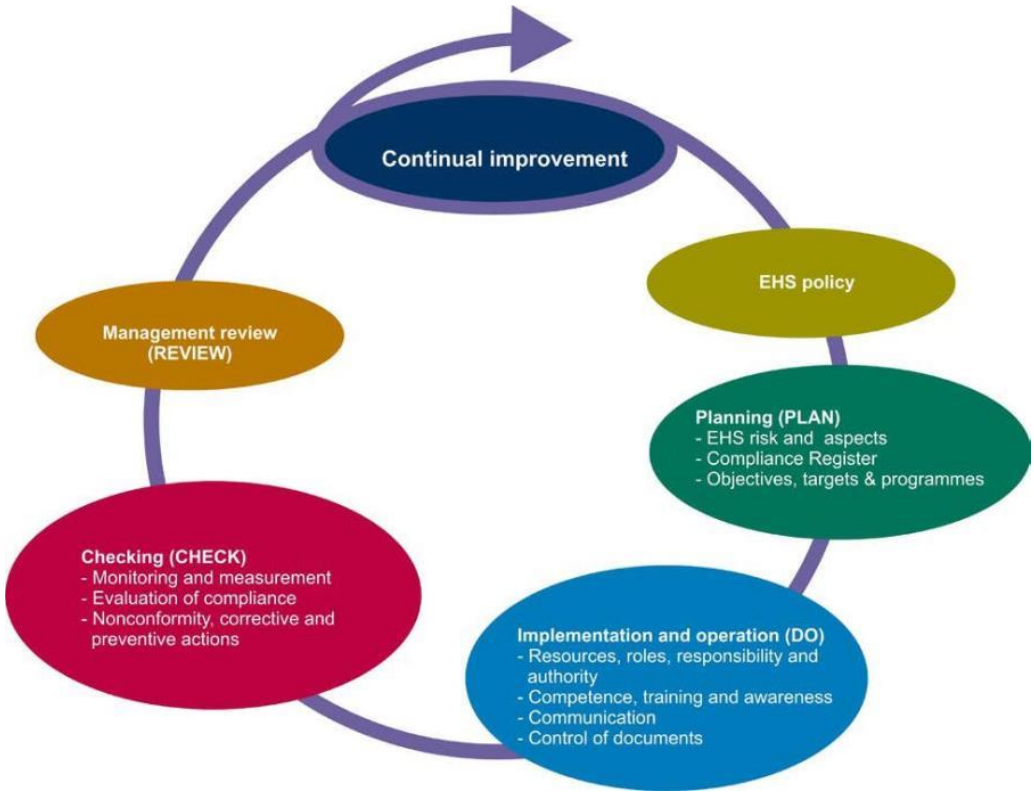


Figure 8-1: Plan, Do, Check, Review Cycle

Plan

- Define policies and objectives for environmental and social performance.
- Identify environmental and social impacts and risks of the operations.
- Develop managements and operational controls to address impacts and risks.
- Develop a management plan to achieve these objectives.

Do

- Implement a management plan.
- Implement management and operational controls.

Check

- Monitor performance against policies and objectives.
- Check that management and operational controls are effective.

Review

- Make corrections to plans, management, or controls in response to performance monitoring or out of control events.

8.2.2 Mechanism for Auditing, Adjustments, and Reporting

Auditing and adjustment is an essential part of a successful ESMP. Auditing systems include inspections and monitoring to confirm proper implementation of the ESMP, as well as effectiveness of management measures. Corrective actions include response to out-of-control situations, non-compliances, and non-conformances. Actions also include those intended to improve performance.

The parties involved in overseeing the day to day activities of Project implementation will conduct continuous monitoring to ensure that all Project personnel (contractors) are fulfilling their obligations under this ESMP.

Monitoring will be conducted to ensure compliance with the commitments in this document and to evaluate the effectiveness of operational controls and other measures intended to mitigate potential impacts. Project monitoring activities are summarized in Table 8-1 below.

The Project proponent will keep relevant authorities informed of the Project performance with respect to environmental and social matters and implementation of this ESMP by way of written status reports and/or face-to-face meetings. Contractors will also be required to provide EHS performance reporting as relevant based on the contractor's responsibilities. The Project proponent will continue the stakeholder engagement efforts described in Section 9 and communicate with stakeholder groups regarding Project activities and the results of environmental and social monitoring.

8.2.3 Training

All Project personnel will be qualified to do the particular job that they are performing and undergo further training to meet the needs of the working environment, as required. All personnel, regardless of position, will be given specific job oriented EHS training prior to starting work and as necessary thereafter. All personnel will be trained on general awareness of environmental and social issues and specific procedures aimed at the avoidance of environmental damage as well as human health and safety. New staff, contractors, and visitors will be given basic induction training and follow Project EHS procedures.

8.3 Organizational Capacity and Policies

GYSBI, as the Project proponent, will be responsible for leading the Project through implementation, and therefore will also be responsible for the implementation of the ESMP. Given the scale and nature of this Project, as a minimum the following roles will be required to support ESMP implementation:

Environmental Coordinator – part-time resource (maximum of 20 hours a week) to ensure that the works are implemented according to applicable national laws, regulations, and rules, as well as international standards – mainly IDB standards – as defined in Section 2 of this document and follow applicable good industry practice (e.g., ISO 9001 Quality Standards, ISO 14001 Environmental Standards, and OHSAS 18001 Occupational Health and Safety Standards). The role will also need to ensure that the relevant management plans described herein are being implemented by the selected contractor, including the associated management measures, so that noise, air quality, water, traffic and biodiversity issues are appropriately managed. Requirements for this role will be a degree in environmental management or engineering (or equivalent) and at least 5 years' experience of environmental management on construction sites.

Community and Social Coordinator – full time resource (40 hours a week) to manage the implementation of the Stakeholder Engagement and Communication Plan, the community and social coordinator and also liaise with the Environmental Coordinator on aspects of the Construction Environmental Plan and Traffic and Pedestrian Management Plan. Requirements for this role will be a degree in social sciences (or equivalent) and at least 10 years' experience of stakeholder engagement and livelihood restoration, including to international standards.

8.4 Environmental and Social Management Plan

The following sections provide a description of the various management plans recommended to be implemented by the Project proponent and other involved parties (e.g., contractors) ~~would follow~~ to manage, mitigate, and monitor the potential impacts of the Project. They include the Project commitments and management measures as identified in Chapter 6 *Impact Assessment*.

Table 8-1: Management Measures and Monitoring Recommendations

Resource / Receptor and Impact	Project Phase	Management Measures	Execution Responsibility	Means of Verification	Monitoring and Reporting
Air Quality					
Emissions from construction and operations vehicles, vessels, fuel storage, and equipment	Construction/ Operations	See Section 8.5.1 for a Construction Environmental Management Plan, which includes the following: • Maintain all construction equipment in accordance with manufacturer's specifications. • Suppress dust as needed in unpaved areas. • Avoid burning non-vegetative wastes (refuse, etc.) at construction sites. • Avoid unnecessary idling of construction equipment or delivery trucks when not in use. • Use of vapour recovery systems for fuel storage, loading and offloading of fuels. • Use floating top storage tanks. • Limit loading/unloading activities	Construction contractor Operations manger	Site inspections during construction and operations	Monthly progress reports during construction

Resource / Receptor and Impact	Project Phase	Management Measures	Execution Responsibility	Means of Verification	Monitoring and Reporting
		during poor air quality conditions. • Implement tank and piping leak detection and repair programs. • Keep work vehicles clean (particularly tires) to avoid tracking dirt around and off the site. • Cover work vehicles transporting friable materials to prevent materials being spread around and off the site. • Minimize drop heights of materials • Develop and implement a grievance procedure in the event of any dust and/or exhaust emissions complaints being received.			
Noise					
Noise generated by construction equipment and activities	Construction	See Section 8.5.1 for a Construction Environmental Management Plan, which includes the following: • Maintain all construction equipment in accordance with manufacturer's specifications. • Schedule construction, modification, and rehabilitation work during daylight hours when increased noise levels are more tolerable. • Schedule construction, modification, and rehabilitation work to minimize activity during peak periods of traffic. • Develop and implement a Construction Communications Plan to inform adjacent receptors (e.g., residents, commercial businesses, churches, and hotels) of construction activities. • Perform regular noise monitoring at a least three locations nearest sensitive receptors. • Provide acoustic enclosures, if necessary. • Install broadband spectrum backup alarms on construction vehicles as opposed to the typical single-tone frequency alarms (broadband alarms attenuate more quickly over distance due to the incorporation of higher frequencies). • Avoid unnecessary idling of construction equipment and trucks.	Construction contractor	Site inspection during construction	Monthly progress reports during construction
Soil and Water Resources					

Resource / Receptor and Impact	Project Phase	Management Measures	Execution Responsibility	Means of Verification	Monitoring and Reporting
Dredging activities for berths construction and maintenance dredging	Construction/ Operations	• An anti-turbidity barrier to confine the affected area preventing the dispersion of potentially contaminated suspended solids beyond the immediate area of the dredging • Monitor water quality for potential contamination during dredging activities	Construction contractor	Site inspection and monitoring during construction	Monthly progress reports during construction
Natural Hazards and Climate Change					
Climate change and natural hazards (flood risk)	Construction Operations	Implement a Construction Environmental Management Plan and a Health and Safety Plan and Emergency Response Plan, which include the following: • All construction and improvements should include a properly designed drainage system. • Ensure drainage solutions have careful calculations and consideration of potential hydrological climate change. • Ensure adequate distance is maintained between roads and immediately adjacent buildings. • Properly secure equipment and materials. • Immediately stabilize disturbed areas. • Provide procedures for site evacuation. • All new construction and improvements should include a properly designed drainage system intended to remove water efficiently from the roads and other Project improvement sites.	Construction contractor	Interviews with construction workers, site inspection	Monthly progress reports
Waste					
Waste generated by construction activities	Construction/ Operations	See Section 8.5.1 for a Construction Environmental Management Plan, which includes the following: • Provide appropriate waste bins, type, volume, and service frequency to accommodate anticipated waste streams. • All loads arriving or leaving the site will be appropriately secured. • Provide information regarding waste management in site specific inductions, including waste separation and importance of securing vehicle loads. • Ensure licensed contractors are used to collect controlled wastes.	Construction contractor	Site inspection during construction	Monthly progress reports during construction

Resource / Receptor and Impact	Project Phase	Management Measures	Execution Responsibility	Means of Verification	Monitoring and Reporting
Land Traffic					
Increased pedestrian and traffic safety. Increased traffic congestion and disruption.	Construction	• During the construction phase, maintain the traffic and schedule construction activities, to the extent possible, to be avoided during peak times (e.g., early in the morning or night). • Deploy traffic, safety, and road detour signs in close cooperation with the authorities. • Coordinate the delivery of construction materials at times that minimize impacts to the existing traffic. Develop and implement a Traffic and Pedestrian Management Plan (Section 8.5.7).	Construction contractor	Site inspection during construction	Monthly progress reports
River Traffic					
Increased vessel traffic	Construction/ Operations	• All vessel crew are to be qualified vessel operators; • The ships will operate in agreement with the standard procedures and protocols currently used by GYSBI. For example, the port pilot will determine the navigation speed in the access channel depending on the meteorological circumstances. The Project will collaborate and inform authorities in order to avoid riverine traffic accidents. • Placement of temporary navigation aids to support safe navigation during construction and to demarcate exclusion zones if required. • The Project will also comply with the safety rules and regulations of MARAD, in particular, the Guyana Shipping (Ship and Port Facility Security) Regulations (2016).	Construction Contractor Operations manager	Monitoring during construction and operations	Monthly reports
Biodiversity					
Biodiversity management in general including the items below	Construction	See Section 8.5.1 for a Construction Environmental Management Plan, which includes the mitigation measures below.	Construction contractor	Site inspection during construction	Monthly progress reports during construction
Loss or disturbance of vegetation	Construction	• When designing and planning work elements, minimize temporary and permanent construction footprints • Demarcate work area with fencing to minimize disturbance or removal of natural vegetation	Construction contractor	Site inspection during construction	Monthly progress reports during construction

Resource / Receptor and Impact	Project Phase	Management Measures	Execution Responsibility	Means of Verification	Monitoring and Reporting
Wildlife injury or mortality	Construction	• Conduct canal- and mangrove-related works outside the water birds breeding season (April – Sept) • Minimize lighting • Implement above measures to minimize noise and air pollution	Construction contractor	Site inspection during construction	Monthly progress reports during construction
Underwater Noise	Construction/ Operations	• Maintain functional mufflers on all diesel operated equipment; • Installation of a cofferdam to provide a platform for welding joints or pipe pile and a barrier for noise/vibration and to reduce the potential for behavioural impacts on estuarine and marine mammals, and fish species; • Ensure vessel operators undergo awareness training; • A “soft start” procedure shall be used during all pile driving activities to give aquatic mammals, birds and fish species an opportunity to move out of the area and away from the sound source • Ensure project areas (within a 500 m radius) are monitored for presence of mammals; and Record all mammal observations	Construction contractor Operations Manager	Monitoring during construction and operations	Monthly progress reports
Habitat alteration - aquatic	Construction Operations	Implement Erosion and Sediment Control Management Plan as well as a Spill Prevention, Control and Countermeasures Plan to include: • Sediment control procedures during in-water works to minimize the release of potentially contaminated fine sediments to adjacent waterways and recommends work to occur during low flow periods and/or dry periods for the Demerara River and McDoom Drainage Canal during the months of August to November. • Demarcate work areas with fencing to minimize disturbance or removal of natural vegetation; • Plan equipment access locations that minimize impacts to riparian areas, where possible; avoid areas with less stable structure such as steep banks; and • Minimize temporary stockpiling and place stockpiles outside of the	Construction contractor	Site inspection	Monthly progress reports during construction

Resource / Receptor and Impact	Project Phase	Management Measures	Execution Responsibility	Means of Verification	Monitoring and Reporting
		active floodplain. Prevent runoff from stockpiles from entering creeks by using erosion control measures such as silt fences and/or straw wattles.			
Increased Surface Water Runoff from Vegetation Clearing	Construction	Implementation of drainage system to direct surface runoff to the stormwater systems Installation of sediment and erosion controls Avoidance of vegetation disturbance.	Construction contractor	Site inspection	Monthly progress reports during construction
Social					
Loss of income for businesses	Construction	• Phase construction activities, create alternate entrances, walkways, detours and parking areas as needed • Provide opportunities for local employment • Develop and implement a Traffic and Pedestrian Management Plan (see Section 8.5.7). • Develop and implement a Livelihood Restoration Plan (see Section 8.5.6) for potentially Affected Persons. • Continue stakeholder engagement through Project implementation through the use of the Stakeholder Engagement and Communications Plan (see Section 8.5.4). • Implement a Grievance Mechanism to receive and respond to grievances (see Section 8.5.5).	Construction Contractor - Community Liaison Officer	Interviews with construction contractor and affected parties	Monthly progress reports during construction
Provision of construction jobs to local companies and materials sourced from the local economy	Construction	• Implement job quotas for local employment and sourcing requirements for construction contractors based on the size and scope of the Project	Construction contractor	Records review and interview of construction contractor	Monthly progress reports
Potential vulnerable groups (gender or disability related)	Construction	• Ensure adequate ground surfaces and associated infrastructure (such as ramps) for patron mobility (e.g., high heels and crutches) at construction sites; and • Conduct Gender Awareness Training for contractors and their staff.	Construction contractor	Records review and interview of construction contractor	Monthly progress reports
Health and Safety					

Resource / Receptor and Impact	Project Phase	Management Measures	Execution Responsibility	Means of Verification	Monitoring and Reporting
Management of health and safety of both construction workers and the public	Construction	• Develop and implement a Construction Health and Safety Plan (see Section 8.5.2) • Implement good housekeeping practices in and around the Project construction sites including elimination of standing water or, if not practicable, treatment of standing water to kill mosquito larvae • Appropriate and timely engagement of stakeholders, to ensure that they are well-informed of the nature and duration of Project activities, and have a good understanding of associated safety risks. • Implement stakeholder outreach to vulnerable subpopulations or to those responsible for maintaining their safety • Establish and publicize a Grievance Mechanism to receive and respond to grievances (see Section 8.5.5).	Construction contractor	Records review and interview of construction contractor	Monthly progress reports
Cultural Resources					
Possible disruption to the use of living heritage sites	Construction	• Conduct an exhaustive inventory of buildings and structures in the Project area prior to the onset of construction. • Perform meaningful stakeholder engagement with affected communities to identify living heritage and other structures: places and features that may have historical, cultural or aesthetic importance to members of the community. • For sites such as churches, mosques and mandirs, engage with the administrators of these institutions to understand their operating and peak hours and regular events such as worship services, allowing for coordination and planning to avoid or minimize undue disruptions. • Develop plans in consultation with stakeholders to ensure their protection during the construction phase.	Construction contractor	Interviews with relevant stakeholders, site inspection	Monthly progress reports
Damage to undiscovered archaeological sites due to construction of	Construction	• Implement a simple Project Chance Finds Procedure (CFP) during all Project ground work.	Construction contractor	Interviews with construction workers, site inspection	Monthly progress reports

Resource / Receptor and Impact	Project Phase	Management Measures	Execution Responsibility	Means of Verification	Monitoring and Reporting
subsurface Project components					
Road Traffic					
Increase in traffic during construction and operations	Construction / Operations	• During the construction phase, maintain the traffic and schedule construction activities, to the extent possible, to be conducted not during peak times (e.g., early in the morning or night). • Deploy traffic, safety, and road detour signs in close cooperation with the authorities. • Coordinate the delivery of construction materials at times that minimize impacts to the existing traffic.	• Construction contractor	Records review and interview of construction contractor	Monthly progress reports
River Traffic					
Increase in river traffic during construction and operations	Construction / Operations	• All vessel crew are to be qualified vessel operators; • The ships will operate in agreement with the standard procedures and protocols currently used by GYSBI. For example, the port pilot will determine the navigation speed in the access channel depending on the meteorological circumstances. The Project will collaborate and inform authorities in order to avoid riverine traffic accidents. • Placement of temporary navigation aids to support safe navigation during construction and to demarcate exclusion zones if required. • The Project will also comply with the safety rules and regulations of MARAD, in particular, the Guyana Shipping (Ship and Port Facility Security) Regulations (2016).	Construction contractor / Port and Vessel Operators	Records review and interview of construction contractor	Monthly progress reports

8.5 Construction Phase

8.5.1 Construction Environmental Management Plan

This Construction Environmental Management Plan (CEMP) provides a working template that will be used by the selected construction contractor (the Contractor) appointed by the Project Proponent (GYSBI). It details the specific management requirements and focus areas identified through the Environmental Assessment, but also recognizes that the selected Contractor will have their own policies and procedures that will need to be inputted to this plan. It also recognizes that as the Contractor develops the Project designs, this may influence how construction will be undertaken and progress, and these aspects will need to be integrated into this plan.

8.5.1.1 Introduction

Overview

This Section provides the Construction Environmental Management Plan (CEMP) for the GYSBI Expansion Project (the "Project"), a Category B Project that focuses on the port expansion and improvements and comprises three components:

- GYSBI Port expansion;
- Construction of two new berths; and
- Upgrades and improvements to the Annex.

The CEMP sets out the expectations of the Project Proponent (GYSBI, and its partner, the Inter-American Development Bank, IDB) and defines how the Contractor will implement and manage environmental matters.

Objectives

The CEMP will ensure that the Project is delivered in full compliance with legal requirements, and also address the requirements of IDB policies. Specifically, it will ensure the Project aligns with the environmental legislation by the Guyana Environmental Protection Agency (EPA).

The IDB has established its own policies and safeguards to ensure that projects financed by the IDB group are sustainable. These include the following environmental policies:

- PS 1 – Assessment and Management of Social Risks and Impacts;
- PS 2 – Labour and Working Conditions;
- PS 3 – Resource Efficiency and Pollution Prevention; and
- PS 4 – Community Health, Safety and Security.

8.5.1.2 Project Description

Once the Project's design is finalized, the construction Contractor needs to prepare the CEMP and include specific details on the proposed works, duration, relevant plans, etc. The following provide guidance on what should be included in this section.

- **Scope of Construction Works:** Description of the full range of construction works / activities proposed (e.g., clearing of land, placement of poles, bridge piles and other infrastructure, filter rock, geotextile fabric and armour rock; installation of drainage structures; etc.).

- **Description of the Construction (Disturbance) Footprint:** Full description of the existing areas that will be disturbed by the construction works and those immediately adjacent;
- **Timing of Works:** Provide a description of both the total duration of the works and the time of year they will occur. The latter would include consideration of expected climate during this time (e.g. anticipated rainfall / storm events, wind direction and speeds);
- **Site Plan:** The project site plan would clearly show the full extent of the proposed works area of the construction project. This would typically include a map with the full construction boundary and disturbance footprint marked clearly over a current aerial photograph (i.e., including all construction activities, associated laydown areas etc.). It would also include site specific information, for example the location of any important waterways, ditches or adjacent vegetation to be protected, national heritage listed areas, or the location of sediment and erosion traps, electrical services, etc.

8.5.1.3 Project Roles, Responsibilities and Contacts

All positions across the Project have environmental responsibilities to some extent. These vary in relation to duties described in Table 8-2, but everyone has a base level duty of care to prevent environmental harm.

Table 8-2: Project Roles, Responsibilities and Contact Details to be Finalized by the Construction Contractor for the CEMP

Position	Responsibilities	Line Manager	Name	Contact Details*
Project Manager				
Site Supervisor				
Environment Manager				
HSE Representative				

8.5.1.4 Training, Awareness and Competency

The CEMP prepared by the construction Contractor must include a code of conduct to be followed by all employees and outline how environmental training, awareness and competency will be delivered / assessed throughout the Project, to ensure the relevant aspects of this CEMP are communicated to the project team and front line staff (including contractors and sub-contractors) in compliance with the local labour laws and regulations and ILO standards to which Guyana is party to, as described in Section 3.1 of this report. Examples may include:

- Site Environment Induction
- Daily Pre-Start Meetings
- Environmental Toolbox Talks
- Incident bulletins
- Sub-contractors kick-off meeting
- Contractor and client site kick-off meeting

8.5.1.5 Environment Management

This section presents a summary of the environmental risks and controls that have been identified for the proposed construction project. The Contractor should determine what additional risks and proposed

management controls are required based on their final design and work method statements. A project risk assessment or job hazard analysis for specific task(s) should be performed.

The following tables are based on the EA that has been performed. Note that this is not an exhaustive list, and it would be expected that Contractor develop risk management strategies, controls, etc. that suit the scale/nature of finalized construction project.

Air Quality and Dust Management

AIR QUALITY AND DUST MANAGEMENT			
Objective(s)	1. To ensure the impacts of air quality and dust on adjacent areas and the community are minimised.		
Management Strategy	Air quality and dust issues managed principally by emission controls at source, and administrative controls during works.		
		Responsibility	Timing
Control(s)	The air quality impacts could be minimized using the following measures: • Maintain all construction equipment in accordance with manufacturer's specifications. • Avoid burning non-vegetative wastes (refuse, etc.) at construction sites. • Avoid unnecessary idling of construction equipment or delivery trucks when not in use. • Dust impacts could be minimized using the following measures: • Area to be disturbed minimized. Clearance lots to be approved by Project Manager. • Where dust is identified as an issue, dust control measures will be implemented. These will primarily be the use of water carts, but may include surface treatments. • Vehicle movements controlled (Traffic Management Plan) and kept to established tracks and haul roads. • Dust awareness issues in environmental induction process.		
Performance Indicator(s)	No complaints from adjacent commercial premises and/or community.		
Monitoring	Daily inspection of works sites to occur, including: • visual check for dust crossing the site boundaries. • visual check of high potential dust areas, such as haul roads, stockpiles and operational areas.		
Reporting	Any complaints or incidents to be reported to PPA project manager.		
Corrective Action(s)	• Investigate cause of excessive dust. • Implement controls immediately (e.g., water carts). • Implement corrective measures prior to the recommencement of site works. • Implement administrative controls if required, such as rescheduling of dust generating activities to more favourable weather conditions.		

Noise Management

NOISE MANAGEMENT			
Objective(s)	1. To minimize the impacts of noise on the amenity of the surrounding areas. 2. Construction activities undertaken in accordance with best practice controls.		
Management Strategy	Noise to be managed primarily through administrative and equipment controls during the construction phase.		
		Responsibility	Timing
Control(s)	The noise impacts associated with the Project components could be minimized using the following measures: • Maintain all construction equipment in accordance with manufacturer's specifications. • Schedule construction and rehabilitation work during daylight hours when increased noise levels are more tolerable. • Schedule construction and rehabilitation work to minimize activity during peak periods of tourism and recreation (weekends, holidays, etc.). • Develop and implement a Construction Communications Plan to inform adjacent receptors (e.g., commercial businesses, churches, and tourists) of construction activities. • Use vibratory piling instead of impact piling for the construction of the bridged piles, if possible, to avoid generating impulsive noise. • Pre-start checks and maintenance schedules to ensure equipment performance is as required. • Noise-dampening equipment to be used on equipment with excessive noise generating characteristics.		
Performance Indicator(s)	No complaints from adjacent commercial premises and/or community.		
Monitoring	• Daily inspection of works sites to occur. • Service logs for equipment/machinery used on site.		
Reporting	Any complaints or incidents to be reported to PPA project manager.		
Corrective Action(s)	• Investigate cause of excessive noise. • Implement corrective measures prior to the recommencement of site works. • Reschedule of noise-generating activities to reduce noise annoyance.		

Sediment and Erosion Control

SEDIMENT AND EROSION CONTROL			
Objective(s)	1. To ensure that the effects of erosion and sedimentation on the environment are minimized. 2. Minimize soil disturbance, degradation and erosion.		
Management Strategy	Ensure that direct impacts (land disturbance) are limited to the works area, and that secondary impacts do not impact adjacent areas.		
		Responsibility	Timing
Control(s)	Measures to be applied include: • Disturbance area will be minimized and clearly demarcated. • Works will only be conducted within the works zone. • Vehicle movements will be restricted to the defined roads/tracks. • Where possible, works area will be designed to ensure stormwater runoff drains into the site. • Where runoff from the site is required, it will be via the longest flow path possible to ensure maximise sediment retention. Flows to undisturbed areas will be prioritised. • Where required, sediment controls will be put in place. These will include, but not be limited to, rock check dams, sediment basins, sediment fences and silt socks. • Sediment controls will be reviewed during site inspections and/or after significant rainfall (more than 10mm in 24hrs resulting in site runoff).		
Performance Indicator(s)	No evidence of significant sediment deposition outside the works area. No evidence of significant rilling, gullies or other instances of run-off erosion.		
Monitoring	• Daily inspection of work site to occur. • Sediment controls will be reviewed during site inspections and/or after significant rainfall (more than 10mm in 24hrs resulting in site runoff). Review will include removal of accumulated sediments as required.		
Reporting	• Incident report for non-conformance of sediment control. • Logging of sediment control structures - location and condition during weekly site inspection.		
Corrective Action(s)	• Investigate cause of sediment control failure. • Review flow path and determine most appropriate controls are in place, additional controls which can be place in-stream and/or changes that can be made to flow path • Review similar controls on-site (even though these may not have failed) for similarities.		

Water Quality

TURBIDITY			
Objective(s)	1. To minimize the contamination of the water column by potentially contaminated fine sediments / silts introduced into the Demerara River through various construction activities. 2. To minimize / manage the spread of contamination generated by construction activities		
Management Strategy	Undertake monitoring of turbidity through observations and in-situ measurements to proactively manage turbid plumes / sediment input.		
		Responsibility	Timing
Control(s)	Management measures to minimize the potential impacts of the Project include: • Monitoring for water quality during dredging activities, piling of the bridge, drilling and material placement activities will be undertaken. Observations will be recorded before, during and after those activities. These observations will include (but are not limited to) recorded information (*pro forma*) and site photographs demonstrating: • Contaminated plume extent (e.g. estimated distance in metres from the drill rig or construction work face), • Contaminated plume direction • Prevailing riverine conditions (e.g., wind, tide, swell) • Start-up and shut down times for drilling / piling operations • Any other notable visual characteristics of the plume or piling / drilling activity. • All material from dredging operations will be recovered on barges and discharged in the area specified by MARAD.		
Performance Indicator(s)	No contaminated plumes of sediment released, or complaints from community.		
Monitoring	• Monitor water quality once before, once during and once after construction/dredging activities		
Reporting	Incidents (including breaches of this management plan) to be reported immediately to the Project Manager and Environment Manager.		
Corrective Action(s)	• Should contamination be identified, response will be to cease the work creating the plume until monitoring levels fall within compliance. • Should the monitoring levels exceed the requirements on a continual basis, Contractor shall investigate additional measures to control release of contaminated sediments.		

Oil and Other Noxious Substances

OIL AND OTHER NOXIOUS SUBSTANCES			
Objective(s)	1. To minimize the potential for spills of oils and other noxious substances to as low as reasonably practicable.		
Management Strategy	Reduce quantity of hydrocarbons stored to that required, implement appropriate controls and provide appropriate training and resources for a spill response.		
		Responsibility	Timing
Control(s)	• All hydrocarbons to be stored in an appropriate container that is capable of holding 110% of a spill from the largest container, or 10% of total volume of stored liquids, whichever is greater. • Refuelling of vehicles/equipment will be undertaken on land (not over water), unless the task is not possible. • To reduce the impact of a spill, the lowest volume of hydrocarbons required will be stored in proximity to the Demerara River and in the onshore lay down areas. • All vessels to follow MARAD guidelines when fuelling and unloading. • A copy of the current hydrocarbon MSDS will be kept at an appropriate location on site. • Drip trays shall be placed under mechanical stationary equipment such as gensets if such equipment is not internally bunded. • Onsite spill response training will be carried out on a periodic basis. All deficiencies identified through training and testing of the procedures will be documented and rectified immediately. • All equipment will be regularly serviced to reduce emissions and reduce the chance of oil leaks on site and in riverine environments. Appropriate controls in place to contain hydrocarbon leaks should they occur whilst servicing. Controls may include use of drip trays when changing oil and transporting waste oils in bunded containers. • Only qualified personnel are to carry out services on plant, equipment and vessels. • Training / awareness to be included in site induction (including all staff, contractors, subbies etc.). • Appropriate volume and type of spill response materials will be available at each work site • Spill will be contained and cleaned-up immediately. Resultant wastes (soils, rags and absorbent material) appropriately stored and disposed of by an appropriately licenced waste contractor as controlled waste. • All spills reported and investigated as required.		
Performance Indicator(s)	• Minor spills (<10L) to land contained, controlled and all contamination removed / cleaned-up within 24 hours. • No spills to riverine waters. • No contamination of soil or surface / ground waters. • No spills that require an emergency response		
Monitoring	• Incident report outlining corrective actions taken and preventative measures to be implemented		

OIL AND OTHER NOXIOUS SUBSTANCES			
	• Statistics reported in weekly meetings and monthly reports.		
Reporting	All riverine spills (regardless of volume) to be reported to GYSBI.		
Corrective Action(s)	• Stop work immediately, contain spill (if safe). Investigate cause of spill and assess. Implement improvements as required. • Investigate and assess adequacy of response – implement improvements as required. • Implement corrective measures prior to the recommencement of site works.		

Housekeeping and Wastes

HOUSEKEEPING AND WASTES			
Objective(s)	1. Reduce waste volume, maximize recycling, reuse and recovery, and prevent any construction waste/litter entering the environment.		
Management Strategy	Minimize environmental impacts through appropriate controls and site inductions of employees and sub-contractors.		
		Responsibility	Timing
Control(s)	• Provide appropriate waste bins, type, volume, and service frequency to accommodate anticipated waste streams. • All loads arriving or leaving the site will be appropriately secured. • Provide information regarding waste management in site specific inductions, including waste separation and importance of securing vehicle loads. • Ensure licensed contractors are used to collect controlled wastes.		
Performance Indicator(s)	• Hazardous materials all appropriately disposed. • Recycling of all recyclable construction metal waste. • Records kept of waste leaving site.		
Monitoring	• Daily inspection of work site to occur. Review of waste bins (% full, time to next service). • Waste volumes leaving site from waste contractors		
Reporting	Environmental incident reports.	Project Manager	Throughout project
Corrective Action(s)	• Investigate cause of inappropriate waste disposal. • Review cause of issue and develop response, such as variation to bin size, service schedule or waste separation awareness. • Implement controls.	Project Manager	Throughout project

8.5.2 Construction Health and Safety Management Plan

This Construction Health and Safety Plan (CHSP) provides a working template that will be used by the selected construction contractor (the Contractor) appointed by the Project Proponent (GYSBI). It details the typical requirements and focus areas for health and safety, however it is recognized that the selected Contractor will have their own policies and procedures that will need to be inputted to this plan. It also recognizes that as the Contractor develops the Project designs, this will influence how construction will be undertaken, and these aspects will need to be integrated into this plan.

8.5.2.1 Introduction

Overview

This document is the Construction Health and Safety Plan (CHSP) for the GYSBI Port Expansion (the "Project"), a Category B Project that focuses on the Port and Annex expansion and improvements and comprises three components:

- Expansion of the GYSBI Port;
- Construction of two new berths; and
- Expansion and improvements at the Annex.

The CHSP sets out the expectations of the Project Proponent (GYSBI, and its partner, the Inter-American Development Bank, IDB) and defines how the Contractor will implement and manage environmental matters.

Objectives

The CHSP will ensure that the Project is delivered in full compliance with legal requirements, and ensures:

- All workers (including subcontractors are fully trained and experienced to do the tasks requested of them;
- Implements measures to eliminate hazards, and where elimination is not possible, puts in place controls to ensure that hazards and risks are minimized to acceptable levels; and
- Ensures protection and well-being of the surrounding communities and visitors.

It is intended that through the implementation of this plan:

- Hazards that may be encountered during the project are identified;
- Assessments are made to quantify the risk; and
- Control measures that require being introduced are implemented to minimize the risks.

The CSHP is a dynamic document that will change and develop throughout the Project. The Plan will be reviewed monthly to ensure that the content reflects the needs of the Project. Additionally, the Plan will be reviewed in light of any unforeseen occurrence.

8.5.2.2 Project Description

Once the Project's design is finalized, the construction Contractor needs to prepare the CHSP and include specific details on the proposed works, duration, relevant plans, etc. The following provide guidance on what is needed.

- **Scope of Construction Works:** Description of the full range of construction works / activities proposed (e.g. clearing of land, dredging activities, geotextile fabric and armour rock; installation of sheet piles; etc.).
- **Description of the Construction (Disturbance) Footprint:** Full description of the existing land area that will be disturbed by the construction works and those immediately adjacent;
- **Timing of Works:** Provide a description of both the total duration of the works and the time of year they will occur. The latter would include consideration of expected climate during this time (e.g., anticipated rainfall / storm events, wind direction and speeds);
- **Site Plan:** The project site plan would clearly show the full extent of the proposed works area of the construction project. This would typically include a map with the full construction boundary and disturbance footprint marked clearly over a current aerial photograph (i.e., including all construction activities, associated laydown areas etc.). It would also include site specific information, for example the location of any important waterways or adjacent vegetation to be protected, national heritage listed areas, or the location of sediment and erosion traps, electrical services, etc.

8.5.2.3 Site Conditions and Requirements

Details must be presented clearly in this plan related to existing site conditions, security and restrictions. This should cover items such as:

- Personal Protective Equipment Requirements - Safety footwear, dust masks, safety goggles, hi-vis vests appropriate gloves and hard hats will be provided and worn as set out by the specific work activities by all site operatives and visitors.
- Existing Services – The Contractor will take all reasonable precautions including carrying out cable detection to avoid contact with live services. This will only be undertaken by competent persons.
- Tree Protection - Temporary protective fencing will be installed if trees and/or vegetation is to be protected.
- Ground Conditions - A Site investigation will be conducted prior to works commencing and the results will be fed into this plan.
- Potential Risks to Construction Workers – to consider items such as:
    - The concentrations of contaminants at the site are understood to be low and are unlikely to require measures beyond that required for health and safety purposes on a construction site. Suitable precautions should be in place.
    - Health and safety measures for work in excavations and confined spaces below ground put in place.
- Cross reference the requirements of the Construction Environmental Management Plan.
- Site security will be maintained during the construction phase. Fencing will be erected to form a secure construction site to prevent entry by children, members of the public, trespassers and

vandals. Warning signage to be placed at strategic points on the perimeter fencing. Information signage to be placed at the site entrance.

- The Contractor will liaise with the local residents and businesses prior to any works being undertaken to make them aware of works taking place and address any concerns by these affected parties. Access to the work sites will have secure gates will prevent entry to unauthorised persons.
- Working hours will be generally 0800-1700 on weekdays, 0900-1400 on Saturdays. No works will be permitted on Sunday's or Bank Holidays.
- Priority will be given to maintaining continuous safe access.

8.5.2.4 Policy and Systems

This Section must include an outline of the Contractors policy and management systems for the Project.

8.5.2.5 Project Roles, Responsibilities and Contacts

All positions across the project have health and safety responsibilities. These vary in relation to duties described in Table 8-3, but everyone has a base level duty of care to manage health and safety and avoid accidents and incidents.

Table 8-3: Project Roles, Responsibilities and Contact Details to be Finalized by the Construction Contractor for the CHSP

Position	Responsibilities	Line Manager	Name	Contact Details*
Project Manager				
Site Supervisor				
Health & Safety Manager				
HSE Representative				

8.5.2.6 Training, Awareness and Competency

The CHSP prepared by the construction Contractor must outline how health and safety training, awareness and competency will be delivered / assessed throughout the project, to ensure the relevant aspects of this CHSP are communicated to the project team and front line staff (including contractors and sub-contractors). Examples may include:

- Site Health & Safety Induction
- Daily Pre-Start Meetings
- Health & Safety Toolbox Talks
- Incident bulletins
- Sub-contractors kick-off meeting
- Contractor and client site kick-off meeting

The Contractor must also detail its organization and arrangements for the promotion of safety, health, and welfare. Overall responsibility for the site and its management will be the Contractor. On the first arrival at site, allowance must be made for:

- Site induction for individuals, which will include ‘‘Site Safety Rules’‘.

- Mandatory Booking in and out of site (includes lunch and breaks).
- Registering workers with appropriate training and competency certificates where necessary.
- Providing inspection and other certificates for equipment and machinery to be used safely.
- Daily / weekly site briefing.
- Demonstrating how contractors will monitor safety and its duration and issuing copies of these reports to the Site Project Manager.
- Pre-existing health issues.

8.5.2.7 Complaints

A complaints procedure shall be outlined within the Contractor's safety management system and shall be available and used whenever a member of the public wishes to raise a complaint.

8.5.2.8 General Monitoring Arrangements

Safety standards will be monitored by the Contractor through:

- A continuous inspection process by the Site Project Manager is in force. A checklist for these inspections is included with the site safety records. These inspections will include all contractors working on the site and a report of all actions required will be given to the contractor's foremen with instructions to rectify non-conformance in a timely manner.
- Once per week the Site Project Manager or appointed representative will inspect fire equipment, first aid equipment (and replenish if necessary), registers and site documentation.
- Monthly by the Contract Manager or appointed representative, who will carry out an inspection of the site and produce a written safety inspection report for distribution.
- The scheduled progress meeting chaired by the senior Contractor representative will as part of agenda discuss health and safety reports, and relevant discussions between the Client, the Contractor and other relevant stakeholders.

8.5.2.9 Emergency Procedures

The Contractor shall document emergency procedures covering the following:

- On-site facilities and responsibilities e.g., First-Aid kits and designated First Aiders.
- Escalation procedures for incidents and accidents.
- Numbers for local emergency services and details of nearby hospitals and other emergency needs.
- Site evacuation procedures and an Emergency Plan for different types of emergencies e.g. fire, flooding, etc.
- Incident reporting requirements and accident investigation procedures.

More information on emergency procedures are provided in the Contingency Plan provided in the next Section.

8.5.2.10 Health and Safety Risk Management

This section will be completed by the Contractor to present a summary of the key health and safety risks and controls that have been identified for the proposed construction project. The Contractor should

determine what additional risks and proposed management controls are required based on their final design and work method statements. A project risk assessment or job hazard analysis for specific task(s) should be performed.

The following table template should be used for each of the following health and safety risks:

- Excavations
- Working over and on water – Demerara River
- Use of heavy equipment
- Use of and contact with power tools
- Working at heights
- Manual handling
- Live services
- Tag out procedures
- Noise, vibration, and dust
- Hot works
- Confined Spaces
- Spills
- Traffic management and protection of neighbouring communities/businesses.
- Storage of waste materials
- Temporary works

Note that this is not an exhaustive list, and it would be expected that Contractors develop risk management strategies, controls, etc. that suit the scale/nature of finalized construction project.

Template

H&S RISK			
H&S Risk Identified			
Method statements and Risk assessment	Either detail here or refer to separate document		
Management Strategy			
		Responsibility	Timing
Control(s)			
PPE Requirements			
Performance Indicator(s)			
Monitoring			
Reporting			
Corrective Action(s)			

8.5.3 Construction Contingency Plan

This Contingency Plan (CP) provides a working template that will be used by the selected construction contractor (the Contractor) appointed by the Project Proponent (GYSBI). It details the typical requirements and focus areas for emergency management, however it is recognized that the selected Contractor will have their own policies and procedures that will need to be inputted to this plan. It also recognizes that as the Contractor develops the Project designs, this will influence how construction will be undertaken, and these aspects will need to be integrated into this plan.

8.5.3.1 Introduction

Overview

This Contingency Plan considers general actions to be taken into consideration in case of emergencies related to the construction of the Project. Although some events can be prevented, as is the case with spills, fires, explosions, etc.; there are others that cannot be controlled; however, impacts can be mitigated by being prepared, as is the case with natural hazards such as: flooding and strong winds, etc. All of these events must be considered in a contingency plan.

The Contingency Plan is a live document and requires that the construction contractor carry out training activities and periodic drills for personnel, as well as continuous review and update of the physical and operational data, as well as equipment and products.

This Contingency Plan is closely linked to the Disaster Management Plan Framework, which is based on the IDB's Operational Policy OP-704 (Policy on Disaster Risk Management).

Objectives

The main objectives of this Contingency Plan are:

- Prevent or control operational emergencies or possible industrial accidents that may arise during the construction phase of the Project.
- Establish procedures and plans to respond in a timely and efficient manner, and with the necessary resources, to fires, accidents, attacks and any other emergency situation that may arise.
- Prevent the consequences of a major event (fire, spills of dangerous products) from damaging human lives and property.
- Manage equipment and installations through periodic inspections.

The contingency plan presents the most important guidelines for subsequent adoption and implementation by contractors. One of the fundamental purposes is to protect and safeguard the human life of all those involved and reduce the losses of public and private property.

There are three elements that significantly influence the success of any contingency plan, which are:

- Resources: appropriate personnel and equipment;
- Strategies, techniques and action plan; and
- Response management: leadership, cooperation and communication.

8.5.3.2 Emergency Levels

For the operation of the Contingency Plan, it is important to first characterize the emergency by seriousness of the situation in order to apply the appropriate level of response:

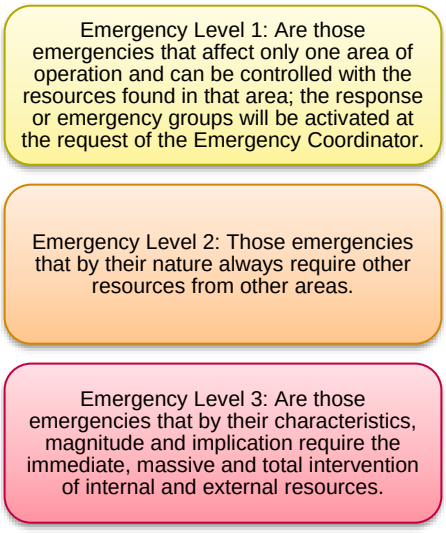


Figure Source: ERM, 2018.

Figure 8-2: Emergency Levels

8.5.3.3 Procedures to be Followed During the Implementation of the Contingency Plan

Considerations for the designation of the appropriate response measures:

- **Identification of Available Resources.** The most important resource to respond to possible contingencies is the people present at the Project site. The actions to be developed will depend to a large extent on the knowledge, confidence and capacity of the staff to carry out the actions previously assigned in the respective plan. It is imperative that the people at the Project site meet training requirements and are provided with the appropriate personal protective equipment (PPE) emergency response equipment, and information to fulfil their mission.
- **Access to information.** Provide all the necessary information in a concise manner to minimize confusion, and to avoid rumours and exaggeration. Obtaining timely and updated information is a dynamic process, and is the best way to provide feedback to the plan.
- **Communication.** The problems associated with communication are mainly related to the content of the messages, the means of transmission, and the interpretation by the person who receives it. Communication systems used internally should be prepared to handle a specific amount of information during an incident.
- **Priority setting.** At the scene of an incident, the personnel in charge of responding to the emergency must be able to alter priorities quickly, in order to face possible changing and/or unexpected situations.

- **Coordination between the Authorities.** An emergency coordinator must be determined for the Project by the contractor during the construction phase. This emergency coordinator will be in charge of coordinating with the appropriate authorities during an emergency.
- **Communication with the communities.** Throughout the construction phase, contractors must take communication initiatives with communities for their safety. These initiatives may include an emergency alert system, a method to provide information on Project activities and how to respond, collaborate with communities to establish action plans, organize demonstrations or training in how to respond to emergencies for communities, and/or identify the emergency response team to communities to establish a relationship before an emergency occurs.

Construction Phase

It is the contractor's and Project sponsor's responsibility to be in charge of risk management, this responsibility is shared with subcontractors if applicable. The Project proponent, as supervisor and owner of the project will have to ensure that the contractors manage risks and prepare an appropriate contingency plan as required. Therefore, the contractors and/or subcontractors will be required to comply with all safety, occupational health and environmental procedures to complete and deliver the work without incidents. As previously stated, Contingency Plans are live documents that may be revised and adapted if necessary according to the appropriate requirements for the construction activities.

The Contractors and Sponsor will ensure compliance with the standards as required based on the type of work, by jobs or disciplines. Such obligations include but are not limited to:

- Guarantee workers with safe conditions in the workplace.
- Instruct and train workers regarding the prevention of accidents, occupational diseases, the risks to which they are exposed in the performance of their work; as well as the use of personal protection equipment according to the work done, through training sessions, posters, etc.
- Design a program of occupational health and safety according to the activities to be performed that contains safety measures to be implemented, in order to avoid injury to personnel or property damage.
- Provide workers with personal protection equipment, according to the work done to prevent injuries.
- Regarding vehicles, machinery and equipment, comply with preventive and / or corrective maintenance programs and safety requirements.
- Organize and maintain health and safety services such as first aid kits in accessible places and ensure staff is knowledgeable.
- Record in writing any statements made by the workers in relation to unsafe conditions and the worker's environment, and carry out corrective measures immediately.
- Report any occupational diseases, work accidents and any other unsafe condition that is present in the workplace.

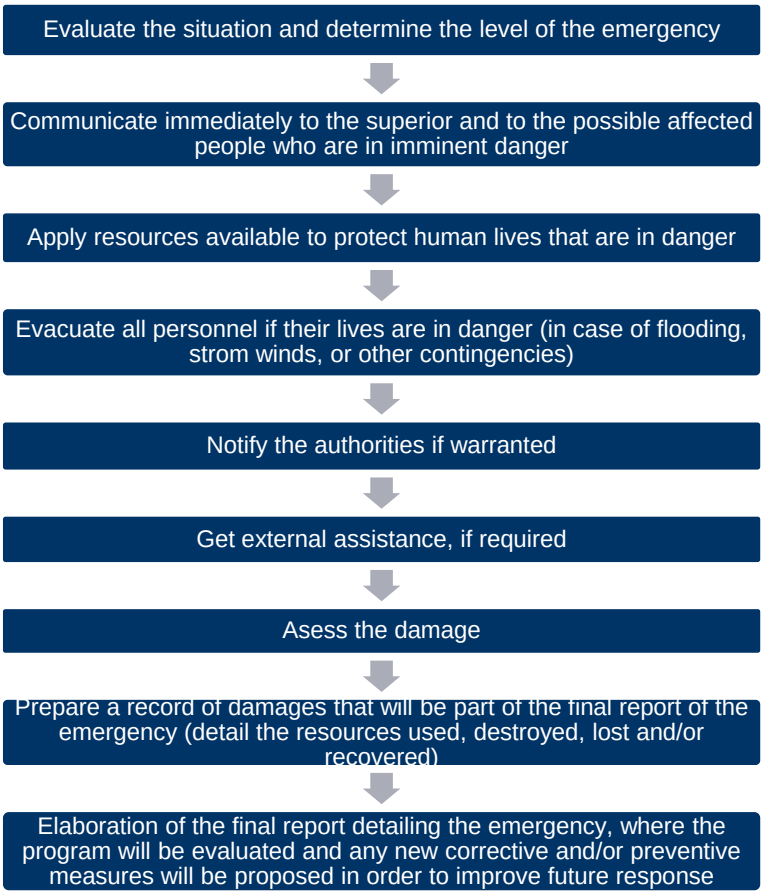
Employees will have to fulfil the following obligations:

- Exercising their specific functions in accordance with the work contract in order to avoid risks and protect their personal safety and health, and that of their work colleagues.
- Immediately report to supervisors any unsafe condition that could threaten their physical integrity or their own health and / or that of other workers.

- Use and maintain personal protection equipment as required, and immediately report to the person responsible for its supply, of the loss, deterioration or expiration of the same.
- Bring to the attention of your superior if you feel that the requested safety or security measures do not appropriately manage the risk.
- Immediately comply with any request that is made for the benefit of your safety and that of others.
- Care for and maintain sanitation and security facilities facilitated to the workers during the construction phase.
- Adhere to all safety and security requests made in the training materials, posters and posted notices.
- Accept the provisions of the medical service and the competent bodies in matters of occupational safety for the prevention, treatment of occupational or non-occupational diseases, and occupational accidents.

Emergency Procedures

The following Section describes the actions and procedures to be considered by the Contractors and Sponsor in case of emergencies and events that may arise.



Source: ERM, 2021.

Figure 8-3: General Procedures during an Emergency

The Contractor or Sponsor must lay out a sequence of actions to be followed in the event of an unplanned event or accident, which may be as follows:

- Notification: Inform all personnel of the accident.
- Verification and evaluation: Confirm that the notification provides an accurate representation of the status of the works and associated risk at the moment that the notification of the event is received.

A notification scheme must be included in the Contingency Plan to include the main local authorities, (may include: the municipalities where the projects are developed, the local police, and/or the local firefighters).

Calling Plan

The Contractor or Sponsor must prepare a calling plan consisting of three types of communications, internal, external, and support.

- Internal Calls: The internal calls include the communication of the emergency to top management personnel, as well as the members of the Contingency Plan who are outside the facilities.
- External Calls: Communication of the emergency to the appropriate Government Authorities, depending on the type of occurrence.
- Support Calls: Support personnel in order to control the emergency (dependent on the type), for example the fire brigade, the national police, ambulance service, medical attention if necessary, government authorities, etc.

Emergency Committee

An Emergency Committee must be organized by the Contractor or Sponsor for the construction phase. It is recommended that the Committee be composed of:

- Environmental supervisor
- Security Supervisor
- Maintenance supervisor

8.5.3.4 Types of Contingencies

The types of contingencies that may arise in the project areas are classified according to their origin:

- Natural phenomena, such as flooding, strong winds, etc.
- Operational emergencies or incidents normally caused by operations, fires, falling machinery, etc.
- Industrial accidents of personnel or contractors, normally caused by unsafe acts, unsafe conditions or as a consequence of the natural phenomena or operational emergencies previously stated.
- Social phenomena such as sabotage, terrorism, robberies, etc.

8.5.3.5 Phases Considered for Each Event

Prevention Process

The best way to control an event and the impact that these may have on the environment is to prevent them from happening by implementing preventive measures. Preventive measures are described below.

Work Permits

All projects must comply with the requirements and procedures established by local law, including those related to work permits in order to prevent unnecessary risks and/or accidents, and must comply with the following:

- It is necessary to obtain work permits in all areas with risk where work is carried, and they must be issued by authorized personnel.
- No work will be started before the respective work permit has been issued and it has been verified that the recommendations and demands required have been complied with.
- Supervisors authorized to issue and receive work permits will be responsible for the correct issuance of the same. They will also be responsible for ensuring that the security conditions are maintained during the time required to carry out the work.
- A work permit will not be issued, covering several areas with different risks. As a general rule, each specific job will require a separate permit.

Personal Protective Equipment (PPE)

- Personal protective equipment will be mandatory. They will not prevent accidents, but will eliminate or reduce the severity of an injury.
- It is the responsibility of the contractors to provide their workers with the personal protection equipment required in the execution of any work that generates risks.
- The equipment will be new and of good quality.
- It is the responsibility of the immediate supervisor of each worker to determine the need for personal protective equipment and to ensure that the worker makes use of them.
- The worker will be responsible for the care, conservation and proper use of any equipment entrusted to him.

Organization and order

Prior to the start of the work, the Contractor or Sponsor will develop a safety, organization and order program for direction, providing guidance everything from inspections to identify faults, to the types of collection waste/trash receptacles provided for the different types of wastes (organic, inorganic waste, solid waste, liquid, and hazardous waste). Transportation and final disposal method, in accordance with the national regulations, must also be included. In addition, the following requirements will be fulfilled:

- Each employee will keep their work site clean and in good condition.
- The employee will notify his supervisor about spills of oil, grease, etc., and will be cleaned as soon as they occur.
- All tools, screws and any other material equipment used in the performance of a job will be kept in order, and these objects should not be placed in places where they can be dangerous.
- The flammable substances and wastes will be handled and stored accordingly in order to avoid the risk of spontaneous fire.
- There should be a staging area or adequate space for orderly storage of bulky objects, equipment, or materials.
- Every workplace should be provided with fresh and potable water in sufficient quantity for workers to use.

- The toilets and bathrooms (one toilet for every 20 workers) will be kept in optimal conditions and with sufficient supply of toilet paper, water and soap.
- If employees eat at the workplace, the workplace should have a dedicate area for eating, protected from weather elements. No waste and debris will be left in place and the use of Styrofoam food containers is prohibit.

Training

Every worker, new or old, will receive operational training from their immediate supervisor (supervisor), in order to develop knowledge and skills for the safe execution of the assigned work, especially on:

- Industrial safety corresponding to construction.
- Occupational health.
- Fire Prevention.
- First aid.
- Personal protective equipment.
- Organization and order.
- Accident prevention.
- Accident analysis.
- Fire protection.
- Works that require written permission for their execution.
- Emergency control.
- Factors of physical risks (electrical, mechanical, noise and vibrations, lighting, heat, ventilation, etc.)
- Factors of chemical risks (smoke, gases in the environment (vapours, fumes), toxic, alkaline and corrosive substances, etc.)
- Other risk factors (health, third-party actions, environmental, etc.).

Emergency Response Actions

The Contractor or Sponsor shall prepare a list of general emergency response actions to include:

- Upon receiving notice of an emergency, immediately evaluate the level of emergency and determine which response measures are necessary, notifying the corresponding response groups.
- If necessary and in accordance with the magnitude of the event, order the evacuation of the area or facilities and initiate the respective response procedures.
- Notify the relevant authorities.
- Consult the emergency response procedures in order to verify the appropriate response for each emergency, ensure all the response procedures have been applied and record descriptive information of the event.
- Restrict access to the event area.

Procedures to be followed during a Natural Disaster

Procedure to be followed in case of earthquake

Preparation

- Train operational personnel to respond to emergencies caused by earthquakes or earthquakes, by means of evacuation drills, so that personnel are prepared for these events.
- If an earthquake is of great intensity, ensure an orderly and safe evacuation.
- Provide vertical and horizontal signalling of evacuation routes in case of earthquakes, as well as the location of fire extinguishers to control the occurrence of fire.

During the earthquake

- Stop work being executed in order to avoid accidents.
- Immediately leave the work area.
- If inside a facility, look for strong structures: under a door frame, next to a pillar or to a strong wall.
- If you are outside of a facility, stay away from structures that may collapse.
- Extinguish any signs of fire.
- If possible, protect yourself by getting to an open place where there is no possibility of falling structures.
- If the earthquake occurs during the night, flashlights should be used; never use matches, candles or lighters.
- Stay away from electric cables and glass.

After the earthquake

- Staff should report to a meeting point or main office.
- Disconnect any power supply and water immediately.
- Look for traces of short circuits before reconnecting them.
- DO NOT light matches (or smoke) before making sure there are no leaks or spillage of flammable material.
- Avoid getting close to broken electrical wires.
- Act in accordance with established procedures in case of fire and / or spill, depending on what happens.
- Resume operations as soon as you are sure that the operational conditions are safe.
- Proceed to clean debris and artefacts that obstruct the operations of the same.
- After the earthquake is over, damage to the equipment and facilities must be assessed, as well as preparing a report as required.
- In the event of an earthquake that exceeds the design capabilities of the Project and significant structural damage occurs, the Contractor must suspend operations and follow the procedures defined for those cases.
- Perform the inspection and evaluation of the components that have been affected. The maintenance staff will be required to report the damage to the Emergency Coordinator and the

level of risk involved in continuing work. Once the approval of Engineering and Maintenance has been obtained, work activities may resume.

General Actions in the Presence of Hurricanes and Floods

In the case of occurrence of threats due to extreme weather conditions, the following actions should be considered:

Preparation

- Train operational personnel to act in the event of hurricane and flooding emergencies, so that personnel are prepared for these events.
- Inspect emergency equipment and make sure it is ready for use. Ensure emergency equipment includes drinking water and canned food.
- Secure with ropes or chains all equipment that cannot be secured inside a building.
- Place the vehicles in a manner so they are protected against hurricane winds.
- Call the relevant authorities for the Project or Operations, the Police and the security company, if any, and indicate that only the minimum emergency personnel will be left on site.
- Close the main gate if able to.
- The Coordinator will determine, according to the prevailing or progressive conditions, if emergency stop procedures should be executed.

After the Emergency

- Equipment will not be energized/turned on until it has been checked by expert electricians/mechanics.
- In case of spills or fires, implement response procedures in accordance with the procedures related to these events in the contingency plan.
- Take a tour and assess the damages incurred.
- Proceed to repair minor damages and those necessary to provide immediate service.
- Proceed to clean debris and artefacts that obstruct the operations of the same.
- Prepare a written report at the end of the emergency. Said report shall contain the results of estimation of damages to the property of the company, affected persons, damages to private properties, and to the environment.
- Response plans should be updated based on the emergency to remain effective.

Spills

Equipment and Materials Needed for Spill Response

The contractors will have the following materials to deal with spill incidents:

- Absorbent material, such as sand, sawdust, absorbent cloths (depending on spilled material).
- Safety equipment such as gloves, plastic aprons, goggles, and boots.
- Appropriate containers for the collected material.
- Photographic camera to document the incident.

Fires and/or Explosions

A fire can lead to serious damage to equipment or personnel, and should be taken care of as quickly as possible. The following recommendations should be included in the Contractor's Contingency Plan in case of a fire.

Before a Fire

- Provide training to all personnel through courses on fire practices and simulations of accidents, use of fire extinguishers, etc.
- Have infrastructure and equipment for fire protection, and extinguishers that work in different environments depending on the type of project (for example, Class A extinguishers for ordinary combustibles such as wood and paper, Class B extinguishers for use on flammable liquids like grease, gasoline and oil, etc.).
- Develop rigorous preventive maintenance programs for all types of equipment, inspect and recharge fire extinguishers, etc.
- Identification and signage of safe areas and establish evacuation routes in all facilities or work fronts.
- Keep extinguishers in good condition.
- Provide first aid kit, battery-operated flashlights, extra batteries, etc. on site.

During a Fire

- Evacuate and or stop work in the area and / or facilities.
- Communicate with the local Fire Brigade, National Police and other entities depending on the severity of the emergency.
- Protect mouth and nose with damp cloths.
- Keep calm and avoid running.
- Assist affected people immediately, if any.
- If appropriate, try to put out the fire with the use of extinguishers and other existing means. Ensure extinguishers are periodically inspected to ensure they are in working condition.
- If any equipment is involved in the fire or explosion, the operator must manually disconnect the electrical power that feeds the equipment, as long as it can be done safely or without risk to human life.

In the event that the fire cannot be fought directly with the extinguishers, or there is danger to the personnel, the actions to be taken are:

- Notify firefighters immediately for help.
- Evacuate the place to the meeting point previously agreed in the training plan and risk drills.
- Once the firefighters have determined that the emergency has ended, the emergency coordinator of the project owner should be informed.
- Proceed along with the maintenance crew to an inventory of damages and then make a detailed report on the matter.

After a Fire

- Clean the affected area.
- Remove all debris.
- Repair and / or demolish affected facilities in case of major damages.
- When the fire has been extinguished, proceed with the maintenance crew to prepare an inventory of damages and then make a detailed report on the matter.

Adequate Staff Training

Practices or simulations should be carried out every six months (can include coordination with the local Fire Department), and should include response procedures for personnel all personnel.

Use and Disposal of Fire Extinguishers

- Fire extinguishers must be located in appropriate places and easily accessible.
- Every extinguisher must have a plaque with the information about the kind of fire for which it is suitable and expiration date. Also, they must have operation and maintenance instructions.
- Each extinguisher must be inspected every two months, tested and maintained in accordance with the manufacturer's recommendations; similarly, they must carry a label with test dates and expiration date.
- If an extinguisher is used, it will be refilled immediately; or if necessary, it will be replaced immediately.

Falls from Heights, Cut Wounds, Electrocution and Burns

Before

- Training for personnel should include industrial safety so that they do not commit unsafe acts and use the appropriate protective implements, such as a helmet, boots, safety glasses, restraint harness, etc.
- Also, training of personnel in the implementation of first aid, so that they may help injured co-workers or themselves, until the arrival of medical or paramedical personnel to the place of the accident or their transfer to a hospital for professional attention.
- Provision of personal protection equipment to all workers, as necessary.

During

In case of an accident in the facilities, the staff will act as follows:

- If it is a minor accident, apply first aid to the injured person and transfer them immediately to the nearest clinic or hospital so that they can be seen by a doctor, in order to rule out possible after-effects.
- If it is a serious fall from heights, shelter the injured person and request an ambulance for immediate transfer to a hospital.
- If a person is not breathing, provide rescue breathing (mouth-to-mouth breathing or mouth-to-nose) and request an ambulance for urgent medical attention.

- In case of burn, do not apply home remedies to the injured only water at the time and request an ambulance for its transfer to the clinic or hospital soon.
- For haemorrhage from a puncture wound, hold a gauze in place to avoid blood loss. If located in the extremities, make a tourniquet to cut blood loss, loosening the tourniquet every 10 minutes to avoid gangrene and to move the injured person to a nearby assistance centre.
- If trapped with weight on the chest, lever the heavy element and remove it so that the victim does not suffocate, until the arrival of the ambulance.
- If the victim has suffered an electric shock, ensure they are breathing, provide rescue breathing (mouth-to-mouth breathing or mouth-to-nose), and simultaneously request medical assistance or transfer to a clinic or hospital.

Immediate attention to an injured person through knowledge of First Aid can save a life. Always seek the appropriate medical attention by a professional.

After

- Analyse the causes of the accident and the actions taken to assist.
- Prepare the preliminary and final report of the industrial accident.

Equipment or Infrastructure Failure

- The person who detects a fault or failure will immediately notify the Supervisor or Chief of Operations identifying themselves and indicating the place and type of emergency.
- Try as much as possible to isolate the area or prevent vehicles or people from approaching.
- After overcoming the problem, analyse the root cause of the emergency/fault or failure.
- Prepare preliminary and final reports and submit to the appropriate authorities in a correct and timely manner.

Attacks and Sabotage

- Provide strict control of the entry of personnel into the facilities by a contracted Security Company, as well as provide surveillance in strategic areas, as necessary.
- In the event of an attack or sabotage, the person who detects it will immediately notify the emergency supervisor of the emergency, indicating the place and equipment affected.
- The shift leader will immediately inform the Police and personnel in charge of the surveillance of the facilities, to neutralize the aggressors.
- If an attack leads to an emergency event (such as a spill or fire), the response strategy to the specific type of emergency will be determined and instructions will be given to the external support units: police, fire brigades, etc.

Prepare preliminary and final reports and submit to the appropriate authorities in a correct and timely manner.

8.5.4 Stakeholder Engagement Plan

This section provides the framework for the development of a Project-specific Stakeholder Engagement Plan (SEP). The IDB's Environmental and Social Safeguards (specifically the policies PS1) require development of an SEP that is appropriately scaled to the project's risks, impacts and development stage.

This SEP should be developed by the EPC Contractor prior to onset of the construction phase, with the purpose of setting out the approach that the Project will follow to implement a two-way engagement and consultation program with stakeholders over the life of the Project.

A stakeholder is defined by the IDB as "…individuals, groups, or institutions that have a stake, or an interest, in the project: They may be affected by it (either positively or negatively), or they may have an interest in it and be in a position to influence its outcomes." This SEP framework focuses on engagement with external stakeholders, meaning those not directly involved in the construction, operations, permitting or financing of the Project.

A SEP is a 'living' document and is developed progressively, and updates issued, as a project moves through the various phases of planning and implementation.

A typical SEP structure is as follows:

- Section 1 provides background information about the Project and outlines the objectives of stakeholder engagement;
- Section 2 outlines national and international requirements for stakeholder engagement;
- Section 3 provides an overview of the local context, and describes how stakeholders are identified and the methods and tools used to support engagement;
- Section 4 summarizes stakeholder engagement undertaken to date by the Project proponent and developer;
- Section 5 describes roles, responsibilities and resources for stakeholder engagement;
- Section 6 outlines a grievance mechanism for the Project which allows for a consistent and transparent means to receive, respond to and address stakeholder concerns and complaints; and
- Section 7 describes the monitoring and reporting of stakeholder engagement activities.

Development, update and implementation of the SEP for this Project will be the responsibility of the EPC contractor.

8.5.4.1 Section 1: Background and Objectives

Stakeholder engagement (including consultation and the disclosure of information) is a key element of project planning, development, and implementation. Effective stakeholder engagement assists good design, builds strong relationships with local communities, and reduces the potential for delays through the early identification of issues to be addressed as a project progresses.

The activities of engagement are guided by international best practice, as well as all applicable laws and regulations in Guyana.

The aims of stakeholder engagement, and of the Project SEP, are to:

- Promote the development of respectful and open relationships between stakeholders and the Project proponent and developer during the Project life-cycle;
- Identify Project stakeholders and understand their interests, concerns and influence in relation to Project activities, particularly during the construction phase;
- Provide stakeholders with timely information about the Project, in ways that are appropriate to their interests and needs, and also appropriate to the level of expected risk and adverse impact;
- Provide stakeholders the opportunity to express their opinions and concerns in relation to the Project, and for these to be reflected in the Project's Environmental and Social Management

System (ESMS), and decisions about Project construction and operations activities, where possible;

- Support compliance with Guyanese legislation for public consultation and disclosure and alignment with financing standards and guidelines for stakeholder engagement; and
- Record and resolve any grievances arising from Project-related activities through a formal Grievance Procedure.

Additionally, should a livelihood survey and census indicate that the Project could result in economic displacement, the SEP will also:

- Provide the framework for stakeholder involvement in identifying appropriate processes for compensating displaced individuals and businesses.

As required by the Bank's Disclosure of Information Policy (PS1), projects categorized as a Category B Project by the Bank (as is the case with this Project), require at least one public consultation event in order to discuss the results of this EA and ESMP.

8.5.4.2 Section 2: Regulatory Framework

This section should provide the regulatory framework that governs the Project including national legislation and policy, as well as applicable Bank policies.

Guyanese regulatory requirements and applicable IDB Invest's Policies are outlined in Section 3.0 of this EA document.

8.5.4.3 Section 3: Stakeholder Analysis

Local Context Overview

It is helpful to group stakeholders based on common interests and characteristics. Use of a number of 'stakeholder categories' helps structure activities for stakeholders of the Project, including a summary of the anticipated interest of these groups with respect to the Project and within the local context (e.g., potential impacts, benefits, concerns). A database of stakeholders should be developed and continue to be updated as additional stakeholders are identified. Typical stakeholder categories used in this step include:

- National government
- Regional and local governments
- Local population
- Local community groups
- Land and resource users and rights holders
- Local businesses
- Business development or worker associations
- Providers of local services and infrastructure
- Interested non-governmental organizations
- Media
- Academic and research organizations

Stakeholder Identification and Mapping

The process of stakeholder identification includes identifying individuals, groups, local communities and other stakeholders who may be affected by the project; identifying broader stakeholders who may be able to influence the outcome of the project; identifying legitimate stakeholder representatives (such as elected officials, non-elected community leaders, etc.); and, mapping the impact zones by placing the Affected Communities within a geographic area.

As part of the stakeholder identification process, it is important to include vulnerable individuals and groups who may find it more difficult to participate in engagement and to understand how each stakeholder may be affected, or perceives they may be affected, so that engagement can be tailored to inform them and understand their views and concerns in an appropriate manner.

Examples of this may be performing engagement activities specifically for women, single-caregiver households, and visible minorities, separate from those for the general public to ensure their voices are adequately heard and considered.

The appropriate type of engagement is determined by a number of factors, including the likely impact of the project on the stakeholder (often related to location), their influence over the project, and their preferences and abilities to access information and participate in consultation.

A list of stakeholders was prepared for the public disclosure event held in (not held as of the date of this document) in order to present the results of this EA and ESMP. This stakeholder list will be included in Appendix B of this report. As the Project progresses, it will be the responsibility of the EPC to update this stakeholder list and continue open communication protocols with the stakeholders as described in the following sections.

Disclosure and Engagement Methods and Materials

The engagement process encourages meaningful participation by stakeholders. The Project proponent and EPC will employ a range of methods and channels for disclosing information in order to tailor disclosure to the interests and needs of the various stakeholder groups, and will also produce materials appropriate for specific stakeholders and types of engagement. This may include: interviews with stakeholder representatives and key informants; surveys, polls, and questionnaires; public meetings, workshops, and/or focus groups with specific groups; and other participatory methods.

Feedback mechanisms (also referred to as Project contact vehicles) are adapted to suit the needs and preferences of different stakeholders and their physical locations. To give stakeholders easy and convenient access to the Project, the following contact vehicles should be considered:

- Toll-free number for general Project inquiries
- General email address
- Mailing address

The contact vehicles must be monitored regularly and response protocols will be developed to ensure all inquiries are tracked for reporting purposes and that responses are provided. Designated personnel from GYSBI or the EPC should serve as identified points of contact for stakeholders.

8.5.4.4 Section 4: Completed Stakeholder Engagement

As a living document, the SEP should be updated to document stakeholder engagement activities as they are conducted, including public consultation meetings, community meetings, and interaction with the various government entities involved in planning, permitting and approvals for various components of the Project. A brief summary of the events, along with appended minutes and attendance sheets, should be

provided. The stakeholder database should also be updated with new information obtained over the course of the engagement events.

8.5.4.5 Section 5: Roles, Responsibilities and Resources

GYSBI should allocate staff and resources devoted to managing and implementing the Project's SEP. As the formal stakeholder engagement process commences, GYSBI will identify the primary staff members responsible for stakeholder engagement at all levels as it pertains to the environmental and social components of the Project.

GYSBI should continually update the stakeholder register as additional stakeholders are identified, or as new information regarding stakeholders becomes known. GYSBI should also complete attendance records at every meeting, and have designated note-takers at each meeting to document stakeholder feedback and questions.

8.5.4.6 Section 6: Grievance Mechanism

The Project should establish and publicize a Grievance Mechanism for implementation throughout the Project's construction phase. This should be designed to accommodate grievances of any type from nuisance impacts like noise and dust, to complaints associated with the compensation process for economically displaced businesses or persons.

A framework for development of a Project-specific Grievance Mechanism is provided in Section 8.5.5 of this document.

8.5.4.7 Section 7: Monitoring and Reporting

Monitoring

It is important to monitor stakeholder engagement to ensure that consultation and disclosure efforts are effective, and in particular that stakeholders have been meaningfully consulted throughout the process. Stakeholder engagement monitoring is managed through the Program's Environmental and Social Management Plan (ESMP).

Monitoring should include:

- auditing implementation of the Stakeholder Engagement Plan;
- monitoring consultation activities conducted with government authorities and non-governmental stakeholders;
- monitoring the effectiveness of the engagement processes in managing impacts and expectations by tracking feedback received from engagement activities; and
- monitoring and analysing any grievances received.

Tracking Stakeholder Engagement Activities

Performance will be reviewed regularly against the SEP. Tracking of stakeholder engagement will be used to assess the effectiveness of the Program's stakeholder engagement activities. Indicators for tracking will include, among others:

- place and time of formal engagement events and level of participation including by specific stakeholder categories and groups (e.g. women, single-caregiver households);

- number of comments by topic and type of stakeholder, and details of feedback provided through the Grievance Procedure or other means (office visits, emails, phone calls) always removing identifying information to ensure continued confidentiality;
- numbers and types of grievances and the nature and timing of their resolution;
- recording and tracking commitments made to stakeholders; and
- community attitudes and perceptions on Program activities based on media reports and stakeholder feedback.

Program Reporting

Annual Reports will summarize all activity for the period, and provide a summary of issues raised and how they have been addressed. Potential issues include timeliness of responses and corrective and mitigation measures taken to address grievances, and analysis of trends in key performance indicators (KPIs). These may include:

- total numbers of stakeholders engaged according to stakeholder category;
- numbers of comments and queries received according to topic and responses;:
- Number of people enrolled in support programs;
- Number of people completing the support program;
- Social Indicators over time:
- Level of access to services/utilities;
- Health indicators (types and quantities of illnesses);
- Security incidents;
- Responses to satisfaction surveys;
- Media spots (positive, negative and neutral);
- Social Media trends; and
- protests, strikes, posters, fliers against the project.
- numbers of grievances lodged; and
- grievance resolution timeliness.

The SEP will be reviewed on a regular basis and revised as needed to reflect completed engagement activities and revise and confirm future engagement plans.

8.5.5 Grievance Mechanism

During any construction Project, stakeholders may have complaints about Project activities and this type of feedback is managed through the Project's Grievance Mechanism (GM).

A grievance is a complaint that a stakeholder has about the activities of the Project that might stem from:

- A specific incident – such as a road accident, property damage or night-time noise;
- The behaviour of workers – such as disrespectful or discriminatory actions;
- An environmental impact – such as soil contamination, or damage to agriculture;
- A social impact – such as disruption of economic or recreational activities; and

- Other types of impacts – such as traffic, health, and cultural heritage impacts.

8.5.5.1 Objectives

Specific objectives of the GM are:

- To help the Project proponent and EPC identify issues and concerns early, so that they can be addressed quickly and proactively;
- To continuously improve Project performance in all areas; and
- To demonstrate the Project's commitment to meaningful stakeholder engagement, and respect for local opinions and concerns.

The EPC will use the GM, working in partnership with GYSBI and with oversight from the IDB, as a critical component of the broader stakeholder engagement activities, including monitoring and reporting.

A member of the EPC team will be assigned as the person in charge of managing the GM, including the internal processes for ensuring grievance resolution. This individual should work closely with the competent team involved in similar actions as part of the Stakeholder Engagement Plan to ensure consistency in the content and processes involved, as well as to share information and lessons learned, and to prevent stakeholder fatigue from over-engagement.

8.5.5.2 Grievance Procedure Overview

A grievance procedure is a program that seeks to compile, register, and resolve grievances, complaints, concerns or questions from stakeholders of any kinds. In this case, the mechanism is designed for any person, household or group impacted by displacement and resettlement as a result of Project activities. The implementation of a GM will complement any proactive or preventative policies or procedures already in place, ensuring that when administrative controls do not adequately address an issue, there is recourse for resolution.

8.5.5.3 Guiding Principles

The GM must be in compliance with international standards particularly Performance Standard 1 on Assessment and Management of Environmental and Social Risks and Impacts and Performance Standard 5 on Land Acquisition and Resettlement.

To this end, the guiding principles for the GM should be the following:

- Provision of information: All affected people should be informed about the GM from the first time engagement takes place, early in the Program planning process, and details about how it operates should be easily available, for example, in public areas impacted by the Project including shops, schools, churches etc.
- Transparency of the process: Affected Populations must know to whom they can turn in the event of a grievance and the support and sources of advice that are available to them.
- Ensuring up to date information: The process should be regularly reviewed and kept up to date, for example, by referencing any new statutory guidelines, changes in routes or benefits.
- Confidentiality: The process should ensure that a complaint is dealt with confidentially.
- Non-retribution: Procedures should guarantee that any project affected person that raising a complaint will not be subject to any reprisal.

- Reasonable timescales: Procedures should allow for time to investigate grievances fully, but should aim for swift resolutions. The longer a grievance is allowed to continue, the harder it can be for both sides to get back to normal afterwards. Time limits should be set for each stage of the process, for example, a maximum time between a grievance being raised and the setting up of a meeting to investigate it.
- Right of appeal: An Affected Person should have the right to appeal to a higher level of Project management if he or she is not happy with the initial finding.
- Right to be accompanied: In any meetings or hearings, the aggrieved party should have the right to be accompanied by a colleague, friend or legal representative.
- Recordkeeping: Written records should be kept at all stages. The initial complaint should be in writing if possible, along with the response, notes of any meetings and the findings and the reasons for the findings.

8.5.5.4 Scope

The GM should be implemented and active throughout all points of the Project construction phase, and every Project-affected person should have access to it.

8.5.5.5 Activities during Implementation

The activities below offer suggestions on how each of the components of the GM should be implemented. Although the content of each of these is flexible and should be built based on the specific context (and as such can be modified and changed as needed, so long as there is sufficient notification with stakeholders to ensure continued accessibility of the process), the content of the GM should remain consistent with this guideline.

Communication

- Office hours from a member of the EPC team;
- Phone numbers or internet, depending on accessibility of technology; and
- Feedback boxes, as well as clearly signposted maps showing where they are located – preferably in highly transited areas including schools, churches etc.

Receipt and Registration of Grievances or Complaints into the System

- Establish forms to be filled in with all necessary information – clarity that if a grievance is submitted verbally, it must be transcribed as soon as possible after.
- Details should be compiled – electronically if possible, and registers of chain of custody and communication must be established.
- When a grievance is received with a name attached, the aggrieved party must be notified within a specific timeline that their grievance has been registered, as well as providing a timeline for future activities, including the timeline by when the Project should have a proposed resolution.
- When a grievance is received without a name attached, the grievance must be addressed and documented within a pre-specified timeframe. The report should be compiled with others of the same sort, and the relevant information (general concerns, how they have been addressed) should be periodically posted somewhere public, where they can be seen. This should in no way infringe on the confidentiality of any aggrieved party and should not include any specifics (e.g.

Complaints about timeline for compensation – have completed an investigation as to the hold-up, and have started discussions with the bank to speed-up payments).

Evaluation and categorization of grievances

- Categorization should differentiate based on relevance (question rather than complaint, request, issue not associated to the project), and urgency (risk to life or property), extent (individual complaints vs. group complaints) etc.
- Where necessary/relevant an interview with the aggrieved party could be helpful, including requesting further details.
- Directing the grievance to the relevant teams for follow up.

Prioritization of grievances and response time

- Must identify a specific response time for confirming receipt of grievance, for completing an investigation and for providing an initial offering of resolution. If at any point these timelines are not addressed, this must also be justified in the documentation.

Options for resolution or response

- Options for response should include: including unilateral response; bilateral response (the aggrieved party and the Company can offer a solution together); third party response (though a mediator); or through a judicial process, outside of the mechanism. Considering the purpose of the mechanism is to effectively address concerns before they escalate, it is important to maximize the opportunities for bilateral response wherever possible.
- Preparing the response.
- Closing the case.

8.5.5.6 Resources and Costs

- A budget should be put in place to pay for any responses involving compensation (in kind or monetary), as well as for the time of those involved in investigating and addressing any issues.
- The relevant management staff should be involved in the grievance process from the earliest point in the process, and decision makers should be involved in the process from the onset, to ensure timely turnaround of responses.
- The grievance must be escalated as needed, and there must be clarity on the part of all management staff the importance of appropriate responses to grievances.

Responsible parties

The GM should be implemented throughout every phase of the Project by an appropriate team, led preferably by the same person who leads the Stakeholder Engagement activities. The composition of the team responsible for the implementation should be sufficient to cover the necessities (considering number of project affected households, the magnitude of impact, the ratio of economic vs. physical displacement, if any, etc.)

Indicators and Monitoring

There are a number of indicators that should be considered in order to make best use of the GM as a tool throughout the life of the Program. These include, but are not limited to:

- Number of grievances registered (by week, month);
- Time in resolving grievances or complaints;
- Number of complaints or grievances by category (i.e. payment, treatment, damage etc.)
- Number of grievances not completed within the timeline
- Cases of re-incidence – when the same issues come up several times

Procedure

The flow chart pictured in Figure 8-4 below illustrates a suggested GM procedure.

Figure 8-4: Suggested Grievance Mechanism Procedure

8.5.6 Compensation and Livelihood Restoration Plan

8.5.6.1 Introduction

While there are no anticipated physical resettlement activities, the construction phase of the Project could potentially result in temporary economic displacement of formal and informal enterprises. All efforts will be made to avoid such displacement, but in the event that such occurs, this Compensation and Livelihood Restoration Plan (CLRP) guideline has been prepared for implementation by GYSBI and the EPC contractor for implementation prior to and during the construction phase. It outlines the process

necessary to ensure the reestablishment of the socioeconomic conditions of people displaced as a result of the Project, with as much specific context as possible.

Once the final Project design and construction plan are complete and a livelihoods census and engagement with Affected Communities to assess the number of affected businesses/individuals have been conducted, it will be necessary to develop a to appropriately manage and mitigate economic displacement.

For the purposes of this plan, the following definitions[29] are used:

- **Affected population:** People who are directly affected by project related activities through the loss of employment, housing, land or other assets.
- **Compensation:** Money or payment in kind to which the affected people are entitled, as decreed by government regulations or laws.
- **Project Affected Persons (PAP):** Persons affected by the Project.
- **Project Impacts:** The direct and indirect physical and socioeconomic impacts caused by the project within the project area.
- **Rehabilitation:** Reestablishment of livelihoods, living conditions and social systems.
- **Relocation:** Moving of people, assets, and public infrastructure.
- **Resettlement:** The entire process of relocation and rehabilitation caused by project related activities; in the case of this Project, this refers to relocation and rehabilitation of economic resources only, as no resettlement of residential communities or households will be required.
- **Resettlement Impacts:** The direct physical and socioeconomic impacts of resettlement activities in the project and host areas.
- **Vulnerable Groups:** Distinct groups of people that may suffer disproportionately from project-related activities.

8.5.6.2 Purpose

Some of the most significant impacts created by development projects can be those associated with economic displacement, which refers to “the loss of income streams or means of livelihood resulting from land acquisition or obstructed access to resources associated with a project”[30].

The purpose of a CLRP is to provide a framework to guide the Program in managing potential economic displacement impacts resulting from Project activities.

8.5.6.3 Objectives

In accordance with the PS 5, the objective of the CLRP is to minimize Project-related disruptions to the affected population—in this case temporary economic displacement for businesses operating along roadway segments slated for improvements, lasting for a portion of the construction period. While the duration of construction activities is not currently known, it is estimated at a few weeks for each road segment. The Project will not result in any physical displacement and no residences are affected.

According to PS 5 when temporary relocation is necessary, special consideration will be given to avoiding irreversible negative impacts (such as permanent loss of employment), providing satisfactory temporary

[29] Inter-American Development Bank, “Involuntary Resettlement in IDB Projects: Principles and Guidelines,” http://services.iadb.org/wmsfiles/products/Publications/362003.pdf

[30] IFC Handbook for Preparing a Resettlement Action Plan

services, and, where appropriate, compensating for transitional hardships. This CLRP has been prepared in order to meet these objectives and ensure that any hardships encountered due to temporary relocation of productive activities in the affected areas will be mitigated or compensated. With these measures, affected persons can be assured that their productive capacity and income levels are maintained at an equivalent or better level as compared to before the Project.

8.5.6.4 Scope

At the time of writing, finalized project description information is not available to understand whether temporary economic displacement can be avoided in its entirety. As such, displacement-focused consultation and engagement activities have not taken place, meaning that a full understanding of the scope of activities are is yet unknown. As such, this document is intended to determine the likely risks and impacts, the potential scale of the restoration, and the likely procedures through which compensation should be managed.

8.5.6.5 Livelihoods Restoration Process

Identification and Categorization of Displaced Groups

Groups likely to be displaced in some way by Project activities first need to be categorized in order to determine the level and type of support the Project would be responsible for providing. Compensation and rehabilitation programs should be developed based on the magnitude and significance of the impact felt by businesses or households as a result of economic displacement.

While from time to time it is possible that compensation and rehabilitation could be considered on a case-by-case basis, it is helpful to have overarching guidelines establishing eligibility, so as to ensure the most effective and responsible use of resources available, and so as to minimize the potential rise of expectations on the part of community members.

Process for Displacement Consultation and Activities

Identification of Project-Affected Communities

In order to identify the specific Affected Populations, the following should be undertaken:

- **Public consultation** should be conducted to identify groups affected by the Project (see Stakeholder Engagement Plan for further details) and determine what adverse impacts the Project may have on their livelihoods. In order to understand what specific impacts may be experienced, consultation should be carried out with local government, formal and informal community leaders, business associations, or other community representatives.
- **Thematic mapping** should be developed using existing maps and baseline information to identify populations, infrastructure, cultural property, and land use patterns in the Project area. This information serves as an important starting point for planning further displacement consultation activities.
- A **census** should be undertaken that enumerates and registers Affected Populations and their location. Through this step, the Project establishes a list of eligible beneficiaries of the livelihood restoration process, and is protected from spurious claims by those seeking benefits. This census also provides a base understanding and framework for any additional socioeconomic data collection required, and a baseline for future monitoring and evaluation. Data should be collected on each individual or business' key economic activities; income; and social networks among

others. Enumerators should be clear on the specific plans for compensation, including the fact that lack of legal land title does not disqualify people from livelihood restoration assistance.

- All interactions should consider **potential vulnerabilities** of Affected Populations including female or elder-owned businesses, people with disabilities, minorities, and ensure that full access to the process is provided accordingly.
- An **inventory** should be collected of any assets pertaining to businesses or economic activities that could be lost or affected. Privately-owned assets could include shops, stalls or other structures, and other types of private non-moveable assets. In assigning value to these assets, it is critical that the Program consults with the Affected Population regarding the methods and formulas for assigning value to assets lost and income forgone as a result of the Project. These inventories should be countersigned by the asset owners.

Dissemination of Information

In order to be successful, the CLRP must be prepared through a process of public consultation with all interested and affected parties. In order to achieve this, affected populations and stakeholders should be informed of the availability of compensation for lost income or assets, their eligibility for compensation, assistance around economic resettlement, and redress of any associated grievances or feedback.

To achieve this, public consultations should be held to present the information included in the CLRP and to collect ideas and concerns about the CLRP and its implementation. In doing this, the Project should make Affected Communities aware of their rights around displacement. As well, copies of the CLRP should be made available to all stakeholders.

Stakeholders in the Project Area should be made aware of opportunities to attend public consultation meetings where they can learn about the details of the Project. These meetings should be held with communities, community organizations, local government departments and agencies, and be ongoing throughout the Project cycle, including during the planning, implementation, monitoring and evaluation of compensation payments and livelihood restoration activities.

During these meetings, stakeholders should be informed of the Project, its planned activities, and plans for livelihood restoration and compensation. These meetings should also provide stakeholders with opportunity to ask questions and provide insights into potential impacts or areas of sensitivity. The sessions should be widely advertised via signage, word-of-mouth, and announcements at community organizations and events. They should (a) provide information on the Project and associated displacement impacts, and (b) allow for attendees to ask questions and voice concerns. They should also indicate specific steps to be taken for stakeholders who will be economically displaced. Meetings should be documented via meeting minutes and photographs, and publicly disclosed.

A consultation log should be developed and used to record the date, location, host organization, type of settlement, issues discussed, and action taken, for all consultations undertaken regarding livelihood restoration activities.

Specific activities involved in the dissemination plan include the following:

- Disclosure of the Compensation and Livelihood Restoration Plan, Stakeholder Engagement Plan, and Environmental and Social Management Plan mitigation measures;
- Procedures for addressing grievances through a Grievance Mechanism;
- Land, property, and assets evaluation procedure;
- Process and rates for compensation;

- Inventory and valuation of properties and assets; and
- Provision of compensation.

8.5.6.6 Design of Income Restoration and Development Initiatives

Compensation and income restoration and development schemes should be designed in consultation with Affected Populations, including input regarding the management of effects and promotion of development opportunities. Local authorities and community-based organizations should also be consulted throughout this process, and should include implementation schedules, programs for consultation and participation, dispute resolution mechanisms, budgets, and schedules for monitoring and evaluation, as well as mechanisms for correcting any issues that arise during monitoring and evaluation.

The following entitlement matrix identifies currently known resettlement impacts and impacted parties, along with suggested entitlements (see Table 8-4). This should be further developed and used as a basis for more specific entitlement actions as more information on impacts become available via additional recommended stakeholder engagement and surveys outlined in Table 8-1 above.

Table 8-4: Entitlement Matrix

Impacted Asset	Entitled Parties & Eligibility	Entitlements
Buildings and structures	Owners and/or occupants of buildings/ structures along affected area	It is not expected that any buildings or structures will be affected. In the event of accidental impacts to buildings or structures, owners of any such structures would receive in-kind or cash compensation for repairs.
Business establishments	Owners of businesses along affected area	▪ In-kind or cash compensation in the event of damage to storefronts or other business assets. ▪ Appropriate phasing and management of construction activities to maintain access to businesses to the extent practicable. ▪ Procurement of goods and services from local businesses as relevant and appropriate to meet Project needs. ▪ Improved public access to businesses in the area after completion of Project construction.
Access routes	Residents, business owners, workers and other commuters in DAI affected by traffic and limitations on access	▪ Improved access and traffic flow in the area after completion of Project construction. ▪ Appropriate management of construction areas to minimize traffic disruptions and maintain access to businesses and residents. ▪ Hiring of workers from the local community during the construction phase, to the extent practicable.
Living heritage sites	Administrators and users of places of worship and other living heritage sites in the Project DAI	▪ In-kind or cash compensation in the event of accidental damage to living heritage structures. ▪ Appropriate management to be determined in collaboration with local authorities, site administrators, and others as appropriate to maintain access and avoid disruption.

8.5.7 Traffic and Pedestrian Management Plan

This Traffic and Pedestrian Management Plan (TPMP) provides a working template that will be used by the selected construction contractor (the Contractor) appointed by the Project Proponent (GYSBI). It details the specific management requirements and focus areas identified through the Environmental and Social Impact Assessment, but also recognizes that the selected Contractor will have their own policies and procedures that will need to be inputted to this plan. It also recognizes that as the Contractor develops the Project designs, this may influence how construction will be undertaken and progress, and these aspects will need to be integrated into this plan.

8.5.7.1 Introduction

Overview

This Traffic and Pedestrian Management Plan (TPMP) for the GYSBI Project (the "Project") sets out the expectations of the Project Proponent (GYSBI, and its partner, the Inter-American Development Bank, IDB) and defines how the Contractor will implement and manage environmental matters.

Objectives

The purpose of the TPMP is to minimize the interface wherever possible between the public (pedestrians, visitors, tourists, residents, etc.) and site and project-related traffic, as well as minimize economic losses of local businesses throughout construction. This document provides practical guidance on the planning and control measures that will be implemented.

The objectives of this plan are:

- Minimize the impact on the public road network approaching and adjacent to the project by road-based construction traffic. This will be achieved by identifying clear controls on routes, vehicle types, vehicle frequency, vehicle quality and hours of site operations.
- To establish main principles for vehicle and pedestrian movement within the site boundary maintaining positive segregation between personnel and vehicles.
- To provide measures to help minimize economic losses of local businesses during construction.

The main construction Contractor is responsible for the execution of the plan, and the plan as a document is 'dynamic', and will be revised and added to as the project evolves.

8.5.7.2 Project Description

This section needs to include specific details on the proposed works, duration, relevant plans, and other characteristics of the project. The following provide guidance on what is needed.

- **Scope of Construction Works:** Description of the full range of construction works / activities proposed (e.g., clearing of land, dredging activities, placement of poles, geotextile fabric and armour rock; installation of sheet piles; etc.).
- **Description of the Construction (Disturbance) Footprint:** Full description of the existing land area that will be disturbed by the construction works and those immediately adjacent;
- **Timing of Works:** Provide a description of both the total duration of the works and the time of year they will occur. The latter would include consideration of expected climate during this time (e.g. anticipated rainfall and storms events, wind direction and speeds);

- **Site Plan:** The project site plan would clearly show the full extent of the proposed works area of the construction project. This would typically include a map with the full construction boundary and disturbance footprint marked clearly over a current aerial photograph (i.e. including all construction activities, associated laydown areas, etc.). It would also include site specific information, for example the location of any important waterways or adjacent vegetation to be protected, national heritage listed areas, or the location of sediment and erosion traps, electrical services, etc.

8.5.7.3 Project Roles, Responsibilities and Contacts

All positions across the project have traffic and pedestrian responsibilities to some extent. These vary in relation to duties described in Table 8-5, but everyone has a base level duty of care to prevent environmental harm.

Table 8-5: Project Roles, Responsibilities and Contact Details to be Finalized by the Construction Contractor for the TPMP

Position	Responsibilities	Line Manager	Name	Contact Details*
Project Manager				
Site Supervisor				
Environment Manager				
HSE Representative				

8.5.7.4 Training, Awareness and Competency

The TPMP prepared by the construction Contractor must outline how traffic training, awareness, and competency will be delivered / assessed throughout the Project, to ensure the relevant aspects of this TPMP are communicated to the Project team and front line staff (including contractors and sub-contractors). Examples may include:

- Site Induction
- Daily Pre-Start Meetings
- Toolbox Talks
- Incident bulletins
- Sub-contractors kick-off meeting
- Contractor and client site kick-off meeting

This awareness and training must also be extended to delivery drivers and trade contractors.

8.5.7.5 Communication with Relevant Stakeholders

The Project proponent (GYSBI) will maintain an open line of communication with the affected stakeholders. Prior to commencement of the work, the TPMP should be disclosed to the appropriate stakeholders in order to ensure all concerns and issues are appropriately mitigated. Any issues and concerns expressed during public consultations should be addressed in the updated TPMP. In addition to disclosure of the TPMP, the public must also be made aware of available communication methods in order for them to express any issues and/or concerns (see Section 8.5.5, Grievance Mechanism, above). It is important that the GM is made available to the public at all times, and that handling of any grievances is done in an expedited manner. All grievances as well as their resolutions shall be recorded.

8.5.7.6 Traffic and Pedestrian Management

Work Area Considerations

This section presents a summary of the risks and controls that have been identified per work areas for the proposed construction Project when considering traffic management and interface with pedestrians. The Contractor should determine what additional risks and proposed management controls are required based on their final design and work method statements. A project risk assessment or job hazard analysis for specific task(s) should be performed.

The following table is based on the assessment that has been performed. Note that the table does not contain an exhaustive list of potential issues, and it would be expected that Contractor develop risk management strategies, controls, etc. that suit the scale/nature of finalized construction Project.

Roads Intervention Work Areas

ROADS INTERVENTIONS WORK AREAS		
Work Area and Route Maps	**Route Maps:** Maps will need to be shown that identify the main roads and pedestrian and cycle footpaths, construction site access points and delivery locations that will be affected by construction activities and which will be used for deliveries. The following aspects need to be carefully considered (as shown in the figure to the right): • **Roads:** vehicular and bicycle traffic along the East Bank Public Road, and the Vieira Estates Access Road • **Parking:** parking areas along these roads • **Pedestrians and cycles**	A detailed map to be inserted here
Specific Considerations	The contractor should identify and prepare specific actions – including the following aspects: • During the construction phase maintain the traffic and schedule construction activities, to the extent possible, to be conducted not during peak times (e.g., early in the morning or night). • Deploy traffic, safety, and road detour signs in close cooperation with the Police. • Coordinate the delivery of construction materials at times that minimize impacts to the existing traffic.	

8.5.7.7 Specific Work Practices

This section presents a summary of the risks and controls that have been identified for specific work practices when considering traffic management and interface with pedestrians. The Contractor should determine what additional risks and proposed management controls are required based on their final design and work method statements. A project risk assessment or job hazard analysis for specific task(s) should be performed.

The following tables are based on the assessment that has been performed. Note that these do not contain an exhaustive list of potential issues, and it would be expected that Contractor develop risk management strategies, controls etc. that suit the scale/nature of finalized construction Project.

Local Business Impacts

PEDESTRIAN SAFETY			
Objective(s)	1. Help Minimize Economic Losses of Local Businesses		
Management Strategy	Management Controls		
		Responsibility	Timing
Control(s)	Measures to be applied include: • Coordinate the delivery of construction materials at times that minimize impacts to the local businesses. • Provide contact information to all residences and business in the Project area (email, phone number) • Alert all residences and business commencement of work at least two weeks before construction starts • Establish measures to ensure continuous access to businesses: • Provide access lanes • Install signs to indicated that businesses are open (e.g., “XXX is OPEN”) • Provide to all residences and businesses weekly updates on project construction progress and schedule, including expected date of completion		
Performance Indicator(s)	Number of complaints received through the Grievance Mechanism		
Monitoring	Communication protocols, public disclosure events		
Reporting	Incident report on grievances received and resolution.		
Corrective Action(s)	• Investigate grievances • Review controls and requirements		

Pedestrian Safety

PEDESTRIAN SAFETY			
Objective(s)	2. To ensure and protect pedestrians both inside and outside the construction work sites. 3. Ensure clear separation of pedestrians from work activities and traffic.		
Management Strategy	Controls, signage and physical separation.		
		Responsibility	Timing
Control(s)	Measures to be applied include: • Ensure pedestrian routes are clearly separated from vehicle routes by fencing and/or a kerb, or other suitable means. • Ensure pedestrian routes are wide enough to safely accommodate the number of people likely to use them at peak times. • Ensure pedestrian routes allow easy access to relevant local work, tourist and residential areas. • Ensure pedestrian routes are kept free of obstructions. • Ensure pedestrian routes are clearly and suitably signed. • Ensure pedestrians can safely cross the main vehicle routes. • Ensure pedestrians have a clear view of traffic movements at crossings and at gates which lead onto traffic routes. • Ensure pedestrians have clearly marked, separate access for use at loading bays and site gates. • Ensure pedestrian routes provide safe access to welfare facilities.		
Performance Indicator(s)	No accidents or incidents.		
Monitoring	Daily inspection of work areas, route signage and protection.		
Reporting	Incident report for non-conformance of pedestrian issues.		
Corrective Action(s)	• Investigate cause of any accident/incident/near miss. • Review controls and requirements		

Vehicle Routes

VEHICLE ROUTES			
Objective(s)	1. To ensure clear and well-signed vehicle routes into and out of the construction site. 2. Ensure non-construction traffic impacts are minimized.		
Management Strategy	Controls, signage and physical separation.		
		Responsibility	Timing
Control(s)	Measures to be applied include: • Ensure routes suitably consider pedestrian issues (as above). • Ensure routes are wide enough to safely accommodate the number of vehicles likely to use them at peak times. • Ensure routes allow easy access to delivery areas. • Ensure routes free of obstructions, and are clearly and suitably signed. • Ensure routes eliminate or reduce the need for reversing. • Ensure that at the final point of exit can the driver see pedestrians on the pavement. • Ensure temporary structures are protected from vehicle impact. • Ensure provision of suitable parking areas. • Ensure routes are planned to reduce the need for excessive vehicle movement. • Ensure measures to prevent vehicles depositing mud on the roadways.		
Performance Indicator(s)	No accidents or incidents.		
Monitoring	Daily inspection of work areas, route signage and protection.		
Reporting	Incident report for non-conformance of traffic movements.		
Corrective Action(s)	• Investigate cause of any accident/incident/near miss. • Review controls and requirements		

Vehicle Reversing

VEHICLE REVERSING			
Objective(s)	To minimize vehicle reversing by following the reversing hierarchy.		
Management Strategy	Management controls.		
		Responsibility	Timing
Control(s)	Implementation of the reversing hierarchy: 1. *Eliminate need to reverse* — Implement one-way systems around the site and in loading and unloading areas Provide designated turning areas. 2. *Reduce reversing operations* — Reduce the number of vehicle movements as far as possible. Instruct drivers not to reverse, unless absolutely necessary. 3. *Ensure adequate visibly for drivers* — If possible, consider use of CCTV, convex mirrors, Fresnel lens, etc. to overcome restrictions to visibility from the driver's seat, particularly at the sides and rear of vehicle. Design vehicle reversing areas which: • Allow adequate space for vehicles to manoeuvre safely • Exclude pedestrians; and • Are clearly signed and have physical stops or buffers to warn drivers that they have reached the limit of safe reversing areas. 4. *Ensure safe systems of work are followed* — Ensure everyone on site understands site rules on vehicle safety. Drivers and signallers need to be in constant communication during reversing operations. Signallers should not be put at risk from vehicle movement, e.g. by standing directly behind reversing vehicles. Ensure all vehicles on site are fitted with appropriate warning devices. 5. *Provide warnings when vehicles are reversing* — Ensure reversing warning lights and alarms are in good working order and instruct workers to keep clear of moving vehicles.		
Performance Indicator(s)	No accidents or incidents.		
Monitoring	Daily briefings of drivers and contractors. Inspection of driving practices.		
Reporting	Incident report for non-conformance of traffic movements.		
Corrective Action(s)	• Investigate cause of any accident/incident/near miss. • Review controls and requirements		

Drivers Safe Work Practices

Drivers Safe Work Practices			
Objective(s)	1. To minimize vehicle incidents through good driver behaviours and practices.		
Management Strategy	Management controls.		
		Responsibility	Timing
Control(s)	Implementation of the following safe work practices for drivers: • Only operate vehicles if you are competent and authorized to drive them • Do not drive with impaired abilities (ill health, poor vision, prescribed/illegal drugs or alcohol) • Make sure you fully understand the operating procedures of the vehicles you control • Know the site routes and follow them. Take care at pedestrian crossovers. • Understand the system of signals used on site • Visiting drivers: seek appropriate authority to enter the site and operate vehicles • Know the safe operating limitations of your vehicles ,particularly relating to safe maximum loads and gradients • Carry out daily checks on your vehicles and report all defects immediately to supervisors • Follow site procedures and comply with all Site rules • Do not drive at excessive speeds • Wear appropriate PPE when out of the cab • Ensure that windows and mirrors are kept dean and dear • Keep the vehicle tidy and free from items which may hinder the operation of vehicle controls • Do not allow passengers to ride on vehicles unless safe seating is provided • Park vehicles on flat ground wherever possible, with the engine switched off, the handbrake and trailer brake applied and where necessary use wheel chocks • Do not reverse without reversing aid or banksman assistance • Where visibility from the driving position is restricted, use visibility aids or a signaller. Stop if you lose site of the signaller or the visibility aids become defective. • Do not remain on vehicles during loading operations, unless the drivers position is adequately protected • Ensure loads are safe to transport • Do not attempts to get off moving vehicles • Do not make adjustments with the engine running and guards removed • Do not smoke during refuelling operations • Do not use a mobile phone whilst driving on site		

Performance Indicator(s)	No accidents or incidents.		
Monitoring	Daily briefings of drivers and contractors. Inspection of driving practices.		
Reporting	Incident report for non-conformance of traffic movements.		
Corrective Action(s)	• Investigate cause of any accident/incident/near miss. • Review controls and requirements.		

Signallers/Banksman Practices

SIGNALERS/Banksman Practices			
Objective(s)	1. To minimize vehicle incidents through good driver behaviours and practices.		
Management Strategy	Management controls.		
		Responsibility	Timing
Control(s)	Implementation of the following practices: • Use relevant safety procedures and correct signalling systems • Ensure drivers understand the correct signalling systems • Signal instructions clearly • Ensure you are visible to the driver and the driver is visible to you; if not, stop the vehicle moving • Stand in a safe location at all times • Warn pedestrians and make sure they are kept away from vehicle operations • Wear appropriate protective clothing, including high-visibility clothing • Report work hazards to supervisors • Make sure you can get to and from your work location safely • Do not ride on the vehicle you are directly unless you are in a designated safe position • Do not direct vehicles if your ability is affected by alcohol or drugs • Do not use a mobile phone whilst directing vehicles		
Performance Indicator(s)	No accidents or incidents.		
Monitoring	Daily briefings of drivers and contractors. Inspection of driving practices.		
Reporting	Incident report for non-conformance of traffic movements.		
Corrective Action(s)	• Investigate cause of any accident/incident/near miss. • Review controls and requirements.		

Construction Equipment

Other Plant and Equipment			
Objective(s)	To minimize equipment incidents through good operator behaviours and practices.		
Management Strategy	Management controls.		
		Responsibility	Timing
Control(s)	Implementation of the following practices: • Allow only competent people to drive construction equipment • Provide stop blocks at the edges of excavations, pits, spoil heaps, etc. to prevent equipment falling. The blocks need to be positioned a sufficient distance away from any unsupported edges and slopes to prevent the weight of the vehicle causing collapse • Do not operate the site equipment controls unless seated on the driving seat • Do not carry passengers unless purpose built seats are provided • Do not drive on gradients in excess of those safe for the plant/equipment (see manufactures instructions) • Avoid manoeuvring on sloping ground • Drive at appropriate speeds for site conditions • Load on a flat ground with brakes applied • Get off equipment when it's being loaded • Ensure loads are distributed evenly and do not let them obscure your vision • Securely fix loads which may cause danger if they move • Stop the vehicle, take out of gear and apply parking brake, before tipping loads • Do not drive around with the skip in the vertical discharge position • Use the appropriate towing pins (not bent pieces of reinforcement bars) • Do not leave the engine running when you leave the vehicle • Be aware of the difference in performance of the site equipment when loaded and unloaded, particularly speed, braking and stability on slopes • Be aware of the different handling and braking characteristics of the vehicle in the wet or icy conditions • Do not alter tyre pressures outside the manufacturers specifications • Do not use a mobile phone while operating equipment		
Performance Indicator(s)	No accidents or incidents.		
Monitoring	Daily briefings of drivers and contractors. Inspection of driving/operating practices.		
Reporting	Incident report for non-conformance of plant and equipment movements.		

Corrective Action(s)	• Investigate cause of any accident/incident/near miss. • Review controls and requirements.		

8.6 Operations Phase

This Operations ESMP provides recommendations and preliminary plans that should be further developed and included by GYSBI into the existing Environmental and Social Management System already in place at the Port in order to achieve compliance with international best practice in environmental protection.

Given that the Project comprises three main components as described in Section 2.5, the Operations phase of the Project would only apply to those activities implemented within the Port and the Annex.

8.6.1 Operations Environmental and Social Management Plan

8.6.1.1 Objective of this Environmental and Social Management Plan

This ESMP is designed to establish a framework for the proper management and mitigation measures to be implemented during the Operations of the proposed Port improvement Projects. Project activities will be carried out by GYSBI and its management companies, so this Plan includes strategies that will them to manage, mitigate, and avoid adverse effects to environmental and social receptors which could potentially be directly or indirectly affected by Project activities.

8.6.1.2 Key Impacts

The proposed Project has the potential to affect the environmental and social conditions within the Port area. Project activities within the Port area that will lead to changes in Operations are limited to improved traffic flow patterns, increased warehouse/storage space and improved/increase parking areas. Potential negative impacts during the operational phase of the Project are not expected to change much from those resulting from current operating conditions of the Port; however could require changes to the current Environmental and Social Management System (ESMS). Negative impacts could be caused by the following Project activities:

- Changes to traffic patterns could lead to operational health and safety impacts;
- Changes to storage areas and handling procedures for hazardous materials and hazardous wastes; and
- Changes to emergency response procedures and emergency response equipment storage/staging areas.

This EA for the Project determined that the proposed Port improvement activities are not expected to have impacts on flora or fauna or cultural resources in the Port area during the operations phase of the Project.

8.6.1.3 Environmental Policy

Operation of the Port is the responsibility of GYSBI who already maintains and implements an ESMS. This ESMS will have to be updated to ensure that any changes in operations resulting from Project activities comply with relevant local regulations, international agreements, as well as IDB policies and safeguards.

8.6.1.4 Organization and Responsibilities

The Executing Agency of the Project's operations phase covered by this ESMP would be GYSBI responsible for ensuring that the ESMS is updated and implemented and that:

- All contractors in charge of Port management and activities implement the requirements in the ESMS and comply with local and international regulations regarding the handling and disposal of hazardous materials and hazardous wastes, and implement the appropriate labour and health and safety regulations. These requirements must be spelled out in all tender documents and contracts.
- All contractors in charge of Port management and activities perform data collection and monitoring.
- All contracts include payment schedules based on quantifiable deliverables (documentation for the appropriate transportation and disposal of wastes).

8.6.1.5 Environmental, Social, and Safety Training

As must be specified in contract documents, all Port contractors must be trained in the appropriate handling and disposal of the hazardous materials that relate to their specific tasks.

Contractors must be trained in emergency response procedures which must include spills, releases, storm events, and fires. The GYSBI Managers are responsible for ensuring that contractors hired guarantee that training is up-to-date for all pertinent personnel.

8.6.1.6 Environmental and Social Management Program

Management Measures Controls

If management measures are properly updated and implemented, the Project impacts are considered to be negligible. Project operations activities will be confined to inside the Port, with no disturbance to new, undeveloped areas.

The negligible impacts of the Project will be mitigated and managed with the application of industry-standard best practices. Table 8-6 summarizes these best practices. Any contractor or supplier that may be involved in the Project will be required to incorporate the proposed management measures and management controls within their own working procedures and plans.

Table 8-6: Environmental and Social Management Program – Updates to Existing Management Measures and Management Controls

Impact	Resource	Source of the Impact	Recommended Mitigation/ Management Measure or Embedded Control	Responsible to Execute
Physical				
Soil and groundwater contamination from spills	Soils / Hydrology	• Inappropriate storage/use of hazardous materials due to changes in operational procedures • Inappropriate disposal/storage of hazardous waste due to changes in operational procedures	• Update existing ESMS and Hazardous Materials/Hazardous Waste Management Plans to ensure they include: ○ Appropriate waste bins, type, volume and service frequency to accommodate anticipated waste streams. ○ All loads arriving or leaving the site are appropriately secured. ○ Provide information regarding waste management in site specific inductions, including waste separation and importance of securing vehicle loads. ○ Ensure licensed contractors are used to collect controlled wastes. • Train all appropriate personnel in changes to hazardous material/hazardous waste management resulting from changes to operational procedures	GYSBI and contractors that may participate in Port operations.
Social				
Fire and explosion	Fire hazard risk	• Fires caused by changes operational procedures at the Port.	• Update existing ESMS and Hazardous Materials/Hazardous Waste Management Plan to ensure they include: ○ Emergency response procedures as described below ○ Prohibitions of smoking or ignition sources in areas not approved for such use.	GYSBI and contractors that may participate in Port operations.
Exposure to hazardous chemicals	Human health	• Accidental spills due to changes to operational procedures (e.g., used oils and lubricants, used battery acid), during collection and transportation	• Update existing ESMS and Hazardous Materials/Hazardous Waste Management Plan to ensure they include: ○ Spill kits with the appropriate personal protective equipment (PPE) necessary for the type of spill (such as gloves and eye protection). • Ensure removal contractors are trained in any new spill response changes	GYSBI and contractors that may participate in Port operations.
Changes to traffic patterns/increased traffic flow	Human health	• Implementation of new traffic patterns as a result of modifications to the Port	• Ensure the ESMS is updated with new traffic and security procedures • Train all appropriate personnel in changes to traffic patterns and security procedures as appropriate	GYSBI and contractors that may participate in Port operations.

Monitoring and Evaluation

During the operation of the Port, GYSBI will verify that activities are conducted in compliance with the ESMS and applicable regulatory requirements.

GYSBI will verify the following:

- Appropriate transportation and disposal of hazardous waste.
- Maintenance of transportation and disposal documentation
- Health and safety procedures.

GYSBI will maintain all documents relating to the following:

- Physical environment: report any event related to the physical environment, such unanticipated spills and releases.
- Occupational health and safety (OHS): discuss the OHS performance and detail any event or incident, its causes and consequences, an analysis of root causes, and measures taken to prevent similar events in the future.
- Community grievances: provide details of community grievances including list of grievances, how grievances were solved, list of any pending grievances, and root causes of grievances.

Emergency Plan

To respond to emergencies, including spills or leaks during the use or transport of the hazardous substances/wastes, or from fires or extreme weather events, GYSBI must update the current emergency response plan to handle and mitigate any emergency. This emergency response plan must be made available to all employees and contractors working at the Port. The following activities should be carried out in case of emergencies:

Spills and leaks:

- Provide spill kits with the appropriate spill response equipment depending on the types of materials handled: oil, battery acid, etc. Spill kits should also contain the appropriate PPE necessary for the type of spill (such as gloves and eye protection).
- During an emergency spill, use the emergency kit to contain the spill. If required, contain the spill using available materials such as soil berms and/or wood planks.
- If materials are leaked, contain the leak and clean up and dispose of material accordingly. Remove spilled materials and place it in an appropriate container for disposal, only if able to do so safely.
- Investigate and report the cause of the spill and retroactively implement procedures to prevent it from happening again.

Fires:

- Provide training to personnel on the causes of fires, extinguishing methods, and equipment use.
- Evacuate the area if there is the possibility for an explosion.
- Prohibit smoking anywhere where there is a fire hazard.
- Assist anyone affected, performing first aid if needed, and transport them to the nearest hospital/clinic if necessary.

- After the fire and once it is safe to enter, ventilate the areas and remove any remaining residual materials for their proper disposal.
- Investigate and report the cause of the fire and retroactively implement procedures to prevent it from happening again.

Work Accidents:

- Provide information and/or training to all employees who are at risk.
- Ensure the used of PPE when required and provide a first aid kit for minor accidents/lesions at the work place.
- In case of an emergency, report the emergency to the supervisors and if needed, transport affected personnel to the nearest hospital/clinic.
- Investigate and report the cause of the accident and retroactively implement procedures to prevent it from happening again.

Community Grievance Mechanism

GYSBI will update their current grievance mechanism as needed based on any changes to Port operations. The grievance mechanism must include the following best practice elements:

- A transparent grievance receipt and registration system to provide culturally appropriate ways for stakeholders to register grievances and confirm they have been received;
- Grievance eligibility assessment to determine if the issues raised in the grievance fall within the scope of the grievance mechanism and the grievances are eligible to file in the grievance mechanism;
- Grievance evaluation to clarify the issues and concerns raised in the grievance, gather information, and identify whether and how the issues may be resolved;
- Problem solving, with or without the assistance of independent, third parties, that include:
    - Internal decision-making processes, whereby issues are handled by designated members of the Project Management Team or other company officials, using clearly articulated standards and criteria, to develop and propose a company response to the grievance and to allow for an appeals process;
    - Joint problem solving, in which the company and the complainant engage in direct dialogue arranged by an Environmental and Social Responsibility Officer; or
    - Third-party mediation to determine a solution when a voluntary agreement is not possible;
- Grievance tracking, monitoring, and reporting, consisting of an internal grievance documentation and tracking system, monitoring of the status of each grievance, and monthly reporting and evaluation of the grievance mechanism, key issues and areas for improvement;
- Company-community feedback and information sharing to strengthen the grievance resolution processes, including asking stakeholder how the grievance mechanism may be strengthened, and ensuring that the mechanism is understood, accessible and appropriate for all stakeholders; and
- Organizational learning and identification of systemic problems and the need for changes to policies and procedures to prevent recurrent future disputes, as identified in monthly and annual evaluations and reports.

9. STAKEHOLDER ENGAGEMENT

Stakeholder consultation is an integral part of a robust EA process, with the level and methods of consultation designed to be commensurate with the Project's complexity, the anticipated significance of its impacts, and the level of public interest in the Project.

According to the IFC's Performance Standard 1, timely and appropriate consultations must be carried out in the context of environmental impact assessments, with at least two consultations for all Category A projects and one consultation for all Category B projects. Taking into account the Category B designation for this Project, the following stakeholder activities have been conducted as part of this EA process:

9.1 Public Disclosure Phase Consultation

Consistent with IDB Invest's Sustainability Policy, a public disclosure meeting was organized by the Project Proponent, GYSBI, on April 21 2021. A morning session was conducted via Zoom with neighbouring business and residences, and an afternoon session, also via Zoom, with government agencies. The purpose of the meeting was to provide an overview of the Project and its impacts to stakeholders, disclose the results of the EA, describe the mitigation and management measures to be implemented, divulge the grievance mechanism, and solicit feedback and questions from attendees.

9.1.1 Disclosure and Engagement Methods and Materials

The public consultation process encourages meaningful participation by stakeholders. The Project executing agency employed a range of methods and channels for disclosing information in order to tailor disclosure to the interests and needs of the various stakeholder groups, and produced materials appropriate for the specific stakeholder types.

Consultation with informed stakeholders to discuss the plans and activities of the Project including the potential impacts and opportunities associated with them, is a two-way process that allows the incorporation of feedback from interested parties in the design and Project planning. The Project included the following considerations for participation activities:

- Programming: All forms of participation were carried out in a timely manner. Invitations to meetings were sent in advance of participation activities, to ensure that interested parties had the opportunity to participate without interruption in their meetings, personal schedules. The meeting was widely advertised to relevant stakeholders (see invitations in Appendix B). This includes the general populations of the affected neighbourhoods, local business owners and the relevant associations representing them, and other industrial tenants adjacent to the Project site;
- Location: The consultation meeting was carried out via Zoom, due to the ongoing COVID-19 pandemic. As previously mentioned, the meeting took place on Wednesday the 21st of April 2021, at 10am local time for the neighbouring stakeholders, and at 1:30pm local time for government agencies.
- Cultural Adequacy: All forms of participation of stakeholders in the activities were designed to meet the needs of the beneficiaries, in order to ensure that everyone had the opportunity to participate freely and informally;
- Language: the public consultation meeting was conducted in the local language (English) using simple terminology (non-technical and concise) and effective communication tools (including verbal alternatives, based on images or other, written format). This ensured that all participants had the opportunity to understand Project information and participate actively in the discussions;

- Recording and Feedback: all group participation activities were recorded using meeting minutes and Zoom recording, and attendance was taken to ensure the transparency of the consultation process (see Appendix B).

The consultation allowed for ample time for a live questions and comment period so that stakeholders could freely express their concerns. All questions and comments were recorded and are included in Appendix B of this EA.

9.1.2 Monitoring and Reporting

9.1.2.1 Monitoring

It is important to monitor stakeholder engagement to ensure that consultation and disclosure efforts are effective, and in particular that stakeholders have been meaningfully consulted. During the public consultation event, the following key issues were monitored:

- Consultation activities were conducted with government authorities and non-governmental stakeholders;
- Effectiveness of the engagement processes by tracking feedback received;
- Analysis of grievances received;
- Recording the level of participation including by specific stakeholder categories and groups (e.g. women);
- Recording the number of comments by topic and type of stakeholder, and details of feedback provided;
- Recording and tracking commitments made to stakeholders; and
- Recording community attitudes and perceptions on Project activities.

9.1.2.2 Reporting

This EA and the ESMP were updated to include the results of the consultation process. Complaints and/or concerns received were addressed during the meeting. As mentioned above, a list of attendees, as well as minutes of the public consultation event and the presentation are included as Appendix B.

9.1.3 Results of the Public Consultation Meeting

9.1.3.1 Attendance and Execution

The public consultation event had 6 attendees for the morning session and 5 attendees for the afternoon session, and included key stakeholders from government organizations as well as specific business, industrial and community stakeholders (see Appendix B for the attendee list). Attendance to the meeting was significant and attendees were participative and showed interest for the Project.

A brief presentation within the broader context of Project was made by GYSBI and then the results of the Environmental and Social Analysis of the project and its respective Environmental and Social Management Plan were presented. The Project's grievance mechanism was also explained, and both a telephone number and an e-mail address were divulged so that the stakeholders can file their grievances. Finally, attendees were given the opportunity to ask questions and comments, and Project

representatives offered necessary answers. The event lasted one hour and fifteen minutes for the morning session, and one hour for the afternoon session.

9.1.3.2 Key Questions and Comments from the Participants

Key issues and concerns expressed by the stakeholders present during the public consultation revolved mainly around the cumulative impacts and other impacts to neighbouring stakeholders (see Appendix B for public consultation meeting minutes). There was one question about the impacts to the river flow of the construction of the wharf. Other questions about the Project included the following:

- Cumulative impacts to surrounding communities,
- Question if buffer zones were implemented around the Annex,
- Question if residential areas were taken into account in the study, and
- Question about details of the livelihood restoration plan.

9.1.3.3 Conclusion of the Public Consultation

Based on the types of questions raised during the public consultation, there does not appear to be any discontent or apprehension with the Project; however, the stakeholders present expressed interest in being informed during construction activities that may disrupt them (traffic, noise, air quality concerns). Upon the conclusion of the stakeholder consultation, GYSBI expressed the importance of stakeholder involvement and reiterated that an email and a telephone number is available for expressing any concerns or ideas. It will be GYSBI's responsibility to ensure continued communication with the local stakeholders as well as the appropriate implementation of the Grievance Mechanism in order to address any concerns during the construction and operations of the Project, as described in Section 8.5.5 of this EA.

10. CONCLUSIONS

10.1 Impact Assessment Overview and Environmental Characterization

Table 10-1 summarizes the key impacts of the Project on the resources assessed in this EA. Based on the In accordance with the IDB's OP-703, screening and classification, the Project will have impacts on the environment and the community, and is therefore classified as Category "B." Category B projects "are likely to cause mostly local and short-term negative" impacts, for which "effective management measures are readily available". The table summarizes each key impact identified in the EA and their pre-management impact significance rating, the associated management measure(s), and the post-management impact significance rating, as developed through the impact assessment process defined in Section 6.1 of this EA.

In summary, the EA determined that the Project would likely result in some environmental and social impacts, but these impacts could be readily mitigated and managed, as long as the actions identified in the Table 10-1 below (see Section 6) and in the ESMP are effectively implemented, including the monitoring measures described in Table 8-1). In addition to implementing measures to minimize or avoid the potential adverse impacts of the Project, measures to enhance the positive effects of Project activities, as described in the ESMP, could be implemented to maximize the short- and long-term benefits of the Project. Ultimately, implementation of the Project would result in positive environmental and social outcomes, because the proposed Project will improve the handling of cargo and services at the Port and Annex.

Table 10-1: Environmental and Social Impact Assessment Summary

Impact Significant Ratings

Negligible
Minor
Moderate
Major
Positive

Resource/ Receptor and Impact	Project Phase	Pre-Management Impact Significance	Management Measures	Residual Impact Significance
Air Quality				
Emissions from construction and operations vehicles, vessels, fuel storage, and equipment.	Construction/Operations	Moderate	• Maintain all construction equipment in accordance with manufacturer's specifications. • Suppress dust as needed in unpaved areas (e.g., use of water sprays). • Avoid burning non-vegetative wastes (refuse, etc.) at construction sites. • Avoid unnecessary idling of construction equipment or delivery trucks when not in use. • Use of vapour recovery systems for fuel storage, loading and offloading of fuels. • Use floating top storage tanks. • Limit loading/unloading activities during poor air quality conditions. • Implement tank and piping leak detection and repair programs.	Minor

Resource/ Receptor and Impact	Project Phase	Pre-Management Impact Significance	Management Measures	Residual Impact Significance
			• Keep work vehicles clean (particularly tires) to avoid tracking dirt around and off the site. • Cover work vehicles transporting friable materials to prevent materials being spread around and off the site. • Minimize drop heights of materials • Develop and implement a grievance procedure in the event of any dust and/or exhaust emissions complaints being received.	
Noise				
Noise generated by construction equipment and activities	Construction	Moderate	• Maintain all construction equipment in accordance with manufacturer's specifications. • Schedule construction, modification, and rehabilitation work during daylight hours when increased noise levels are more tolerable. • Schedule construction, modification, and rehabilitation work to minimize activity during peak periods of traffic. • Develop and implement a Construction Communications Plan to inform adjacent receptors (e.g., residents, commercial businesses, churches, and hotels) of construction activities. • Perform regular noise monitoring at a least three locations nearest sensitive receptors. • Provide acoustic enclosures, if necessary. • Install broadband spectrum backup alarms on construction vehicles as opposed to the typical single-tone frequency alarms (broadband alarms attenuate more quickly over distance due to the incorporation of higher frequencies). • Avoid unnecessary idling of construction equipment and trucks.	Minor
Soil and Water Resources				
Dredging activities for berths construction and maintenance dredging	Construction/Operations	Moderate	• An anti-turbidity barrier to confine the affected area preventing the dispersion of potentially contaminated suspended solids beyond the immediate area of the dredging • Monitor water quality for potential contamination during dredging activities •	Minor
Natural Disasters and Risks				

Resource/ Receptor and Impact	Project Phase	Pre-Management Impact Significance	Management Measures	Residual Impact Significance
Climate change and natural hazards (flood risk)	Construction/Operations	Moderate	• All new construction and improvements should include a properly designed drainage system intended to remove water efficiently from the roads and other Project improvement sites. Implement a Construction Environmental Management Plan and a Health and Safety Plan and Emergency Response Plan, which include the following: • All construction and improvements should include a properly designed drainage system. • Ensure drainage solutions have careful calculations and consideration of potential hydrological climate change. • Ensure adequate distance is maintained between roads and immediately adjacent buildings. • Properly secure equipment and materials. • Immediately stabilize disturbed areas. • Provide procedures for site evacuation.	Minor
Waste				
Waste generated by construction and operations activities	Construction/Operations	Moderate	• Provide appropriate waste bins, type, volume, and service frequency to accommodate anticipated waste streams. • All loads arriving or leaving the site will be appropriately secured. • Provide information regarding waste management in site-specific inductions, including waste separation and importance of securing vehicle loads. • Ensure licensed contractors are used to collect controlled wastes.	Minor
Land Traffic				
Increased pedestrian and traffic safety. Increased traffic congestion and disruption.	Construction / Operations	Minor	• During construction and operations phases, maintain the traffic and schedule activities, to the extent possible, to be avoided during peak times (e.g., early in the morning or night). • Deploy traffic, safety, and road detour signs in close cooperation with the authorities. • Coordinate the delivery of construction materials at times that minimize impacts to the existing traffic.	Negligible

Resource/ Receptor and Impact	Project Phase	Pre-Management Impact Significance	Management Measures	Residual Impact Significance
			• Develop and implement a Traffic and Pedestrian Management Plan	
River Traffic				
Increased river traffic	Construction / Operations	Moderate	• All vessel crew are to be qualified vessel operators; • The ships will operate in agreement with the standard procedures and protocols currently used by GYSBI. For example, the port pilot will determine the navigation speed in the access channel depending on the meteorological circumstances. The Project will collaborate and inform authorities in order to avoid riverine traffic accidents. • Placement of temporary navigation aids to support safe navigation during construction and to demarcate exclusion zones if required. • The Project will also comply with the safety rules and regulations of MARAD, in particular, the Guyana Shipping (Ship and Port Facility Security) Regulations (2016).	Minor
Biodiversity				
Loss or disturbance of vegetation. Wildlife injury or mortality.	Construction	Minor to Negligible	• When designing and planning work elements, minimize temporary and permanent construction footprints, • Demarcate work area with fencing to minimize disturbance or removal of natural vegetation, • Conduct works outside the water birds breeding season (April – Sept) • Minimize lighting • Implement above measures to minimize noise and air pollution, • Demarcate work areas with fencing to minimize disturbance or removal of natural vegetation; • Plan equipment access locations that minimize impacts, where possible; avoid areas with less stable structure such as steep banks.	Negligible
Underwater Noise	Construction/Operations	Minor	• Maintain functional mufflers on all diesel operated equipment; • Installation of a cofferdam to provide a platform for welding joints or pipe pile and a barrier for noise/vibration and to reduce the potential for behavioural impacts on estuarine and marine mammals, and fish species;	Negligible

Resource/ Receptor and Impact	Project Phase	Pre-Management Impact Significance	Management Measures	Residual Impact Significance
			• Ensure vessel operators undergo awareness training; • A "soft start" procedure shall be used during all pile driving activities to give aquatic mammals, birds and fish species an opportunity to move out of the area and away from the sound source • Ensure project areas (within a 500 m radius) are monitored for presence of mammals; and • Record all mammal observations	
Degradation of Aquatic Habitat	Construction/Operations	Moderate	Implement Erosion and Sediment Control Management Plan as well as a Spill Prevention, Control and Countermeasures Plan to include: • Sediment control procedures during in-water works to minimize the release of potentially contaminated fine sediments to adjacent waterways and recommends work to occur during low flow periods and/or dry periods for the Demerara River and McDoom Drainage Canal during the months of August to November. • Demarcate work areas with fencing to minimize disturbance or removal of natural vegetation; • Plan equipment access locations that minimize impacts to riparian areas, where possible; avoid areas with less stable structure such as steep banks; and • Minimize temporary stockpiling and place stockpiles outside of the active floodplain. Prevent runoff from stockpiles from entering creeks by using erosion control measures such as silt fences and/or straw wattles.	Minor
Increased Surface Water Runoff from Vegetation Clearing	Construction	Minor	• Implementation of drainage system to direct surface runoff to the stormwater systems • Installation of sediment and erosion controls • Avoidance of vegetation disturbance.	Negligible
Social				
Loss of income for businesses	Construction	Minor	• Phase construction activities, create alternate entrances, walkways, detours and parking areas as needed • Provide opportunities for local employment • Develop and implement a Traffic and Pedestrian Management Plan	Minor to Negligible

Resource/ Receptor and Impact	Project Phase	Pre-Management Impact Significance	Management Measures	Residual Impact Significance
			• Develop and implement a Livelihood Restoration Plan for potentially Affected Persons. • Continue stakeholder engagement through Project implementation through the use of the Stakeholder Engagement Plan. • Implement a Grievance Mechanism to receive and respond to grievances.	
Provision of construction jobs to local companies and materials sourced from the local economy	Construction / Operations	Positive	• Implement job quotas for local employment and sourcing requirements for construction contractors based on the size and scope of the Project	Positive
Impacts on potential vulnerable groups (gender or disability related)	Construction	Negligible	• Ensure adequate ground surfaces and associated infrastructure (such as ramps) for patron mobility (e.g., high heels and crutches) at construction sites; and • Conduct Gender Awareness Training for contractors and their staff.	Negligible
Health and Safety				
Impacts on health and safety of workers and public	Construction	Moderate	• Develop and implement a Construction Health and Safety Plan • Appropriate and timely engagement of stakeholders, to ensure that they are well informed of the nature and duration of Project activities, and have a good understanding of associated safety risks. • Implement good housekeeping practices in and around the Project construction sites including elimination of standing water or, if not practicable, treatment of standing water to kill mosquito larvae • Implement stakeholder outreach to vulnerable subpopulations or to those responsible for maintaining their safety • Establish and publicize a Grievance Mechanism to receive and respond to grievances.	Minor
Cultural Resources				
Possible disruption to the use of living heritage sites	Construction	Moderate	• Conduct an exhaustive inventory of buildings and structures in the Project area prior to the onset of construction. • Perform meaningful stakeholder engagement with affected communities to identify living heritage and other structures: places and features that may have historical,	Minor

Resource/ Receptor and Impact	Project Phase	Pre-Management Impact Significance	Management Measures	Residual Impact Significance
			cultural or aesthetic importance to members of the community. • For sites such as churches, mosques and mandirs, engage with the administrators of these institutions to understand their operating, peak hours, and regular events such as worship services, allowing for coordination and planning to avoid or minimize undue disruptions. • Develop plans in consultation with stakeholders to ensure their protection during the construction phase.	
Damage to undiscovered archaeological sites due to construction	Construction	Minor	• Implement a simple Project Chance Finds Procedure (CFP) during all Project groundwork.	Negligible

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APPENDIX A EXISTING PERMITS

APPENDIX B PUBLIC MEETING REPORT