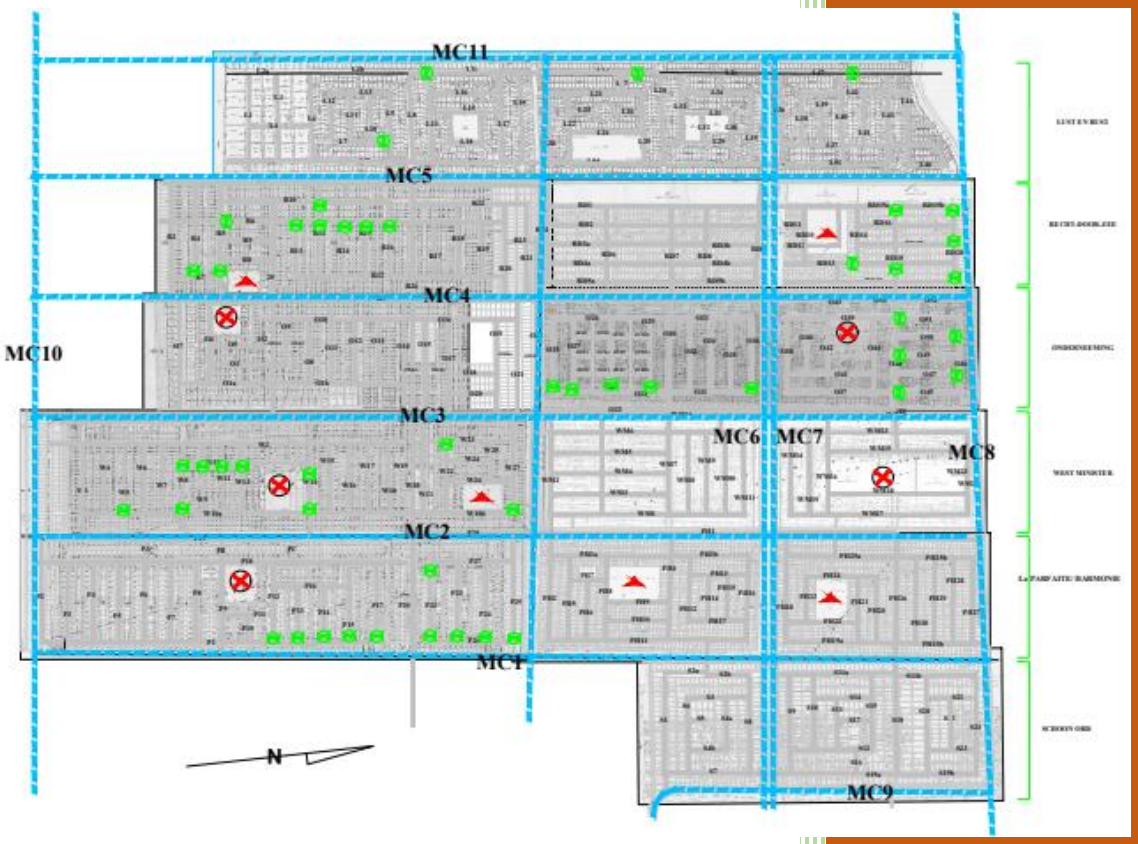
ENVIRONMENTAL AND SOCIAL ASSESSMENT (ESA) STUDY FOR LA PARFAITE HARMONIE HOUSING SCHEME, WEST BANK DEMERARA, REGION NO. 3

ADEQUATE HOUSING AND URBAN ACCESSIBILITY PROGRAMME (AHUAP) - GY/L1031.



Prepared for:

Central Housing and Planning Authority
Ministry of Housing and Water
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Acronyms

AHUAP	Adequate Housing and Urban Accessibility Programme
CHPA	Central Housing and Planning Authority
EHS	Environmental, Health and Safety
ERP	Emergency Response Plan
ESA	Environmental and Social Assessment
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
GoG	Government of Guyana
GPL	Guyana Power and Light Company
GRW	Grievance Redress Mechanism
GTT	Guyana Telephone and Telegraph Company
GUYSUCO	Guyana Sugar Corporation
GWI	Guyana Water Inc.
HSE	Health, Safety and Environment
IDB	Inter-American Development Bank
ITCZ	Inter-Tropical Convergence Zone
IUCN	International Union for Conservation of Nature
LCDS	Low Carbon Development Strategy
LRP	Livelihood Restoration Plan
MH&W	Ministry of Housing and Water
NDS	National Development Strategy
NDC	Neighbourhood Democratic Councils
NEAP	National Environmental Action Plan
PAPs	Project Affected Persons

PR	Public Relations
SR	Scoping Report
TOR	Terms of Reference
WHO	World Health Organisation

EXECUTIVE SUMMARY

The Government of Guyana, with support from the Inter-American Development Bank (IDB) is currently implementing the Road Network Upgrade and Expansion Programme: Adequate Housing and Urban Accessibility Programme" or AHUAP. The programme is specifically aimed at improving the quality of life in urban and peri-urban Georgetown, through better access to adequate housing and basic infrastructure for low income populations, enhance urban and suburban mobility and safety, and strengthen national and local capacity to operate and maintain urban services. The Ministry of Housing and Water, through the Central Housing and Planning Authority (CHPA), is tasked with the implementation of the AHUAP, which is designed as a multi-work programme. Component 1 of the Programme focuses on the delivery of quality housing and basic infrastructure solutions and includes three (3) sub-components: affordable and sustainable housing; consolidation of existing housing schemes; and implementation support and institutional strengthening. Under this Component the CHPA is pursuing a project to improve infrastructure within La Parfaite Harmonie, West Bank Demerara, Region 3. For this project an Environmental and Social Assessment (ESA) was required to be performed.

The ESA aims at identifying potential environmental, social, health and safety risks associated with the implementation of the project, and developing recommendations to mitigate and manage such risks. The general objective of the ESA is to ensure that the potential environmental and social impacts of the activities of the proposed project interventions are identified, evaluated and addressed as part of the project's design phase for the project site, and further improve integration of project interventions into their environmental and social setting, and mitigate negative environmental and social impacts.

The project consists of five categories of infrastructure construction and rehabilitation works which spans across six adjoining communities within the West Bank Demerera area. These communities include Lust-en-Rust, Recht-Door-Zee, Onderneeming, Westminster, La Parfaite Harmonie and Schoonord. The five categories of works include road rehabilitation, installation of reinforced concrete drains, construction of paved sidewalks, construction of reinforced concrete culverts and cleaning of drains. The project will be divided in various lots to be awarded to different contractors through a tendering process.

The project area has a long history of use by agriculture, being occupied by the sugar plantations for over two centuries. The area was returned to the state when the sugar estates abandoned the lands and were subsequently converted to housing lands. Currently, housing occupies most of the area as part of a planned developing housing. Most of the utilities and infrastructure required for housing development are in place.

The project activities are expected to comply with all national policies and plans, legislation and guidelines, especially those relating to the environment, health and safety. The project will also have to comply with the IDB Safeguard Policies relevant to the project. The CHPA will have direct oversight of the project and has an Environmental Unit within the Projects Department which will ensure environmental compliance. The Environmental Protection Agency is also expected to play a role in ensuring environmental compliance. The contractors will be required to have as part of their project team an Environmental Personnel who will be required to ensure the environmental measures set out in the Environmental and Social Plan (ESMP) are implemented.

During the ESA preparation process stakeholders' engagements were conducted, including central and local levels stakeholders. The general feedback is that the community is pleased for the project since it will result in improvement to the infrastructure, which will impact positively on their daily lives. No significant impact to the community was identified. A few persons who conduct roadside vending may be required to temporarily relocate their stalls during the construction activities. However, the feedback from these persons indicate that they are willing to do so to facilitate the project.

Most of the project impacts identified or envisaged will be localised and can be mitigated with the implementation of management and mitigative measures. These impacts are directly linked to the construction works and will likely to occur only around the areas of active construction works. The more significant potential impacts identified are:

- Dust nuisance
- Noise generation
- Surface water sedimentation/contamination
- Disruption of utilities
- Workers health and safety
- Public safety

No impact to the biological environment is foreseen since the area is an already developed housing scheme. Most social impacts are positive since the project will result in enhancement of the community. Minor impacts on the community will include disruption to accesses to properties during construction, and possibly temporary relocation of a few roadside vendors during construction.

An ESMP is prepared which recommends measures to be implemented by CHPA and the contractors to ensure any potential negative impacts are managed, prevented or minimised. Measures are included for the mitigation of the following:

- Dust and noise suppression
- Protection of water quality
- Collection and disposal of waste to be generated
- Handling and storage of fuel and other hazardous materials
- Measures to address the disruption of utilities and services
- Health and safety measures for workers
- Measures to ensure the safety of the public
- COVID-19 related guidance

The measures outlined in the ESMP are to be communicated early in the process to the contractors so these can be addressed prior and during construction. The contractors will be required to provide the necessary awareness to workers to ensure they are aware of their responsibilities in ensuring compliance. The work sites are to be monitored for non-compliance and corrective actions are to be addressed promptly. Environmental monitoring will also have to be done by the contractors, including the monitoring of air quality, noise levels, and water quality. The contractors will also be required to implement an Emergency Response Plan.

Prior and during project implementation it is recommended that the community be kept informed on the project and the progress of works. As such, a Stakeholder Engagement Plan is included as part of the management framework for the project. In addition, a Grievance Redress Mechanism is also included so as to enable any stakeholder who may have an issue with the project or project related activities to have addressed in an understandable, transparent and fair process.

Overall the potential project impacts are few, which are very localised, and can be prevented or minimised effectively once the measures outlined in the ESMP are implemented.

1.0 INTRODUCTION

1.1 Background

The Government of Guyana (GoG), in May of 2017, renegotiated with the Inter-American Development Bank (IDB) to reformulate a 2012 loan operation "Road Network Upgrade and Expansion Program" (GY-L1031) to include a component addressing housing and basic infrastructure needs of low-income populations in social housing schemes in the Greater Georgetown area. This initiative gave rise to the reformulated Road Network Upgrade and Expansion Programme labelled "LO-1031 BL/GY: Adequate Housing and Urban Accessibility Programme" or AHUAP. The programme is specifically aimed at improving the quality of life in urban and peri-urban Georgetown, through better access to adequate housing and basic infrastructure for low income populations, enhance urban and suburban mobility and safety, and strengthen national and local capacity to operate and maintain urban services. The Ministry of Housing and Water (MH&W), through the Central Housing and Planning Authority (CHPA), is tasked with the implementation of the AHUAP, which is designed as a multi-work programme.

Due to the nature of the Programme, it was categorised by the IDB as a Category B Programme. This means that negative environmental and social impacts of the Programme activities are likely to be mostly local and short-term, and can be readily mitigated with effective mitigation measures. Based on this categorization, IDB Operational Policy 703- Directives B.3 and B.5, and the Programme's Amendatory Loan Agreement, the Environmental and Social Management Framework (ESMF) and the Operating Regulations requires that an Environmental and Social Assessment (ESA) for each project site be performed, with the development of an Environmental and Social Management Plan (ESMP) to identify and manage environmental, social, health and safety risks and impacts. Further, the reformulated program requires the development of the ESA to support approval of the reformulation.

Component 1 of the Programme focuses on the delivery of quality housing and basic infrastructure solutions and includes three (3) sub-components: affordable and sustainable housing; consolidation of existing housing schemes; and implementation support and institutional strengthening. Under this Component the CHPA is pursuing a project to improve infrastructure within La Parfaite Harmonie, West Bank Demerara, Region 3. For this project an ESA is required to be performed. In this regard, the CHPA procured the services of a multidisciplinary team, through a private consultancy, to undertake the ESA for project. This document presents ESA for the project.

1.2 Purpose and Objectives of the ESA Study

The ESA aims at identifying potential environmental, social, health and safety risks associated with the implementation of the project, and developing recommendations to mitigate and manage such risks. The general objective of the ESA is to ensure that the potential environmental and social impacts of the activities of the proposed project interventions are identified, evaluated and addressed as part of the project's design phase for the project site, and further improve integration of project interventions into their environmental and social setting, and mitigate negative environmental and social impacts. The specific objectives of the ESA are:

1. To understand the existing environmental and social conditions within the project area; and

2. To identify the potential social and environmental impacts of the proposed project interventions.

As such, the ESA focused primarily on the implementation of all infrastructure works related to the project and identified the potential impacts of the activities on the physical, biological and socio-economic environment, and outlined mitigation measures to prevent and reduce these impacts. In addition, many of the activities of the project would involve elements of health and safety were also addressed and integrated, as far as is necessary, with the prescriptions for environmental and social management. The ESA covered a geographical location comprising the following communities on the West Bank of Demerara:

1. Lust-En-Rust;
2. Recht-Door-Zee;
3. Onderneeming;
4. Westminster;
5. La Parfaite Harmonie; and
6. Schoonord

1.3 Approach and Methodology

The ESA was prepared in accordance with the consultancy's Terms of Reference, which specifically requires the assessment to be conducted and a management plan prepared for all the infrastructure works, which will eventually form part of the Contractors' contract documents. In addition, the preparation of the ESA was guided by the project's ESMF. Further, the process was done in accordance with the Environmental Protection Agency (EPA) guidelines for the preparation of EMPs (dated March 2013), and guided by IDB requirements, guidelines and safeguard policies which are applicable to the project or those triggered by the project. All works were conducted within the limits of the Ministry of Health COVID-19 Guidelines.

During the initial phase of the preparation of the ESA the following was done to gain an in depth understanding of the project and the project environment:

- Meeting with project officials from the CHPA to discuss the proposed project and collect any project related information. Throughout the process several discussions were held with key personnel from the CHPA in order to ascertain a good understanding of the civil works to be undertaken and other activities as it relates to the general scope of work.

- Review all project related information to gain a clear understanding of the project and to determine the scope and magnitude of the works to be done. Some amount of existing data and literature relevant to the type of project and the project environment also exist and were therefore reviewed. These documents include:

    - The project's Environmental and Social Framework
    - The Sophia project Environmental and Social Assessment
    - The Westminster Secondary School Construction Environmental and Social Management Plan
    - The Ebini Agricultural Station Environmental and Social Management Plan
    - The Condition Survey for La Parfaite Harmonie
    - Relevant policies, legislations, standards and guidelines, etc.

- Conducted an initial visit to the project area to understand the project area and footprint. Site visits to the project site continued throughout the process to each village within the general project area. This was done so as to gain a better understanding of the project, the existing condition of the area

and to assess the biological and social conditions. These visits were beneficial in determining the characteristics of the project environment, which in turn assisted in the categorisation of all physical, environmental and biological impacts. It is important to note that these visits were instrumental to the process since they allowed for critical ground-truthing, which provided useful information, and also validated information obtained from literature reviews, particularly given the current situation where stakeholder engagements are difficult to conduct due to the limitation in place from the risks and national restrictions associated with the COVID-19 pandemic.

- Determined the project's Area of Influence.

Once the above is completed a project description was compiled. Thereafter, a review of the policy, legislative and institutional framework relevant to the project was also determined. This includes pertinent national policies and plans, regulations, standards, and the institutions which will have some oversight of the project. The applicable IDB policies were also be assessed.

Thereafter, the preparation of the ESA was done in three phases as follows:

1. Establishing the Baseline Conditions
2. Impact Determination
3. Environmental Management and Mitigation Planning.

Establishing the Baseline Conditions

This phase comprised the following:

1. A description of the project environment was compiled. This required the collection primary and secondary data on the physical, biological and socio-economic environment.

    - Primary data was collected as part of the field work at the project site and include water quality analyses, noise measurement, air quality analysis, and a rapid biodiversity assessment. It also include collection of socioeconomic data such as on land uses, population, etc. The methodology utilized for the collection of primary data is further described under the respective sections of Chapter 3.

    - Secondary data was obtained from existing sources such as reports relating to the project area. This include weather data obtained by the Hydrometeorlogical Department and population data from the Bureau of Statistics.

2. Consultations with stakeholders was also done including with relevant institutions, communities, community leaders and other relevant personnel. A Stakeholders Consultations Report is prepared and included in the ESA. Engagements were done through structured interviews with national and regional institutions, as well as community consultations. Record of these consultations, including persons/institutions engaged and issues raised are included in the document. Given the limitations under the COVID-19 guidelines, most of the consultations with institutions were done virtually, and with the community members through one on one interviews in person. Prior to the stakeholders' consultations the stakeholders relevant to the project were identified and categorised. The methodology utilized for the stakeholders' engagement is further described in Chapter 5.

Review of Data and Impact Analysis

Once the project and the project environment, along with the regulatory requirements and stakeholders concerns are understood, the impact prediction and assessment was conducted. The potential environmental and social effects and impacts during the construction phase of the project were assessed utilising an impact assessment matrix. The matrix was used to predict the significance of the impacts by establishing the interactions between the proposed project activities and the characteristics of the existing environment and within the effective area of direct and indirect influence. The full range of potential impacts were examined using these qualitative assessments to identify and recommend appropriate and adequate mitigation and management measures.

The impact assessment was also guided by the Environmental and Social Screening Checklist provided by the CHPA (Annex 1). In keeping with the ToR, all potential impacts identified were categorised under the following three major pillars:

- ***Physical Environment*** **–** this includes impacts pertaining to microclimate, air quality, water resources (surface and groundwater), drainage, uses, landscape, waste, geology, soil quality, anthropic risks, and natural risks.

- ***Biological Environment*** **–** this includes impacts pertaining to ecosystem including biodiversity (including rare, endangered and endemic biodiversity components), and biological resources of cultural, social, or economic importance.

- ***Socio-economic Environment*** **–** this includes impacts pertaining to aspects that depend on environmental changes such as but not limited to public health, vulnerability and access to natural resources, resettlement, potential loss of property/land acquisition, loss of agricultural land, loss of right of use, easement/access arrangements, loss of income, property damages to nearby Project Affected Persons (PAPs), cultural heritage, and sites of historical, archaeological or cultural value.

Mitigation and Management Planning

Once the potential physical, biological and social impacts were known and understood, mitigation and management planning commenced. During this phase the following were done:

1. Feasible and practical measures were identified and recommended to reduce and mitigate the potential negative impacts or the project, as well as, maximise the expected positive impacts.

2. A Stakeholder Engagement Plan which should be applied during project implementation, especially as it relates to grievances, was prepared.

3. Measures for emergency response were recommended.

4. An implementation framework for the environmental and social management plan was prepared, outlining responsibilities, timeframe, etc.

5. A Monitoring Framework that examines the social and environmental parameters to be monitored during the construction phase was also prepared.

1.4 Organisation of the ESA

The ESA is outlined in a number of Chapters, as summarized below:

- **Executive Summary –** This presents a concise statement of the project objectives and a brief project description in addition to a description of key project findings and recommendations for environmental and social management.

- **Chapter 1: Introduction -** This chapter presents a background to the ESA, the scope and format of the document and methodology used to prepare the document.

- **Chapter 2: Project Description -** This chapter provides a description of the proposed project.

- **Chapter 3: Environmental and Associated Social Conditions-** This chapter provides a description of the project environment, including the physical, biological and socio-economic environment.

  Chapter 4: Legislative and Institutional Framework - This chapter provides a summary of national policies relevant to the project, specific legislation and the regulatory bodies which will have oversight of the project's activities. It will describe the relevant IDB policies that are applicable to the project.

- **Chapter 5: Stakeholders Consultations and Public Disclosure –** This chapter documents the findings of the stakeholders' consultations, including the interviews conducted with institutions and agencies and consultations with communities and community leaders.

- **Chapter 6: Environmental and Social Impact Assessments -** This chapter assesses the potential impacts of the project on the physical, biological and socio-economic environments.

- **Chapter 7: Environmental and Social Management Plan -** This chapter outlines practical measures to prevent and manage potential adverse environmental impacts.

- **Chapter 8: Implementation Framework -** This chapter describes the recommended framework to be in place prior and during project implementation to ensure that the ESA is fully implemented and is effective, including monitoring and reporting, stakeholders' engagement and addressing of grievances.

- **Chapter 9: Public Disclosure –** This chapter describes the public disclosure process of the draft ESA.

1.5 Challenges

During the conduct of the ESA some challenges were encountered. These are described below:

<u>COVID 19 Pandemic</u>

The preparation process for the ESA was done during the COVID-19 pandemic. The implementation of the national restrictions, requirements of practicing social distancing, as well as the need to ensure the safety

of personnel involved in the ESA preparation process, collectively impacted the stakeholder engagement aspect of the process.

Taking into consideration the many issues and or risks associated with in-person gatherings, the option of using internet based platforms, such as Zoom, Skype and Google Meet was explored to interface and engage with stakeholders. However, given that the Project's target area falls within the low income category, many residents lack reliable internet connectivity, and the basic equipment resources such as internet-friendly mobile devices and computers to participate on the aforesaid platforms, hence making the stakeholder engagement process quite challenging. In some cases, to overcome these challenges, the consultant conducted face to face meetings with individuals and other key stakeholders of the communities so as to avoid large gathering. Most of the consultations with institutions had to be done virtually, which also took some amount of time to arrange.

Site visits also greatly assisted to overcome these challenges since they allowed for critical ground-truthing, which provided useful information, and also validated information obtained from literature reviews. This approach ensured that the comprehensiveness of the stakeholders' engagement was maintained.

Support from the CHPA

Throughout the ESA process the consultant enjoyed tremendous support from the Projects Department of the CHPA which is responsible for the implementation of the project. However, early in the ESA process, the Department was affected by a COVID -19 outbreak, which delayed the conduct of a joint initial visit to the project areas. Eventually, not to delay the process further, this visit had to be conducted by the consultants alone utilising project information provided by CHPA. In addition, the COVID – 19 situations within the Department also delayed the provision of important and updated project related information to the consultants. These challenges were overcome by robust work by the consultants to fully understand the project environment and project components/activities.

Tremendous support was also provided by the Planning and Development Division, especially the GIS Unit within that Division, which provided much needed geospatial data for the production of maps which were used for planning and baseline surveys, as well as for maps presented in the ESA.

While the Public Disclosure aspect of the ESA was successfully conducted, it had to be done in accordance to the national COVID -19 restrictions, which led to multiple sessions being held. This included virtual and onsite gatherings so as to restrict the number of persons per session. The Community Development Department of the CHPA was very instrumental in the planning and execution of the various Public Disclosure sessions.

2.0 PROJECT DESCRIPTION

2.1 Project Overview

As indicated, the GoG, in May of 2017, renegotiated with the IDB to reformulate a 2012 loan operation "Road Network Upgrade and Expansion Program" (GY-L1031) to include a component addressing housing and basic infrastructure needs of low-income populations in social housing schemes in the Greater Georgetown area. This initiative gave rise to the reformulated Road Network Upgrade and Expansion Programme labelled "LO-1031 BL/GY: Adequate Housing and Urban Accessibility Programme" or AHUAP. The programme is specifically aimed at improving the quality of life in urban and peri-urban Georgetown, through better access to adequate housing and basic infrastructure for low income populations, enhance urban and suburban mobility and safety, and strengthen national and local capacity to operate and maintain urban services. The Ministry of Housing and Water, through the CHPA, is tasked with the implementation of the AHUAP, which is designed as a multi-work programme.

Under Component 1 of the reformulated programme, the CHPA is tasked with the implementation of three (3) sub-components, which include the following:

1. **Affordable and Sustainable Housing:** The sub-component finances the delivery of subsidies to contribute to affordable housing solutions for low-income households in the Georgetown area and peri-urban areas, for: (i) housing improvement, and (ii) construction of core homes on existing serviced lots. This Component has a budget of USD 10 million.

2. **Consolidation of existing Housing Schemes:** The sub-component, which follows a multiple works approach, finances completion or rehabilitation of infrastructure and services on housing sites in the Georgetown area and peri-urban areas. Specific investments are tailored to local conditions and include: (i) secondary road maintenance and rationalization; (ii) climate-ready drainage; (iii) installation of street lighting and relocation of utilities as needed; and (iv) community facilities development or upgrading on earmarked publicly-owned lands that will include gender considerations regarding access and use. This Component has a budget of USD 16 million.

3. **Implementation support and Institutional Strengthening:** This sub-component will finance institutional strengthening activities for: (i) project management and monitor and evaluation for CHPA; and (ii) operations and maintenance training for Local Democratic Organs in charge of housing sites. This Component has a budget of USD 1 million.

The ESA, however applies to the second aspect of Component 1, which is consolidation of existing housing schemes. Under this Component the CHPA is pursuing a project to improve infrastructure within La Parfaite Harmonie, West Bank Demerara, Region 3. The following sub-section provides a more in-depth description of the project's scope of works.

2.2 Scope of Works

The project consists of five categories of infrastructure construction and rehabilitation works which spans across six adjoining communities within the West Bank Demerera area. These communities include Lust-en-Rust, Recht-Door-Zee, Onderneeming, Westminster, La Parfaite Harmonie and Schoonord. The five categories of works include road rehabilitation, installation of reinforced concrete drains, construction of paved sidewalks, construction of reinforced concrete culverts and cleaning of drains. Details of these works are presented below.

2.2.1 Rehabilitation of Roads

A total of 10,813 meters of roads are air marked for rehabilitation works under the project. These roads include both primary and secondary and are sparsely distributed among the six (6) communities. Primary roads will account for approximately 2,158 meters, while secondary roads will account for approximately 8,655 meters. These roads were all selected based on a conditional survey that was conducted by the CHPA and were all identified as being critical. Details of the road rehabilitation works can be observed in Table 2-1 below.

Table 2-1: Distribution of Road Rehabilitation Works

Area	Primary Roads (m)	Secondary Roads (m)
Onderneeming (western and eastern side)		1000
Rect-Door-Zee (western side)		1140
Rect-Door-Zee (eastern side)		1396
Westminster (western side)	700	297
Westminster (eastern side)		1247
La Parfaite Harmonie (eastern side)	568	1200
Lust-en-Rust		2375
Schoonord	890	
Total	**2,158**	**8,655**

The 2,158 meters of primary roads to be constructed under the project will see the widening of existing roads within Schoonord, La Parfaite Harmonie and Westminster. These roads will be 14 feet wide with a 6 feet shoulder on both sides. Both sides of these roads will be equipped with reinforced concrete drains. Once completed, these roads, along with supporting structures, will connect all of the six (6) communities, forming a major access and connecting/linking road. Figure 2-1 shows the alignment of the primary connecting/linking roads (roads represented by blue lines) that are to be constructed.

As noted, the secondary roads that are to be constructed are distributed among the six (6) communities. These roads will have a total carriageway of 12 feet in width and a 4 feet wide shoulder on both sides of the road. Rehabilitation works will see the placement of 6 inches of white sand/sand clay and 4 inches of compacted first grade crusher run. These roads will be finished with 2 inches of upgraded asphaltic concrete. A cross sectional drawing of these roads can be observed in more detail in figure 2-2.

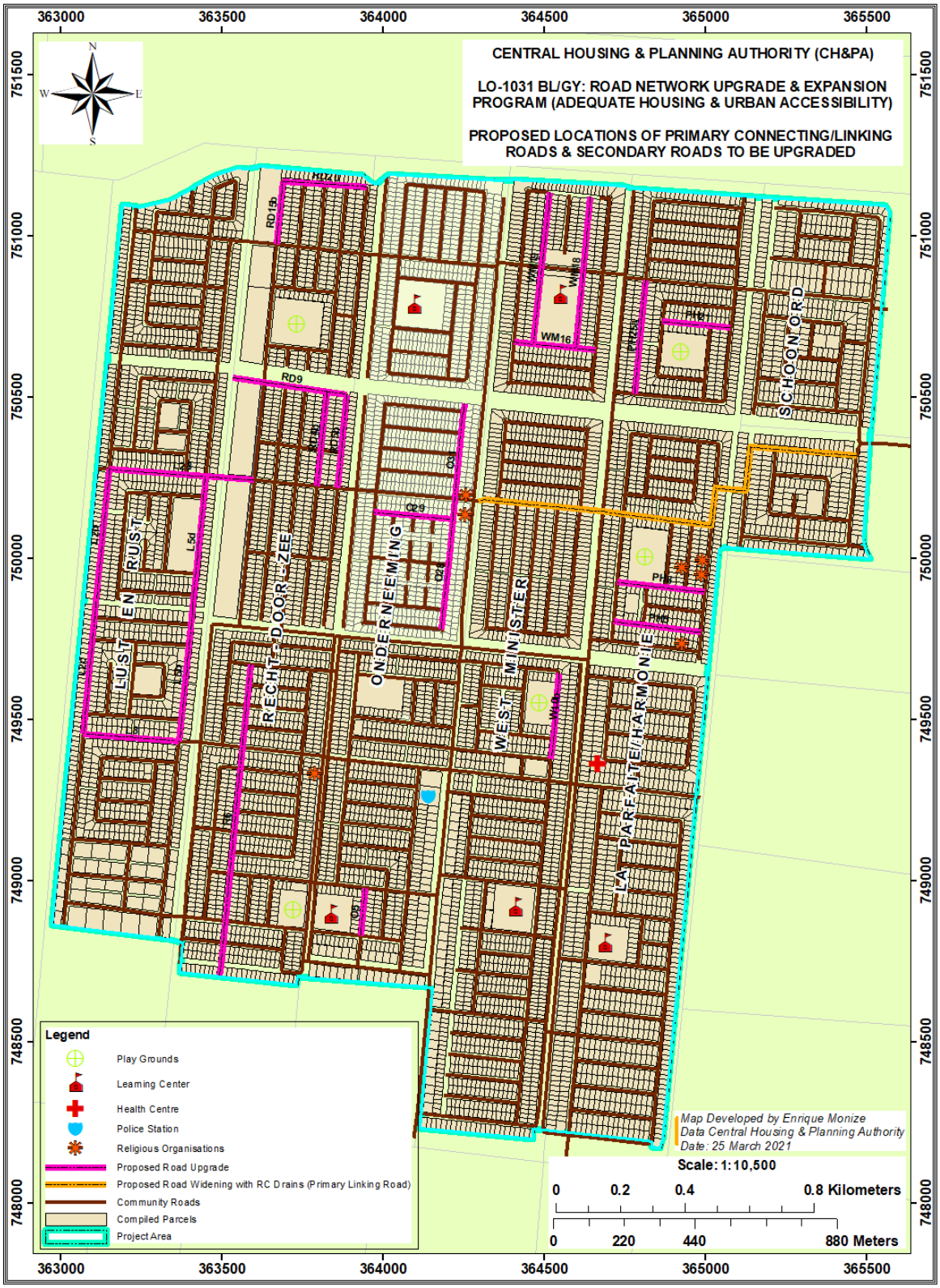

Figure 2-1: Alignment of the Primary Connecting/Linking Roads to be constructed

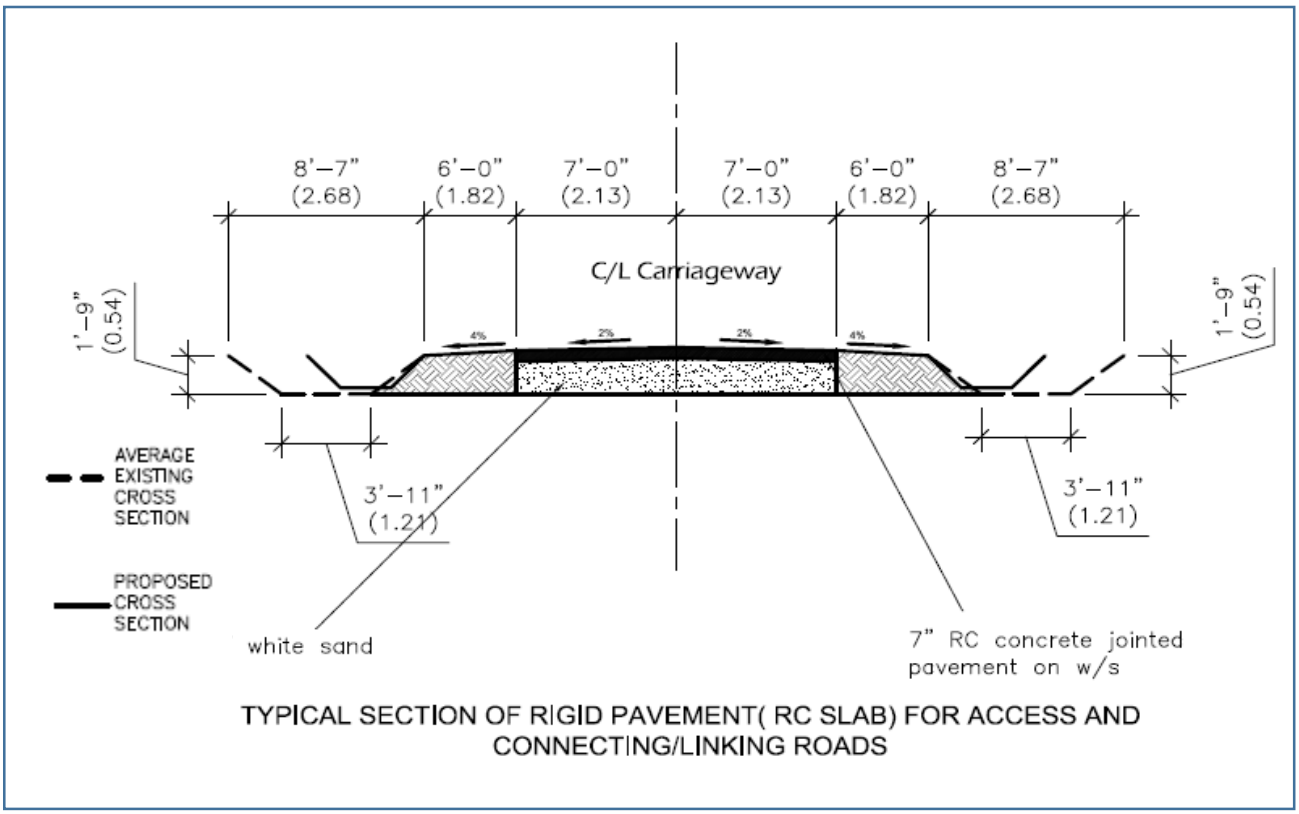

Figure 2-2: Typical Section of Rigid Pavement for Access and Connecting/Linking Roads[1]

2.2.2 Reinforced Concrete Drain

Reinforced concrete drains will be constructed within three of the six communities. These are Westminster, La Parfaite Harmonie and Schoonord. A total of 2,158 meters of reinforced concrete drains will be constructed along both sides of the primary roads as indicated in figure 2-1. Table 2-2 below provides a breakdown of the distribution of reinforced concrete drains the three communities. These drains will be 3 feet wide with a depth of 3 feet. A cross sectional design of the reinforced concrete drains that are to be built at these locations can be seen in figure 2-3.

Table 2-2: Distribution of Reinforced Concrete Drains

Area	Reinforced Concrete Drains (m)
Westminster (western side)	700
Parfaite Harmonie (eastern side)	568
Schoonord	890
Total	**2,158**

[1] CH&PA

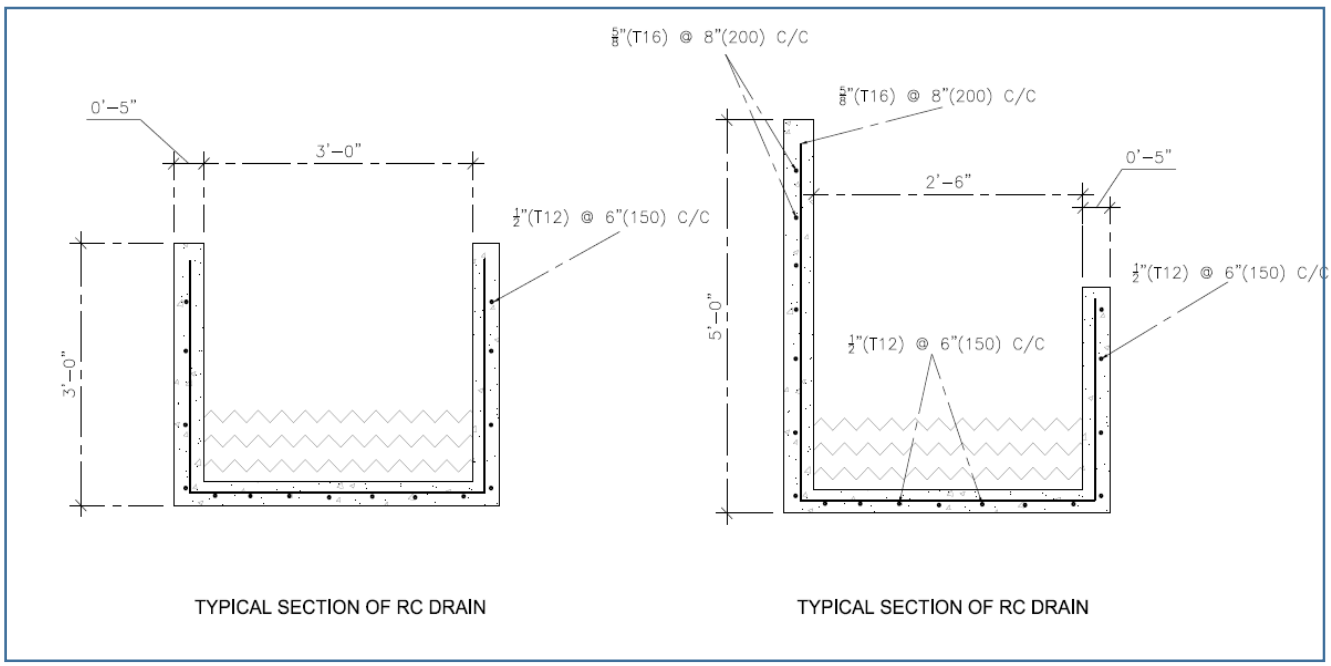

Figure 2-3: Cross Sectional Design of the Reinforced Concrete Drains

2.2.3 Paved Sidewalks

Three of the six communities will see the construction of sidewalks, totaling approximately 1,290 meters as is indicated in Table 2-3. These communities, as is indicated on the map provided in figure 2-4, are Westminster, La Parfaite Harmonie and Schoonord. These sidewalks will have a 300mm thick white sand base which will be finished with 2 inches thick pavers. A cross sectional representation of these sidewalks is provided in figure 2-5 for a more detailed understanding.

Table 2-3: Distribution of Paved Sidewalks

Area	Paved Sidewalks
Westminster	300
La Parfaite Harmonie	100
Schoonord	890
Total	**1,290**

Figure 2-4: Map showing the Locations of Sidewalks that are to be constructed

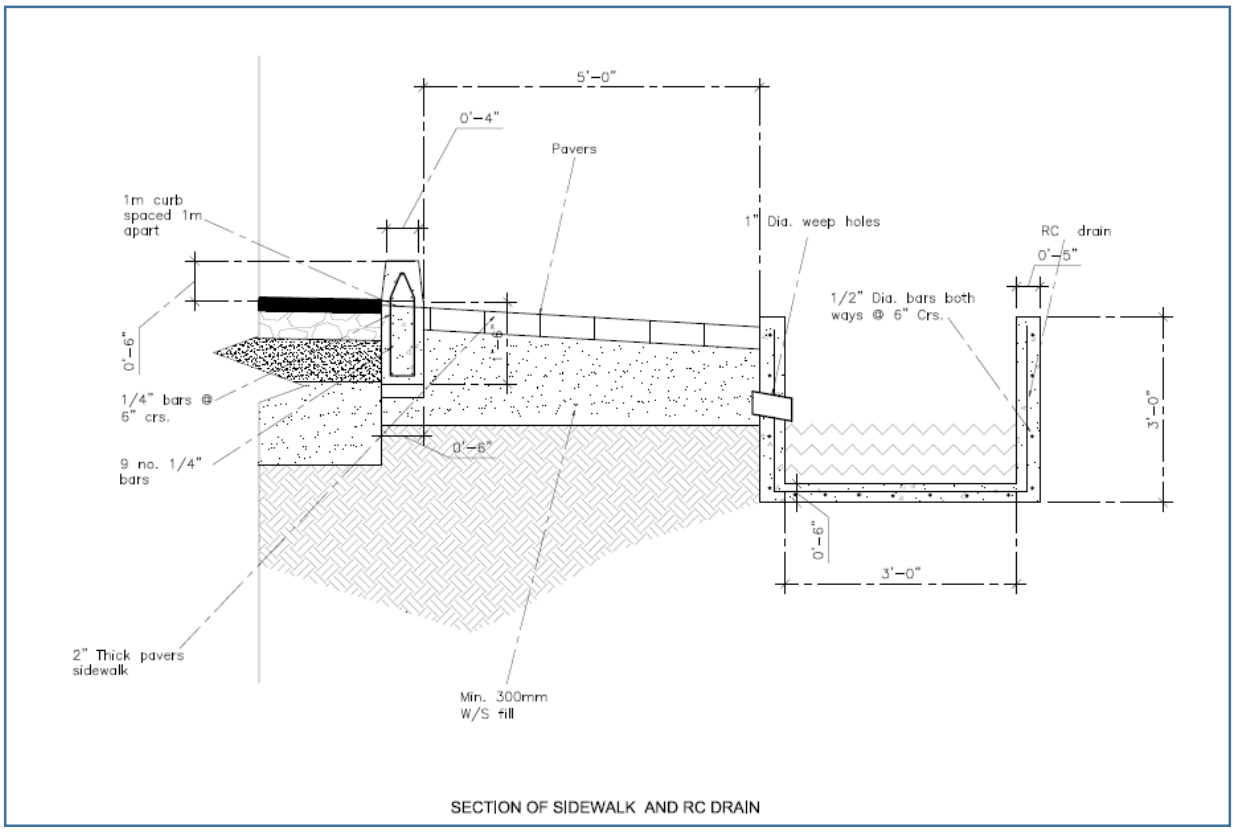

Figure 2-5: Cross Sectional view of the Sidewalks and Reinforced Concrete Drains[2]

2.2.4 Reinforced Concrete Culverts

A total of 49 reinforced concrete culverts will be constructed within five of the six communities. These communities include Onderneeming, Recht-Door-Zee, Westminster, La Parfaite Harmonie and Schoonord. Table 2-4 below provides details on the amount of culverts to be built within each of the mentioned communities, while figure 2-6 shows their locations. A cross sectional design of the culverts can be observed in figure 2-7.

Table 2-4: Distribution of Culverts per Community

Area	No. of Reinforced Concrete Culverts
Onderneeming (western and eastern side)	10
Rect-Door-Zee (eastern side)	15
Westminster (eastern side)	10
La Parfaite Harmonie (eastern side)	10
Lust-en-Rust	4
Total	**49**

[2] CH&PA

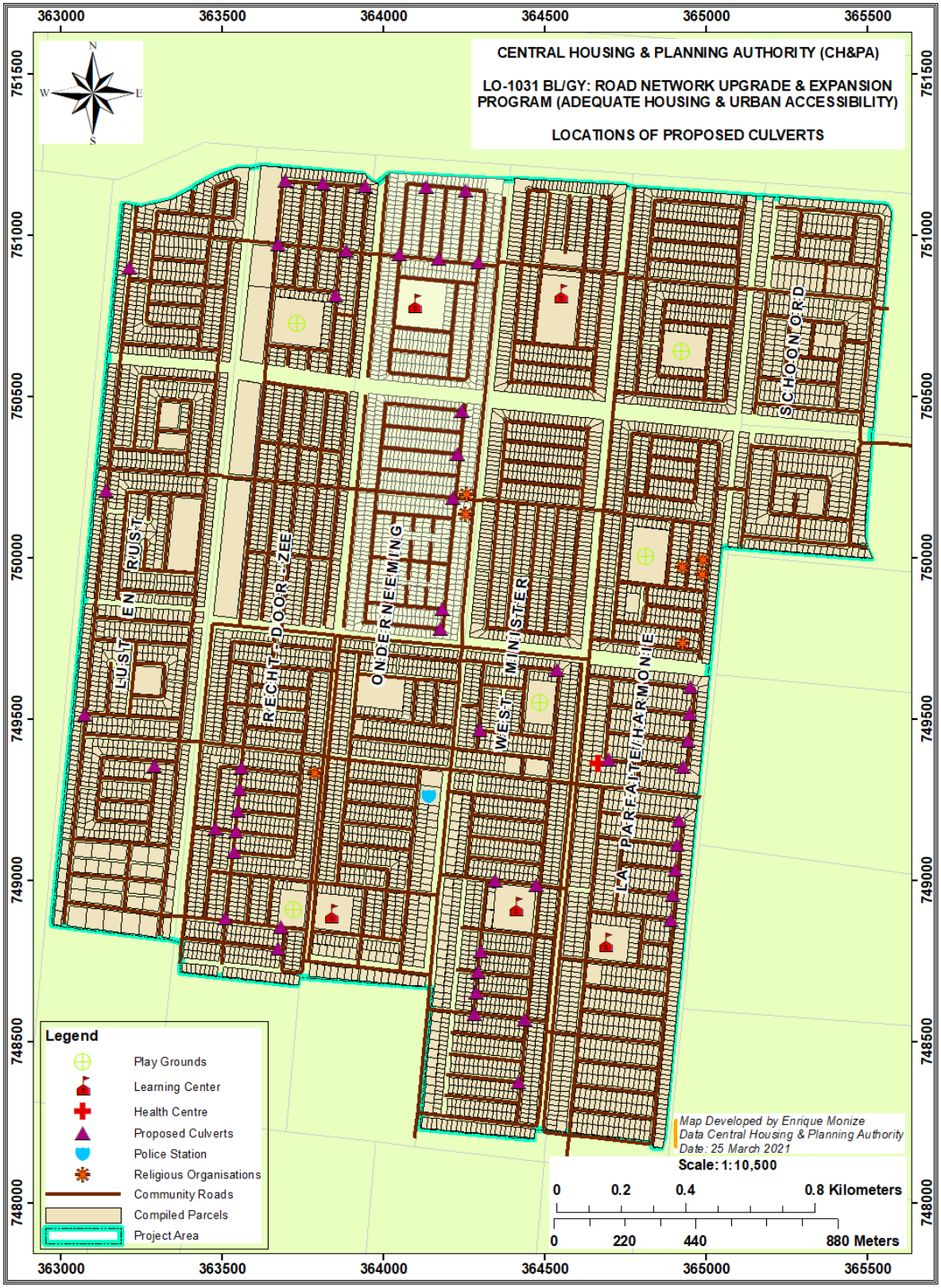

Figure 2-6: Location of Culverts to be constructed within the various Communities

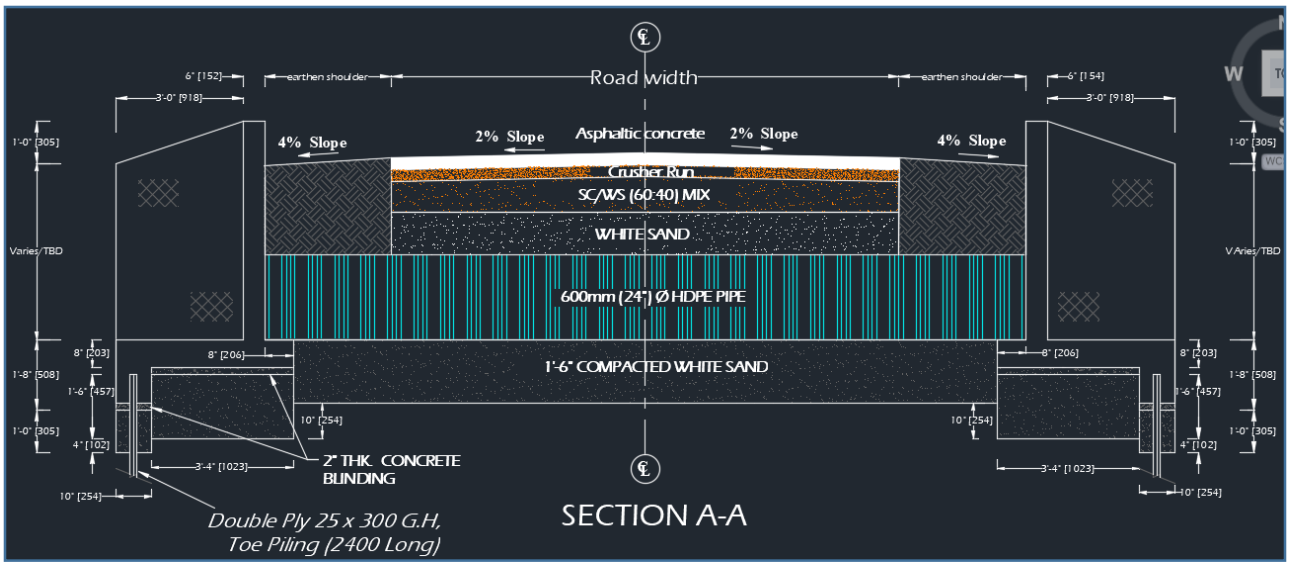

Figure 2-7: Cross Section of Culvert[3]

2.2.5 Cleaning of Earthen Drains/Canals

The communities comprises two (2) types of earthen drains of which include secondary canals and main canals. During the course of the project an approximate total of 9,400 meters of secondary canals and 36,400 meters of main canals will be cleaned within the six communities. Table 2-5 provides a breakdown on the amount of canals, both secondary and main, to be cleaned in each of the six communities. A typical cross sectional view of earthen drains can be observed in figure 2-8.

Table 2-5: Earthen Drains/Canals to be Cleaned

Area	Cleaning of Earthen Drains/Canal	
	Secondary Canals (m)	Main Canals (m)
Onderneeming (western and eastern side)	1,200	4,550
Rect-Door-Zee (western side)	1,200	4,550
Rect-Door-Zee (eastern side)	1,200	4,550
Westminster (western side)	1,200	4,550
Westminster (eastern side)	1,200	4,550
La Parfaite Harmonie (eastern side)	1,200	4,550
Lust-en-Rust	1,000	4,550
Schoonord	1,200	4,550
Total	**9400**	**36,400**

[3] CH&PA

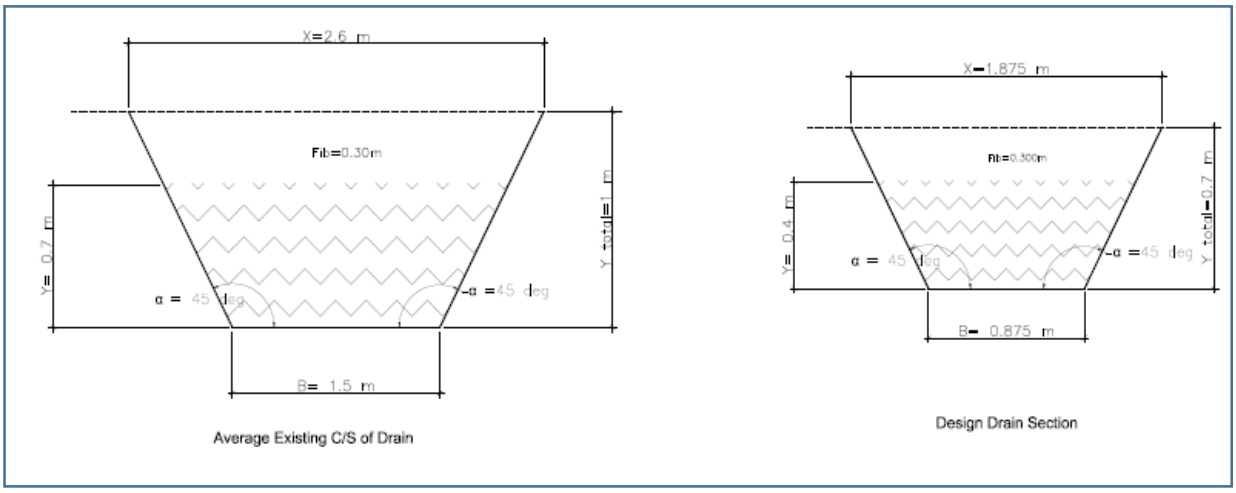

Figure 2-8: Cross Section of Earthen Drains/Canals[4]

2.3 Project Location

Geographically, the project spans several adjoining communities within the West Bank Demerera area. These communities include Lust-En-Rust, Recht-Door-Zee, Onderneeming, Westminster, La Parfaite Harmonie and Schoonord. The project location can be observed in figure 2-9.

[4] CH&PA

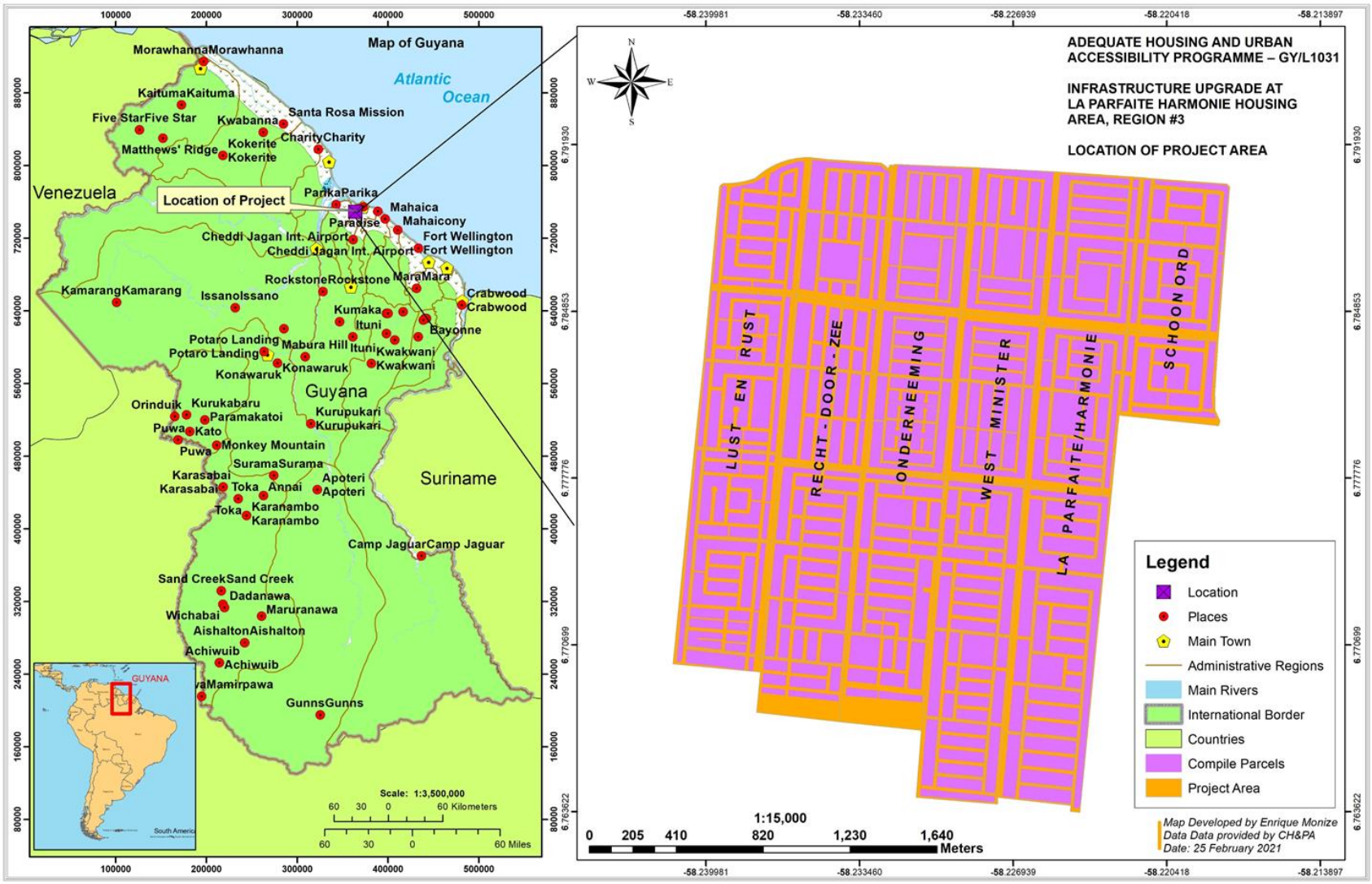

Figure 2-9: Location of the Project Area

3.0 ENVIRONMENTAL AND ASSOCIATED SOCIAL CONDITIONS

3.1 Overview

Geographically, the project spans several adjoining communities within the West Bank Demerera area. These communities include Lust-En-Rust, Recht-Door-Zee, Onderneeming, Westminster, La Parfaite Harmonie and Schoonord. The project area, therefore, has been defined to encompass the overall potential area of influence of the project, taking into account that each item of infrastructure work outlined in Chapter Two may have a different zone of influence based on the actual location of works within these six communities.

The project environment was examined under three categories, the physical, biological and socio-economic environment. Each of these categories was characterised based on review of existing information, as well as baseline studies conducted by the team of specialists commissioned to execute this study. Baseline studies conducted by the team included:

- Water Quality Analyses;
- Noise Level Measurements;
- Air Quality Testing;
- Biological Assessment; and
- Socio-economic Assessment.

3.2 Physical Environment

As indicated, the project area comprises six adjoining communities which covers an approximate area of 561.37 ha (1,387.2 acres) of coastal land that had a long history of agricultural uses of mainly sugarcane and rice cultivation.

3.2.1 Soils and Topography

The project area is located on the Low Coastal Plain, where the topography is typically low–lying and flat and is approximately 1 to 2 m below mean high tide level. The soil type is predominantly Demerara clays, which is characterised by Tuschen Clay. Tuschen Clay is a poorly drained soil developed from river alluvium. It is characterised by a thin dark grey clay surface over a grey to greenish clay subsoil with mottles of brownish yellow, yellowish red and brown. The soil is strongly acidic, slowly permeable and has a moderate level of fertility. Most soils within the area also have a thin layer of organic material on the surface, greyish colour, and are deep and developed from unconsolidated and stratified deposits of marine origin. These soils are placed in land capability Class 1-11, good to moderate agricultural land.[5]

3.2.2 Climatic Conditions

Just near the equator from about 5^0 North and 5^0 South, the north-east trade winds and the south-east trade winds converge in a low-pressure zone known as the Inter Tropical Convergence Zone (ITCZ). Guyana is uniquely positioned within this zone of convergence; and as such, its weather and climatic conditions are heavily influenced by the seasonal shifts of this zone. The movement of the ITCZ over Guyana's coast, where the project area is located, brings with it heavy rainfall

[5] Seawall Feasibility and Zoning Plan November 28, 1997

that coincides with the rainy seasons generally occuring between May to August; and November to January, respectively. Meanwhile, when the ITCZ lies outside of Guyana's borders from February to April; and August to October much lower levels of precipitation levels are experienced, which coincide, with the two (2) dry seasons experienced. Annual rainfall is approximately 2000-2500 mm. The intensity of rainfall at the project area varies throughout the year with an average annual rainfall of 2000 mm. February to April and September to November are the driest periods of the year. Rainfall data for the last twenty years was obtained from the Hydrometeorlogical Department for the Whales Weather Station, which is the closest weather station to the project area. The rainfall data is presented in Table 3-1 and the rainfall pattern can be observed in Figure 3-1.

Wind speed is generally 1.5 to 2.5 mph in east to northeast direction. On the coast, daily maximum temperatures average 29.6 ^{0}C, while daily minimum temperatures average 24.0 ^{0}C. Guyana's coast is subject to the north-easterly trade winds with speeds of about 6 meters per second. Even though the coast is situated in the trade winds, tropical storms or cyclones do not occur along Guyana's coast. Winds and offshore wave directions are remarkably consistent with nearly sixty percent (60%) coming from the 45^0 north-east sector with an average velocity at sea of 6 m/s. Wind and waves are strongest during the months of December to June and weakest during the period July to November. The mean sea level within the area is approximately 15.52 m above Georgetown Datum[6] (GD).

Table 3-1: Monthly Rainfall Data (mm) for Wales Station for 2000-2019[7]

Year	Months											
	Jan.	**Feb.**	**Mar.**	**Apr.**	**May**	**Jun.**	**Jul.**	**Aug.**	**Sep.**	**Oct.**	**Nov.**	**Dec.**
2000	112.3	14	18.3	132.6	224.7	70.4	31.4	276.8	129.1	85.3	323.6	304.9
2001	335.5	16.7	49.3	135.6	389.4	70.4	31.4	145.1	223.9	177.8	84.6	117
2002	146	62.5	70.4	31.4	391	61.3	64.8	222.5	93.7	83.3	253.5	102.9
2003	38.8	38.8	19	34.9	446	391.9	359.3	129.1	152.5	71.2	277.6	338.9
2004	218.8	188.6	190.3	70.4	31.4	300.4	473.1	95.1	137.3	91.5	121.2	293
2005	70.4	31.4	66.3	287.5	354.6	214.8	486.2	61	61	240.8	85.7	70.4
2006	31.4	583	38.4	101.8	373.6	61	61	133.5	246.6	114.7	303.4	258.8
2007	150.8	54.2	164.2	160.1	523.6	453.4	504.2	237.4	127.1	92.7	504.2	237.4
2008	236.3	529.6	250.6	127.3	401.2	615.7	451.9	173.6	98	108.7	174.6	884.3
2009	449.7	75.4	64.8	421.8	114.3	357.6	295.5	238.3	76	180	78.2	62.2
2010	46.2	37	18.6	285.2	582.7	340.6	661.8	254.3	312.9	282.3	494.9	403.8
2011	251.5	486.4	530.1	46.1	264.7	212	197.2	187.8	213.5	166.3	88.8	297.9
2012	509.1	463.7	50.3	162.8	371	295.5	462	192.8	57.2	111.8	205.9	200
2013	74.3	203.9	95.3	170.5	348.7	414.6	259.8	427.4	304	138.7	306.5	377.8
2014	159.8	119	87.9	47.8	128.4	263.2	151.1	125.5	72.2	133.4	270.9	157.4
2015	252.2	153.5	88.8	123.7	401.8	328.5	461.5	181.3	78.2	26	105.7	132.6
2016	20.4	71.7	83.1	261.9	239.4	271.7	439.5	194.7	96.2	54.8	111.6	450.5
2017	-	146.8	166.3	195..2	289.8	456.1	204.5	223.5	96	179.1	299.8	483.4
2018	157.7	188.3	89.1	255.8	255.7	275.3	344.4	143.8	161.9	57.5	192.9	102.3
2019	50.7	99.3	26.2	86.4	349.2	314.8	410.3	343.6	70.8	124.8	177.9	205.1

[6] The Georgetown Datum is set to 56 feet below Mean Sea Level
[7] Hydrometeorological Service, Ministry of Agriculture

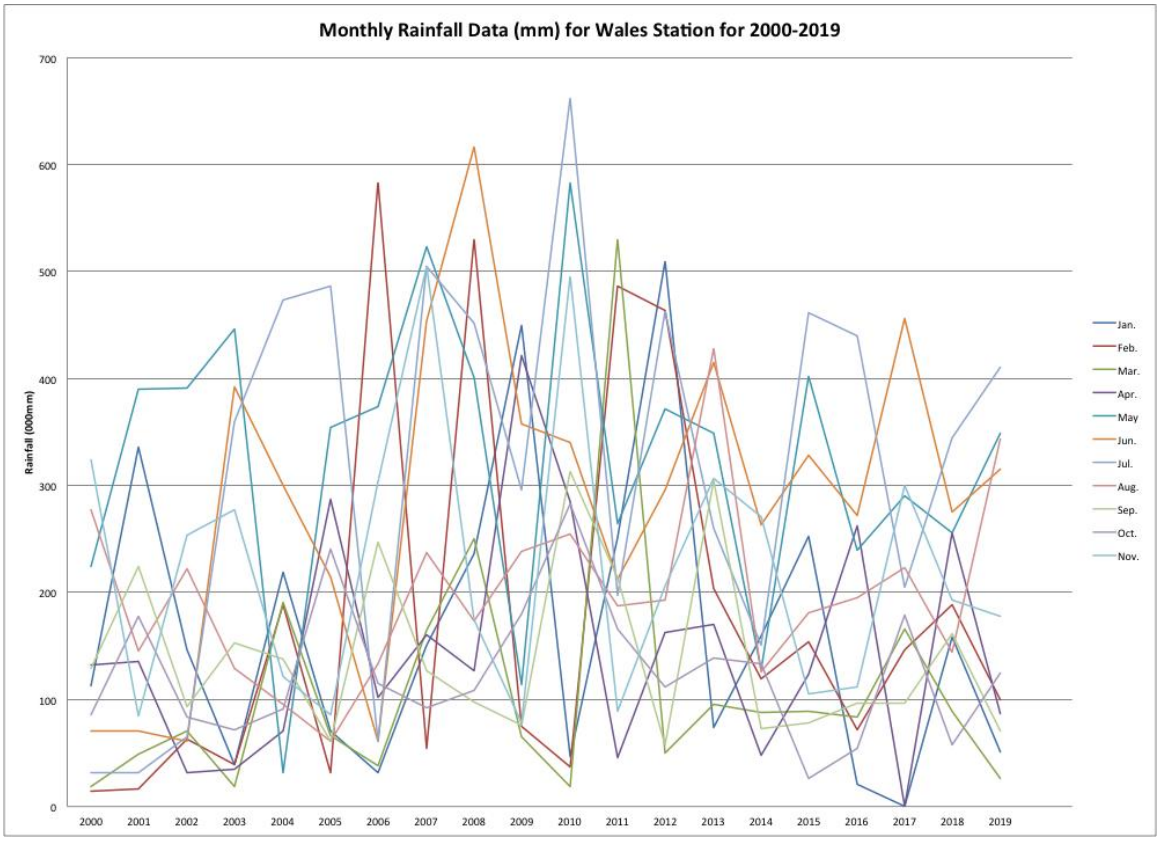

Figure 3-1: Rainfall Pattern for Whales (2000-2019)

3.2.3 Groundwater

The hydrogeology of the project area is similar to that of the rest of the coast, including Georgetown, which consists of three main sand layers, typically referred to as the A, B, and C sands. Each layer is separated by clay layers. These layers trend downwards from east to west. The A sands occur at a depth of 152 m (500 feet) and the B sands at a depth of 244 m (800 feet).

The untreated water is slightly acidic with a pH range of 6.5 to 8.5. The water contains a low chloride content, low alkalinity and hardness, but high levels of iron. Water from the "B" sands has a higher temperature and chloride content, and also contains hydrogen sulphide.

There is one well within the project area which is located in Westminster. This well was established by the Guyana Water Incorporated (GWI) to supply the area with potable water. This well taps the "A" sands aquifer. Average shallow groundwater depth is between 1 m to 2 m of the ground surface.

3.2.4 Drainage

Drainage within the project area is typical to that in communities throughout the coastal plain, whereby a network of interconnected earthen drains and primary canals facilitate the flow of storm waters off the land. The areas are drained by small ditches along the road side which empty into primary drains or canals. The entire project area is drained by small drains which feed into trenches which empty into the Demerara River and is regulated by sluices and pumps.

3.2.5 Surface Water Quality

An analysis of the surface water quality within some of the main areas that are air marked for construction activities were conducted. A total of seven (7) samples were collected from roadside drains, both earthen and concrete, and analysed. The locations where the samples were collected are identified in Figure 3-2. These locations were chosen based on clusters, magnitude and proximity to the proposed construction works.

Confirmation on the background quality of surface water within the project area was necessary since, should there be any impact on water quality as a result of project activities during both the construction and post construction phases, the impact can be detected by collecting and testing samples from the same locations and comparing the results to those of the baseline water quality provided in this report. A description of the surface water sample locations is provided in the Table 3-2. At the time of sampling, the weather conditions varied from an overcast condition to mostly sunny, with clear sky and in some cases windy, with no rainfall.

Table 3-2: Description of Surface Water Sample Locations and Sampling Details

Sample ID	Coordinates	Sample Location	Weather Condition	Date Sampled	Time Sampled (h)
SW 1	N 06^0 47’ 06.8” W 58^0 13’ 17.1”	PH 11, drain west of existing road.	Overcast	March 23, 2021	10:58
SW 2	N 06^0 46’ 29.8” W 58^0 13’ 20.6”	P1, drain west of existing road.	Cloudy	March 23, 2021	11:29
SW 3	N 06^0 46’ 20.3” W 58^0 13’ 40.6”	W12, drain east of existing road.	Sunny	March 23, 2021	11:55
SW 4	N 06^0 46’ 34.9” W 58^0 14’ 04.9”	R6, drain east of existing road.	Sunny	March 23, 2021	12:19
SW 5	N 06^0 47’ 09.6” W 58^0 14’ 18.0”	L2c, drain west of existing road.	Sunny	March 23, 2021	12:42
SW 6	N 06^0 47’ 17.7” W 58^0 13’ 54.0”	RD9, drain south of existing road	Sunny	March 23, 2021	13:10
SW 7	N 06^0 47’ 28.7” W 58^0 13’ 30.2”	WM18, drain west of existing road.	Sunny	March 23, 2021	13:27

It is important to note that the area has been generally disturbed for a number of years due to ongoing anthropogenic activities which include agriculture and currently, housing development. The samples collected were analysed for several parameters which are important and generally used to determine the quality of water. Parameters analysed include temperature, pH, turbidity, conductivity, dissolved oxygen and total dissolved solids. In the absence of a national standard, background water quality comparison was made with the Guyana National Bureau Standards (GNBS), GYS 262:2004 Specification for Drinking Water and GYS 207:2002 Interim Guidelines for Industrial Effluent Discharge into the Environment. These limits are included in the results table. All analyses were done in the fields via the use of portable handheld water quality testing devices. Samples analyses can be observed in Figure 3-3. The result of the water quality analysis is presented in the Table 3-2.

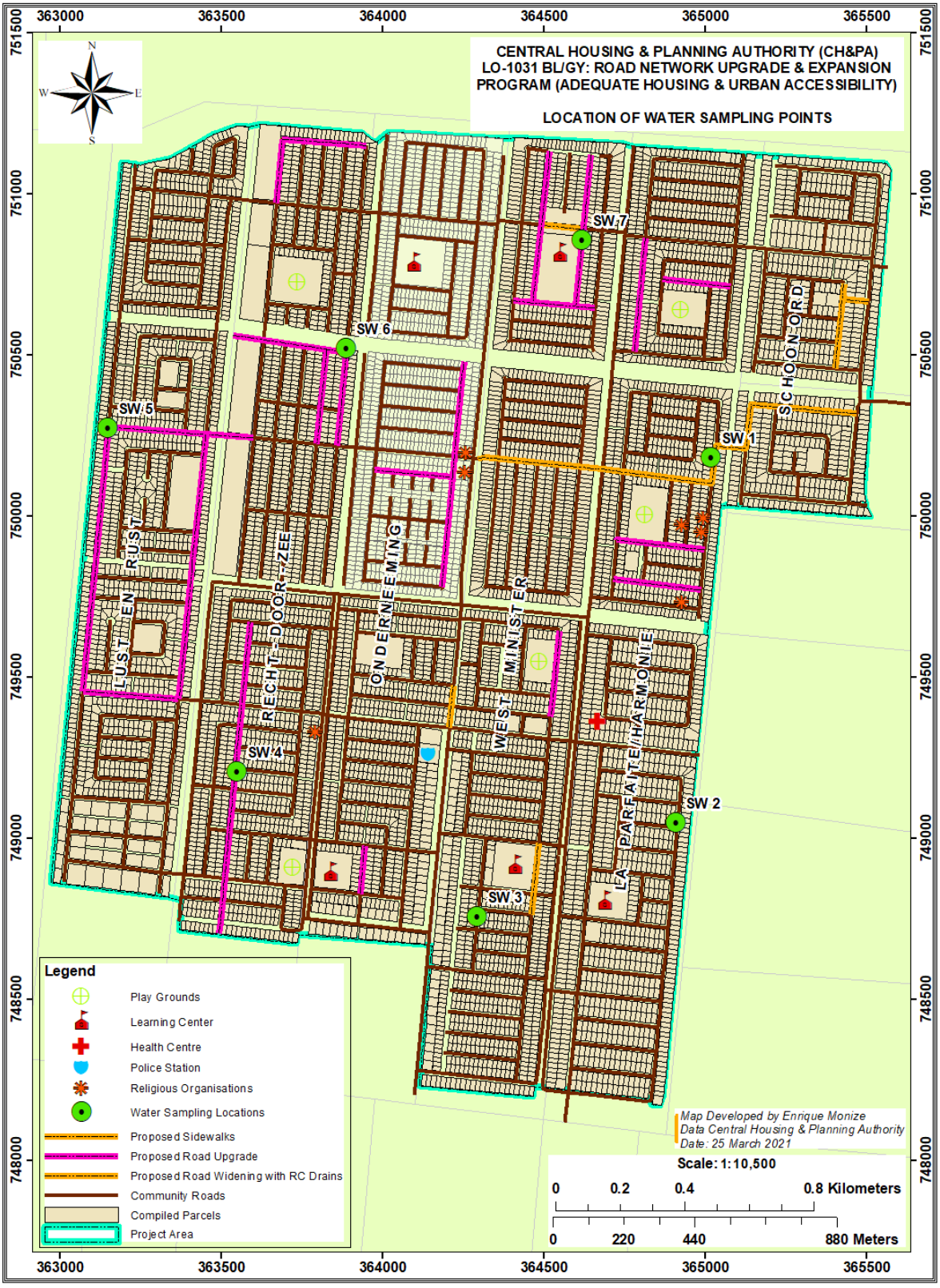

Figure 3-2: Surface Water Sample Locations

Figure 3-3: Conducting *In Situ* Water Quality Analyses

Table 3-3: Results of Water Analysis Conducted in the Field

Sample ID	Parameters					
	pH 5-9	Temp. (^{0}C) <40	Cond. (µS/cm)	TDS (ppm)	DO (mg/L) >5	Turbidity (NTU 25)
SW 1	7.26	28.1	302	151	2.40	27.8
SW 2	7.51	31.4	237	118	4.9	73.6
SW 3	8.62	33.3	374	187	14.7	63.7
SW 4	7.28	33.3	332	166	11.8	50
SW 5	7.24	32.9	154	77	6.92	23.1
SW 6	7.10	33.8	221	110	7.39	20.2
SW 7	7.18	33.6	454	227	5.6	49.8

Key
Cond. – Conductivity
Temp. – Temperature
TDS - Total Dissolved Solids
DO - Dissolved Oxygen

Based on the results presented in Table 3-3, most of the parameters analysed suggests that the water quality at the various locations are somewhat within the acceptable limits, with the exception of a few locations which recorded low dissolved oxygen levels and high turbidity levels. Nevertheless, the results indicate that the existing water quality of the area is typical of the water quality for similar type of areas within Guyana, if not better. The only results which can be considered outside normal is the low dissolved oxygen levels, particularly for SW 1. This could have been as a result of the presence of a significant algae population which was visible in the water. As algae die and decompose, the process consumes dissolved oxygen.

3.2.6 Noise

A noise survey was conducted within the project area in order to determine the current decibel levels. Measurements were recorded at eight (8) sites. These sites were chosen based on clusters, magnitude and proximity to the proposed construction works. Figure 3-4 shows noise measurement being taken at one of the eight locations. The locations of these sites are shown in figure F-5. All

of the measurements taken were lower than the GNBS limits of 75 dB (maximum) for residential areas. Details of the noise surveys are outlined Table 3-4.

Figure 3-4: Conducting Noise Measurement within the Project Area

Table 3-4: Noise Levels Recorded at Various Locations within Project Area

Sample ID	Coordinates	Sample Location	Date Sampled	Time Sampled (h)	Comments	Decibel Level (dB)	
N 1	N 06^0 47' 22.9" W 58^0 13' 04.0"	East of Schoonord Learning Centre for Diverse Needs.	March 23, 2021	10:38	Background noise from construction works, persons talking and birds singing.	Max.	50.4
						Min	35.4
						Avg.	42.9
N 2	N 06^0 47' 06.8" W 58^0 13' 17.1"	Middle of PH 11 road.	March 23, 2021	10:50	Background noise from vehicle passing and birds singing.	Max.	53.8
						Min.	48.6
						Avg.	51.2
N 3	N 06^0 46' 29.8" W 58^0 13' 20.6"	Middle of P1 road.	March 23, 2021	11:32	Background noise from persons talking and birds singing.	Max.	67.6
						Min.	31.6
						Avg.	49.6
N 4	N 06^0 46' 20.3" W 58^0 13' 40.6"	Middle of W12 road.	March 23, 2021	12:01	Background noise from ransom operating.	Max.	65.2
						Min.	38.7
						Avg.	51.95
N 5	N 06^0 46' 34.9" W 58^0 14' 04.9"	Middle of R6 road.	March 23, 2021	12:18	Background noise from hammering, plane overhead and birds singing.	Max.	61.1
						Min.	39.0
						Avg.	50.05
N 6	N 06^0 47' 09.6" W 58^0 14' 18.0"	Middle of L2c road.	March 23, 2021	12:44	Background noise from ransom operating.	Max.	71.8
						Min.	44.4
						Avg.	58.1
N 7	N 06^0 47' 17.7" W 58^0 13' 54.0"	Middle of RD9 road	March 23, 2021	13:06	Background noise from music, kite and birds singing.	Max.	73.1
						Min.	31.7
						Avg.	52.4
N 8	N 06^0 47' 28.7" W 58^0 13' 30.2"	Middle of WM18 road.	March 23, 2021	1:23	Background noise from construction works at the new Westminster Secondary school	Max.	67.4
						Min.	40.4
						Avg.	53.9

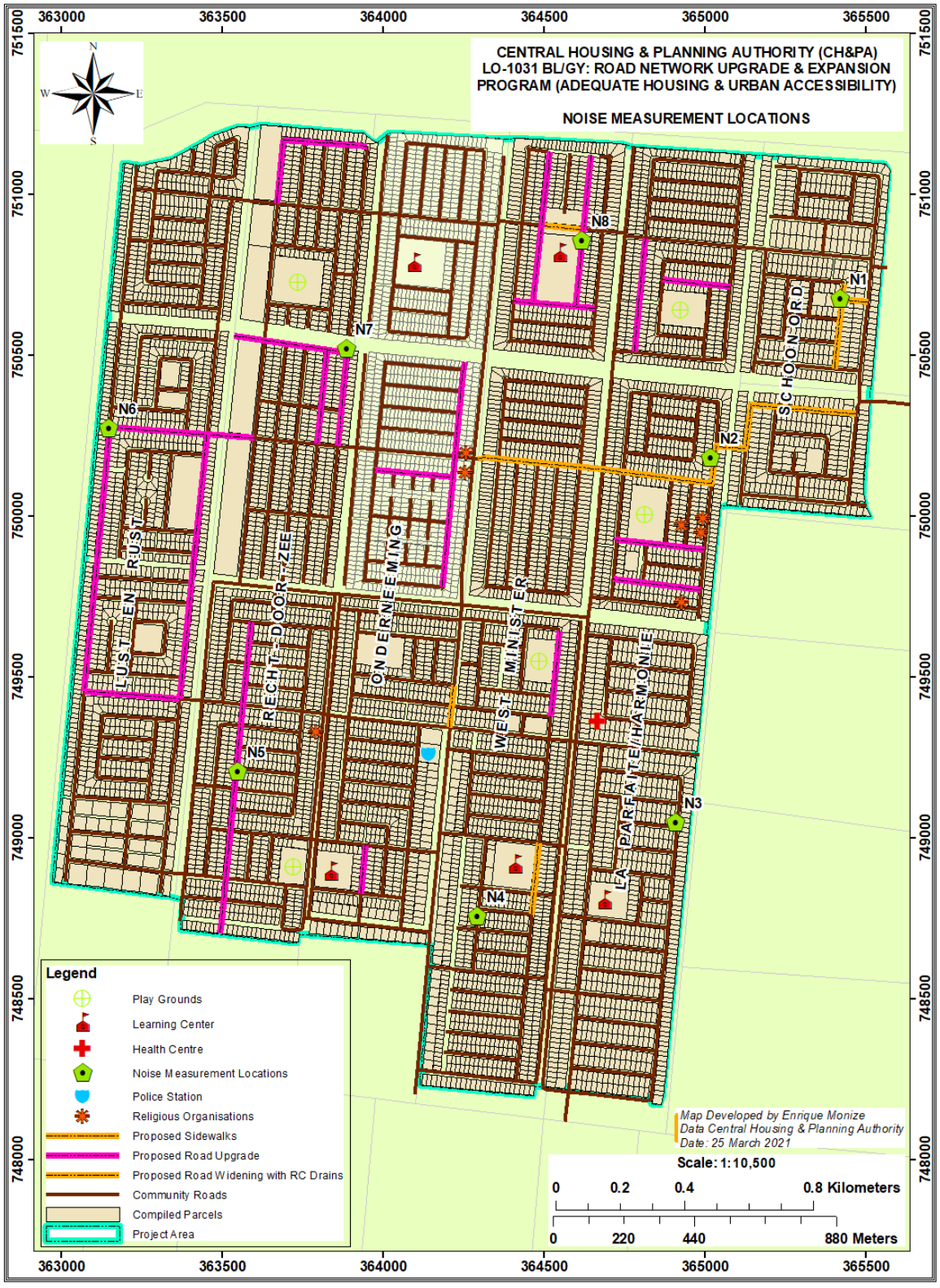

Figure 3-5: Location of the Noise Measurement Points

3.2.7 Air Quality

Ambient air quality measurements were conducted within the project area so as to establish baseline levels of particulates. Particulates matter measured were $PM_{2.5}$ and PM_{10}. Measurements were recorded at eight (8) sites. These sites were chosen based on clusters, magnitude and proximity to the proposed construction works. Figure 3-6 shows air quality measurements being recorded at one of the eight locations. The locations of these sites are shown in Figure 3-7. A description of the air quality testing locations is provided in the Table 3-5.

Figure 3-6: Conducting Air Quality Testing within the Project Area

Table 3-5: Description of Air the Measurement Locations

Sample ID	Coordinates	Sample Location	Date Sampled	Time Sampled (h)	Weather Condition
AQ 1	N 06^0 47' 22.9" W 58^0 13' 04.0"	East of Schoonord Learning Centre for Diverse Needs.	March 23, 2021	10:34	Overcast
AQ 2	N 06^0 47' 06.8" W 58^0 13' 17.1"	Middle of PH 11 road.	March 23, 2021	10:52	Overcast
AQ 3	N 06^0 46' 29.8" W 58^0 13' 20.6"	Middle of P1 road.	March 23, 2021	11:25	Overcast
AQ 4	N 06^0 46' 20.3" W 58^0 13' 40.6"	Middle of W12 road.	March 23, 2021	11:51	Sunny
AQ 5	N 06^0 46' 34.9" W 58^0 14' 04.9"	Middle of R6 road.	March 23, 2021	12:13	Sunny
AQ 6	N 06^0 47' 09.6" W 58^0 14' 18.0"	Middle of L2c road.	March 23, 2021	12:41	Sunny
AQ 7	N 06^0 47' 17.7" W 58^0 13' 54.0"	Middle of RD9 road	March 23, 2021	13:03	Sunny
AQ 8	N 06^0 47' 28.7" W 58^0 13' 30.2"	Middle of WM18 road.	March 23, 2021	1:20	Sunny

Based on the readings provided in Table 3-6 below, all sampling locations recorded low levels of particulates, for both $PM_{2.5}$ and PM_{10}. This is well below the 62 µg/m^3 threshold for poor ambient air. These measurements therefore indicate that the current air quality within the project are is 'good'.

Table 3-6: Results of Air Quality Testing ($PM_{2.5}$ and PM_{10})

Location ID	Temp .^{O}C	Humidity (%)	Parameters Tested	
			$PM_{2.5}$ (ug/m^3)	PM_{10} (ug/m^3)
A1	30.5	58.6	3.4	4.6
A2	31.7	52.4	2.5	3.3
A3	33.1	50.0	3.7	5.0
A4	33.5	50.7	3.4	4.6
A5	33.7	42.8	3.1	4.2
A6	34.2	49.2	3.7	5.0
A7	33.2	52.5	3.4	4.6
A8	33.9	48.6	3.1	4.2

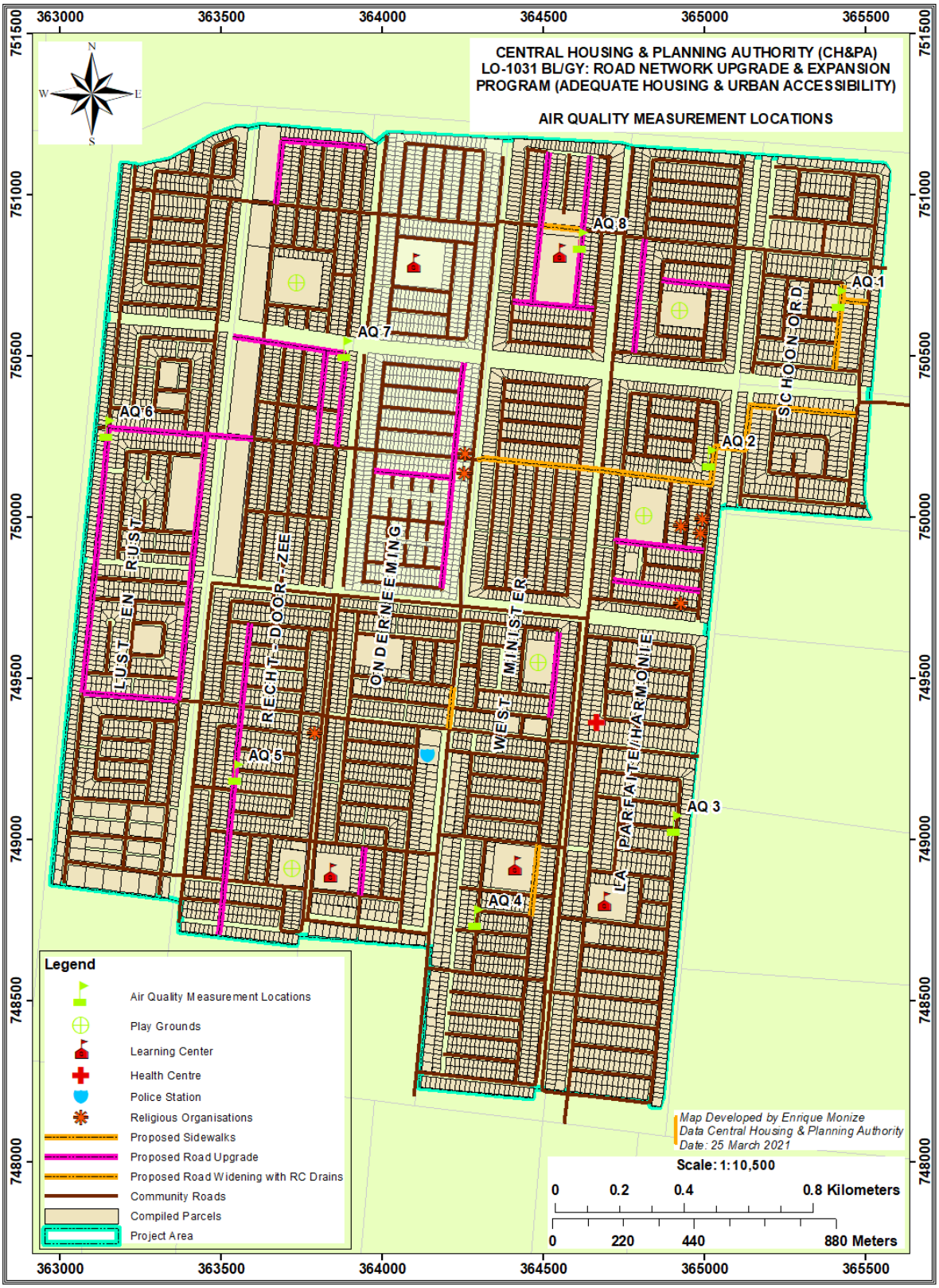

Figure 3-7: Air Quality Measurement Locations

3.3 Biological Environment

3.3.1 Overview

Guyana is divided into three major biogeographical provinces (Guyana/UNEP, 1992) namely: the coastal biogeographical province, the savannah biogeographical province and the forest biogeographical. The project area is located within the Coastal Province which stretches along the low coastal plain. This province can be further subdivided into twelve biogeographical provinces, with the project area sitting directly within palustrine ecosystem subdivision. However, the fact that the project area has been constantly subjected to anthropogenic activities over the past decades, suggests a shift from its original classification. As such, these areas are now considered to be classified as grasslands with water bodies that follow a linear pattern, with little to no salinity.

The project landscape is typical to all urban coastal habitats, which are largely degraded habitats, comprising mainly of species that adapt and thrive successfully owing to their ability to adapt well to rapidly changing environments.

3.3.2 Method of Assessment

An assessment of the biological environment was conducted using a simple three phase method which is outlined in Figure 3-8 and is further described below.

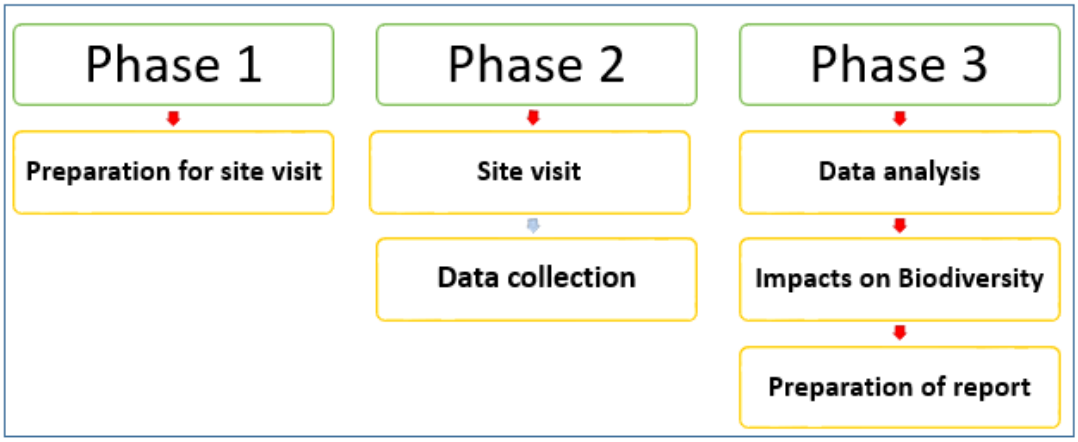

Figure 3-8: Method of Assessment

Phase 1- Preparation for site visit
Prior the site visit, literature was reviewed so as to be familiarized with species, both flora and fauna, that are common in urban areas similar to that of the project area. This also helped in enhancing the list of species compiled during the site visit.

Phase 2- Site visit
The assessment of the biodiversity within the project area was mainly conducted through informal interviews with persons from the area and visual encountered surveys. Interviews were conducted to determine the domesticated flora and fauna within the six communities, whereas visual encountered surveys were done mainly to identify the wildlife species (mainly birds).

Phase 3- Data analysis and preparation of report
Data obtained from literature reviewed and the site visit were compiled to establish baseline lists of species, both flora and fauna, that are commonly found within the extent of the project area. Possible impacts to the biological environment were also assessed.

3.3.3 Flora

Over the years, the development of lands within the project area has resulted in secondary vegetative growth, which mainly include shrubs and a variety of grass species. These species are resilient and can withstand the impacts of human daily activities. There are a few species that have establish dominance within the project area. These include *Cassia alata* (Carrion crown bush), *Cynodon dactylon* (Bahama grass) and *Axonopus compressus* (Carpet grass). Several residents were also observed to have kitchen gardens and a variety of fruit trees commonly grown in Guyana.

Table 3-7 provides a list of some common species that are grown by residents within the area for domestic purposes. It is important to note that these crops are grown within the residents' yard and are grown on a very small scale, mainly for home use. Others have planted a variety of fruit trees such as cherries, guava and mangoes. Table 3-8 provides a list species that are commonly found in the area that are not necessarily cultivated.

Table 3-7: Fruits and Vegetables Cultivated Around the Project Area

COMMON NAME	FAMILY	GENUS	SPECIES
Mango	**Anacardiaceae**	*Mangifera*	*indica*
Coconut	**Arecaceae**	*Cocos*	*nucifera*
Guava	**Myrtaceae**	*Psidium*	*guajava*
Dongs	**Rhamnaceae**	*Ziziphus*	*jujuba*
Cherry	**Rosaceae**	*Prunus*	*avium*
CASH CROPS			
Eschallot	**Alliaceae**	*Allium*	*cepa*
Eddoes	**Araceae**	*Colocasi*	*esculenta*
Papaya	**Caricaceae**	*Carica*	*papaya*
Carila	**Cucurbitaceae**	*Momordica*	*charantia*
Pumpkin	**Cucurbitaceae**	*Cucurbita*	*maxima*
Squash	**Cucurbitaceae**	*Lagenaria*	*vulgaris*
Watermelon	**Cucurbitaceae**	*Citrullus*	*lanatus*
Bora	**Fabaceae**	*Vigna*	*sesquipedalis*
Broad leaf thyme	**Lamiaceae**	*Plectranthus*	*amboinicus*
Thyme	**Lamiaceae**	*Thymus*	*vulgaris*
Ochro	**Malvaceae**	*Abelmoschus*	*esculentus*
Plantain	**Musaceae**	*Musa*	*balbisiana*
Boulanger	**Solanaceae**	*Solanum*	*melongena*
Sweet peppers	**Solanaceae**	*Capsicum*	*annuum*
Hot peppers	**Solanaceae**	*Capsicum*	-
Tomato	**Solanaceae**	*solanum*	*lycopersicum*

Table 3-8: Flora Species around the Project Area

Family/Common Name	Species Name	Frequency/Comments
POACEAE		
Burr grass	*Cechrus echinatus*	Very common
Carpet grass	*Axonopus compressus*	Very common
Bahama grass	*Cynodon dactylon*	Very common
Bird seed grass	*Echinochloa colonum*	Very common
Jew grass	*Imperata brasiliensis*	Common
Razor grass	*Paspalum virgatum*	Common
Elephant grass	*Pennisetum purpureum*	Common
CAESALPINIACEAE		
Carrion crow bush	*Cassia alata*	Very common
Money bush	*Cassia obtusifolia*	Very common
Wild coffee	*Cassia occidentalis*	Common
FABACEAE		
Shak-Shak	*Crotalaria incana*	Common
Sweet heart/Watch man	*Desmodium frutescens*	Common
PONTEDERIACEAE		
Water hyacinth	*Eichhornia crassipes*	Common
MIMOSACEAE		
Giant shame bush	*Mimosa pigra*	Common
Shame bush/Goat plimpla	*Mimosa pudica*	Common
ARACEAE		
Moko Moko	*Montricardia arborescens*	Common
ANACARDIACEAE		
Mango	*Mangifera indica*	Common
Golden apple	*Spondias dulcis*	Common
MUSACEAE		
Banana	*Musa acuminata*	Common
MALPIGHIACEAE		
cherry	Malpighia punicifolia	Common
NYMPHACEAE		
Water lilly	*Nelumbium nelumbo*	Common in larger canals
SPHENOCLEACEAE		
Soap bush	*Sphenoclea zeylancia*	Common
CECROPIACEAE		
Conga pump	*Cecropia sp.*	Common
MYRTACEAE		
Guava	Psidium guajava	Common
Jamoon	*Syzygium cumini*	Common
Aunty Desmond	*Antidesma bunius*	Common
BORAGINAAECEAE		
Clammy Cherry	*Cordia tetranda*	Common

3.3.4 Fauna

The diversity of fauna within the project area is not as expected. This is as a result of the general area being influenced heavily by anthropogenic activities. However, there are a few species of butterflies, wasps, beetles, birds such as the kiskadee, dove, yellow plantain, etc. Domesticated

animals such as cows, sheep, goats, etc. also exist, utilising isolated grazing grounds within the general area. The area is reported to have fishes such as hassar, houri, and sunfish. It was observed that some residents have the occasional livestock, such as ducks or chickens, which is kept for consumption within the family. Table 3-9 list some of the common species that one may encounter within the community. The area also contains reptiles and amphibians including snakes, lizards, and crapauds none of which are considered threatened or endangered. Faunal speices likely to be found within the project area are presented in 3-10.

Table 3-9: Common Domesticated Animals Found within the Project Area

COMMON NAME	FAMILY	GENUS	SPECIES	BREED
Ducks	**Anatidae**	*Cairina*	*moschata*	Muscovy duck
		Anas	*platyrhynchos*	Pekin duck
Sheep	**Bovidae**	*Ovis*	*aries*	Barbados Blackbelly sheep
Cows	**Bovidae**	*Bos*	*primigenius*	Brown Swiss
				Holstein
Chicken	**Phasianidae**	*Gallus*	*gallus*	Variety
Horse	**Equidae**	*Equus*	*ferus*	Guyana common breed

Table 3-10: List of Faunal Diversity within the Project Area

FAMILY/COMMON NAME	SPECIES NAME
VERTEBRATES	
BIRDS	
Columbinidae	
Dove	*Columbina passerine*
ARDEIDAE	
Great Egret	*Egretta alba*
Icteridae	
Yellow Plantain	*Icterus nigrogularis*
Carib Grackle	*Quiscalus lugubris*
Trochilidae	
Spectacled Humming bird	*Schistos geofforyi*
Tudidae	
Cocoa Thrush	*Turdus fumigatus*
Tyrannidae	
Kiskadee	*Pitambus sulphuratus*
JACANIDAE	
Spurwing	*Jacana jacana*
THRAUPIDAE	
Peezing	*Volatinia jacarina*
TURDIDAE	
Cocoa Thrush	*Turdus fumigatus*
Mammals	
Herpestidae	
Mongoose	*Herpestes auropunctatus*
FISHES	
Cichlidae	
Patwa	*Cichlosoma bimaculata*
Sunfish	*Grenicichla alata*

FAMILY/COMMON NAME	SPECIES NAME
Erythrinidae	
Huri	*Hoplias malabaricus*
Pimelodinae	
Kasi	*Rhamdia quelen*
Simoridae	
Hassar	*Hoplosternum littorale*
Silverbait	*Astanyax sp*
AMPHIBIANS	
Bufonidae	
Crapaud	*Bufo marinus*
Hylidae	
Water frog	*Hyla sp.*
REPTILES	
Teiidae	
Salipenta	*Tupinambus tebuixin*
Tropiduridae	
Lizard	*Trapidorus hisperus*
Viperidae	
Labaria Snake	*Bothrops atrox*
INVERTEBRATES	
Formicidae	
Ants	*Pheidole sp.*
Scarabaeoidea	
Black beetle	*Deltochilum icarus*
Libellulidae	
Dragon fly	*Erythrodiplax sp*
Pieridae	
Yellow butterfly	*Phoebis argante argante*
Nymphalidae	
White lace butterfly	*Anartia jatrophae*
Pieridae	
Yellow butterfly	*Apnrissa statira statira*

3.4 Socio-economic Environment

3.4.1 Land Use

The area has a long history of use by agriculture, being occupied by the sugar plantations for over two centuries. The area was returned to the state when the sugar estates abandoned the lands and were subsequently converted to housing lands. A large part of the sugar estate was converted to a dairy farm in the 1980s as part of the diversification program by the Guyana Sugar Corporation (GUYSUCO) introducing milking cows at a commercial scale, a tradition continued by the local people albeit at a much smaller scale. Small farmers within the scheme are found occupying the reserves and also having small kitchen gardens in their yards with produce for sale and home use. Currently, housing occupies most of the area with homeowners grazing animals in the empty lots and on the road reserves. There are spaces for recreation including the Multi-purpose Building and school ground. There are numerous *'bottom-house'* shops and twelve (12) supermarkets that sells food items and general household items. Numerous bars/beer gardens are found in the project area, selling alcohol and beers/wines, including the restaurants operated by the Chinese immigrants.

Roadside vendors add to the mix selling food and alcoholic beverages at various corner spots on the main routes.

3.4.2 Access & Transportation

The area is connected by the Canal # 1 Main Road, Independence Road and the new Parfaite Harmony Scheme Road. The area is also accessible via the unpaved roads used by GUYSUCO to transport sugarcane to the Uitvlugt Estate. In addition to these land base assesses, the area can be accessed by boat using the Canal # 1 main canal from the Demerara River or from the West Demerara Water Conservancy.

3.4.3 Utilities & Services

The area is serviced by GWI with one main water well located in the Westminster housing scheme. Residents have reported that the water well is not sufficient, the water pressure is low, and the water quality is poor. The area is also connected to the La Grange well that can provide additional water when required. Many residents harvest rainwater for domestic purposes including drinking. Freshwater is available in the irrigation canals that is used for farming purposes and by nearby households.

Electrical power is provided by the Guyana Power and Light (GPL) through its electrical grid from power generated at Vreed-en-Hoop and Leonora power stations. There are homeowners who have solar panels mounted on their roofs to generate electricity as a support to the power they purchase from GPL. Electrical connections are available through application to GPL and for a service charge per Kwh of power consumed.

The Guyana Telephone & Telegraph Company (GTT) is the only landline-based telephone service provider in the housing scheme. Wireless mobile phone services are provided by GTT and Digicel inclusive of various internet plans. GTT has provided its Blaze Internet Service within some areas of the scheme that has the landline service. Internet can also be accessed through private providers such as E-Networks, Globespan, Atlantic Cable, and NextLink operating in the area.

Water mains supplying potable water, landline telephone service with internet, and electrical system are found along the roads connecting with homeowners.

3.4.4 Security

The project area does not have a police or fire station and relies on services from within Region 3 and Georgetown. The nearest police station is the La Grange Police Station who frequently patrol the area with support from Vreed-en-Hoop and Wales Police Stations. There are numerous security concerns raised by the residents particularly of the minor crime category including burglary, bicycle theft, car parts theft, mugging, and others. There are private security firms operating in the area securing the government public buildings and some of the private businesses.

3.4.5 Solid Waste & Sewerage

Residents rely mainly on the services of Puran Brothers - a private contractor, to collect their garbage. The Neighbourhood Democratic Council (NDC) does minimal work in the area with its tractor and trailer not properly equipped for the job. Some residents burn/bury and compost

garbage, with burning reported as a nuisance to the community. There is no sewerage system for treatment of waste and households have their internal septic systems on their properties that is connected to the drainage system. There are a few homeowners with outdoor pit latrines located on their properties.

3.4.6 Population Dynamics

The Population and Household Census of 2012 shows that the stakeholder communities have a total population of 6,388, of which 3,067 were males and 3,321 were females (GoG, 2016). The most populated community was Westminster and the least populated were Lust-Tot-Rust and Schoonord with both communities having less than one hundred residents. This can be observed in Table 3-11. The small communities were least populated and lacking in infrastructural works for a considerable time. This may have contributed to the reluctance of the land owners to settle in the areas. However, it is expected that the current population within the project area is much greater since the area is a growing housing scheme.

Table 3-11: Stakeholder Population by Age Group

Community	Population by Age Ranges (years)				Total
	0-19	20-54	55-79	80+	
Lust-Tot-Rust	5	1	0	0	**6**
Recht-Door-Zee	435	458	57	2	**952**
Onderneeming	639	682	93	0	**1414**
Westminster	1065	1221	170	7	**2463**
La Parfaite Harmonie	638	771	85	1	**1495**
Schoonord	26	29	3	0	**58**
Total	**2808**	**3162**	**408**	**10**	**6388**

Source: Population and Household Census, 2012

The population of the communities in 2012 did not follow the typical population pyramid. The adult average working age population (20 – 54) was 49.5% of the total outstripping the youth population (0 – 19) of 43 %. The area has an extremely low elderly population of 80+ residents with the elderly not choosing to move into the project area. This is probably due to the elderly waiting until the scheme is fully established with all the infrastructure and amenities in place including, public security.

The population of working age averages (20 -79) and represents 56% of the total population. 74% of this group were actively employed in 2012. The Craft & Trade Sector (which included employment in the industrial community) accounted for the largest share of workers followed by those in Service & Sales Sector which is consistent with the peri-urban environment dynamics. Overall, there was a high level of employment, but this was severely impacted by the COVID-19 pandemic thereby shifting the local community dynamics and increasing the vulnerability of the households.

Table 3-12: Employment by Category

Community	Employment Type/Category							Total
	Armed Forces	Professionals	Clerical	Service & Sales	Agri & Forestry	Craft & Trade	Elementary	
Lust-Tot-Rust	0	0	0	0	0	0	0	0
Recht-Door-Zee	0	46	34	74	4	129	67	354
Onderneeming	11	91	59	148	16	200	68	593
Westminster	13	145	78	277	25	288	191	1017
La Parfaite Harmonie	3	207	65	112	20	194	56	657
Schoonord	0	2	2	2	2	8	2	18
Total	27	491	238	613	67	819	384	2639

Source: Population and Household Census, 2012

Of a total of 4262 individuals with a source of income 2556 or sixty percent (60%) were employed in the formal or informal sectors receiving a regular income for work or services provided. The next main source of income for 35% of the population in the survey was from their family with whom they lived or received direct support whilst living somewhere else. It is noteworthy to state that among the survey were one hundred and fifteen (115) pensioners and fifteen (15) persons on disability or public assistance. Table 3-13 provides a detailed breakdown of the main sources of income within each community.

Table 3-13: Main Source of Income

Community	Main Source of Income for Community Stakeholders in 2012							
	Employed	Remittances	Family Support	Pension	Investment & Savings	Public Assistance Disability	Other	Total
Lust Tot Rust	1	0	2	0	0	0	0	3
Recht Door Zee	365	4	253	14	3	4	2	645
Onderneeming	585	5	316	29	5	0	0	940
Westminister	999	13	565	47	12	8	3	1647
La Parafaite Harmonie	591	12	354	24	4	3	2	990
Schoonord	15	1	19	1	1	0	0	37
Total	2556	35	1509	115	25	15	7	4262

Source: Population and Household Census, 2012

3.4.7 Schools

Within the project area there is one Nursery School that also serves as a Special Needs School, a Primary School, and a Secondary School under construction set to be opened in 2021 (see Figures 3-9 and 3-10).

Figure 3-9: Nursery and Special Needs School

Figure 3-10: Secondary School under Construction

4.0 POLICY, LEGAL, INSTITUTIONAL AND REGULATORY FRAMEWORK

4.1 Overview

The project will improve selected streets and drains and construct sidewalks within the project area. This section provides an overview of the relevant national policies, legislation and institutional framework related to the project which are relevant to the implementation of infrastructure works in Guyana. The IDB policies relevant to the project were also assessed.

4.2 Policies, Strategies and Plans

The key national policies relating to the infrastructure and housing sectors, and environmental management are described in this section.

4.2.1 National Development Strategy

The National Development Strategy (NDS) 2001-2010[8] prepared by the Government of Guyana sets out the primary development policy framework for Guyana. It provides a framework for national planning and captures a number of cross-sectoral issues such as infrastructure, environment, forestry, agriculture, mining, tourism and fisheries, among others.

The NDS identified six (6) major constraints that are faced by Guyana as a result of poor infrastructure (mainly, Guyana's road network) and, as a consequence, has outlined measures aimed at improving the road network system. The NDS states that the *gross inadequacy of our transport system militates against our social and economic development in several ways*. Annex 8 of the NDS focused directly on transportation and the road networks. The NDS also speaks of a number of proposed developments to improve infrastructure across the country to facilitate the sustainable development of the country and improvement in livelihoods. Infrastructure development outlined in the NDS includes improvement of existing roadways, construction of new roads, construction of bridges, improvement of existing airstrips and construction of new ones, etc.

Chapter 23 of the NDS focuses on the housing sector and outlines several initiatives to be undertaken to improve housing for Guyanese. The wider project, which is utilizing unused sugar cultivation lands to provide housing schemes, fits within the objectives of the NDS. The provision of house lots and the necessary infrastructure for housing development is a key recommendation of the NDS.

Further, the NDS stipulates that environmental considerations should underpin all aspects of development, whether physical or social and further, that Guyana's development must not threaten the integrity of the environment. Provision of infrastructure should therefore address issues of environmental, economic and social sustainability. Specifically, the NDS states that attention has to be given to monitoring and enforcement and actions to improve environmental management practices.

[8] While the duration is from 2001 – 2010 currently it is still considered to be in use.

4.2.2 Low Carbon Development Strategy

Guyana's LCDS was prepared in 2009 and updated in 2013. The new Government has indicated its interest in pursuing and expanding on the LCDS[9], which will replace the Green State Development Strategy. The strategy will be broadened to include wider environmental services, water resources management, climate resilience, biodiversity, renewable energy, and the marine economy. The expanded LCDS will also include the establishment of an International Centre of Excellence for Biological Diversity with objective of promoting cutting edge research and developing and exporting educational services. The LCDS presents the country's vision and plan for the forest to be protected and maintained in an effort to reduce global carbon emissions while at the same time attracting resources for development that would put Guyana onto a low carbon growth path. The LCDS has three main components: (i) investment in low carbon economic infrastructure; (ii) investment and employment in low carbon economic sectors; and (iii) investment in communities and human capital.

This project is in keeping with the LCDS which promotes the use of non-forested arable lands for development purposes. Installation of the infrastructure and the wider housing scheme development will allow Guyana to maintain its forest cover in order to offer climate services while pursuing its development. The project will also contribute positively to Guyana's REDD+ efforts since it would demonstrate that developmental opportunities can be pursued while avoiding deforestation, since unused agricultural lands will be utilised for infrastructure and other purposes.

4.2.3 National Land Use Plan

The National Land Use Plan prepared in 2013 highlighted that the main demand for housing is at the East Coast Demerara but available land is at a premium. As a result, the CHPA have been concentrating on establishing housing areas on the East Bank Demerara and in Region 3, where the project site is located. The National Land Use Plan also recommended that the development of housing and industry is also a primary option on the coastal plain and states that there is the potential for developing housing on abandoned agricultural land but housing developments need to be better planned in relation to both their location and to other land uses. The Plan also states that, with improved access and other development, industrial sites can be developed and could be located either on poor quality, abandoned frontlands or could even be located in backland areas providing that access and power are provided. This project will contribute to the utilization of unused agricultural lands in the backlands area. However, the National Land Use Plan also recommended that primary agricultural lands should be avoided.

4.2.4 National Environmental Action Plan

The National Environmental Action Plan (NEAP) (1994) was one of the first efforts towards integrated environmental planning and outlines the focus of Government of Guyana as it relates to environmental management. The NEAP outlined several policy objectives. One of the policy objectives calls for the Government to ensure that environmental assessments of proposed development activities which may significantly affect the environment are undertaken. In keeping with this environmental policy objective, the Environmental Protection Act was introduced.

[9] https://newsroom.gy/2021/02/12/govt-to-follow-through-on-plans-to-resuscitate-lcds/

The NEAP was revised (2001-2005) and set out the *"environmental development strategy for Guyana for five years"* and *"a framework for integrating cross-sectoral environmental concerns in the broader context of the country's economic and social development programme".*

4.3 Legislative Framework

Several laws exist in Guyana which are applicable to this project. The relevant pieces of legislation are discussed below:

4.3.1 Constitution on Guyana

The Constitution is the supreme law of Guyana and outlines, inter alia, the branches and powers of Government, the rights of Guyanese, and the principles for the political, economic and social systems. All other laws must be in keeping with the provisions of the Constitution. Specifically, Articles 2:25 and 2:36 of the Constitution provides the base for a national environmental policy and emphasizes these as key principles for the functioning of Guyana's social and economic systems.

Article 2:25 of the Constitution states that *"every citizen has a duty to participate in activities to improve the environment and protect the health of the nation".* And Article 2:36 states that *"in the interest of the present and future generations the state will protect rational use of its flora and fauna and will take all appropriate measures to conserve and improve the environment".*

4.3.2 Environmental Protection Act

Environmental protection and management is governed by the Environmental Protection Act 1996. The act is the first comprehensive environmental legislation in Guyana and established and detailed the functions of the EPA. The Act provides for *"the management, conservation, protection and improvement of the environment, the prevention and/or control of pollution, the assessment of the impact of economic development on the environment, the sustainable use of natural resources and for matters incidental thereto connected therewith".* Under the Act the EPA is mandated to coordinate environmental management and outlines the legal process for undertaking sustainable and effective management of the natural environment.

The Act is currently being implemented as a planning mechanism for the approval of new developments that may cause environmental impacts. It also provides the basic regulatory and administrative framework for pollution control. The Environmental Protection Act, No. 11 of 1996 outlines the Environmental Authorisation process for certain new or existing projects being modified. Part IV of the Act requires all developers of any project listed in the fourth schedule or other projects that may significantly affect the environment to apply to the EPA for an Environmental Authorisation. The application form, which must be accompanied by the prescribed fee, must include a description of the project as well as information regarding location, size, duration of the project, and potential environmental impacts. The EPA will review the application and assess whether or not the project should be exempted from the Environmental Impact Assessment process. Once a decision has been made, the EPA will publish a notice to the public in at least one daily newspaper informing them of EPA's position, thereby allowing the public review of the decision.

Under the Environmental Protection Act, a project of this nature may require an Environmental Authorisation from the EPA. If an Environmental Authorisation is required and is granted, the EPA will then monitor the project to ensure compliance with the conditions of the permit and other requirements.

4.3.3 Environmental Protection Regulations

Regulations on Hazardous Waste Management, Water Quality, Air Quality and Noise Management were established under the Environmental Protection Act in 2000. These pollution management regulations were developed to regulate and control the activities of developmental project during their construction and operation phases. The EPA has the responsibility to ensure the compliance of all new and existing activities with these Regulations by issuing the required authorizations and monitoring their operations. Standards establishing the permissible parameters under these regulations are being developed.

As it relates noise management, national standards were prepared which stipulates decibel level limits for various types of activities. For construction projects the noise limits applicable are 90 dB during the day and 75 dB at nights.

For water quality interim national standards were developed relating to the discharge of effluents. Limits are set out for various parameters for which compliance is required. Parameters relating to this project for which limits are established are presented in Table 3-1.

Table 4-1: Relevant Parameters and Maximum Allowable Limits

Parameters	Maximum Allowable Limits
pH	5.0 to 9.0
Total Suspended Solids (TSS)	<100 mg/L
Oil and Grease	<20 mg/L
Total Dissolved Solids (TDS)	<200 mg/L
Turbidity[10]	<50 NTU
Dissolved Oxygen	>5
Total coliforms	< count per 100 ml

For air quality any operation that emits any air contaminant apply to the EPA for an environmental authorization. The EPA is supposed to establish desirable air pollution limits. However, currently, there are no nationally determined or established air quality standards. The EPA is guided by and utilises air quality guidelines from the World Health Organisation (WHO), United States Environmental Protection Agency (USEPA) allowable limits and other reputable international organisations. The air quality parameter which is of concern for this project is particulate matter. The WHO limits for particulate matter is presented in Table 3-2.

[10] In accordance with the Mining (Amendment) Regulations 2005 since the Interim Effluent Discharge Standards did not include a limit for turbidity.

Table 4-2: WHO Air Quality Standards

Element	Averaging Period	Acceptable Limit
Particulate Matter (PM_{10})	24-hour	50 g/m^3
Particulate Matter ($PM_{2.5}$)	24-hour	25 g/m^3

Regarding hazardous waste generation and management the contractor is expected to generate small quantities of hazardous wastes which are expected to be managed in compliance with these regulations. Hazardous waste expected to be generated includes waste oil and used batteries. These are to be properly collected, stored, transported and disposed.

4.3.4 Environmental Protection (Litter Enforcement) Regulations

In 2013 the Environmental Protection (Litter Enforcement) Regulations was enacted. These Regulations provide for the enforcement against litter offences. It is an offence under these Regulations to place litter in a public place, permit or cause another person to litter a public place or have litter on private premises that pose a health risk. Under the Litter Prevention Regulations, the contractor will have to ensure that solid waste generated is managed and disposed of in an acceptable manner.

4.3.5 Land Acquisition for Public Purposes Act 1914

The Land Acquisition for Public Purposes Act covers expropriation of land required for public works including roads. This Act gives the GoG the power to enter upon any piece of land (with the consent of the occupier) and acquire said land for road work, etc. Therefore, if any land is needed for the project, it can be acquired under this Act, even if it is occupied by a private person, and that person will be compensated by the GoG for the value of their land and any structure. The Act states that in determining claims for compensation, the GoG may consider: the market value of the land; losses to earnings; losses due to severance and relocation expenses.

Given the current design and the initial scoping exercise, it is not envisage that any land acquisition will be required. However, if for some reason the Government has to acquire any portion of land or property, this will be guided by the Act.

4.3.6 Housing Act, 1948

This Act established the CHPA and outlines how the Agency should conduct its affairs. The Act gives the CHPA the mandate to adequately develop the housing sector to provide for the needs of the working class. This include acquiring of lands and development of schemes. It is under this mandate that the CHPA is pursuing its housing development initiatives across the country, including in Region 3. One of the main objective of this project is to allow the CHPA to provide proper infrastructure for the improvement of the housing scheme.

4.3.7 Town and Country Planning Act, 1948

This Act makes provision for the orderly and progressive development of lands, cities, towns and other areas including both urban and rural and to preserve and improve the amenities within these areas. The Act outlines the procedures for the development of schemes. It also outlines how collaboration should occur between the CHPA and the local government authorities and also gives

the powers to authorities to carry out enforcement to ensure the all development activities within an area conforms to the requirements.

4.3.8 Labour Act

The Labour Act of 1942 specifies the conditions that an employer must observe in the contracting employees. For example, Part V specifies that the entire wages of the employee must be paid as money and not otherwise. However, in occupations where it is customary to make partial payment of allowances in the form of food, toiletries, housing etc. these are acceptable and not considered illegal, if both the employer and employee are agreed on such terms.

This Act ensures that workers under this project are not mistreated and have proper representation to ensure that they are treated properly and paid adequately for their services.

4.3.9 Occupational Safety and Health Act

The Occupational Safety and Health Act 1997 defines the responsibilities of management and workers with respect to safety and health and applies to every workplace in Guyana. The Act makes provisions for the registration of industrial establishments, the establishment of an Occupational Safety and Health Authority, the establishment of a National Advisory Council on Occupation Safety and Health, the duties of employers, workers and other persons, treatments of accidents and occupational diseases, and occupational safety and health regulations. The Act authorises OH&S inspectors to enter and inspect workplaces. The Contractor will have to comply with the provisions of this Act in relation to workers.

4.4 IDB's Safeguards and Policies

The IDB applies environmental and social safeguard policies, standards and guidelines to projects it supports. Safeguards are applied to ensure that project funds are engaged in a manner consistent with the Bank's institutional policies with respect to environmental and social management. Safeguards are applied in two manner, firstly, environmental and social considerations are integrated into the screening process of all projects, and secondly, during project implementation negative impacts are prevented or minimised through the identification, monitoring and mitigation of potential issues.

The main safeguard policies of the IDB are:

- Environmental and Safeguards Policy (OP-703)
- Natural Disaster Risk Management Policy (OP-704)
- Indigenous Peoples Policy (OP-765)
- Gender Equality in Development Policy (OP-761)
- Access to Information Policy (OP-102)
- Involuntary Resettlement Operational Policy (OP 710)

According to project documents, the project has triggered the IDB's Environment and Safeguards Compliance Policy (Operational Policy OP-703) and the project has been categorized as a Category B Programme, which means that negative environmental and social impacts of the programme activities are likely to be mostly local and short-term, and can be readily mitigated with effective

mitigation measures. Table 3-1 outlines the policy directives of OP-703 and discusses their relevance to the project.

Table 4-3: Policy Directives of OP-703 – Environmental and Safeguards Compliance

Policy Directive	Aspect (if applicable)	Relevance to the Project
B.1. Bank Policies	OP-102: The Access to Information Policy.	The IDB to determine whether this ESA contains information subject to the Access to Information Exceptions List. If it is not on the Exceptions List, the ESA should be posted to the Bank's website.
	OP-710: The Involuntary Resettlement Policy.	This Policy is not expected to be triggered by the project based on the initial scoping done.
	OP-704: The Natural and Unexpected Disasters Policy.	The risk profile of natural hazards relating to the project will be examined.
	OP-761: Gender and Equality in Development.	The CHPA will have to ensure that the operation will not affect women or gender equality negatively and will offer opportunities to promote gender equality or women's empowerment. Improving infrastructure within communities may contribute to achieving these objectives.
	OP-765: The Indigenous Peoples Policy.	This policy is not expected to be triggered since the project site is not located in close proximity to any Indigenous community.
B.2. Country laws and Regulations	Compliance with national environmental laws and regulations and with multilateral environmental agreements.	The project must comply with national legislation on environment, and occupational safety and health as stated in the ESA.
B.3. Screening and Classification	Classification of the risk level.	The project has been classified a Category B Programme by the IDB because the negative environmental and social impacts are likely to be mostly local and short-term, and can be readily mitigated with effective mitigation measures.
B.4. Other Risk Factors	Capacity of executing agency for environmental governance, high environmental and social risks, vulnerability to natural disasters.	The CHPA has in place a structure to ensure environmental oversight of projects, including having environmental personnel assigned to the project.

Policy Directive	Aspect (if applicable)	Relevance to the Project
B5. Environmental Assessment Requirements	Requirements for various types of environmental assessments including ESMPs.	CHPA will complete an ESA which will include an ESMP.
B.6 Consultation	Consultation	Stakeholders' consultation will be done as part of the ESA process. A Stakeholder Engagement Plan that is scaled to the programme risks and impacts will also be prepared as part of the ESA, along with a grievance mechanism to receive and facilitate resolution of affected communities' concerns and grievances.
B.7. Supervision and Compliance	Monitoring	CHPA has in place a structure to supervise and monitor the project and will ensure allocation of budget for monitoring activities.
B10. Hazardous Materials	Production, use and disposal of hazardous substances.	Small quantities of hazardous materials such as waste oil, paint residues, etc. may be generated at some of the construction sites. Management measures will guide storage, transport and disposal.
B.11. Pollution Prevention and Abatement	Water, air, noise and waste pollution management.	The project will implement management and mitigation measures for any adverse impacts on water quality, air quality, noise management, hazardous waste, and litter prevention.
B. 16 In-Country Systems	Utilizing in-country systems to manage environmental and social impacts.	The IDB will decide whether the in country systems will be used to manage potential environmental and social impacts from the project.
B.17 Procurement	Safeguards for procurement incorporated into loan agreements, operating regulations and bidding documents.	CHPA will have to ensure that environmental, social, health, and safety related requirements are included in procurement documents such as bidding documents.

4.5 Institutional Framework

The key institutions which will have oversight during the implementation of the project are described in this section.

4.5.1 Environmental Protection Agency

The EPA was established under the EP Act of 1996. The Agency is governed by a Board of Directors, and falls under the direct supervision of the Department of Environment within the Ministry of the Presidency. In Sec. 4 (1) (a), of the Act, the EPA is given the mandate to *"take such steps as are necessary for the effective management of the natural environment so as to ensure conservation, protection and sustainable use of its natural resources*". In addition, the Agency is given the overall responsibility to:

- Take necessary steps for effective management of the natural environment to ensure conservation, protection and sustainable use of its natural resources;
- Ensure that any developmental activity, which may cause an adverse effect on the natural environment, is assessed before such activity is commenced;
- Coordinate and maintain a programme for the conservation of biological diversity and its sustainable use; and
- Coordinate the establishment of national parks and protected areas system and a wildlife protection management programme.

In fulfilling the above listed functions, the EPA is required to ensure projects such as infrastructure projects are authorized and are in compliance with the environmental requirements. Once an environmental authorisation is issued the EPA may conduct period monitoring of project activities to ensure environmental compliance.

4.5.2 Central Housing and Planning Authority

The CHPA was established in 1948, under the Housing Act, to address the housing needs of the citizens of Guyana. CHPA is under the purview of the Ministry of Housing and Water and has the following 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 centers.
- Provision of services (access roads, internal road networks, water distribution networks, drainage, electricity).
- Collaboration with stakeholders for the development of sustainable communities.

CHPA has the responsibility for the planning and implementation of Government of Guyana housing schemes as well as undertaking squatter regularisation. In making land available for housing purposes the Agency ensures that the necessary infrastructure is in place. It is as a result of providing these services that the CHPA is spearheading the implementation of this project which will significantly benefit existing housing development within the project area.

The CHPA Projects Department will implement the project and has the capacity to provide environmental oversight of project activities. The Health, Safety and Environmental (HSE) Unit of the CHPA is mandated to provide HSE functional and technical support on locally and foreign funded infrastructure and building projects. The HSE Unit was established under the Projects Department, given that this Department is the main project execution arm of the CHPA. Further, and for this reason, the HSE Unit is better able to provide HSE management support to those projects, which are under the portfolio of the Projects Department. The HSE Unit is currently headed by an HSE Manager (previously termed the Environmental and Social Safeguards

Coordinator), and several Environmental and Social Safeguards Works Supervisor (see Figure 4.1 for the HSE Unit's Staff Structure). The main roles and responsibilities of the HSE Unit are as follows:

- Provide HSE functional and technical support to the Agency's Supervision Management Team, and the Contractor's Construction Management Team;
- Implement Environmental and Social Management Plans (ESMPs) and undertake Environmental Social Safeguards Site Surveys, and Feasibility Studies;
- Conduct HSE monitoring and daily inspections, and provide guidance to Contractors and the Department's engineering team on the implementation of ESMPs and corrective actions;
- Provide technical support to the Community Development Department in executing the Agency's Stakeholder Engagement Plan (SEP), which includes conducting regular stakeholder awareness sessions with project affected communities; to provide project updates, address grievances, carry-out sensitization, garner stakeholder feedback, and foster discussions and stakeholder participation;
- Lead incident investigations; prepare incident/accident notifications and investigation reports (for communication of significant incidents to agency leaders (CEO, Ministers);
- Ensure that Contractors HSE activities comply with the Multilateral Development Bank (MDB) safeguard policies, local legislation, CHPA and Contractors HSE Policies, Plans and Procedures, and conform to the Contract HSE Schedule;
- Prepare and analyze the daily and weekly HSE Contractor compliance site reports and performance and propose the necessary improvement actions to improve HSE awareness, onsite management and culture.
- Consolidate Environmental and Social Management Requirements, including HSE Evaluation Criteria for Project tender documents.
- Lead HSE Evaluation of Project Tenders.
- Undertake HSE Reporting on HSE Compliance and Project HSE Management.

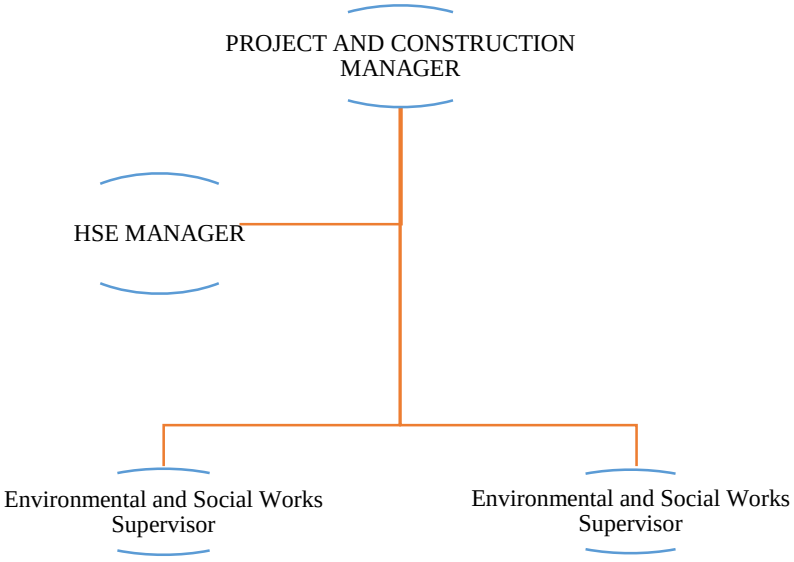

Figure 4.1 Current Staffing Structure of HSE Unit

4.5.3 Local Government (Regional and Neighbourhood Democratic Councils)

The local government system is enshrined in the Constitution of Guyana. Chapter VII, section 71(1) state that local government is a vital aspect of democracy and shall be organised so as to involve as many people as possible in the task of managing and developing the communities in which they live. The Ministry of Local Government and Regional Development has the responsibility for overseeing local government, which comprises the RDCs, the municipalities and the NDCs. The maintenance of public roads outside of Georgetown is the responsibility of the RDCs. They also coordinate the activities of local NDCs, providing support where necessary, and are responsible for overseeing public works and supporting the NDC's. The NDCs are required to provide services such as solid waste collection and disposal, sanitation, rehabilitation of roads and dams and operation of markets, etc. These NDCs have the jurisdiction to play a part of the entire planning process, especially in the area of community engagements, allocation of areas for site facilities and storage of materials, disposal of waste, drainage, etc.

The Regional Democratic Council Region # 3 is the RDC which has oversight for the project area. The NDC within which district the project area falls is the Malgre Tout - Meer Zorgen NDC.

4.5.4 IDB

The IDB is providing the funding for this project and as such, it is anticipated that there will be some oversight of the project by the IDB, especially to ensure that its policies and safeguards are being complied with. The project was screened by the IDB to determine the applicable safeguard policies and the level of environmental and social assessment and management planning required. It is expected that, during the construction phase, there will be close liaison between the IDB's Safeguards Specialists and the CHPA to identify and address any challenges encountered or compliance issues. This may require periodic visit of the Specialists to the project site and periodic reporting to the IDB on environmental and social safeguards management by the CHPA during the execution of the works.

5.0 STAKEHOLDER ENGAGEMENT

5.1 Engagement Approach

Stakeholder engagements were considered as a critical element of the ESA preparation process. Stakeholders were engaged to provide information on the project area and to present any concerns or recommendations they may have regarding the project. Stakeholder engagement for the ESA process is discussed in this section.

Engaging with project stakeholders in a transparent, systematic, and non-discriminatory manner adds several benefits to a project. These include but are not limited to:

- Enabling people to understand their rights and roles in relation to a project leading to greater transparency and involvement of stakeholders by enhancing their trust.
- Building the credibility and legitimacy of the companies and institutions involved, whether in an implementing or supporting role.
- Promoting project acceptance, and local ownership, which are key to project success and sustainability.
- Holding stakeholder engagement sessions to identify and assess potential project impacts.
- Having brainstorming sessions to develop measures to mitigate impacts identified by stakeholders.

In addition, some form of stakeholder engagement is generally a formal and legal requirement in projects, based on national law and requirements of financing institutions. Stakeholder engagements can also familiarize local and central stakeholders of project's activities, the measures being undertaken to protect the environment, to provide a platform for concerns to be raised and to lay the foundation for a positive relationship between the project and the community. More specifically, the engagements provide a means to take their views into account as inputs to improved project design and implementation, thereby avoiding, or reducing adverse impacts, and enhancing benefits.

Stakeholders for the project are diverse and generally, comprise local communities, national, regional, and local government authorities, and civil society organisations. The overall purpose of the stakeholder engagements is to build awareness of the project and provide a platform for stakeholders to share their feedback during the ESA preparation process. The following approach was adopted:

- Inform stakeholders about project and planned project activities.
- Initiate open dialogue between the ESA team and stakeholders to allow stakeholders to receive clarifications on the project, and to share their views, concerns, and expectations.
- Receive feedback from stakeholders on the main environmental and social concerns associated with the project for inclusion and consideration in the ESA.
- Create a mechanism through which feedback from stakeholder engagements are shared with the CHPA to ensure that stakeholder engagements are meaningful and are considered in decision-making.

The engagement approach builds on the numerous engagements held by CH&PA with the project stakeholders that were critical to project design. The primary stakeholders engaged were drawn

from the communities which fall within the project's area of influence, which are the communities which would benefit from the works to be conducted as part of the project. These communities are:

1. Lust-Tot-Rust;
2. Recht-Door-Zee;
3. Onderneeming;
4. Westminster;
5. La Parfaite Harmonie; and
6. Schoonord

5.2 Stakeholder Identification and Characterization

Identifying the stakeholders and groups of stakeholders who should be consulted was done early in the ESA preparation process with since a Stakeholder Engagement Plan for the ESA was required to be submitted in in the Scoping Report. According to the donor this Category B program will have short lived negative environmental and social impacts with low project risks. With a multitude of options for categorization for stakeholders it was determine to maintain the objective of simplicity by not overly complicating a lower-risk project.

Primary stakeholders consist mainly of those at the local level, including residents, business, civil society organisations, religious organisations, non-governmental organizations, media, and other community groups. The list of primary stakeholders identified are presented in Table 5-2. The engagement process was guided by the IDB's Operational Policy on Community Health, Safety and Security, Gender Equity and Resettlement (specifically economic resettlement in this case).

Table 5-1: List of Primary Stakeholders

No.	Stakeholder Entity	Contact Person
1	Housing Scheme Residents	Random selection
2	Local Businesses	Random selection
3	Black Cabra Karate Club, Westminister, WBD	Mr. Lloyd Ramnarine
4	Parafaite Harmonie Action Group	Ms. Halls
5	Westminster Multipurpose Building Committee	Mr. Malcolm Garnett
6	Orchid Women's Group (NGO) Westminster Ph2, WBD	Ms. Indra Constantine
7	Throne Room Int'l Westminster - Westminster WBD	Pastor Marshall Lambert
8	Masjid Alnur-27-4th Street, La Parafaite Harmonie, WBD	Mr. Nazim Hussain

The secondary stakeholders consist of local, regional, and national level agencies and institutions who are not core stakeholders. These stakeholders are presented in Table 5-3.

Table 5-2: List of Secondary Stakeholders

No.	Stakeholder Entity	Contact Person
1	Ministry of Social Protection	Mr. Suresh Jaigobin
2	Ministry of Education, Regional Education Officer Region 3	Mr. Persaud
3	Ministry of Health, Parfaite Harmony Health Centre	Nurse Semple
4	Guyana Water Incorporated	Aubrey Roberts, Executive Director
5	Guyana Power and Light Company Inc.	Ms. Knights, Region 3 District Office
6	Guyana Telephone and Telegraph Company	Ms. Jasmine Harris
7	Guyana Police Force	Senior Superintendent Watts
8	Regional Democratic Council, Region 3	Chairman, Mohamed Inshan Ayube
9	Malgre Tout/Meer Zorgen NDC Office, Goed Fortuin	Overseer, Ms. Theresa Persaud
10	Best Klien/Pouderoyen, Neighbourhood Democratic Council	Assistant Overseer, Sarswattie Harripersaud

5.3 Engagement Methodology

5.3.1 Engagement Philosophy and Approach

The success of the public engagement of the project stakeholders was rooted in honest, open, and meaningful dialogue early and often throughout the course of a project. Some elements of this process are provided below but not limited to:

- Joint identification by community representatives and CH&PA of all stakeholders who could have an interest in the project.
- Allowing community members to identity their priority issues to be addressed by developmental projects.
- The early engagement and meaningful integration of community leaders into the project's purpose, need, and benefits, and provision of frequent updates as the project progresses.
- Meeting with project-affected communities in appropriate forums and using suitable methods to better understand local, context-specific issues and demonstrate a commitment to public involvement.
- Providing adequate notice of all public meetings and other such public outreach efforts being sensitive to cultural norms of the diverse housing communities.
- Providing stakeholders with the appropriate grievance mechanism to seek remedy if the project causes harm to them or the environment.
- The developing of a database of stakeholders that will continue to be updated as additional stakeholders are identified.

5.3.2 Primary Stakeholders

The Government, through the office of the CH&PA, is expected to ensure that stakeholders, particularly affected communities, are provided with timely and transparent information regarding the Project, and to voice potential issues of concern emerging from the project. The group of primary stakeholders stand to be mostly affected by the project mainly due to proximity in daily

interactions with the project environment. This group was consulted based on availability and willingness to participate in the engagements mostly on a one to one basis and also by telephone with strict observance for all COVID-19 guidelines.

The residents to be consulted were selected based on their availability for face-to-face interviews with all COVID-19 protocols observed. The consultant conducted a walkthrough of the area and randomly called on residents informing them of the request and respected their wish to accept/deny. Those willing to participate were asked to provide a suitable time for the interview inclusive of the present moment. Their contact numbers were requested and stored for future engagements or arrangements for the required engagement.

The businesses were also selected at random and the request for the interview made. The stakeholder was asked to decide on the type of consultation (in-person, online or by telephone) and their request respected in the wake of the COVID-19 pandemic. The contact details were requested and stored for future engagements. Businesses included both formal and informal establishments located within the communities irrespective of legal or other status.

The community groups identified were contacted through their representatives' identified or any other party recommended. The party was asked to choose their preferred way of contact for the interview. A structured interview was administered to the stakeholders with room for the interviewee to add other concerns not raised in the process.

5.3.3 Secondary Stakeholders

The representatives of the stakeholder institutions were requested to select their preferred way of engagement at their convenient time in keeping with the COVID-19 guidelines. The consultant proposed in-person, internet based, question and answer by email or telephone consultations, giving the stakeholder the option to choose their most comfortable method. A structured interview was administered to the stakeholders with room for the interviewee to add other concerns not raised in the process to ensure that their concerns were documented in the ESA.

5.4 Documentation of Engagement Process

Detailed notes were taken of the consultations and images were requested from the stakeholder to serve as a guide to the process and further evidence of the event. As far as possible, considering the COVID-19 pandemic restrictions; a signed record was kept of the various consultations. A detailed report of the consultations was prepared for inclusion in the ESA and is included as Annex 2.

5.5 Stakeholder Feedback

The Stakeholder matrix is provided in Annex 2 with all details of the various engagements. A summary of the key feedback from the two groups is provided below:

5.5.1 Primary Stakeholders

The primary stakeholders all support the project and are anxious to see their community develop. They were mainly not aware of the project and cannot recall being engaged by the authorities. Road works are welcomed and will be more of an asset if there are streetlights installed along the roads or around the schools where children are walking in late afternoons or nights. The residents believe more streetlights will prevent many crimes from happening in the cover of darkness at night.

Residents who have building materials, old vehicles, other materials, or have blocked off the road reserves for other reasons may not be as enthusiastic about the project that will require them to remove their items from the reserves. These items will have to be cleared to make way for road works and drainage works. The stall owners located at the street corners are willing to relocate to accommodate the installation of the culverts or the paving of the roads. They were supportive of the project as long as it did not stop them from earning a daily living.

There is some concern with floods resulting from poor drainage and the stakeholders are confident that the addition of culverts will alleviate the situation if the earthen drains are cleaned on a regular basis. The addition of concrete drains will be an asset and boost the water flow in the community. The unoccupied house lots are a major concern as they harbor mosquitoes, snakes and other pests that plague homeowners.

Another concern raised was that of security that can be enhanced with the addition of streetlights and the addition of a mobile police outpost in the area. The sidewalks to be constructed by the schools should extend to the main roads where the children disembark from their transport to walk to the school. The residents believe that with more frequent vehicle patrols by the police there can be a reduction in crime. The Community Policing Group is not functioning and needs to be reactivated to have an impact in the community.

5.5.2 Secondary Stakeholders

This group of stakeholders were mostly not aware of the project and required details before providing feedback. The main concern raised was that the project works can disrupt the utility services. There is need for much care and coordination to prevent any broken water main, power lines or telephone lines.

The stakeholder group were aware that the project will have a positive impact on the community leading to increase demand for services. The water well of GWI was not deemed adequate in quantity or quality but there are no immediate plans by GWI to add another well or treatment plant in the scheme.

GPL will coordinate with project personnel to ensure that its system is not broken and sections under work is not live during construction. GTT is expanding its network as the scheme populates with major sections already having landline and Blaze Internet.

The NDC needs to begin its collection of taxes and provision of services in the housing scheme with the areas handed over since 2019. There are numerous properties with overgrown vegetation that needs clearing that can be cleared by the NDC and billed to the property owner. This action will lessen some of the security concerns of the residents. Residents can apply to GPL to have a streetlight installed in their area and be billed a fixed fee for its operation while the NDC pays for its connected lights.

The government through its ministries will continue to implement programs with the aim of developing the scheme and raising the standard of living in the peri-urban environment. The police at the division level are willing to step up its vehicle patrols with the objective of reducing crime in the area.

6.0 ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

6.1 Identification and Evaluation of key Environmental and Socio-economic Aspects

Geographically, the project spans several adjoining communities within the West Bank Demerera area. These communities include Lust-En-Rust, Recht-Door-Zee, Onderneeming, Westminster, La Parfaite Harmonie and Schoonord. However, the works that are to be undertaken are sparsely dispersed between these six communities. In addition, the interventions will be done within existing housing schemes where the project environment is already impacted from the development of these schemes. The roads and drains to be upgraded as part of the project are already in place.

An evaluation of the project and its impacts on these communities, and the general environment was conducted based on reconnaissance done during field exercises. The process utilised for the identification and evaluation of key environmental and socio-economic impacts was done in accordance with the IDB approved Environmental and Social Screening Checklist as outlined in the ToR, and included in Annex 1. Literature review of projects that were similar in nature also played a significant role in determining potential impacts. Based on the evaluation, it was predicated or envisaged that the project will have some amount of impacts on the physical, biological and socio-economic environments.

Impact identification and evaluation was conducted by a rigorous systematic approach and included:

- Characterizing the baseline conditions of the project area to establish and assess the most current and potential environmental effects of the project;
- Identifying the source of impacts and the impacts themselves that are being or are likely to be generated by the project. This was achieved through professional judgment, field work, desktop analysis and review of relevant literature;
- Rating impacts to determine impact significance. This was achieved through the guidance of the Environmental and Social Checklist which was instrumental during the field exercises;
- Evaluation of impacts after considering mitigation measures; and
- Evaluation of long term impacts which are likely to occur during the operational phase.

The impacts were assessed based on the project environment and the activities to be conducted as part of the project. For each impact, the following were taken into consideration:

- Whether the impact is localised or extensive;
- Whether it is short term or long term;
- Whether it is a positive (+) or negative (-) effect;
- Whether the intensity and magnitude is high (H), medium (M) or low (L)
- Whether it is avoidable or unavoidable;
- Whether it is significant or insignificant; or
- Whether it is mitigable or unmitigable.

The following subsections will elucidate on the foreseen impacts on the physical, biological and socio-economic environment.

6.2 Environment Impacts

6.2.1 Air Quality

Based on an appraisal of all the activities that are to be conducted during the construction phase and those which are likely to occur during the operational phase of the project, it is anticipated that there will be emission related impacts to the air in the form of dust and combustion gases. During the construction phase, these impacts are likely to be more significant, but short-term, direct and localised. The intensity and magnitude of these impacts are likely to be low due to the dispersion of works and the fact that the impacts are mitigable. These impacts are also expected to continue for a period after construction, since the project itself would create a positive effect on the socio-economic environment of these communities, which would likely spark an increase in private construction, hence increasing the rate of occupancy.

Dust

Given the nature of the main and supporting activities that are to be performed during the execution of works during the construction phase, it is anticipated that there will be emissions to the air in the form of dust/particulates. In fact, it is expected that there will be an increase in particulates such as $PM_{2.5}$ and PM_{10} in contrast to those recorded during the baseline survey, which shows relatively low readings. These emissions are likely to be short-term and direct and are likely to continue after construction since the new infrastructural developments are likely to increase socio-economic activities within the various communities. Several sources of dust emissions have been identified and are presented in Table 6-1 below.

Table 6-1: Emissions to the Air: Dust/Particulates

Phase	Type of Dust Emission	Emission Sources	Effect (+/-)	Intensity (H/M/L)	Magnitude (H/M/L)
Construction Phase	Fugitive dust and other particulate matter.	Vehicles and heavy-duty equipment kicking up dust while traversing roadways during dry conditions, particularly, when transporting materials, equipment, spoils/waste to and from the various projects sites	-	L	L
		Land clearing activities, particularly in areas with thick vegetation	-	L	L
		Excavation works, for example: clearing of canals, drains and culvert sites	-	L	L
		Grading of roadways and walkways	-	L	L
		Building of Road Shoulders	-	L	L

Phase	Type of Dust Emission	Emission Sources	Effect (+/-)	Intensity (H/M/L)	Magnitude (H/M/L)
		Offloading of materials such as sand, loom, stones, cement and wood	-	L	L
		Sawdust produced during the cutting of wood for construction uses	-	L	L
		Removal of form works, particularly during the construction of culverts and sidewalks	-	L	L
		Construction activities involving masonry works, particularly during loading and operating cement mixers	-	L	L
Post Construction Phase	Fugitive dust and other particulate matter.	Increased traversing of vehicles and trucks along roadways during dry conditions	-	M	M
		Trucks transporting materials for private construction	-	M	M
		Building materials such as sand and stone for housing construction being dumped along roadways uncovered for long periods	-	M	M
		Sawdust from offloading and cutting of wood for housing construction	-	L	L
		Masonry activities, particularly during operation of cement mixer and removal of formworks during private construction works	-	M	M

L – Low M – Medium H - High

Gaseous Pollutants

Given the nature of the main and supporting activities that are to be performed during the execution of works or construction phase, it is anticipated that there will be emissions to the air in the form of gaseous pollutants. These emissions are likely to be short-term and direct and are also likely to continue after construction is completed since the new infrastructural developments are likely to increase socio-economic activities within the various communities. Several sources of gaseous pollutants have been identified and are presented in Table 6-2 below.

Table 6-2: Emissions to the Air: Gaseous Pollutants

Phase	Type of Gaseous Pollutants	Emission Sources	Effect (+/-)	Intensity (H/M/L)	Magnitude (H/M/L)
Construction Phase	Combustion Gases (CO, CO_2, SO_2, NO_x, N_2O, VOCs or HCs.)	Combustion of fossil fuels during the operation of generators, water pumps and heavy-duty equipment such as excavators, bull dozer, non-vibratory soil compactor, trucks, rollers and cement mixers	-	L	L
Post Construction Phase	Combustion Gases (CO, CO_2, SO_2, NO_x, N_2O, VOCs or HCs.)	Combustion of fossil fuels by vehicles traversing the area and by equipment used in construction of buildings	-	L	L

L – Low M – Medium H - High

6.2.2 Noise

Noise levels above the alert threshold of 86 decibels and hazard threshold of 95 decibels will be considered a nuisance and would therefore have significant negative effects on both construction workers and nearby receptors such as residents. It is anticipated that there will be an increase in noise level throughout the duration of the project. This is evident in the baseline data collected for noise levels within the project area, whereby the maximum readings recorded for N4, N5, N6 and N8, which were all taken within proximity to construction activities, were higher than those recorded in areas that hand no such activities.

During the construction phase, it is expected that the main sources of noise are likely to be from the use of generators, ransoms, heavy duty equipment and manual and electrical hand tools. It is envisaged that the potential impacts of noise nuisance will be direct, localised and short-term, but could be significant if it exceeds the prescribed levels for long periods. Works conducted at night will also likely to result in noise nuisances.

Exposure to noise levels above the internationally accepted level of 90 decibels can cause noise induced hearing loss. Noise levels above the tolerable threshold of 72 decibels can result in fatigue, tiredness, low morale and decreased productivity. Heavy-duty equipment and generators in particular, usually generates significant levels of noise. However, rehabilitation and construction within these communities are well dispersed and will therefore not have cumulative effects. Nevertheless, measures should be implemented to keep noise levels within the Guyana National Bureau of Standards (GNBS) prescribed limits for construction sites, which is 90 dB during the day and 75 dB at nights.

High levels of noise are also expected to continue post construction since the new infrastructural developments are likely to increase socio-economic activities within the various communities. This increase is also expected to be short term with little significance. Several sources of noise pollutants have been identified and are presented in Table 6-3 below.

Table 6-3: Noise Emission

Phase	Emission Sources	Effect (+/-)	Intensity (H/M/L)	Magnitude (H/M/L)
Construction Phase	Operation of generator and water pumps	-	M	M
	Heavy duty equipment	-	M	M
	Manual and electrical hand tools	-	L	L
	Operation of soil compactors/vibrators	-	L	L
Post Construction Phase	Heavy duty equipment used	-	M	M
	Operation of generator	-	M	M
	Manual and electrical hand tools	-	L	L

L – Low M – Medium H - High

6.2.3 Water Resources

Surface Water

The project is anticipated to have some amount of impacts to surface water quality. These impacts are foreseen to be both positive and negative. Activities such as, excavation of earthen drains and canals and temporary construction of cofferdams during culvert construction could result in changes to the quality of surface water within these communities. This could be exacerbated during periods of heavy rainfall due to erosion. Eroded materials can be transported into the waterways via surface runoff and can increase the turbidity of surface water bodies way above the relatively low figures recorded for the baseline water quality analyses and at the same time result in sedimentation and discolouration. This can ultimately have direct long-term impacts on the productivity of the aquatic environment within these areas and at the same time impacts on the aquatic life, fishes especially. However, while these impacts are possible, it should be noted that the current condition of the drainage networks, which accounts for the main surface water bodies within these communities, is currently deplorable and in some cases non-existent, due to heavy siltation and vegetative growth. In some cases, the drains are used as dumping grounds for domestic garbage. In this regard, the project will have a direct positive impact on the surface water quality, particularly activities which involves re-establishing the drainage networks within these communities. Thus, the potential issues of sedimentation and increased turbidity is expected to be short term and not anticipated to be a likely significant impact.

There is the likelihood that there will be waste disposal issues which can compromise the existing quality of surface water within the various communities. Improper management of waste, including both solid and liquid waste can affect water quality. Solid waste can often end up in water bodies as a result of direct dumping or through indirect means hence, resulting in contamination and blockages. These can result in both direct and indirect impacts over a medium-term basis.

During the construction period there will also be effluent or liquid waste, particularly blackwater and greywater which will be produced from temporary office and housing facilities. If these are allowed to drain directly into the nearby waterways, it can have negative effects on the water quality. This impact is likely to be short term but can intensify during the operational phase, as the development will motivate persons who have not yet occupied their lands to do so.

Fuel and waste oil, if not properly managed and handled can accidentally spill and result in direct or indirect water contamination. Water can also be contaminated from fuel and waste oil through leakage of storage containers and improper handling practices. Improper disposal of waste oil and other hazardous waste can result in contamination. Therefore, it is necessary for measures to be implemented to prevent this occurrence, especially taking into consideration the soil type, which would allow for the material to be dispersed easily, hence creating long-term direct and indirect impacts. However, it is not expected that significant amount of waste oil and other hazardous waste will be generated during both construction and operational phases.

The likely sources of these impacts been identified and are presented in Table 6-4 below.

Table 6-4: Impacts to Surface Water

Phase	Type of Impacts	Sources	Effect (+/-)	Intensity (H/M/L)	Magnitude (H/M/L)
Construction Phase	Sedimentation, discolouration and increased turbidity.	Excavation works	-	M	M
		Drainage cleaning	+	L	L
		Stockpile materials (Sand, loam and stone)	-	M	M
		Spoils	-	M	M
		Construction of cofferdams.	-	L	L
	Contamination	Dumping of Solid and liquid waste (blackwater and greywater)	-	L	L
		Spilling of fuel, waste oil or any other such liquid wastes that are hazardous	-	L	L
Post Construction Phase	Sedimentation, discolouration and increased turbidity.	Land clearing	-	M	M
		Stockpiling building materials.	-	M	M
	Contamination	Dumping of Solid and liquid waste (blackwater and greywater)	-	H	H

L – Low M – Medium H - High

Ground Water

A project of this nature could have significant negative impacts on groundwater resource, since there is a high probability of construction works causing damages to underground mains which provides potable water to residence within these communities. In such cases, pipelines which becomes damaged or broken will create entry points for a host of contaminants which during low pressure could be fed back into the aquifers. This could therefore compromise the quality of groundwater within the area, hence creating negative long-term impacts that are specific to human. While there is a high possibility of this impact occurring, it should be noted that such an issue currently exists in each of the six communities within the project area and to a larger extent, external communities. In fact, it is common to find existing leaks throughout the projects area. This issue could be worsened if spills of hazardous material occurs within proximity to breakage or leaks.

Table 6-5 provides the likely impacts to groundwater and the subsequent sources.

Table 6-5: Impacts to Groundwater

Phase	Type of Impacts	Sources	Effect (+/-)	Intensity (H/M/L)	Magnitude (H/M/L)
Construction Phase	Contamination through broken water mains.	Dumping of Solid and liquid waste (blackwater and greywater)	-	L	L
		Spilling of fuel, waste oil or any other such liquid wastes that are hazardous	-	L	L
Post Construction Phase	Contamination through broken water mains.	Dumping of Solid and liquid waste (blackwater and greywater)	-	H	H
		Spilling of fuel, waste oil or any other such liquid wastes that are hazardous	-	H	H

6.2.4 Waste Management

The project will generate waste, which, if not managed properly, can result in soil and water contamination, contribute to ill health, and affect the aesthetic of the general area. Waste piles often present an eyesore and can affect the aesthetic of any environment. The improper disposal of waste, especially kitchen and food waste can result in odour and attraction of vermin. Waste to be generated includes domestic garbage, which usually consists of a mix of bottles, bags, cans, boxes, plant residues, excess food and kitchen scraps and old clothing and paper. These will mainly be generated by construction staff on a daily basis. Liquid waste will also be generated including sewage waste and waste water from bathing and washing. Hazardous waste to be generated includes waste oil, filters and oil containers which if not properly managed can result in water and soil contamination. Construction waste is also expected to be generated in large quantities, particularly from excavation and masonry works, and would include spoils, wood, broken concrete, pieces steel rod, cement bags, etc.

Several categories of waste materials will be generated throughout the project, these of which include the following:

- ***Solid Waste*** **-** Several categories of solid waste materials will be generated during the course of the project. These wastes are identified as vegetation residues: stripped vegetation, trees and roots; construction wastes: formwork, lumber and steel; excavated soil: undesirable materials (spoils) mixed with garbage; packaging wastes: cartons, food boxes and plastics, metals cans and containers; organic wastes: food scraps.

- **Liquid Waste (Effluent) -** Liquid waste to be generated during the project will include blackwater (sewage effluent) and greywater (domestic/non-sewage waste water). These waste will require proper management measures so as to avoid any significant impact.

- **Hazardous Waste -** Several categories of hazardous waste will be generated during the project that will have to be managed, these wastes include the follows:
    - Waste oil
    - Waste oil filters
    - Lubricants
    - Hydraulic fluids
    - Medical waste from injuries/accidents

The generation of waste is inevitable throughout the life span of the project and as such will require proper management practices. Poor waste management can result in a number of environmental and social impacts. Some of these impacts may include soil and water contamination and ill health through the spread of diseases. Waste piles also often present an eyesore and can affect the aesthetic of any environment. Improper disposal of waste, especially kitchen and food waste can result in odour and attraction of vermin. Domestic waste or garbage are common on a daily basis and can usually consists of a mix of bottles, bags, cans, boxes, styrofoam, plant residues, excess food, kitchen scraps and old clothing.

Impacts regarding waste and waste management could be exacerbated during the operational phase as these areas would become more favourable to inhabit, hence increasing the level of occupancy. An increase in occupancy will inevitably see an increase in all categories of waste, particularly domestic waste and effluents both greywater and black water.

6.2.5 Natural Disasters/Flooding

Guyana's position on the globe, along with its geological characteristics allows it to escape from a wide array of natural disasters that are common to its neighbouring countries, particularly those within the Caribbean Region. Nevertheless, Guyana is vulnerable to flooding, particularly along its coastal region, which is often affected during the raining seasons. Prolong dry seasons are also attributed to droughts in Guyana. The project is therefore vulnerable to both droughts and floods, with the latter being perhaps the most severe. This risk of flooding is imminent within the project area and as such could present adverse short and long-term impacts during both construction and post construction phases.

The project itself can be affected by flooding. Heavy and continuous rainfall during the rainy seasons could significantly impact construction, resulting in flooding in construction sites and damages to project facilities and equipment. This can also delay the completion of the works, thus prolonging the project duration.

Construction activities can result in localised flooding in the areas where construction works are being undertaken. Construction activities will result in the blocking of some drains to facilitate works, such as the drain rehabilitation works. If alternative drainage is not provided then localised flooding may occur. Construction materials can also end up in the drains, thus impeding the area drainage. These situations can be exacerbated during the rainy seasons. In addition, construction activities such as excavation could result in environmental impacts that could exacerbate the effects of flooding in the long-term; for example, increased erosion and sedimentation of drainage canals leading to impaired drainage system functioning, potentially causing an increase in inundated areas.

During post construction or the operational phase, flooding could damage housing and infrastructure, and could also pose a danger to the local population. The project will result in

increased occupancy within the project areas over a medium to long term period, which represents a larger population that will be exposed to the area's potential risk of flooding.

Flooding represents the main adaptation challenge for the project and for Guyana since the coastal areas lie below mean high tide level. However, with appropriate management and adaptation measures, negative impacts could be minimised. As such, the project is not anticipated to worsen or intensify the risk of flooding. Furthermore, residual impacts could be offset by implementing management measures that result in positive impacts such as preventing floods and riverine erosion. It is therefore possible that the project could have a net positive impact on the area with respect to natural disaster such as flooding.

6.3 Biological Impacts

Combined, the communities which incorporates the project area portrays a typical urban like setting and has been under human development for decades. Like most urban areas, the biodiversity may not be as diverse as that in rural areas, as such, the project area lacks significant biodiversity (both flora and fauna) and therefore holds little ecological value. There is no species of importance (Rare, Endangered, and Endemic) inhabiting these locations, and there is no area which can be considered a critical habitat. Therefore, adverse impacts on the biodiversity itself is little to none.

In fact, urban wildlife, such as house mice, are synanthropic, ecologically associated with and even evolved to become entirely dependent on humans. Other species simply tolerate cohabiting around humans and using the remaining green spaces and street/garden vegetation as niche habitats, in some cases gradually becoming sufficiently accustomed around humans to also become synanthropic over time.

In some cases, the project will contribute positively to the direct long-term development of existing species, particularly aquatic lives.

6.3.1 Flora

The existing flora within the project surroundings are not likely to be impacted negatively since the area comprises mainly of secondary disturbed vegetation, primarily of common weeds, shrubs, herbaceous plants and small trees. In fact, the flora diversity within the project sites is similar to that of all villages and towns along the Coast of Guyana. It is dominated by many shrubs and grass species such as *Cynodon dactylon* and *Axonopus compressus*, which to some extent have become invasive in nature and resistant to the harshest of human interference. None of the species identified are endangered or are on the IUCN species listings.

While there are no significant negative impacts foreseen as a result of the project, there may have potential positive impacts during post construction as more land owners will be encouraged to build and inhabit the area. Human dispersal of spores, shoots and seeds can spread many of the species identified during the biodiversity assessment throughout the area. In contrast, the project could cause a reduction of the more invasive grass species observed and listed in table 3-8. This will be seen as a positive impact since a reduction in some of the more aggressive weeds could create a conducive environment for other or even newer species to thrive within the area. Further, this could lead to a richer diversity of flora, which may even facilitate a wider diversity of fauna, including arthropods (particularly insects) and birds). The availability of insects will then attract more avian species and some herpetofauna. The arrival of new species, particularly herpetofauna, could serve as important environmental indicator for future projects within the area, since a diverse ecosystem

is a sign of a healthy ecosystem. This shift in diversity could also be supported by better drainage of surface water and abundance of soil nutrients due to the reduction of aggressive weed species.

6.3.2 Fauna

The fauna is also not likely to be impacted negatively by the project activities. Fauna observed is typical of areas where human disturbances are frequent. They are very common and can be found throughout the coastal areas of Guyana. Even though common within the coastal realm, faunal diversity in the area is sparse primarily due to heavy habitat disturbance. However, faunal diversity observed at the site consisted primarily of highly mobile species that adapts easily to changing environments. Species observed are nevertheless confined to micro-habitats fragmented by urban structures such as the roads, residents, canal and agricultural activities. Most avian species observed were transient, with a home range spanning the project site.

While the project is likely to have no significant negative impacts to the fauna found with the area, the project could result in positive impacts, especially for aquatic life. Clean and wider drains will allow increased drainage capacity and longer periods of flowing water, hence creating more habitat for aquatic lives such as fish, which could be become a source of food and recreation for persons living within the area. The constructed drains, once properly maintained, will be once again free of pollutants such as plastics and other waste materials, allowing species to thrive freely. Domesticated animals introduced during post construction by new residents will add positively to the diversity of fauna within the area. Increased planting of fruit trees and the occasional kitchen garden by new residents could also lead to an increase in avian species for example, *Columbina passerine* and *Pitambus sulphuratus*, as these species will be able to feed on them.

6.4 Socio-economic Impacts

The area has a long history of use by agriculture, being occupied by the sugar plantations for over two centuries. The area was returned to the state when the sugar estates abandoned the lands and were subsequently converted to housing lands. The project is expected to have some short-term negative impacts and long-term positive impacts on the local communities, as can be seen in Table 6-3. The risks introduced by the project are related to the following issues:

- Gender-related impacts, including gender-based violence, prostitution, and family dysfunction.
- Impacts on cultural heritage.
- Immigration risks associated with local international migrants.
- Risks to project workers and laborers.
- Risks to local communities related to health, safety, security, and impacts of labour influx.

Table 6-3: Potential Socio-economic Impacts

Phase	Type of Impact	Impact Source	Effect (+/-)	Intensity (H/M/L)	Magnitude (H/M/L)
Construction Phase	Effects on sites of historical, archaeological, or cultural values and introduction of new materials, colours, and shapes	Land Clearing & Construction Work	**-**	**L**	**L**
	Relocation - Loss of Livelihood	Construction Works	**-**	**L**	**L**
	Changes in Land Use	Construction Works			

Phase	Type of Impact	Impact Source	Effect (+/-)	Intensity (H/M/L)	Magnitude (H/M/L)
	Disruption of Services, Infrastructure and Drainage	Construction Works	-	**M**	**L**
	Community Wellbeing- Sanitation, Health and Recreation	Construction Works	-	**M**	**L**
	Community Security	Construction Works	-	**L**	**L**
Operational Phase	Physical integration of the housing schemes into the urban fabric	Physical Integration	+	**H**	**M**
		Demand for Infrastructural Services	-	**H**	**M**
		Influence on environmental behaviour	+	**H**	**M**
		Health	+	**M**	**L**
		Road safety	-	**M**	**M**
		Density of land occupation	+	**M**	**L**
		Movement of population in adjoining areas	+	**M**	**L**
		Project beneficiary monthly expenses	+	**L**	**L**
		Property value	+	**M**	**M**
		Productive activities	+	**M**	**L**

6.4.1 Archaeological and Cultural Heritage

There have been no significant archaeological finds in the area to date despite the area being used and occupied by Amerindians prior to the land conversion to commercial agriculture. The historical and cultural value of the land are tied to the land use and its potential for increase in value is consequently tied to this land development. There is no area which was identified as having any religious or cultural values apart from the various fenced properties of the different religious groups. The area where the works are to be conducted were already disturbed during the construction of the housing scheme.

The project is in a housing area where development is expected to be natural process in which new materials, shapes and colours will be introduced in the construction. These are expected to have a positive impact on the community and increase the value of the properties in the local neighbourhood.

There are no expected negative impacts from the project during the post construction phase of the project with the predicted increased occupancy and household construction activities. The project landscape will be changed by the removal of vegetation on unoccupied house lots and clearance for future development, all with positive impacts to the local communities.

6.4.2 Relocation and Resettlement

Based on the assessment conducted during the ESA process, there are no encumbrances to the proposed works, or no existing community facility which may have to be relocated. As such, there is no need for relocation. There is the presence of roadside vendors in the project area, which can be grouped into the following categories:

- Afternoon vendors who sell various homemade snacks at street corners or strategic locations for a few hours daily with no permanent stall;
- School vendors who sell during school hours outside of the school compound in a semi-permanent manner;
- All day vendors of vegetables, fruits and other perishables occupying a semi-permanent stall on the road shoulders or over the roadside drain;
- All day vendors of packaged snacks, drinks and perishable cooked snacks; and
- All day and sometimes late-night vendors of cooked foods and drinks especially alcoholic beverages.

There are unoccupied stalls on road shoulder where road works are to be executed. These persons may have to temporarily relocate when the project works begin. There may be cases for loss of income by the roadside vendors who occupy road reserves designated for project works. However, the vendors are highly adaptable due to their mobility and will most naturally relocate their businesses to facilitate the project works and then move back to the area when the works are completed. Vendors consulted during the stakeholder engagement exercise have indicated a willingness to move to facilitate the construction works. The short-term disruption may lead to losses but will also create new opportunities from the increase traffic, construction, and other workers now traversing the area.

Figure 6-1: Roadside Stalls and Materials on Road

Figure 6-2: Roadside Stalls on Road Reserves

After construction it is expected that the area will benefit from increased commercial activity due to the increase traffic and new homeowners. The roadside vendors will benefit from increased traffic and are expected to modify their operations as the peri-urban community transforms with each additional development.

In addition, it should be noted that as part of the Programme's approved Livelihood Restoration Plan (LRP), a detailed Socio-Economic Survey and Asset Inventory was undertaken by the CHPA throughout each project section of the La Parfaite Harmonie Housing Area, Region No.3. This exercise was supplemented by an extensive ground truthing exercise (reconnaissance survey). The

aim of the reconnaissance survey, and CHPA's Socio-Economic Survey and Asset Inventory was three-fold:

1. To identify and document All Project Affected Persons (PAPs).
2. To inform the surveyed PAPs of the project and it's planning.
3. To determine the type of impact that the surveyed PAPs would likely experience as a result of project works. These impacts were classified as:
    - Physical Displacement i.e. Involuntary resettlement of people affecting their residence and requiring physical relocation;
    - Displacement of land-based economic activity (including disruption of livelihood) i.e. significant displacement of economic activity (disruption of income) resulting from land acquisition or by limitations of land use (obstructed access to resources) that eventually will cause physical displacement of people; and
    - Disruption of income or means of livelihood i.e. temporary or permanent, absolute or partial disruption when it is not directly related to land take for project implementation, even if location based.

It was further conveyed by the CHPA that the findings revealed that there will be no physical displacement of formal and or informal land users, who are occupying lands for residential purposes. Similarly, the various upgrade interventions within La Parfaite Harmonie focuses on rehabilitating and upgrading of land occupied by existing infrastructure (i.e. existing roads, drainage canals and road shoulders). Thus, there will be no interference with other land uses, particularly local residents that raise livestock for subsistence/commercial purposes. In most cases, small scale poultry farming is undertaken by residents within the confines of their residential lots. For this reason, there is not expected to be any disruption to such activities given the location of works. Where residents rear cattle, grazing of this livestock is done mainly in open areas (i.e. uninhibited playfields) that are not within the construction corridor or apart of the construction footprint under this sub-component of the Programme. Thus, it is not expected that persons utilizing existing grazing areas will be disrupted.

However, as noted, there will be economic displacement of vendors in the area (i.e. shops, which operate within the confines of residential lots, and street side vendors). This economic displacement will likely be in the form of those vendors experiencing a loss of daily income due to construction works, which would impede patron's access to those shops. However, given the nature of the upgrade interventions (scope and duration), such impacts are expected to be short term and localized. The findings documented by the assessment revealed that only one (1) street side vendor would likely have to be relocated to facilitate the upgrading of a road. Shops within residential lots are not expected to be relocated.

6.4.3 Land Use

The fact that the project will be focusing only on rehabilitation and upgrading of existing infrastructural works within these communities, suggests that there will be no interference with land uses throughout the construction phase. As such, no impact to land use is envisaged. At minimum, some residents will lose part of their parking areas to the sidewalks and will have to remove any vehicles or materials stored on the road shoulders. Property owners who park or store materials on the road shoulders will be displeased.

Also, as noted in section 6.4.2, as part of the Programme's approved Livelihood Restoration Plan, a detailed Socio-Economic Survey and Asset Inventory was undertaken by the CHPA throughout each project section of the La Parfaite Harmonie Housing Area, Region No.3. The findings from

this exercise revealed that there will be no physical displacement of formal and or informal land users, which are occupying lands for residential purposes. As mentioned, the various upgrade interventions within La Parfaite Harmonie focuses on rehabilitating and upgrading of land occupied by existing infrastructure (i.e. existing roads, drainage canals and road shoulders), thus, there will be no interference with other land uses, particularly local residents that raise livestock for subsistence/commercial purposes. In most cases, small scale poultry farming is undertaken by residents within the confines of their residential lots. For this reason, and given the location of the project works, disruption to such activities is not expected.

Where residents rear cattle, grazing of this livestock is done mainly in open pastures (i.e. uninhibited playfields) that are not within the construction corridor or apart of the construction footprint under this sub-component of the Programme, thus, disruption to persons utilizing existing grazing areas is not expected.

In the long term, the project could have a positive impact on the socio-economic structure of these communities, as they would become more favourable to inhabit, hence increasing the occupancy rate which would see the establishment of more residences and businesses. Higher levels of disposable income from regular jobs will lead to decrease in unregulated roadside vending but can lead to more regulated vending of specialised products.

Figure 6-3: Goats Grazing in the Project Area

Figure 6-4: Cattle Returning Home from Grazing

6.4.4 Disruption of Services

Services and utilities within the construction zone can be disrupted by construction activities. The area adjacent to the roadways serves as a corridor for utilities including electricity, telephone and water. Given that construction works will occur in these areas there could be cases where road lighting, utility poles and water lines may require relocation or temporary disconnection to facilitate construction works. Construction activities can also accidentally damage these facilities, thus resulting in disruptions. In addition, during the drainage works, drainage of the areas where work is being done may be affected. This situation can be exacerbated during the rainy season.

Construction along roadways can result in temporary road closure, which can delay traffic or require drivers to utilise alternatives routes. Temporary closure of the roads will also impact the

vendors who can either relocate or cease vending during the short construction period. The construction activities will also temporarily disrupt exercising and recreational activities that are street based in the various locals, as well as persons access to their properties.

6.4.5 Community Wellbeing

The influx of workers during the construction can have a negative impact on the local community if they are not properly managed, since conflicts can arise. The workers can be viewed as a threat by the local population because of their greater disposable incomes particularly by the local males without steady employment.

The project can negatively impact community health in the short term due to opportunities for dust, noise and water pollution. Homeowners will have to spend more time and resources on cleaning due to the impact from roadside dust. These impacts will be short and will be overtaken by the positive impacts from the project.

The road works can increase the risk from vehicular collisions. Errant drivers are known to speed on newly built roads without speed humps. The impact is expected to be negative for sections of the communities with an overall low risk to stakeholders.

The project will not serve the entire community and upon completion there will still be areas without proper roads, streetlights, curbs, access to safe schools and community facilities among other related needs of the community. This will negatively affect the stakeholders of the sections of the communities that are unserved and continue to have unpaved roads and poor drainage, etc.

Figure 6-5 Children Relaxing After School

Figure 6-6: Road to be Paved by Project

The project will increase investment in the communities and encourage lot owners to build or complete their buildings reducing the area for dumping of garbage, unwanted grazing, over-growth of vegetation and general property maintenance, all contributing to positive environmental actions. The population density of the area will increase but it is not expected to lead to overcrowding. The new construction activities of property owners will also stimulate the local economy with greater demand for food, transport, and other services. As expected, the increase in incomes during the construction period will have a positive impact on the local community, boosting the local economy through persons from the community being employed and spending by construction workers. Improved infrastructure, especially roadways, will improve access to the area. This will benefit residents significantly and can reduce transportation cost.

The improve access, aesthetics and influence of prosperity due to project works and other development will encourage other landowners to commence construction and eventually improve occupancy of the housing schemes. Improved drainage infrastructure will contribute to better drainage of the area, thereby preventing water accumulation and the issues associated, such as mosquitos breeding, flooding, and damages to property, etc. Overall, the project can increase the value of property within the project area.

6.4.6 Security

The influx of workers and non-local individuals associated with the project can have the ability to negatively impact the project community. The impact will be greater if the number of foreign individuals is large within small rural communities. Workers can bring alcoholism, drug use, gambling and other high-risk behaviors that can negatively influence the local people.

The project, by the nature of its positive impact on the communities, strengthened the need for increase security in the area. The Ministry of Public Works has begun replacing streetlights and may install along the newly constructed roads. The police have indicated that they will increase patrols in the area should there be an increase in crimes.

Residents are hopeful that the development of the community will lead to greater awareness of security issues with more property owners taking the initiative to de-bush the area, own guard dogs, and install security cameras – all simple steps to reduce crime in the neighborhood. There was also the call to reactivate the Community Policing Group to support local crime fighting in the area.

6.5 Health and Safety

The project can affect the health and safety of both constructions workers and members of the public.

6.5.1 Construction Workers

Health and safety are always key concerns at any construction site. Workers are usually exposed to situations which can result in serious accidents, some of which can be fatal, if established guidelines and practices are not properly communicated nor complied with. Risks can result from the use of heavy-duty machines and equipment, continuous exposure to noisy machines/equipment, inhalation of fumes, improper use of equipment, etc. Given the activities related to this particular project, it is highly likely for certain health and safety risks to occur. In addition, there is also the possibility of workers becoming infected with the coronavirus, given the fact that there will be a high degree of close interaction with each other. The health and safety of workers will therefore be a major concern throughout construction activities.

The following are therefore possible health and safety risks which are likely to occur:

- Sickness caused by the consumption of untreated water;
- Sickness caused by continuous exposure to excessive noise and vibrations from heavy-duty equipment;
- Drowning due to accidental fall or being pinning in toppled equipment/vehicle;
- Injuries or death caused by the toppling of heavy duty equipment;
- Injuries or death from vehicular collisions;

- Injuries from slips, trips and falls;
- Ill health caused by insect bites/ stings or from hostile fauna;
- Injuries or death caused by snake bites;
- Injuries or ill health caused by working under extremely hot conditions;
- Injuries such as loss of limbs;
- Illness caused by vector-borne diseases such and dengue fever;
- Injury or death due to electric shock; and
- Sickness/death cause by COVID -19 infection;

It is expected that construction works will see the use of several types of equipment, heavy-duty machinery and vehicles. Adding to this, is the fact that works will be done in close proximity to drainage canals, which in some areas can have steep slopes that can be slippery, especially during and after rainfall. While training and monitoring seeks to reduce the risk of any serious accidents, accidents can still occur.

Risks may include accidents during site clearing operations, transporting of materials, the use of heavy-duty equipment, improper use of equipment, slip or trip while traversing the work sites, etc. In such cases, these exposures can result in physical injuries such as cuts, bruises, loss of limbs or can even be fatal. Exposure to high noise levels can result in increased stress levels. Since heavy-duty equipment and vehicles will be frequently traversing main and internal roadways, the safety of other road users can also be at risk.

Construction works can lead to water logged conditions, particularly in areas closes to the main canals and construction of culverts, whereby cofferdams will be used to temporally block the flow of water. This can increase the risk of vector-borne diseases such as dengue fever which is commonly spread by mosquito.

Another risk that is of major significance to the health and safety of workers is that of electrical shock. The communities within the project area in known to have illegal electrical connections that are connected directly from the high voltage lines to residents' homes. These connections are often hidden between vegetation or even run across major canals and drains, hence making them difficult to detect.

The frequent movement of workers between the projects sites can create a hostile environment with regards the recent COVID-19 pandemic whereby the number of cases continue to rise. Employees coming from outside communities can therefore put those coming from the nearby communities at risk of catching the virus.

These impacts could be further exacerbated taking into consideration the access to immediate emergency and proper health care within the area, since the health post is not equipped to handle serious health cases and the fact that the nearest hospital, West Demerara Regional Hospital, is located in Best village on the West Coast of Demerara.

6.5.2 Public Safety

The safety of persons traversing the area could be compromised by certain project activity if guidelines and best practices are not implemented nor complied with. There is the risk of accidents occurring during both the construction and post construction phases.

It is likely that persons may want to visit the construction site to observe construction activities or are just forced to traverse the work zones as a result of them living in close proximity. This could present serious danger, particularly when traversing during work related hours. As such, if the construction sites are not secured members of the public could get too close to the activities, creating a safety risk. It is also possible for these individuals to contract the COVID -19 disease while visiting or traversing the worksites if they are not properly attired. The reverse of this is also possible whereby staff could become infected if an infected person visits or traverses the project site not properly attired.

Construction materials, equipment and personnel may be transported from Georgetown to the various project sites on a daily basis which could results in an increase in traffic along the roadways. In some case roads may be occupied with machines during working hours and the flow of traffic may also be compromised for short periods. During post construction phase, it is expected that some communities will be interconnected via the construction of interconnecting bridges and primary roads, hence potentially increasing traffic in areas that currently have low traffic. Each of these impacts present the risk of road accidents.

In addition, new and wider roads can lead to speeding which can result in much serious vehicular accidents.

6.6 Capacity Assessment

The Programme's approved ESMF and Operating Regulation establishes the Institutional Arrangements, which must be implemented by the CHPA in order to support the implementation of the ESMF tasks, and therefore ensure compliance with the Programme's environmental and social safeguards measures. It has been determined that the CHPA has the required institutional capacity to undertake Environmental and Social Safeguards Management throughout the duration of the Project. It was revealed that the CHPA's Institutional capacity was reinforced in accordance with the institutional arrangements set out in ESMF. For instance, a multi layered management system has been established to ensure compliance with the occupational health and safety, environmental and social requirements, with responsibilities designated at the different levels, including roles for the CHPA's Projects Department, specifically the Department's HSE Unit, and for the Contractors. As was previously indicated, CHPA has the overall responsibility for ensuring compliance. CHPA through the Projects Department's HSE Unit oversees the environmental and social aspects of the project. The Unit is therefore responsible for ensuring that all Contractors adhere to the ESMRs, which comprises the ESMP outlined in this ESA Study, and the ESMP sub-plans, which comprises Section VII.B of the Contract. Oversight will also be provided by CHPA's Civil Engineers, Clerk of Works and Environmental and Social Safeguards Works Supervisor.

6.7 Synopsis of Potential Impacts and Mitigation Measures

A synopsis of potential impacts of the project and mitigation measures recommended are presented in Table 6-4.

Table 6-4: Synopsis of Potential Impacts and Mitigation Measures by way of CHPA Sub-ESMPs and Monitoring Program

Potential Impact	Likely Phase	Proposed Mitigation Measure	Execution Responsibility	Verification	Monitoring and Reporting
Increased levels of dust/particulates	Construction and Operation	Environmental, Health and Safety (EHS) Monitoring Plan	Contractors and CHPA	CHPA	Weekly inspection reports and corrective action directives
Increased levels gaseous pollutants	Construction and Operation	Environmental, Health and Safety (EHS) Monitoring Plan	Contractors and CHPA	CHPA	Weekly inspection reports and corrective action directives
Increased levels of noise	Construction and Operation	Environmental, Health and Safety (EHS) Monitoring Plan	Contractors and CHPA	CHPA	Weekly inspection reports and corrective action directives
Surface water contamination	Construction and Operation	Waste Management Plan; Hazardous Materials Management Plan; Emergency Preparedness and Response Plan; Spill Prevention Countermeasures & Control Plan (SPCCP); and the Soil and Drainage Management Guidelines.	Contractors and CHPA	CHPA	Monthly inspection reports and corrective action directives
Ground water contamination	Construction and Operation	Waste Management Plan; Hazardous Materials Management Plan; Emergency Preparedness and Response Plan; Spill Prevention Countermeasures & Control Plan (SPCCP); and the	Contractors and CHPA	CHPA	Weekly inspection reports and corrective action directives

Potential Impact	Likely Phase	Proposed Mitigation Measure	Execution Responsibility	Verification	Monitoring and Reporting
		Soil and Drainage Management Guidelines.			
Waste/Hazardous Materials	Construction Phase	Waste Management Plan; Hazardous Materials Management Plan; Emergency Preparedness and Response Plan; Spill Prevention Countermeasures & Control Plan (SPCCP);	Contractors and CHPA	CHPA	Daily inspection reports and corrective action directives
Natural Disaster (Flooding)	Construction and Operation	Emergency Preparedness and Response Plan; Spill Prevention Countermeasures & Control Plan (SPCCP); and the Soil and Drainage Management Guidelines and Environmental, Health and Safety (EHS) Monitoring Plan.	Contractors and CHPA	CHPA/IDB	Monthly
Relocation - Loss of Livelihood	Construction	Livelihood Restoration Plan	CHPA	IDB	Monthly Monitoring of Livelihood Restoration Plan indicators
Disruption of Utility Services	Construction	Provide advance notification of any planned interruptions to water and power service as a part of construction activities.	Contractors and CHPA	CHPA	Daily inspection reports and corrective action directives
Disruption to Transportation	Construction	Traffic Management Plan;	Contractors and CHPA	CHPA	Weekly monitoring
Community Wellbeing-	Construction	Traffic Management Plan;	CHPA	IDB	Weekly inspection

Potential Impact	Likely Phase	Proposed Mitigation Measure	Execution Responsibility	Verification	Monitoring and Reporting
Sanitation, Health and Recreation		Access Management Plan; Waste Management Plan; Hazardous Materials Management Plan; Emergency Preparedness and Response Plan; Spill Prevention, Countermeasures & Control Plan; (SPCCP) and Environmental, Health and Safety (EHS) Monitoring Plan.			reports and corrective action directives
Health and Safety	Construction	Traffic Management Plan; Access Management Plan; Waste Management Plan; Hazardous Materials Management Plan; Emergency Preparedness and Response Plan; Spill Prevention, Countermeasures & Control Plan; (SPCCP) and Environmental, Health and Safety (EHS) Monitoring Plan.	Contractors and CHPA	IDB	Daily inspection reports and corrective action directives

7.0 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

7.1 Introduction

It is critical for construction activities to be conducted in a manner which is in compliance with the legislations and guidelines outlined in Chapter 4, and in particular with the requirements of the CHPA and the IDB. In this regard, this Environmental and Social Management Plan (ESMP) has been prepared to guide the construction activities by recommending measures to address the environmental, social and health and safety issues related to the construction activities. Activities to be undertaken in an effort to prevent, minimize and manage the principal adverse effects of the project are identified and recommended. A framework for the implementation of the ESMP is outlined in Chapter 8, including the roles and responsibility of all parties.

7.2 Mitigation of Physical Impacts

Impacts to the physical environment are expected to be short term, localized and mostly mitigable with no significant adverse impacts foreseen. This section outlines the recommended measures which can implemented to ensure physical impacts are prevented or minimized.

7.2.1 Air Quality

Dust

The following measures can be implemented to reduce the impact of dust on the environment:

- Truck drivers and operators should be instructed to reduce their speed when traversing dusty roads during dry conditions so as to minimize dust generation.
- Dusty roadways, particularly roads which have been graded should be soaked regularly.
- Personnel working within dusty environments or operating equipment that generates dust such as cement mixer should be required to use dust masks or respirators.
- Trucks transporting sand to construction sites should be covered.
- Sand stockpiles should be kept to a minimum height and covered if required.
- Stockpile areas should be located in areas away and downwind from residents.

Gaseous Pollutants

The following measures can be implemented to reduce the impact of gaseous pollutants on the environment:

- All heavy-duty vehicles and equipment engines should be operated and maintained in accordance with the manufacturer's operating specifications and should be serviced regularly so as to reduce the levels of combustion gases.
- Operators of heavy-duty equipment should be instructed to minimize excessive idling of the same.
- There should be no burning of garbage onsite.
- Maximise on the number of trips when transporting materials and workers between work sites.

7.2.2 Water Resources

Surface Water

Impacts to surface water, which comprises primarily the drainage network, are somewhat consistent throughout the various phases of the project and are mainly related to contamination due to accidental spillage of fuel and lubrication oil. Other impacts include upwelling of sediments and sediment laden water discharge.

Impacts which are related to the contamination of water via accidental spillage of fuel, oil and other such substances will require mitigation measures since these can also affect aquatic lives. All fuel and oil base substances should be stored in a contained area which should be constructed with an impermeable base so as to avoid penetration. Servicing of equipment should be done at a designated site which will be at least fifty feet from the nearest drain. Drip trays should be used to collect waste oil from equipment during servicing. All fuel and oil-based substances including oil filters and oil rags should be stored in sealed five-gallon buckets and removed from the site immediately after completion. See Table 7-1 for waste management measures.

With regards to upwelling of sediments, this is expected to be temporary and localised and as such will not necessarily require mitigation measures. Also, most of the existing drains are badly silted up and will require some amount of cleaning so as to accommodate the increased volume of storm water once the project is completed. Impacts relating to sediment laden water discharge are likely to occur from sand fill and stockpiles. White sand fills should be managed by retaining walls, in this case the road shoulders, while stockpile materials should be located more than fifty feet from the nearest drain. In situations where materials do runoff into drains, the contractor should excavate so as to not compromise the drainage capacity as well as, to maintain the flow of water. In addition, the following measures should be implemented by the various contractors to prevent or minimize erosion and subsequent sedimentation of nearby water bodies:

- All activities are to be undertaken with the strictest of conformation to the recommended practices to prevent erosion and sedimentation.
- The removal of vegetation should be limited to areas where it is absolutely necessary, where only areas required to be cleared for the project should be cleared.
- Areas of exposed soils should be monitored during periods of heavy rainfall including stockpiles, excavated areas and recently worked areas. Monitoring of these areas is a precursor to taking mitigation action and if the potential for sedimentation is observed, then mitigation measures should be implemented such as sediment fences/traps.
- Appropriate machines should be utilized for all earth works.
- Routes should be designated for heavy duty equipment to prevent compaction of soil. If ponding is observed due to compaction, it may be necessary to scarify the topsoil so as to allow percolation which reduces the occurrence of runoff.
- The weather pattern should be considered before initiating major earthworks. Major earthworks should be avoided during periods of heavy rainfall.
- Natural re-vegetation should be allowed in areas where possible to prevent further soil exposure.

Effluent discharge such as black water (sewage) and grey water (kitchen/domestic) can also contaminate surface water and create unpleasant odour. In the case of black water all temporary toilets should be connected to removable septic tanks. These septic tanks should be equipped with

multiple phase faeces process which eliminates the likeliness of solid wastes discharge with effluence. For example, the 'Royal Septic Tank' which is available in Guyana comes with a four phase faeces process that allows for the complete separation of sewage and grey water through a displacement system and as such eliminates the need for further mechanisms such as soak away systems. If septic tanks become full during the course of the project, Contractors should make arrangement for a waste disposal company to empty all filled tanks.

Grey water generated on site is expected to be minimal as such, this waste stream can be channelled into the external drainage system within the area where it will be displaced by a larger body of flowing water.

At the end of the project, each septic tank should be emptied and removed from the project areas. Once emptied, all pipes which are connected to the tanks should be cut-off and sealed with PVC caps. An excavator should be used to carefully remove the tanks from the ground and loading onto trucks to be transported.

While overall long-term impacts of the project are expected to be largely positive, the issues regarding surface water contamination could be exacerbated as the development will motivate persons who have not yet occupied their lands to do so. In this regard, the following recommendations could be considered so as to minimize adverse impacts and optimize positive benefits in the long-term:

- Implementation of a drainage canal maintenance program as part of the program intervention to maintain maximum capacity of canals. This should be executed in collaboration with the local Neighbourhood Democratic Council (NDC) and the National Drainage and Irrigation Authority (NDIA).
- Implementation of a community - wide solid waste management program.
- Consider the potential for the establishment of a sewage system for the housing scheme.

Ground Water

The measures identified to manage and mitigate impacts to surface water resources are also applicable to that of ground waters resources. Other measures which could be implemented to mitigate impacts to ground water resources can also include the following:

- Identify and demarcate all water mains prior to excavation activities.
- Identify and mark the locations of all existing damages to water main and report same to the relevant authorities.
- Water mains that become damaged during project activities should be reported to the relevant authorities for swift action.
- Handling of hazardous materials such as fuel, lubricants, waste oil, etc. should not be done within the vicinity of damaged water mains.

7.2.3 Noise

The following are recommended measures that should be implemented to reduce noise levels and nuisance:

- Generators and other noisy equipment should be sited at a distance away from the nearest occupied building and general work areas and should only be in use when necessary.
- Noisy activities should be scheduled for daylight hours. Night works should be avoided.
- Noise levels should be controlled at the source via installation of silencers and mufflers on exhaust systems. Efforts should be made to ensure machinery and equipment are working efficiently.
- Noisy equipment such as generator should be enclosed in sound proofing material, if necessary.
- Personal Protective Equipment should be provided to employees exposed to high noise levels.
- Noise levels should not exceed 90 dB during the day and 75 dB at nights.
- Noise levels should be monitored on a periodic basis so as to ensure minimal impacts.

7.2.4 Waste Management

The project will generate waste, which, if not managed properly, can result in soil and water contamination, contribute to ill health, and affect the aesthetic of the general area. Waste piles often present an eyesore and can affect the aesthetic of any environment. The improper disposal of waste, especially kitchen and food waste can result in odour and attraction of vermin. Waste to be generated includes domestic garbage, which usually consists of a mix of bottles, bags, cans, boxes, plant residues, excess food and kitchen scraps and old clothing and paper. These will mainly be generated by construction staff on a daily basis. Liquid waste will also be generated including sewage waste and waste water from washing. Hazardous waste to be generated includes waste oil, filters and oil containers which if not properly managed can result in water and soil contamination. Construction waste is also expected to be generated in large quantities and would include wood, form boards, cut steel, broken concrete, etc. Materials which could be reused can be given to persons from the communities if requested or be transported back to the Contractors' head offices. Other recommendations for disposal of these waste are outlined in Table 7-1.

Table 7-1: Types of Waste and Recommended Disposal Methods

Waste Category	Waste Type	Disposal Method
Solid Waste	Kitchen Waste	Domestic waste generated from kitchens, where construction workers would be temporarily housed, should be collected in bins for disposal at an approved landfill site.
	Cardboard/Paper	A small volume of these materials is expected and would mainly be generated from packaging of construction materials. These should be collected in covered bins and further disposed of at an approved landfill site.
	Plastic Bottles/Cans	These materials should be collected in covered bins and further disposed of at an approved landfill site.
	Construction Waste (Old Wood, form boards cut steel, etc.)	These materials are expected to be generated in large quantities. Materials which could be reused can be given to staff or persons from the communities if requested or be transported back the contractors' storage for reuse. Excess and damaged materials along with other construction wastes can be dumped in dumpsters until accumulated and can be disposed of at an approved dumpsite.

Waste Category	Waste Type	Disposal Method
Liquid Waste	Grey water - Waste Water from Kitchen/Bathing Facilities	Wastewater from these facilities should be drained into a soak away system.
	Sewage/Black water	All temporary toilets such as those to be used at site offices or workers housing should be connected to removable septic tanks. These septic tanks should be equipped with multiple phase faeces process which eliminates the likeliness of solid wastes discharge with effluence. For example, the 'Royal Septic Tank' which is available in Guyana comes with a four phase faeces process that allows for the complete separation of sewage and grey water through a displacement system and as such eliminates the need for further mechanisms such as soak away systems. Effluent can be discharged into large bodies of drainage water so as to be easily displaced. Portable toilets should be utilised at the worksites. These should be well maintained. An adequate number of portable toilets should be provided based on the amount of workers at the site.
	Waste Oil	Waste oil collected during servicing of equipment should be stored in sealed plastic containers and given to persons from nearby communities who would use the waste oil on chain saws and other mechanical equipment.
	Oily Rags/Filters	The quantity of oily rags, oil and fuel filters to be generated is expected to be minimal and will be mainly generated from servicing of equipment. The contractors will therefore be required to store these in sealed plastic containers and disposed of at an approved landfill site.
	Contaminated Soil	Soil, which may become contaminated due to accidental spills of oil, fuel and other such hazardous chemicals, should be excavated and stored securely in plastic containers and be disposed of at an approved landfill or kept until the contaminant is been broken down by bacteria.

In addition to the above listed measures that emphasize reuse and recycling, aimed at avoiding excess waste creation, the following measures will enhance further environmentally conscious waste disposal:

- Waste collection receptacles such as drums should be placed at strategic locations within each work zone. These should also be equipped with covers.
- No burning of waste should occur within the project environs.

The issue of waste management is expected to be exacerbated during the operational phase, as the development will motivate persons who have not yet occupied their lands to do so. However, while it is easy to mitigate this issue during the construction phase, it might not necessarily be the same during the operation phase, since this will require a more sectorial approach, through the

implementation of policies and measures. The following recommendations could be considered so as to minimize adverse impacts and optimize positive benefits:

- Implementation of a community - wide solid waste management program which should be executed in collaboration with the local NDC.
- Establishment of a sewage system for the housing scheme.

7.2.5 Fuel, Lubricants and other Hazardous Materials

Fuel and lubricants are classified as hazardous materials and require special consideration in terms of transportation, storage and handling. Improper management of these materials can result in spills and leakage which can contaminate soil and water resources or even result in fires. However, given the works to be conducted it is not expected that there will be the need for significant amount of fuel and therefore fuel storage onsite should be limited. Nevertheless, the following measures should be implemented to ensure the likelihood of contamination of soil or water from spillages or leakages as well as risks of a fire are minimized:

- All fuel, lubricants, waste oil and empty fuel containers should be stored within a contained designated area which should be impervious.
- Significant amount of fuel should not be stored onsite, but should be brought as is required. This will eliminate the need for extensive storage facilities and reduce the risk of contamination from spills and leaks.
- Employees should be properly trained in handling of fuel and in refueling practices.
- Spill kits should be made available to contain and clean up any spillages occurring. The kits should be placed in strategic locations that are easily accessible. Workers, mechanics and other staff should be trained on how to utilize spill kits.
- Fuel storage areas should have the necessary warning/caution signs in place including 'No Smoking' and 'Flammable Area'.
- Fire extinguishers and sand buckets should be made available within proximity to the fuel storage area.
- Fuel storage areas should be sited at a safe distance from any drain, offices and work areas.
- All fuel storage containers should be adequately labelled.
- All used oil and grease should be collected and disposed of appropriately.
- Care should be taken to prevent spillage and leakage of fuel during off loading and refuelling. When refuelling is completed, all nozzles, hoses and other materials should be stored in a proper manner to avoid spills.
- The storage areas should be checked daily for leaks. Leaks should be immediately reported and corrected.
- Ground sheets or drip trays will be used in the servicing of machinery and vehicles to capture any spill that may occur.

7.2.6 Flood Risk/Disaster Management Measures

As noted, the project could have a net positive impact on the areas in which it is to be executed with respect to natural disasters, particularly flooding. The key therefore to achieving a net positive impact will be the careful selection, combination and implementation of a series of adaptation measures that protect vulnerable areas. These measures should be cost-effective in their implementation, build resilience and effectively address the identified hazard, rather than just relocate it. For instance, flood protection should not create worse flooding in nearby areas.

The following measures should be consider in collaboration with other relevant Ministries and Government entities to ensure the long-term viability of the project:

- Enforcement of adequate building codes and adequate land use regulations;
- Reinforcement of sea and river defences by considering sea level rise projections in vulnerable areas;
- Implementation of building set-back legislation and/or minimum residential housing living area elevation standards to limit buildings and other major developments on high risk and vulnerable to climate change zones;
- Provision of adequate and regular maintenance to the existing drainage system.
- Installation of mechanical pumping stations to aid drainage of water during high tide and precipitation events. These pumps will help flowing out excess water in the drainage canals;
- Continued promotion of rain harvesting activities in the new housing developments;
- Consider addition of infrastructure to divert storm water run-off to lower-lying, permeable areas to encourage more groundwater recharge;
- Ensure infrastructure such as roads are built above normal flood levels; and
- Encourage landfilling to above normal flood levels.

During the construction phase, it is imperative that measures be implemented to prevent localised flooding within the construction areas. Measures to be implemented by the contractors should include:

- Areas of exposed soils should be monitored during periods of heavy rainfall including stockpiles, excavated areas and recently worked areas. Monitoring of these areas is a precursor to taking mitigation action and if the potential for sedimentation of drains is observed, then mitigation measures should be implemented such as sediment fences/traps.
- Construction materials should not be stockpiled in close proximity to the drainage system which can result in materials entering the drains. Any material entering the drain as a result of stockpiling or construction works should be immediately removed.
- Alternative drainage should be identified prior to blocking of any drain. The alternative drain should be cleared of any encumbrances and is functioning properly.
- If alternative drainage is not available then pumps should be utilised by the contractors to ensure drainage of the area is maintained.
- The local area drainage should be monitored throughout construction works in that area.
- Upon conclusion of construction works in an area the drainage system should be adequately restored with the removal of cofferdams, debris and any other encumbrance.

7.3 Mitigation of Biological Impacts

Combined, the communities which comprised the project area portrays a typical urban like setting and has been under human development for decades. Like most urban areas, the biodiversity may not be as diverse as that in rural areas, as such, the project area lacks significant biodiversity (both flora and fauna) and therefore holds little ecological value. Existing flora and fauna within the project area are therefore not likely to be impacted negatively. To this avail, no mitigation nor management measures are required.

7.4 Mitigation of Socio-economic Impacts

7.4.1 Archaeological and Cultural Heritage

The possibility of a discovery of an artifact during project construction is extremely low. However, a Chance Find Procedure should still be in effect and should be implemented if there is a discovery. If any project related personnel believes that they have encountered any archaeological material the Chance Find Procedure outlined below should be adhered to:

1. All construction activity within the vicinity of the find is to cease immediately;
2. The find must be recorded and artefacts left in place;
3. The National Trust must be contacted immediately;
4. The National Trust should assess the find and mitigation options identified in coordination with the project management; and
5. If the archaeological finds need to be removed for some significant reason the following steps can be taken:
    - All finds need to be handled as if they are extremely fragile;
    - Should the finds break during handling or movement – all parts must be gathered and stored together;
    - Each separate piece should be moved separately and not stacked during movement or storage;
    - Finds must be handled with both hands providing full support in order to avoid breaking;
    - Objects can be wrapped in cloth or soft paper on order to prevent them from moving in storage or from being damaged further;
    - Maintain contact with the National Trust to ensure that the finds are secured until they arrive at the site.

The CH&PA should ensure that all contractors and construction staff are aware of the procedure and are equipped with the necessary contact details for the appropriate authorities.

7.4.2 Relocation

There will be no relocation of households during the project. However, as mentioned under sub-section 6.4.2, the CHPA, through the conduct of a detailed Socio-Economic Survey and Asset Inventory, revealed that only one (1) street side vendor would likely have to be relocated to facilitate the upgrading of a road. The relocation of shops within residential lots are not expected during the execution of project works.

Given the potential socio-economic risks associated with economic displacement, the CHPA should ensure that the Programme's Livelihood Restoration Plan (LRP) is implemented throughout the construction phase. In this context, and based on Section 5.7 of the LRP, PAPs should receive the following entitlements when they are likely to experience economic displacement:

1. Provision of mobile unit to PAPs operating out of a business structure that is on Public Land, and which is designated for relocation.
2. Given at least one (1) week to relocate from project affected area.
3. Cash entitlement at the cost for dismantling PAPs business structure, and relocating business PAPs designated for relocation. This includes the cost for labour fees (for dismantlement) and transportation costs.

4. Provision of opportunity to business PAPs to salvage materials from the dismantlement of PAPs business structure(s).
5. Daily cash entitlement (income allowance) at the daily reported income, for each day where business has been closed (shutdown) as a result of works.
6. Daily cash entitlement (income allowance) at the difference in average daily income reported, for each day where affected business PAPs has experienced reduced income.

Essentially, the Programme's LRP documents the potential socio-economic impacts associated with upgrade interventions, and present the planned mitigation measures.

7.4.3 Land Use

The project is not intended to change the current land uses within the project area. The upgrades are to existing roads and drains. It is therefore not expected that there will be need for any mitigatory measures related to land uses. Measures relating to roadside vending were discussed under section 7.4.2 *Relocation & Resettlement*. As it relates to grazing of livestock, this is done mainly in open pastures (i.e. uninhibited playfields) that are not within the construction corridor or apart of the construction footprint under this sub-component of the Programme, thus, disruption to persons utilizing existing grazing areas is not expected, hence there is no need for migratory measures.

7.4.4 Disruption of Services

Along the project alignment, the adjacent areas are served by utilities including electricity, telephone and water. Given the project activities, there may be cases where utility poles or water lines may require relocation. Also, there is the possibility of utilities being damaged by construction activities and would require repairs. As such, the following measures will be implemented to ensure the utilities and other services are not affected:

- Advance notice should be given to the utilities company including the Guyana Telephone and Telegraph Company, Guyana Water Inc. and Guyana Power and Light Inc. to identify areas where the utilities are located.
- If there is need for relocation, the utility company should be contacted and facilitated promptly so as to avoid discomfort to the residents.
- If any utility is damaged during construction the utility company should be contacted immediately. The contractors should have all contact information for the responsible personnel of the utilities companies, should an unintended disruption occur and need for urgent repairs.
- Care should be taken to avoid any disruption to utilities.
- Monitoring of all construction site should be conducted on a regular basis by both the CHPA as well as the contractors to ensure that the utility services are not affected.
- In areas with drain works, the contractors should pall-off the utility poles to prevent them from falling if the earthen material is excavated in the process.
- Contractors should coordinate with CHPA and GPL to power down internal circuits with works on days/hours involving heave machinery close to its utility poles.
- Contractors should employ flag persons on busy roads under construction to assist with traffic management in order to have a smooth flow and to reduce incidents.

- Contractors, in collaboration with the CHPA, should implement to its fullest, the IDB approved Traffic Management Plan (TMP).[11]

7.4.5 Community Wellbeing

The contractors and CHPA should be directly engaged with the communities to monitor all issues relating to dust, noise, flooding, and health and safety. Joint site visits should be conducted on a regular basis to ensure that all grievances are quickly resolved, to ensure that the project environment is safe, to check that adequate PPEs are provided for the workers, and to ensure that the workers are properly briefed on the laws and social norms, particularly unwanted attention forced onto females.

Adequate notices of works should be provided to property owners so that they can take the necessary measures to protect their properties. Where accesses to homes/properties will be disrupted this should be communicated to the affected parties in advance, and alternative access be provided.

7.4.6 Security

The Contractors can employ their own security to protect their company's assets and liaise with the police to patrol the area on a regular basis. Contractors should make every effort not to work beyond the regular working hours so as to ensure that workers leave the site during daylight hours. Night time works should be avoided if proper lighting facilities are not available since this could increase the overall risks to employees and residents.

Additional streetlights should be considered and incorporated as part of the planned road upgrades so as to help deflate the security issues raised by the residents.

7.5 Mitigation of Health and Safety Impacts

7.5.1 Health and Safety of Workers

Contracting companies and their associates, should be aware of the Guyana's Occupational Safety and Health Act and as such, implement measures to comply so as to ensure a safe and healthy environment for all staff and other land and road users. The following measures can be considered; however, the project should not be limited to these measures alone as there may be others that can also be implemented:

- Each contractor should have in an established Occupational Health and Safety Policy which should be well known to all staff. The policy should also be posted where it can be easily accessible at the various site offices.
- Each contractor should have on their team, a health and safety officer. This individual should conduct routine visits/checks to all active construction sites and equipment so as to ensure that all safety measures are fully in place. Checks should be guided by a simple to

[11] The CHPA received IDB's no objection to the Bidding Document, which comprises the Environmental and Social Management Requirements (Section VII-B of the Bidding Document), which includes the Traffic Management Plan (Chapter 1) for upgrade interventions in La Parfaite Harmonie.

use checklist form. Operational areas are also to be monitored to ensure compliance with all health and safety requirements and that good health and safety practices are maintained throughout every aspect of the construction.

- A Job Safety Analysis (JSA) should be conducted for every high-risk activity if not, daily works.
- A vehicle should be permanently available on site to be used for all emergency cases. This vehicle should be regularly serviced and be kept in a good working condition at all time.
- Contractors should establish or have in place proper arrangements with the Versailles Health Centre, as well as the West Demerara Regional Hospital, which is the main referral hospital in the West Demerara area, for any emergency cases.
- A Health and Safety Committee should be established and meet on a monthly basis to review health and safety performance and discuss measures for improvements. This committee should include at least one member from the CHPA.
- All staff should undergo an induction exercise on occupational health and safety and regular training programs on safe practices and proper handling of equipment and machinery.
- Workers operating certain equipment and conducting risky tasks should be provided with specialized training and proper skills set to allow for efficient and safe utilization of vehicles and machinery.
- All employees should be properly oriented to safety and health practices consistent with the construction activities.
- All workers should be provided with the necessary protective gear and attire (gloves, respirators, hard hats, high visibility vests, protective glasses, long boots and safety boots) as required. Employees required to work in the rain should be provided with wet weather gear.
- All employees should be required to wear safety equipment and protective clothing provided to them.
- Employees not wearing prescribed safety clothing and associated equipment in an area where the use of such is mandatory should be required to leave such designated area and should be subject to disciplinary action.
- Smoking should not be permitted anywhere in or near the fuel storage areas or in any other designated non-smoking area.
- Operators must be licensed in accordance with the Laws of Guyana and have the requisite experience and training.
- First Aid Kits with the requisite drugs and equipment to cater to emergencies or occurrences should be available at all project sites.
- Snake bite kits should be available at all project sites.
- Workers should be trained to use emergency response equipment such as fire extinguishers, first aid equipment and snakebite kits.
- Each Contractor should prepare an Emergency Response Plan (ERP) or be guided by the ERP prepared in this ESA (Section 8.10). The contents of ERP should be well known by all personnel who are responsible for its execution.

- Appropriate safety signage should be posted throughout all construction sites and along roadways that are occupied for construction activities so as to forewarn road users.
- All light and heavy-duty equipment and vehicles should be properly maintained and be in good working condition so as to comply with the national road fitness/safety requirements and manufacturer's safety recommendation.
- Passengers should not be permitted on mobile equipment unless they are being trained to operate the machine or are required to ride on it as an unavoidable part of their duties, provided it is safe to do so.
- Potable water should be provided for all employees at all worksites, thus reducing the possibility of illnesses caused be exhaustion and fatigue.
- All vehicles and equipment traversing the roadways should do so with full compliance of the traffic rules and signage.
- Illegal electrical connections should be identified and flagged with high visibility ribbons prior to the commencement of daily works. These connections should be reported to the necessary authorities for appropriate disconnection/removal.

7.5.2 Public Safety

The following are measures which can be implemented to minimize harm to both project personnel as well as the general public:

- Members of the community should be engaged prior to the commencement of works and made aware of the risks presented by the works and the precautionary measures that they should abide with.
- All hazardous areas should be secured to prevent access to unauthorized personnel, especially those who are visiting out of curiosity.
- Warning signs should be installed in areas which present a risk for incidents to occur, including advance warning signs.
- All work areas should be demarcated, including material stockpiles.
- Construction sites should be equipped with lights and reflective material at nights.
- Where accesses to properties are affected a safe alternative access should be provided.
- Vehicles passing through communities should not exceed the stipulated speed limit and drivers should exercise extreme caution.
- Contractors should ensure that all vehicles and heavy-duty equipment are in a full functional state prior to its use on the roadways, within and outside of the project area;
- Contractors should ensure that all trucks transporting materials are equipped with adequate measures for strapping onto the bunkers.
- It should be recommended that materials be delivered to the various project sites during off-peak hours. This way, offloading can be done in a timely manner without compromising the flow of traffic.
- All trucks should be well equipped with a rotating amber light on top of the cab so as to improve visibility to other road users;

- Appropriate cautionary signs should be placed at the project access junction which connects to the main road along the West Bank of the Demerara River so as to forewarn drivers of ongoing construction works.
- All drivers and operators must be licensed in accordance with the Laws of Guyana and have the requisite experience and training.
- All drivers and operators should be equipped with the necessary PPE, especially dust mask which is necessary when traversing dusty roads during dry weather, this will also aid in minimising the risk of contracting the coronavirus.
- Trucks should at no time carry more that their normal carrying capacity.

7.5.3 COVID-19 Guidelines and Measures

The following guidelines/measures should be considered in order to reduce the risk of spreading the coronavirus virus among staff and the general public:

- Each contractor should establish a COVID-19 sanitization booth at their site offices for persons to sanitize prior to commencing works and whenever entering the site offices space. The booth should contain sinks, flowing water and soap for handwashing. Soap should be in the form of liquid.
- A thermometer should also be available on site to conduct temperature check on workers prior to the commencement of work each day.
- Hand sanitizers should also be provided at all work zones so that staff can re-sanitize as often as possible.
- Workers should be encouraged to stay home if they are feeling sick.
- The wearing of mask should be mandatory for all workers and persons visiting the worksites.
- Workers should be educated/trained on how to put on and remove mask without touching the front surface of the mask.
- Workers should be advised to avoid physical contact with others and direct employees/contractors/visitors to increase personal space to at least six feet, where possible.
- Vehicles transporting staff to worksites should be kept to a minimal amount so as to ensure that staff are not packed too close to each other.
- Respiratory etiquette should be encouraged, including covering coughs and sneezes with a tissue and dispose of into closed bin immediately or by coughing and sneezing into your flexed elbow;
- Persons should be encouraged to wash their hands regularly with clean water and soap for at least 20 seconds and avoid touching the eyes, nose and mouth with unwashed hands.
- If workers do not have immediate access to soap and water for handwashing, provide alcohol-based hand rubs containing at least 60 percent alcohol.
- Use approved cleaning chemicals that have label claims against the coronavirus.
- To the extent tools or equipment must be shared, provide and instruct workers to use alcohol-based wipes to clean tools before and after use.
- Keep in-person meetings (including toolbox talks and safety meetings) as short as possible, limit the number of workers in attendance, and use social distancing practices.
- Clean and disinfect portable jobsite toilets regularly. Hand sanitizer dispensers should be filled regularly. Frequently-touched items (i.e., door pulls and toilet seats) should be disinfected.

- Workers should be clearly informed on protocols to follow in case they or their family members get sick, they should also be encouraged to report any safety and health concerns.
- Informative signs/guidelines on issues related to COVID-19 should be posted around the sanitization boot and other areas.
- All project workers should be made to follow strict COVID-19 guidelines to minimize risk and preventing the spread of the virus and should be educated on the various signs linked to the condition so they themselves can identify when they think they need to be tested.
- The Contractor and workers should comply with the National Order relating to COVID-19. In this regard each contractor must designate a member of staff as a COVID-19 officer who will be responsible to ensure compliance with the recommended measures onsite.
- Guidelines such as the PAHO/WHO guideline for the Prevention Measures for Managing COVID-19 Risks on Construction Sites to Prevent the Spread of Coronavirus should be consulted for guidance.

8.0 ESMP IMPLEMENTATION FRAMEWORK

8.1 Introduction

The ESMP outlined in Chapter 7 has recommend measures to be implemented to ensure that the potential impacts of the project are prevented or minimised. CHPA has the overall responsibility of ensuring that the recommended measures are implemented. This Chapter outlines a framework for the implementation of the measures recommended in the ESMP and to ensure compliance with the requirements of the IDB.

8.2 Management Structure and Environmental Responsibility

A multi layered management system is recommended to ensure compliance with the occupational health and safety, environmental and social requirements, with responsibilities designated at the different levels, including roles for the CHPA's Projects Division and the contractors.

As was previously indicated, CHPA has the overall responsibility of ensuring compliance. CHPA, within the Projects Division, has an Environmental Unit which will oversee the environmental and social aspects of the project. The Unit will be responsible for ensuring the IDB's Safeguard Policies are complied with, that the contractors adhere to the requirements set out in the ESMP, and that the recommendations outlined in the ESMP are implemented. Oversight will also be provided by CHPA's Engineers, Clerk of Works and representatives from the IDB.

Implementation of the environmental and social requirements is the responsibility of the each contractor. The Contractor(s) will be required to have as part of their team an Environmental and Social Personnel. This individual will be required to:

- conduct training of workers in health, safety and environment requirements;
- liaise with CHPA's Environmental Unit on compliance;
- implement the requirements of the ESMP;
- monitor of the site for compliance with the requirements and ensure corrective actions are implemented;
- conduct joint monitoring with CHPA Environmental team;
- conduct environmental monitoring required to be conducted by the contractor, as outlined in the Monitoring Plan.
- address any grievances of stakeholders;
- report on environmental and health and safety compliance; and
- oversee the clean-up and decommissioning of the worksites upon the completion of works.

An outline of the HSE Management Structure is presented in Figure 8-1.

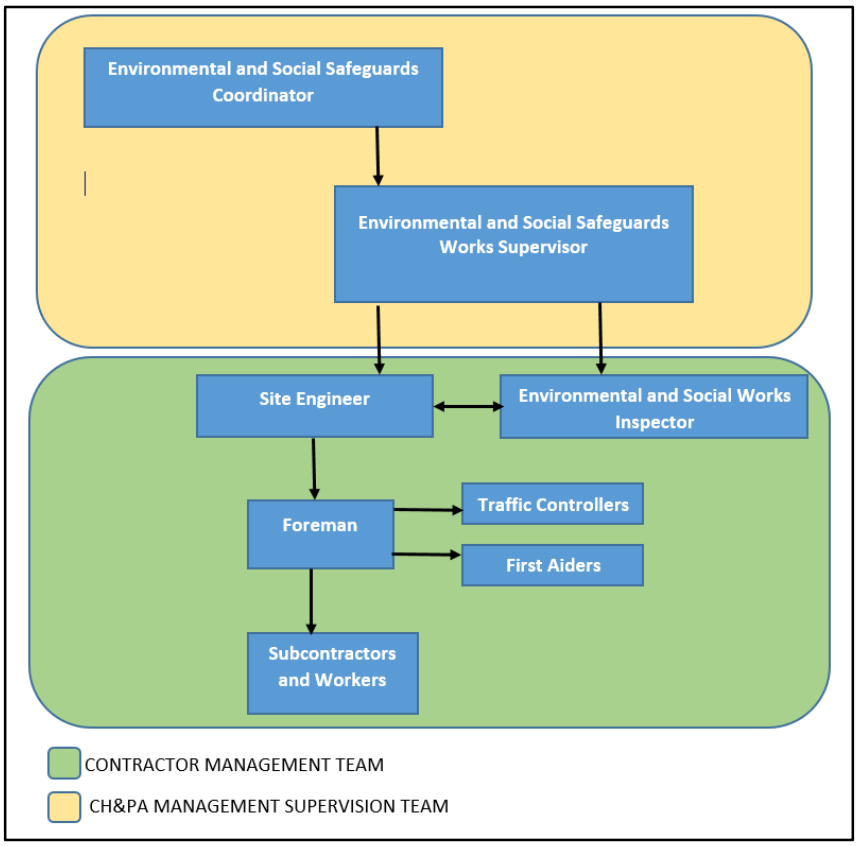

Figure 8-1: HSE Management Structure

8.3 Institutional Strengthening

The development and proposed implementation of the ESA and associated ESMP is guided specifically by the IDB policies and by the Programme's Environmental and Social Management Framework (ESMF), and Section 8 of the Programme's Operating Regulations (also referred to as the Operating Manual).

The CHPA has been designated the Executing Agency and is, in effect responsible for the successful implementation of the AHUAP – GYL1031. This responsibility includes meeting the environmental and social demands of the Programme. In addition one of the special contractual conditions for execution is that "*throughout the life of the Project, the Executing Agencies shall implement and comply with the ESMF and ESMP, and shall cause every contractor, operator or any other person perform the Project related activities to design, build, operate, maintain and monitor all activities in accordance with the ESMF, integrated in the Operating Manual*"

Considering the multi-fold environmental and social aspects of the AHUAP, the CHPA's Project Management Team includes two Environmental Specialist (an HSE Manager and an Environmental and Social Works Supervisor) to improve its environmental management capacity. While this has improved the CHPA's environmental management capacity, additional efforts should be made to increase the capacity and awareness at the level required to foster the required corporate awareness. As such, the following can be considered:

1. Certification of engineers on environmental and social matters;

2. Sensitizing and informing the senior management level on environmental and HSE matters;

3. Implementing a comprehensive Public Relations (PR) information campaign on the programme. In this context, experiences with previous projects suggest that the PR Department should be more actively involved in crafting and executing a PR program to facilitate community awareness and participation in the construction;

4. It is likely that sub-component 1.2 of the Programme will be implemented concurrently in Sophia and La Parfaite Harmonie, and with sub-component 1.1 (particularly the construction of Core Homes) also being executed in parallel to the infrastructure works. In this regard, it is recommended that an additional Environmental and Social Works Supervisor be hired for the HSE Unit in order to ensure there is adequate HSE management, supervision and monitoring of the various sub-components in the various project areas;

5. The HSE Unit has procured several pieces of Environmental Testing Equipment, namely a Noise Level Meter, an Air Quality Monitor, and a Water Quality Meter for use under the Programme. It is recommended that an Environmental Officer be employed specifically for the undertaking of Environmental Testing throughout the project sites to verify the contractors' environmental testing results. Given the existing responsibilities of the Environmental and Social Works Supervisor and the likelihood of concurrent project sites, it is unlikely that this personnel would be able to undertake such tasks effectively.

In addition to the above, the following training sessions are proposed to facilitate CHPA's alignment with the IDB's Operational Policies and the Programme's ESMF:

1. An intensive one-day training/orientation for CHPA's Senior Management, including Board Members on the IDB's Operational Policy on Environment and Safeguards Compliance, and Environmental and Social Policy Framework (ESPF), and the implication for CHPA's Corporate arrangements relevant to the AHUAP.
2. An Intensive Training/Orientation of CHPA's Procurement Team, PR, Operation and Divisional Managers on the following:

    - IDB's Operational Policy on Environment and Safeguards Compliance, and Environmental and Social Policy Framework (ESPF).
    - ESA Process.
    - Public Communication and Consultation
    - CHPA's Corporate arrangement to satisfy the referenced policies and guidelines

The Sessions should be facilitated by senior environmental specialists from the IDB.

8.4 Communication of Environmental and Social Requirements to Bidders

In executing the project, the Contractor is required to comply with all national regulatory requirements and best practices, and ensure activities are in compliance with the safeguard policies of the IDB. The Contractor is required to implement the mitigation measures outlined in this ESMP. Other applicable measures recommended by CHPA are also to be implemented. The Contractor is

required to cover all cost relating to the environmental, social, health and safety requirements. As such, it is imperative that these requirements be clearly communicated in all tender documents. This will ensure that potential contractors are aware of what is required and include the necessary resources including personnel and funds to ensure compliance.

8.5 Training

Prior to the commencement of works the Contractor shall conduct an Induction Training for all workers. The training should be conducted by the Contractor's Environmental and Social Personnel and covers the environmental and social requirements of the project, including the role of workers in pollution control, health and safety and emergency response. Thereafter, all new workers should be adequately briefed on the requirements prior to commencing work onsite. If necessary, refresher training may be conducted. Specific areas to be targeted in the training of workers should include:

- COVID 19 Precautionary Measures
- Use of Personal Protective Equipment
- Transfer and Storage of Hazardous Materials
- Spill Prevention and Response
- Waste Management
- Emergency Response Equipment and Measures

The Contractor's Environmental and Social Personnel should also conduct regular toolbox session with small groups of staff. This is recommended at least once per week of twice per month. Daily toolbox session could also be conducted by the contractors' engineers or supervisor prior to the commencement of works at the start of each day.

8.6 Monitoring

To ensure compliance by the Contractor monitoring of the construction activities will be conducted by CHPA Environmental Unit. Visits to each worksite will be conducted at least once per week to determine the level of compliance by the contractors. Non-compliances will be identified during these monitoring visits and corrective actions will be recommended.

The contractors are also required to monitor the implementation of the mitigation measures to ensure the works do not negatively affect the environment and that the health and safety of workers, residents and other stakeholders are not compromised. Monitoring is the responsibility of the contractors' Environmental and Social Personnel with support from other senior members of staff. Once non-compliances are detected corrective actions are to be implemented. The Contractor is also required to conduct monitoring in accordance with the Monitoring Plan outlined in Table 8-1.

Table 8-1: Monitoring Plan

Environmental Components	Indicators	Monitoring Schedule
Soil	• Compacted/disturbed land • Erosion • Contamination	Weekly
Water	Visual Observations for: • Discoloration	Daily

	• Sedimentation • Contamination • Unobstructed flow	
	Testing for: • Turbidity • pH • Dissolved Oxygen	Monthly
Noise	Noise levels impacts on workers and surrounding community	Daily
	Measuring decibel levels	Monthly
Air Quality	Dust generation	Daily
	Particulate Matter Testing	Monthly
Community Relations	• Dispute • Grievances • Encumbrances	Weekly
Health & Safety	• PPE available • PPE used by worker • Reduction in incidents • Emergency response measures in place • Hazardous areas identified and restricted • Traffic management and control in place • Signs installed • Sites demarcated/cordoned off • Sites lighted	Daily
Waste Management	• Garbage collection receptacles provided and used by workers. • Waste properly disposed. • No significant accumulation of construction waste.	Weekly

8.7 Reporting

The Contractor should report on environmental, health, safety and social compliance at progress meetings or any such engagements. The Contractor should also be required to report on any environmental or health and safety incidents which might occur.

Separate reports should be prepared for accidents or incidents which have occurred on the project site. This report should outline details as to what occurred, response measures, outcomes/actions taken to resolve same and management measures implemented to prevent future occurrences. An accident/incident register should be kept by the contractors.

8.8 Stakeholder Engagement Plan

Stakeholder engagements were conducted as part of the ESA preparation process. During project implementation CH&PA should continue to engage with the community regularly to provide updates on Project progress and activities and also to air concerns based on project activities. In this regard, this Stakeholder Engagement Plan (SEP) was prepared. The SEP presents the details

for the conduct of the engagements based on as the project progresses. Stakeholder engagements will familiarize local stakeholders with the project's activities, the measures being undertaken to protect the environment, provide a platform for concerns to be raised and to lay the foundation for a positive relationship between the project and the community. The SEP aims to conduct engagements that provide a means to take all viable views of project stakeholders into account to improved project design and implementation, thereby avoiding, or reducing adverse impacts, and enhancing project benefits. The process should also be guided by the IDB Policy Directive B 6.

The engagement approach builds on the engagements held by CH&PA with the project stakeholders in the past, and those conducted during the preparation of the EIA. CH&PA should lead all public meetings and consultations as the Government's representative. All sessions are required to observe the COVID 19 protocols for public safety during the pandemic period.

8.8.1 Approach

The stakeholders will be engaged in a transparent, systematic, and non-discriminatory manner towards maximizing numerous benefits to the project. These include but are not limited to:

- Enabling people to understand their rights and roles in relation to a project leading to greater transparency and involvement of stakeholders by enhancing their trust.
- Building the credibility and legitimacy of the institutions involved, whether in an implementing or supporting role.
- Promoting project acceptance, and local ownership, which are key to project success and sustainability.
- Informing stakeholders of any significant changes to the project that can result in additional risks and impacts of concern, specifying how those risks and impacts are being addressed.
- To report complaints and grievances incurred during the execution of the project.

The stakeholders to be engaged during the project implementation are resident, businesses, civil society organisations, religious organisations, schools and other community groups from the communities falling within the project's area of influence or beneficiary communities. These communities are:

1. Lust-Tot-Rust;
2. Recht-Door-Zee;
3. Onderneeming;
4. Westminster;
5. La Parfaite Harmonie; and
6. Schoonord

8.8.2 Engagement Methodology

The success of the public engagement of the project stakeholders is rooted in honest, open, and meaningful dialogue early and often throughout the course of a project. The group of primary stakeholders stand to be mostly affected by the project mainly due to proximity in daily interactions with the project environment. CH&PA is expected to ensure that stakeholders, particularly affected communities, are provided with timely and transparent information regarding the Project, and to voice potential issues of concern emerging from the project.

A project pre-start up meeting should be held with the relevant stakeholders, informing them of the plans. This can be more effective if done separately for each lot to be worked on. Thereafter, regular engagements should be done, at least quarterly. Prior notice should be given to the community for any public meetings to be held. However, these engagements should be conducted in full consideration of the COVID-19 pandemic restrictions. It is noted that in the COVID-19 pandemic, public meetings will not be the best forum for stakeholder engagements. As such, one on one engagements should also be considered. In addition, dissemination of information such using flyers, etc. should be considered. Information which can be included are project Fact Sheet with relevant contact numbers, Project Summary, Frequently Asked Questions, etc.

CH&PA will keep detailed notes of all engagements with minutes held for the quarterly meetings. Signed attendance sheets will be required to record participation along with images of each session. Notes will be taken of taken of the individual meetings and images will be requested from the stakeholder to serve as a guide to the process and further evidence of the event.

8.9 Grievance Redress Mechanism

A Grievance Redress Mechanism (GRM) for stakeholders is to be established to facilitate the complaints and concern for all stakeholders, including those whose who are directly affected by project activities. It is to be designed to address concerns promptly using an understandable and transparent process, and it will enforce measure to protect personnel from reprisal for its use. A well-functioning grievance mechanism provides a transparent and fair process to all parties without any bias to the CHPA or contractors. All stakeholders who believe aspects of the project will have a detrimental impact on the community, their day to day activities, the environment, or on their quality of life should be able to communicate their grievances. These grievances should be documented, analysed and responded to efficiently. Stakeholders may also submit comments and suggestions that they feel will increase the benefits of the project and decrease the impact they face. It is expected the any grievances arising from the construction activities will be localized. As such, to ensure that the process is effective, a site level mechanism to address grievances is recommended.

The GRM does not impede access to judicial or administrative remedies that is available under law or other avenues to submit complaints. Affected parties can escalate their complaints if they consider that the GRM is not appropriate space for their complaints, or if their claims were not addressed to their satisfaction.

The contact information for affected persons to submit their complaints will be incorporated into the GRM once the information becomes available. This information will include the Responsible Person, Address, Telephone Number, Text Message Number and Email Address. The GRM should be posted around the community at strategic locations, and communicated to stakeholders at any community meeting.

A register of grievances received should be maintained by the CHPA and should include information such as date of complaint, by whom, nature of grievance, date investigated and by whom, validity and corrective action required, timeline for implementation of corrective action, and if grievance was satisfactorily addressed or not. A monthly review on the status of grievances received/addressed should be conducted by the CHPA.

The Environmental Unit of the Project Department of the CHPA should manage the grievance redress process. All grievances should be address in a timely manner, with timelines set for each

aspect of the process. Once any grievance resulting from the execution of works is received the following actions should be undertaken:

- The CHPA Environmental Personnel, along with the Contractor Project Manager/Environmental Personnel, should investigate reported grievances to determine the validity of a complaint and cause for the grievance;
- It should then be determined whether grievance can be resolved by the Project Team or whether outside authorities with regulatory or other responsibilities and relevant skills are to be consulted;
- Or it should be determined if corrective actions are to be taken by the Contractor and what those actions are;
- The CHPA Environmental Personnel should prepare grievance report, including supporting materials such as photographs. If necessary, a clear list of tasks and outcomes expected shall be developed;
- If grievance is the fault of the Contractor, then the Contractor is to implement corrective action immediately.
- The CHPA Environmental Personnel, along with the Contractors Project Manager/Environmental Personnel should conduct follow-up inspection to monitor the situation and determine whether problem is likely to recur and put measures in place to prevent recurrence.

8.10 Emergency Response

Even though the contractors may have implemented proper systems and are complying with all the environmental and occupational health and safety requirements to ensure a safe and healthy work environment, occasions can still arise when an environmental emergency can occur. In the event of an emergency, the objectives are to ensure a prompt and effective response by the company, as well as to minimize the effects. In this regard, this Emergency Response Plan (ERP) was prepared. The ERP describes the general types of emergency and actions to be followed, should an emergency occur during the construction phase of the project. The ERP includes:

- Emergency Contact Details;
- Emergency Procedures;
- Description of an Emergency;
- Authority of Control;
- Scenario Description and Response;
- Materials Inventory; and
- Incident Reporting.

It is advisable that contractors prepare their own ERP, utilising this for guidance. The contractors ERP should be provided to employees and placed at strategic locations within the project sites. Such locations will include the office, living quarters and work areas.

In any ERP, it is critical that the workers be adequately trained and there should be detailed emergency procedure drills and briefings. Training should be done to make staff aware of the dangers of the workplace, as well as the appropriate management measures to be implemented in cases of emergencies. All personnel should benefit from training and orientation and should be familiarized of the potential hazards of their work area and to take the necessary precautions to

prevent these from occurring in the course of carrying out their duties, as well as to follow good housekeeping practices to prevent accidents, fires and other emergencies.

8.10.1 Objectives of Emergency Response

The emergency response objectives include:

1. Protection of human health and safety;
2. Protect and minimize the effect on the environment or property;
3. Contain the spread of material;
4. Neutralize and render safe any noxious or hazardous materials; and
5. Commence clean-up activities and site remediation.

By their very nature, emergency response procedures deal with events either not foreseen or almost totally unlikely. It is necessary therefore to plan for worst case scenarios or adopt general procedures, as normally anything that can be covered by a specific plan is not an emergency. It is important to recognize that, although highly unlikely, an emergency can have serious impacts well beyond the individual operation immediately involved.

8.10.2 Identification of an Environmental Crisis

An emergency is a situation in which injury to a person(s) and/or damage to the environment or property is involved thus requiring emergency service attendance. An environmental emergency would involve widespread actual or potential destruction or contamination of the environment that calls for immediate action. Given the nature of the project, no major emergency is foreseen. Some examples of events that would require the instigation of an emergency response procedure at the project location include:

1. A fuel and or oil spill;
2. Fire; and
3. Minor and major accidents;

8.10.3 Emergency Contact Details

The contact information for institutions and agencies to be contacted in a case of emergency are outlined in the table below. These institutions are either relevant to the project activities or its location.

Table 8-2: Emergency Contact Information

Emergency Contact Numbers		
No.	**Organization**	**Contact Number**
1	Georgetown Public Hospital Cooperation	227-8210-2, 227-8204-7227-8241-7
2	West Demerara Regional Hospital	254-0311
3	La Grange Police Station	264-2357

4	Leonora Fire Station	268-2350
5	CHPA	225-4810
6	EPA	225-0506

8.10.4 Authority of Control

The staff structure should comprise the Site Engineer, who reports directly to the contractor. This personnel should be responsible for the day-to-day execution of works at the project site. Environmental and Health and Safety support should be provided by means of a specialist who will advise on specialized areas. The Site Engineer should have the authority to take control of any incident and can make a decision to close down all or any part of the operations following an incident. This person should also decide on the type and level of response required for a particular emergency.

8.10.5 Emergency Response Equipment

Contractors should maintain stocked and adequate First Aid Kits onsite. These kits should be located in a central area and clearly labeled. The contents of the kits should be consistent with what is recommended by the Red Cross and should be accompanied by proper instructions on usage. However, proper medical services are available at the West Demerara Regional Hospital, which is approximately fifteen minutes away from the project location. More advanced medical services are also available at Georgetown Public Hospital Cooperation (GPHC), approximately forty-five minutes away. These should be utilised for more severe situations.

Fire fighting equipment such as fire extinguishers and sand buckets, along with instructions on their usage, should be located at strategic points at the construction sites. These points should be clearly marked, being visible at all times, and employees should be aware of their positions. Dry chemical extinguishers should be acquired. Staff should be trained in fire response and how to operate fire response equipment available onsite.

Fuel should be stored in limited quantity in sealed metal drums and kept in an enclosed area with on impermeable base. In the case of a spill occurring outside of this area, a Spill Kit should be kept onsite to assist with the clean-up.

8.10.6 Response Mechanism

Emergency response measures should be applied to both minor and major incidents/accidents. Adequate information and equipment should be maintained onsite to respond to emergencies. The following outlines the emergency response procedures for several types of emergencies that may occur during the project implementation.

8.10.6.1 Minor Incident/Accident

In the event of a minor accident, the Site Engineer or Foreman should be informed and should then take the responsibility for on-site treatment utilizing First Aid facilities. The contractor should consider training personnel in First Aid if none of the employees hired had prior training. An entry should be done into the Accident and Emergency Record book which is to be kept on the project site at all times.

8.10.6.2 Major Incident/Accident

In the event of a major accident the following measures should be implemented:

- Inform the Site Engineer or Foreman.
- Assess type of injury, i.e. broken leg, conscious or unconscious.
- In the case of injury, First Aid treatment to be applied.
- Arrange transportation to West Demerara Regional Hospital or the Georgetown Public Hospital if case is serious.
- Make entry into the Accident and Emergency Record book.

As was previously stated the West Demerara Regional Hospital is in close proximity to the project site. This hospital is fully equipped to handle most accidents such as bruises, broken bones, cuts, etc.

8.10.6.3 Fire

Fire fighting equipment such as fire extinguishers and sand buckets should be located at strategic points within the project area such as fuel storage area with instructions on their usage. These points should be clearly marked, be visible and employees would have knowledge of their position. In the event of a fire, employees should initiate the following procedure which they would be familiar with as a result of fire drills:

- Immediately warn others and evacuate area.
- Attack the fire if safe to do so, with fire fighting equipment provided, but without taking personal risks.
- Take decisions on containment. If it is a small fire, use fire extinguisher. In the event of a larger fire, employ water spray if water pump is available on site. Also contact the Guyana Fire Service.
- Contact the site Environmental and safety Personnel.
- Make entry into the Accident and Emergency Record book.

8.10.6.4 Fuel Spills

If fuel is stored on-site for refueling of equipment, it should be located within a containment area that has an impermeable base. However, in the event of a spill beyond or outside the containment area the following action should be taken:

- Attempt to stop the flow if possible.
- Inform the contractor Environmental Personnel and seek guidance.
- Prevent the movement of people or vehicles into restricted area.
- Treat spill with absorbent materials such as sand or sawdust and a bund formed if possible to prevent the spill spreading and contaminating the waterways and soil.
- Collect absorbent materials and place in a secured area with an impervious base at a restricted zone.
- Make entry into the Accident and Emergency Record book.

8.10.7 Incident Reporting

After every incident/accident a report should be required. The contractor Environmental Personnel should have direct responsibility for the preparation of such a report. The following is a format, which can be used.

(Name of Construction Company)

Record of Accident/Incident

ENVIRONMENT, SAFETY & HEALTH MANAGEMENT INFORMATION

TO BE COMPLETED BY Farm Manager

1. Reason for Record: ☐ Accident ☐ Incident

2. Name: _____

3.Position:_____

4. Date of Birth: _____ 5. Sex: ☐ Male ☐ Female

6. Date of Accident/Incident: _____ Time: _____ ☐ AM ☐ PM

7. Duty Station Address:	8. Location of Incident:
9. Description of Accident/Incident	
10. Extent of injury or illness and Body Parts Affected:	
11. Medical Treatment? ☐ Yes ☐ No 12. Lost Time? ☐ Yes ☐ No	
13. Description of Treatment:	
14. Follow-up Acton:	

Signature: _____ Date: _____

Title: _____

Figure 8-2: Suggested Format for Incident Reporting

9.0 Public Disclosure

The draft ESA report was disclosed by the Consultants with support from the CH&PA in accordance with the IDB's requirements. The draft ESA prepared by the Consultant was reviewed by the CH&PA and was subsequently published on Agency's website in April 2020. Public disclosure/consultation meetings were then held with stakeholders of the La Parfaite Harmonie Housing Area, which may be impacted during the execution of the AHUAP – GY/L1031 in the program area.

The purpose of these meetings were:

- To inform the stakeholders and residents on the nature, goals and scope of the project, including the upgrade interventions expected as a consequence of the AHUAP;
- To discuss the potential positive and negative environmental and socio-economic impacts related to the works;
- To present the recommended mitigation measures; and
- To gather their feedback, including concerns and recommendations so that these can be addressed in the revised ESA.

Prior to the meetings, discussions were held between the CHPA Community Development Department and the Consultant to determine the most effective way of disclosing the draft ESA, especially given the situation regarding the COVID-19 pandemic. Any engagement had to be done in accordance to the national COVID -19 restrictions. It was determined that multiple sessions should be held targeting different stakeholder groupings. This included virtual and onsite gatherings so as to restrict the number of persons per session. The Community Development Department of the CHPA was very instrumental in the planning and execution of the various Public Disclosure sessions.

Copies of the Draft ESA report were sent before the meetings to the La Parfaite Harmonie Housing Area to the representatives of stakeholder or residents in order to enhance the knowledge about the project characteristics and facilitate informed discussion on the different aspects.

Five public disclosure sessions were held, each targeting a different group of stakeholders. The engagement schedule is outlined in Table 9-1.

Table 9-1: Schedule of Public Disclosure Sessions

Date	Time	Stakeholder Groups	Media
May 04, 2021	9:00 hrs-11:00 hrs	Government Agencies, Regional Democratic Council, Neighbourhood Democratic Council	Virtual
May 04, 2021	1:00 hrs-3:00 hrs	Faith Based Organisation and NGOs	Virtual
May 20, 2021	9:00 hrs-11:00 hrs	Vendors and Businessowners	Virtual
May 22, 2021	11:00 hrs-1:00 hrs	Residents	Community Meeting
May 22, 2021	2:00 hrs -4:00 hrs	Residents	Community Meeting

At each of the meetings an overview of the purpose of the meeting was presented by CHPA. The Agency also presented the details on the project, including the works to be conducted, timelines, areas targeted, etc. Thereafter the Consultant presented the findings of the ESA, including potential impacts determined and the recommended mitigation measures. The meetings was then opened for stakeholders to participate in the discussion by airing any concerns, seeking any clarifications, and making recommendations. The feedback relating to the ESA from each meeting is outlined below.

First Community Meeting - May 04, 2021

a. Would the NDC be notified on time/date and duration of project? One week notice on road closure so alternative routes can be established would also be necessary.
b. How in the long term, is the work being done be sustained in terms of preventing drains from blocking and building of concrete drains?
c. The widening of drains may also lead to electrical poles being closer to drains which can lead to them leaning and eventually falling.
d. GPL plans to slowly move away from wooden poles and move to concrete poles. It is important that the soil near the drains can support concrete poles.
e. What is the timeline of the project?
f. Will the Project documents be shared with the stakeholders in a timely and adequate manner? When will this happen?

Second Community Meeting - May 04, 2021

a. How are we guaranteed that project and all other guidelines will be enforced?

Community Meeting - May 20, 2021

a. Property owners who have not yet built on their land are not cleaning and maintaining the land. What will be done in this case?
b. There is a lack of street lighting in the area and as a result persons are getting robbed. How will this be dealt with by the project?
c. Will persons from the community be employed during project implementation?

First Community - May 22, 2021

a. How can residents contribute to enforcing the environmental requirements the contractors are required to comply with, for example, to know what is allowable and what may be restricted?
b. Will contractors be allowed to work under low visibility conditions such as during rainy conditions or late in the evenings?
c. Would Environmental Monitoring Personnel be present at the construction sites?
d. Contractors should not be allowed to stockpile materials along the roadway which can result in an impediment to access.

Second Community Meeting - May 22, 2021

a. Empty/unoccupied lots within the project areas are a security and safety risks. The project may result in some land-owners moving to occupy their lands due to improved infrastructure.
b. Will the roads be widened from the current width as part of the project?

c. Are there suitable areas for which roadside vendors can be relocated to facilitate the construction works?
d. When will the project commence and what will be the duration of the construction period?
e. Will residents have some responsibilities of watching over the contractor?
f. Persons currently have construction materials stored along the roadway in some areas which may impede construction works under the project. Some of these materials have been there for a while.
g. How will monitoring of the contractors be done to ensure the quality of the work is of the required standard?
h. What will be standard size of the drains to be constructed?
i. When drains within a particular area is being worked on, how will this affect the area drainage, or drainage from persons' yards?

Generally, most of the feedback was positive, with persons looking forward to the implementation of the project. The concerns raised were not many and were not significant and persons were satisfied with the responses provided during the meeting. The final version of the ESA Report incorporates the feedback received during the public disclosure process.

Details on the ESA public disclosure including attendees and photographs are presented in Annex 3.

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APPENDICES

ANNEX 1: Completed Environmental and Social Screening Checklist

Government of Guyana
Ministry of Housing and Water
Central Housing and Planning Authority
Adequate Housing and Urban Accessibility Programme (AHUAP)
GY-L1031

E&S Checklist for Scoping Study as part of the Environmental and Social Assessment (ESA) Study for La Parfaite Harmonie Housing Area

E&S CHEKLIST- IDENTIFICATION AND EVALUATION OF POTENTIAL ENVIRONMENTAL IMPACTS

References for reading the identification table and evaluation of potential environmental impacts:

Impact	Sign of the Impact	Intensity	Magnitude
Y / N	+ / -	H/ M / L	H / M / L

Impact (iM): Identification of significant effect of Project actions.
Y: if it affects,
N: it does not affect.

Sign of the Impact (SiM):
sign +: positive effect on the environment
sign -: negative effect on the environment

Intensity (I):
Severity of an impact based on the degree of environmental quality modification.
Qualitative categories: H = high, M = medium, L = low.

Magnitude (M): Area of influence of the affectation. Qualitative categories:
H = high, it affects the whole neighborhood and the environment;
M = average, affects a sector of the neighborhood;
L = low, the effect is circumscribed to a specific space within the neighborhood.

ENVIRONMENTAL IMPACTS

1. ECOSYSTEMS AND CULTURAL HERITAGE
   1.1. Could the project affect sites of particular ecological value?

Response

No, it is very unlikely that the project will have any significant impact on any particular site of ecological value. Based on preliminary studies done, the project site is located in a

highly populated urban area on the West Bank of Demerara. These lands were previously used for the cultivation of sugar cane and have been recently developed to accommodate housing, therefore there is loss of wilderness. With loss of wilderness there is low ecological value. Additionally, areas with high anthropogenic activities are synonymous with low biodiversity and species limited to those areas are usually common to the region and are less sensitive to human impacts.

1.2. Could the project affect any natural feature of the site or adjacent area? (topography, bodies of water, rivers, vegetation, fauna, etc.)

Response

No, the project will not affect any natural features of the sites or areas adjacent to it since all project activities are limited to rehabilitation and improvement works done to existing infrastructure.

1.3. Would there be effects on sites of historical, archaeological or cultural value?

Response

No, there would be no effects on sites of historical, archaeological or cultural value. No such sites were identified during the scoping exercise.

2. WATER RESOURCES

2.1. Could the project modify the depth of the groundwater?

Response

No, the project will not have any impact on the depth of the groundwater.

2.2. Could there be alterations in the quality of the usable underground water?

Response

Yes, a project of this nature could have minor negative impacts on groundwater resource. There is a high probability of construction works causing damages to underground mains which provides potable water to residences within these communities. In such cases, pipelines which becomes damaged or broken can serve as entry points for contaminants which, during low pressure, could be fed back into the aquifers. This could therefore compromised the quality of groundwater within the area. While there is a possibility of this impact occurring, the likelihood is low. In addition, it is common to find existing leaks throughout the projects area.

2.3. Could the project cause a decrease in underground water resources due to deviation of flow rates, waterproofing of surfaces or local consumption?

Response

No, the project will not cause a decrease in underground water resources due to deviation of flow rates or waterproofing of surfaces. This is due to the fact that the project is limited to rehabilitation works of existing infrastructure. However, at the end of the project, there may be an increase in occupancy rate which could increase the demand for potable water which is usually provided from underground sources.

2.4. Could the project modify the sediment load in surface waters?

Response

Yes, the project will significantly modify the sediment load in surface water since most of the existing drains that are directly within the work zones will be re-established by means of cleaning/excavation. In fact, it should be noted that the current condition of the drainage networks, which accounts for the main surface water bodies within these communities, is deplorable and in some cases non-existent, due to heavy siltation and vegetative growth. In some cases, the drains are used as dumping grounds for domestic garbage. In this regard, the project will have a positive impact on the surface water quality, particularly activities which involves re-establishing the drainage networks within these communities. Thus, the potential issues of sedimentation is expected to be short term and not anticipated to be a significant impact.

2.5. Could the project modify the quality of the water resource in cases of graywater discharge in storm drainage system?

Response

Yes, during the construction period there will be effluent or liquid waste, particularly blackwater and greywater which will be produced from temporary office and worksite facilities. If these are allowed to drain directly into the nearby waterways, it can have negative effects on the water quality. This impact is also likely to intensify during the operational phase, as the development will motivate persons who have not yet occupied their lands to do so.

2.6. Could the project affect the quality of the water resource by discharging wastewater into receiving bodies?

Response

Yes, the project could affect the quality of the water resource by discharging wastewater into receiving bodies. During the construction period there will be effluent or liquid waste, particularly blackwater and greywater which will be produced from temporary office and housing facilities. If these are allowed to drain directly into the nearby waterways, it can have negative effects on the water quality.

2.7. Could the project affect the provision of drinking water for other users?

Response

Yes, the project could in fact affect the provision of drinking water for other users, since there is a probability of construction works causing damages to underground mains which provides potable water to residence within these communities. While there is a high possibility of this impact occurring, it should be noted that such an issue currently exists in each of the six communities within the project area and to a larger extent, external communities. In fact, it is common to find existing leaks throughout the projects area.

3. DRAINAGE

3.1. Does the storm drain network modify the current drainage conditions?

Response

Yes, the current drainage conditions will be modified. Additional culverts will be constructed in order to enhance the drainage network so as to allow better flow and channeling of water into larger bodies. Existing drains will also be enhanced.

3.2. Does the project modify the collection of drainage in the basin corresponding to the neighborhood?

Response

Yes, the project will modify the collection of drainage in the basin corresponding to the neighborhood. Several culverts will be constructed to interconnect drains and canals so that there will be a constant flow of storm water in multiple directions.

3.3. Does the project modify the exit of the drainage in the basin corresponding to the neighborhood?

Response

No, there will be no modification to the exit drainage. No external structure or drainage outside of these communities are targeted for intervention under the project.

3.4. Will the drainage system be affected by sediments, due to erosion caused by runoff water?

Response

Yes, the drainage system can be affected by sediments, due to erosion caused by runoff water. Construction materials could be eroded into nearby drains during periods of heavy rainfall. Eroded materials can be transported into the waterways via surface runoff and can increase the turbidity of surface water bodies and at the same time result in sedimentation and discolouration.

3.5. Would there be an increase in erosion, due to water coming from drainage?

Response

It is not expected that water coming from the drainage will contribute to any significant erosion.

3.6. Was there a risk of flooding from other sectors adjacent to the site as a result of the project?

Response

Yes, flooding could occur from the agriculture sector (rice cultivation) adjacent to the site as a result of the project if main drainage bodies are blocked for long periods.

3.7. Does the drainage network guarantee that ponds or puddles of still water are not created?

Response

Yes, to a greater extent the drainage network will guarantee that ponds or puddles of still water are not created. Due to the flatness of the coastal lands, all drains are designed and created to a particular gradient that allows smaller drains to drain into larger ones, which eventually flows into main drainage canals, which discharges in to rivers or the Ocean.

Additionally, the project caters for the construction of several culverts which will also be beneficial in preventing such a situation from occurring, as it will increase connectivity, which will allow drains that are currently stagnated to flow freely.

3.8. When carrying out consolidation activities, waterproofing of soils or elimination of vegetation cover, will there be a risk of altering the degree of infiltration?

Response

Yes, there will be some level of alteration to the degree of infiltration since the roads will be upgraded from sand based surfaces to asphaltic concrete surfaces which prevents penetration and increases the rate of runoff, hence reducing the rate of infiltration.

4. USES

4.1. Could the project affect or modify the current land use?

Response

The project will be focusing only on rehabilitation and upgrading of existing infrastructural woks within these communities. As such, there will be no interference with land uses throughout the construction phase. In this regard, no impact to land use is envisaged. However, in the long term, the project could have a positive impact on the socio-economic structure of these communities, as they would become more favourable to inhabit, hence increasing the occupancy rate which would see the establishment of more residences and businesses.

4.2. Could the project affect or eliminate adequate land for agriculture or forestry production?

Response

No, the project will not affect or eliminate adequate land for agriculture or forestry since it will only be focusing on rehabilitation works to infrastructure within existing communities. No new lands will be developed.

4.3. Will the project have spaces for the allocation of green areas?

Response

Not applicable, since the project focuses only on the rehabilitation of infrastructure within existing communities.

4.4. Does the project include afforestation of public spaces?

Response

No, since the project focuses only on the rehabilitation of infrastructure within existing communities.

4.5. Does the planned lot in the project include spaces for family productive activities?

Response

Not applicable, since there will be no new land development.

4.6. Could the project affect the use, or access to a space and / or recreation area or green spaces?

Response

Yes, in some cases the project could temporarily affect access to recreational areas, particularly during road construction works. This impact is expected to be short term and not significant since pedestrian accesses could be maintained or alternative access utilised.

4.7. Does the project modify activities of natural extraction of wood, firewood, or burning by the current population?

Response

Not applicable.

4.8. Does the project modify the activity of soil extraction? (abandonment of brickworks, cellars, etc.)

Response

Not applicable

5. LANDSCAPE

5.1. Could the project cause changes in visual characteristics in or near the area through alterations of natural or cultural factors?

Response

Yes, the project will caused changes in visual characteristics in or near the area. These visual changes will be positive since the project's main goal is to improve the living conditions within these communities and not necessarily alteration of natural or cultural factors.

5.2. Could the project interfere with the view or access to views of natural and / or cultural factors of the landscape?

Response

The project is located in a housing area where development is expected. Some homeowners who would have established themselves in the scheme have accepted access, views and the natural landscape.

5.3. Could the project introduce new materials, colors, and shapes to the immediate landscape?

Response

New materials will be introduced to the immediate landscape during the construction phase, particularly as it relates to the construction of the sidewalks whereby pavers is expected to be used. These are expected to have a positive impact on the community and will increase the value of the properties in the local neighborhood.

6. NATURAL RISKS

6.1. Could the project be susceptible to environmental risk (natural origin: floods, earthquakes, landslides) due to its location?

Response

Yes, the project will be susceptible to mainly flood. Guyana has two rainy seasons that can cause severe flooding within coastal areas. Floods are also caused directly by unusually high spring tides or breaches in the coastal sea defense.

6.2. Would there be a risk of flooding from other sectors adjacent to the site as a result of the project?

Response

Yes, there could be a rick of flooding from other sectors adjacent to the site as a result of certain project activities such as culvert and bridge construction, particularly if temporary cofferdams are used. Activities in other sectors that restrict the drainage capability of the project area can negatively affect the project. Floods due to the discharge of irrigation waters from the West Demerara Conservancy can also flood the project area.

6.3. Could the project contribute to creating land sinking problems?

Response

No, the project will not contribute to creating land sinking problems.

6.4. Will the project produce or intensify the erosion of the area?

Response

No, there is not enough gradient for the rainfall to flow overland with the required intensity for soil erosion to occur. During periods of rainfall the rainwater accumulates on the land and in the drainage canals and is drained off by gravity when the sluices were opened during low tides, or pumped by mechanical pumps. This process does not contribute to significant erosion.

1. ANTHROPIC RISKS

1.1. Could the project be susceptible to technological risk due to the presence of high voltage pipelines, gas pipelines, railways, high traffic roads, industrial plants, canals, reservoirs?

Response

No, the project will not be susceptible to any technological risk due to the presence of high voltage pipelines, gas pipelines, railways, high traffic roads, industrial plants, canals or reservoirs since these are not located within the project area.

1.2. Could the project be susceptible to health risk due to the presence of brick kilns, cellars, contaminated landfills, garbage dumps, slaughterhouses, uncontrolled animal husbandry due to its location?

Response

No, the project will not be susceptible to any health risk since none of the listed facilities are located within the project area.

1.3. Could the project be susceptible to technological risk due to pre-existing infrastructure works?

Response

No, the project will not be susceptible to technological risk due to pre-existing infrastructure works.

2. WASTE

2.1. Does the project contemplate the management of solid waste?

Response

Yes, a waste management plan will be formulated as part of the Environmental and Social Assessment (ESA) for implementation by the CHPA and the contractors.

2.2. Could the project cause changes in activities related to waste management? (scrap, recyclers, etc.)

Response

Nope, this is not expected since the waste to be generated would be typical garbage and construction waste.

3. IMPACTS DURING CONSTRUCTION

3.1. Will there be interruptions in surface drainage in the excavation areas?

Response

Yes, there will be short term interruption in surface drainage in the excavated areas. This is likely to occur mainly during the construction of culverts, whereby cofferdams may be used to temporarily block the flow of water from the construction area.

3.2. Will there be interruptions in surface drainage in the filling areas?

Response

No, there will not be any interruptions in surface drainage in the filling areas since these areas comprises existing roads.

3.3. Could the amount of waste and material waste be increased?

Response

Yes, the project will generate waste, Waste to be generated includes domestic garbage, which usually consists of a mix of bottles, bags, cans, boxes, plant residues, excess food and kitchen scraps and old clothing and paper. These will mainly be generated by construction staff on a daily basis. Liquid waste will also be generated including sewage waste and waste water from bathing and washing. Hazardous waste to be generated includes waste oil, filters and oil containers. Construction waste is also expected to be generated in large quantities, particularly from excavation and masonry works, and would include spoils, wood, broken concrete, pieces steel rod, cement bags, etc.

3.4. During the construction, could excavations and fillings be affected by erosion or other processes?

Response
Yes, there is a possibility that excavation and fillings could be affected by erosion, particularly during the construction of roads and culverts occurring in the rainy season.

3.5. Product from project works could accumulate water in unfilled loan wells.

Response
Not applicable

3.6. Will construction supplies (gravel and fill material) be obtained from existing quarries?

Response
Yes, it is likely that all construction supplies (gravel and fill material) will be obtained from existing quarries; however, this is solely dependent on the individual contractor's choice or preferences in sourcing of material.

4. **SOCIOECONOMIC ASPECTS**

4.1. Does the project contribute to the physical integration of the area into the urban fabric?

Response
The project will contribute to the physical integration of the area into the urban fabric, particularly with the construction of the primary roads which will seek to interconnect some of these communities.

4.2. Does the project meet the demands for infrastructure and community services?

Response
The project will meet some of the demands for infrastructure and community services.

4.3. Could the project influence environmental behavior in the population?

Response
There is a possibility that the project could influence environmental behavior in the population, since it will improve the general aesthetics or the area. Also, the project will increase investment in the communities and encourage lot owners to build or complete their buildings reducing the area for dumping of garbage, unwanted grazing, over-growth of vegetation and general property maintenance, all contributing to positive environmental actions.

4.4. Could the project have an impact on health?

Response
Yes, the project could have an impact on health in the form of air, noise and water pollution. These impacts are predicted to be minimal, localized and short term, occurring during the construction phase. After construction the project impact on health is expected to be positive with improved drainage and access.

4.5. Could the project lead to future conflicts within the project's beneficiary community?

Response
No.

4.6. Could the project lead to changes in the density of land occupation?

Response
The project will lead to changes in the density of land occupation since more persons would be encouraged to build their homes as a direct result of improved roads and other infrastructural works

4.7. Could the project lead to changes in the levels of overcrowding?

Response
The project will not lead to changes in the levels of overcrowding since the area has no issues in this regard. Increased occupancy will be welcome since there is currently a low occupancy rate within these communities. However, it can address overcrowding in other areas since persons can move from currently overcrowded areas to the community.

4.8. Could the project stimulate some spontaneous movement of population towards the adjoining area of the project?

Response
The objective of the project is mainly to improve the living conditions within these communities by means of improving some of the existing infrastructural works which will ultimately address the issue of low occupancy rate. As such, there will be an increase in occupancy rate within the community. No spontaneous movement of people to adjoining areas is anticipated.

4.9. Could the project cause the elimination or relocation of existing industrial or commercial activities?

Response
No, this is not expected.

4.10. Could the project influence the monthly expenses of the population?

Response
Yes, the project has the ability to influence the monthly expenses of the population, particularly transportation costs for residents in the area. Improved roads and shorter interconnection routes between communities can reduce transportation cost.

4.11. Could the project affect the value of the property?

Response
Yes, the project has the potential to increase the property value of the entire community beginning with the direct beneficiaries whose streets will be paved and who will have access to better community services.

4.12. Could the project generate new productive activities?

Response

Yes, the project will generate new productive activities both during the construction phase and operational phase. The construction phase will provide employment opportunities which is expected to continue during the post project as land owners would be encouraged to construct homes on their lands.

5. INSTITUTIONAL

5.1. The project will require a variation of some, statute, permit or regulation that regulates situations of environmental damage?

Response

No, no variation of any regulation will be required.

5.2. Would the lack of articulation with other programs or undertakings (public and / or private) affect the integrity of the project?

Response

This is not expected to occur since development work within the area is usually the initiative of the CHPA.

5.3. In the case of being necessary vacant land outside the polygon, it has environmental conditions suitable for housing relocations?

Response

Vacant land surrounding the housing development can also be converted for housing development in the future. However, some of these lands are privately held and are utilized for other purposes currently, such as rice cultivation.

ANNEX 2: Stakeholders Engagement Report

Stakeholder	Date of Engagement	Representative and Contact Information	Key Issues Identified
Ministry of Health Parfaite Harmony Health Centre	22.03.2021	Nurse Semple, Head Nurse, Parfaite Harmony Health Centre 680 4644	The community and health centre need treated water for its daily uses. The current water supplied by GWI is not good for consumption directly from the tap, and is heavy in iron that stains everything it contacts. The community roads must be paved, and lights placed at strategic locations including the health centre. The health centre is too small to serve the needs of the community, and will have to be extended as the community develops and the population increases. The housing project should help poor families that have already begun to build their homes and are currently living in the unfinished buildings.
Ministry of Human Services & Social Security Department of Cooperatives	20.03.2021	Suresh Jaigobin, Cooperatives Officer, Department of Cooperatives suresh.jaigobin@yahoo.com 2273133, 6106439	The Dept of Cooperatives and Friendly Societies provide the service of registering and supervising of all Cooperatives and Friendly Societies in Guyana under the management of the Ministry. The Ministry welcomes such Cooperative, Credit and Developmental facilities formed by residents for the betterment of their communities and to improve livelihood activities. Societies such as agricultural, multipurpose centres, Credit Unions, etc. which are focused on economic activities and other socio-cultural facilities including NGOs are encouraged. At this point, the Department of Cooperatives has no concerns.
Guyana Telephone & Telegraph (GTT)	19.03.2021 22.03.2021	Jasmin Harris 623 2899 jharris@gtt.co.gy	A conference call was held on March 22 with Ms. Harris and Mr. Barry of GTT who requested additional details on the proposed works in order to better understand the project. These were provided by the consultant in the call. GTT is expanding its network as the scheme populates with major sections already having landline and Blaze Internet.
Guyana Power & Light Inc (GPL)	19.03.2021	Vreed-en-Hoop Office Commercial Manager Ms. Bibi Knights 2643110, 603 3067	Ms. Knights was worried that the project works could affect the utility poles in the housing scheme as happened in Belle West Housing Scheme. She was supportive of the project that will be good for the scheme and pointed out that the NDC or residents can have streetlights placed on the poles for a fixed rate. She will provide a link with the network manager of the district who should be made aware of all construction works.

		Omesh Yogeshar Network Manager 624 2033	The Network Manager assigned his engineer Mr. Abrams to liaise with the project in order to have an incident free project.
Guyana Police Force D Division West Demerara, Essequibo Islands	22/03/2021	Division Commander, Senior Superintendent Errol Watts 620 6863	The new roads must cater for the most vulnerable citizens by ensuring all safety features are included and with an internal speed limit 20 km/h. The safety concerns raised by the residents must be communicated to the Minister who will either instruct the Commissioner or Divisional Commander to implement the Police Outpost or instruct the Division to conduct an outreach with the public to gather more information and study the situation on the ground before a decision is taken. The Divisional Commander support additional patrols in the area to boost security for the community.
Regional Democratic Council	17.03.2021	Mohamed Inshan Ayube Chairman, Regional Democratic Council, Region 3 695-5384	The Regional Chairman was not aware of the project and requested an in-person meeting to be presented with the project documents and then provide his comments. The consultant presented the project details available as part of the consultation and pointed out the available documents online. After listening to the presentation of the consultant, the Chairman maintained that he would have to be presented with the project documents and be more integrated into the process that is happening in his region.
Malgre Tout/Meer Zorgen NDC	17.03.2021	Theresa Persaud Overseer, Malgre Tout/Meer Zorgen - NDC Office 2533006/6473850	The Overseer is aware of numerous developmental works in the scheme but not aware of this project. She is supportive of the project that is necessary for the communities believing that better roads will increase occupancy. The Overseer was hopeful that the government will place more streetlights along the new roads to be built. There is a garbage problem in the scheme that can be made worst if the contractor does not obey the laws. Residents also leave derelict vehicles, building materials and overgrown vegetation on the roadside. There is the growing problem of squatting on the roadside by numerous shop owners who are increasing the size of their stalls despite numerous warnings from the NDC.
Best Klien/Pouderoyen NDC	17.03.2021	Sarswattie Hsarripersaud Assistant Overseer, Best Klien/Pouderoyen NDC 2642461	The Assistant Overseer was acting on behalf of the Overseer in all official matters. Ms. Harripersaud was not aware of the project but was in full support of the project outputs. She inquired about a similar project for the Crane Housing Scheme that is within her NDC. She was confident that the new roads will be a big boost for the community now that more people own vehicles in Guyana. She was concerned about the impact of the heavy-duty trucks on the proposed roads and whether they can withstand the load.

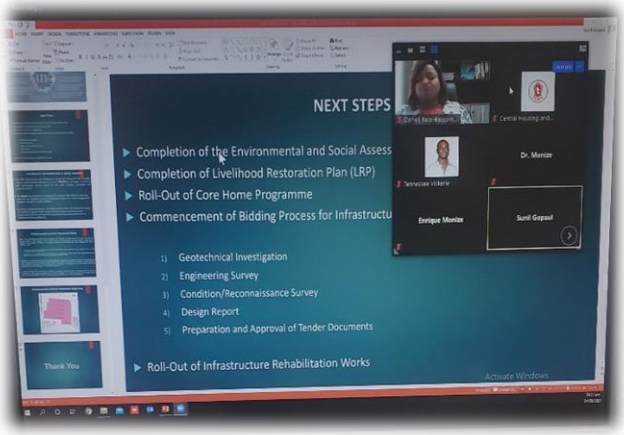
Invisible Kick Martial Arts Academy, Westminster	17.03.2021	Mr. Lloyd Ramnarine, President of Invisible Kick Martial Arts Academy 698-6727	The community leader has never heard of the project but welcomed the development initiative that will be a great positive for the community. He was very concerned about the welfare of the youths and was positive about the outcome of the project on the youths. He enquired about the possibility of being granted a plot of land or utilizing the abandoned community centre to host a free martial arts class for youths in order to help them stay off the streets and involved in gangs.
Throne Room International, Westminster	19.03.2021	Pastor Marshall Lambert 648-3747	The community leader was at a consultation held by CH&PA but cannot remember this project. He welcomes the project and its developmental trust but is worried that only the low income areas will benefit from the works. He believes that the sidewalk is a good initiative, and the primary school should have a sidewalk extending the two full blocks to the main road where the school children are dropped off by public transportation. The area around the schools should have streetlights so that children can walk in a safer environment when finishing school late. The vacant lots with lush vegetation is a threat in the area and must be addressed by the NDC.
Masjid Alnur-27-4th Street, La Parfaite Harmonie	20.03.2021	Nazim Hussain 699-6411	The community leader attended a consultation in 2017 and was aware of the project but was under the impression that the project was shelved. He welcomed the developmental initiative particularly the housing assistance component. He proposed a project to improve the current water situation in the area that will include a treatment plant to reduce the iron content. He was confident that the drainage issues are not significant and will be resolved with the proposed culverts and regular maintenance of drains. The leader expects the NDC to be proactive and collects its taxes from which it can provide more services to the community.
Parfaite Harmony Action Group	21.03.2021	Malcolm Garnett - Secretary 665 4694	The Secretary to the Parfaite Harmony Action Group who manages the Multipurpose Building is in full support of the housing project. He would like to see more concrete drains built including around the compound of the Multipurpose Building. The group is seeking to have more support for the community through the Multipurpose Building and therefore will welcome the assistance of the government or the IDB in community development activities.
Orchid Women's Group, Westminister	21.03.2021	Ms. Indra Constantine, President 670 0644	The community leader and head of the women's group was not aware of the project and welcome the opportunity to be informed by the consultant. The leader who owns a small business recently used ten (10) members of her thirty-four (34) strong women's group to manufacture 30,000 COVID-19 masks for the government. She was supportive of the project that will bring more development to the communities that needs more paved roads and streetlights.

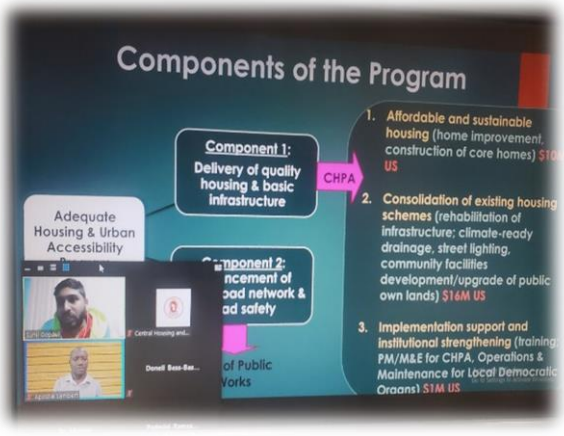
			She encouraged the CH&PA to repossess the unoccupied lots that are overrun by vegetation that houses many dangers. Ms. Constantine stated that the housing component of the project must be realistic to meeting the needs of the community.
Parfaite Harmony Action Group	21.03.2021	Ms. Halls, Resident & Chair 629 6652	No concerns for the project and welcomes the initiative including the housing support. The sidewalk can be painted in order to improve the looks and safety. The community needs equipment to assist in the clearing/cleaning of vegetation and welcomes any donation. Items required are weeding machines, small chainsaw, cutlass, wheelbarrows, grass rake, hoe, shovels etc.
Businesswoman & Resident	21.03.2021	Wendy Coleman 678 7409	The businesswoman supports the project that will make a tremendous difference to the community. She wishes to see streetlights installed along the new roads and the main road in the community. The light will help with community security as there are lots of robberies in the area. The NDC needs to clear the drains, bushes on empty lots and collect its taxes from residents in the area.
Resident & Stall Owner	02.03.2021	Jennifer Rose 658 5908	The resident who is also a roadside vendor supports the project and had no concerns for her vending as she is willing to move to accommodate any works within her selling area. The project will need to ensure that streetlights are installed on the main roads and around the school area. She is requesting a place to sell within the new secondary school compound when the school opens in 2021.
Businessman & Resident	02.03.2021	Timothy Persaud 611 4384	The businessman supports the project and expects to have more sales during and after the project. He believes that more drainage works are required in the area with the rainy season coming in two months. He is not concerned with the works and is willing to accommodate any works within his area even if he is inconvenienced for a short period. The businessman is asking for there to be a police outpost in the scheme to have a faster response to petty crimes and to discourage crimes.
Resident	01.03.2021	Sandy Mahadeo 686 4223	The resident is sharing a dwelling with her family in the scheme for the last four years and is very supportive of the project especially the drainage works for her area that floods with heavy rains. She is concerned with the empty lots that is heavily vegetated harbouring many dangers in the areas without streetlights. The high number of drug users poses a security threat that must be addressed by the government. She is urging that CH&PA to move quickly on the house lot process so she can have access to a plot of land to build her house.
Worker at the Special Needs School	01.03.2021	Ezaad Alli 665 1544	The worker is supportive of the projects and will like to see the internal roads widened along with concrete drains constructed. The area has many issues with the dumping of garbage that is indiscriminately burnt affecting the school and

			residents. There are security issues relating to the drug users who are guilty of committing petty crimes in the area. Residents with building materials, old vehicles and other items on the road shoulder will not be happy with the works requiring their items to be removed from the roadside.
Roadside Vendor & Resident	02.03.2021	Linden Burrows	The vendor supports the project and wants to know if any culvert will be installed at the corner his stall is located so he can move to a safe distance from the works. He is not against moving to facilitate development and believes that the project can lead to more business in the area. He is urging the authorities to install streetlights along the main roads in the area and around the schools.
Roadside Vendor & Resident	02.03.2021	Mrs. King 614 3890	The vendor is supportive of the project and does not foresee any negative impact to the community. She believes that the roads are too narrow and should be widened. She expects more traffic because of the project and thereby more sales. The community has many issues relating to burglary, vehicle theft, mugging and other petty crimes. There is urgent need for a police outpost in the area.
Resident, Westminster	02.03.2021	Nurse Thurma 625 3091	The nurse is very supportive of the project that will improve the living conditions of the residents. There are many issues in the community including the indiscriminate burning of garbage, empty lots that harbour mosquitoes and other pests, no street lighting, and high cost of transportation.
Resident, Westminster	02.03.2021	Celina Constantine	The resident is supportive of the project that will bring promised development to the housing scheme. The area is in dire need of paved roads and street lighting. There are numerous security concerns in the area with many instances of petty crimes being committed.

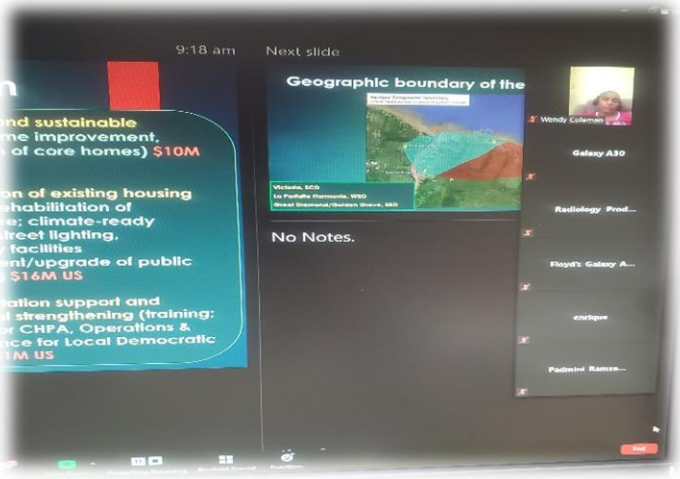
ANNEX 3: ESA Public Disclosure

Images of Participation & Public Engagement





Images 1 and 2: Presentation at Virtual Meetings



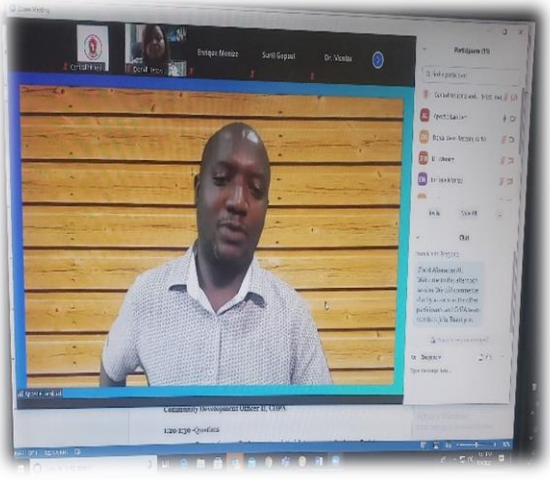


Image 3: Virtual Meeting with the Local Businesses

Image 4: Public Disclosure with NGOs

Images 5 & 6: CHPA Staff Engaging the Residents at Public Meeting

	
Image 7: ESA Consultant Presenting finding from the ESA	**Image 8: Resident participating in discussions**

Central Housing and Planning Authority Staff Attendance

Date	Name of Staff	Designation	Medium Used
4th May, 2021	Mrs. Donell Bess-Bascom Ms. Padmini Ramsamooj Ms. Carnesehia Pereira Mr. Sunil Gopaul	Deputy, Director Community Development Community Development Officer II Community Development Officer II Environment and Social Safeguard Coordinator	Virtual
20th May, 2021	Mrs. Donell Bess-Bascom Ms. Padmini Ramsamooj Ms. Carnesehia Pereira Mr. Sunil Gopaul Ms. Shennel Moore Mrs. Antanette Bennett	Deputy, Director Community Development Community Development Officer II Community Development Officer II Environment and Social Safeguard Coordinator Community Development Office III Senior Community Development Officer	Virtual
22nd May, 2021	Mrs. Donell Bess-Bascom Ms. Padmini Ramsamooj Ms. Carnesehia Pereira Mr. Sunil Gopaul Ms. Shennel Moore Ms. Amanda Thompson Mr. Ezekiel Manget Mr. Kishan Permanand Mr. Calvin Prince Mr. Odel August Mr. Rawle Garraway Mr. Marvin Thomas	Deputy, Director Community Development Community Development Officer II Community Development Officer II Environment and Social Safeguard Coordinator Community Development Office III Data Entry Clerk Data Entry Clerk System Analyst Office Assistant Driver Driver Driver	La Parfaite Harmony Primary School Face-to-Face Community Engagement

Stakeholder Attendance

Ministry of Housing and Water
Central Housing and Planning Authority
Community Development Department
Adequate Housing and Urban Accessibility Program
Attendance Register

-(Government Agencies, RDC & NDC)
Environment and Social Assessment (ESA)

Date: 2021/05/4th

Venue: Virtual Zoom Meeting - Morning Session

NO.	Name	Gender (M/F)	Address/Organization	Designation	Email Address	Telephone Number
1	Devendra Persaud	M	Ministry of Education - Reg#3	Regional Education Officer	reg3edu@gmail.com	264-2459 604-5492
2	Mohamed Ayube	M	Regional Democratic Council Reg#3	Regional Chairman	regional.chairman.reg.3@gmail.com	695-5384
3	Bibi Knights	F.	Guyana Power & Light Company	Commercial Manager	bknights@gplinc.com	264-3110 603-8067
4	Crystal Davis (Rep)	F	Guyana Telephone & Telegraph comp	Engineer	cdavis@gtt.co.gy	
5	Omesh Yogashur	M	Guyana Power & light Company Reg3	Network Manager	Oyogashur@gplinc.com	624-2033
6	Tennessee Vickene	M	Malgre Tout/Meer Zorgen NDC	Chairman	tennesseevickene2004@yahoo.com	253-3006/647-3850
7	Shanta Chunaman	F	Best Kliens/Pouderoyen NDC Reg3	Overseer	pouderoyenndc@gmail.com	264-2461/626-6568
8	Khalid Alladin	M		Environmental Specialist	khalidalladin@gmail.com	
9	Marvin Monize	M		Biologist	marvinmonze@yahoo.com	
10	Richard Persaud	M		Social Specialist	richardpersaud@yahoo.com	

Ministry of Housing and Water
Central Housing and Planning Authority
Community Development Department
Adequate Housing and Urban Accessibility Program
Attendance Register

Date: 2021/05/4th

Venue: Environment and Social Assessment (FBOs & NGOs) Virtual Zoom Meeting - Afternoon session

NO.	Name	Gender (M/F)	Address/Organization	Designation	Email Address	Telephone Number
1	Richard Persaud	M	-	Social Specialist	richardpersaud@yahoo.com	
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Ministry of Housing and Water
Central Housing and Planning Authority
Community Development Department
Adequate Housing and Urban Accessibility Program
Attendance Register

Environment & Social Assessment - Local Businesses

Date: 2021/08 20th

Venue: Virtual Zoom meeting - Morning session

NO.	Name	Gender (M/F)	Address/Organization	Designation	Email Address	Telephone Number
1	Phillippe Mangnan	M	Lot 1223 Independence Drive Hart Hunter #2 Hous Pharmacy	Businessman	mangnanp8@gmail.com	694-8036
2	Floyd Clement	M	Lot 601 Ondemeeming Ph1 Land and sea services	Businessman	floydclement@gmail.com	612-4171/625-4741
3	Bhagmania Khan	F	Lot 2669 Recht Door-Zee H&B Daughters Mini Mall & General Store	Businesswoman	sheilak866@gmail.com	694-0919
4	Mariann James	F	Lot 2842 La Parfaite Harmonie Radiology Products & Medical Supplies	Supervisor	marijames1608@gmail.com	668-5891
5	Jennifer Rose	F	Lot 2411 La Parfaite Harmonie	Stall owner	rosejennifer463@gmail.com	658-5908
6	Wendy Coleman	F	Lot 2824 La Parfaite Harmonie Coleman Variety store	Businesswoman	wendy_coleman41@yahoo.com	678-7409
7	Enrique Monize	M	Lot 2 Cove & John, ECD	Environmental & Geographic Information Systems Consultant	enrique.george@gmail.com	610-5602
8	Sunil Gopaul	M	CHPA	Environment & Social Safeguard Coordinator	sunilg@chpa.gov.gy	227-8886
9	Shennel Moore	F	CHPA	Community Development Office III	shennelm@chpa.gov.gy	227-3647 ext 218
10	Padmini Ramsarnoop	F	CHPA	Community Development Office III	padminir@chpa.gov.gy	227-3647 Ext 222

Ministry of Housing and Water
Central Housing and Planning Authority
Community Development Department
Adequate Housing and Urban Accessibility Program
Attendance Register

Environment & Social Assessment - Local Regulations

Date: 2021/05/20th

Venue: Virtual Zoom meeting - Morning Session

NO.	Name	Gender (M/F)	Address/Organization	Designation	Email Address	Telephone Number
1	Donell Bess-Jarvis	F	CHPA	Deputy Director Community Dev.	donell6@chpa.gov.gy	227-3647 ext 224
2	Ganesha Perina	F	CHPA	Community Development Officer II	ganesha@chpa.gov.gy	227-3647 ext 224
3	Antanette Bennett	F	CHPA	Senior Community Development Offi	antanette6@chpa.gov.gy	227-3647 ext 215
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Ministry of Housing and Water
Central Housing and Planning Authority
Community Development Department
Adequate Housing and Urban Accessibility Program
Attendance Register

Date: 22/05/2021

Venue: Parfaite Harmony Primary School

NO.	Name	Gender (M/F)	Address/Organization	Designation	Email Address	Telephone Number
1	Maradona Allicock	M	2180 Caparaich Harmony			6425444
2	Margaret Jadine	F	347 Recht-Door zee			667 7269
3	Tessa Garraway	F	1849 Onderneeming			675 2394
4	Patricia Barton	F	1855 Onderneeming			646 4706
5	Shawn Grant	F	Recht-Door-Zee			
6	Keshaw & Mitchelle Rogers	M	767 Recht Door-Zee			676-7027 678-5441
7	Odetta Bacon	F	404 Onderneeming			467-7282
8	Shola Bobb	F	Lot 770 Recht-Door-Zee			659-7150
9	Fabian David	M	Lot 520 onderneeming			677 4153
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Ministry of Housing and Water
Central Housing and Planning Authority
Community Development Department
Adequate Housing and Urban Accessibility Program
Attendance Register

Environment & Social Assessment - Residents

Date: 2021/05/22nd

Venue: La Payate Hamonie Primary School

NO.	Name	Gender (M/F)	Address/Organization	Designation	Email Address	Telephone Number
1	Victor Laurence	M	6263 ondemeeming			688-8634
2	Ann Rodrigues	F	1983 ondemeeming			601-6625
3	Dawn-Collins-Kellman	F	554 ondemeeming			644-3295
4	Jacklene Dean	F	360 ondemeeming			
5	Mary Whittington	F	822 ondemeeming			678-2276
6	Camilla Harris	F	686 Recht-Door-zee			676-8080
7	Patricia Smithen	F	242 Recht Door-zee			603-8174
8	Harry Perreira	M	496 Recht-Door-zee Harry Perr			664-2257
9	Suzanne Benjamin	F	278 Recht-Door zee			690-5995/650-2234
10	Debra Gill	F	278 ondemeeming			673-3217

Ministry of Housing and Water
Central Housing and Planning Authority
Community Development Department
Adequate Housing and Urban Accessibility Program
Attendance Register

Date: 22/05/2021 Venue: Parfaite A Harmonie

NO.	Name	Gender (M/F)	Address/Organization	Designation	Email Address	Telephone Number
1	Joylene Joseph	F	3838 West Minister			667 2241
2	Andre Abrams	M	3841 West Minister			694 6152
3	Quanza Verwayne Abrams	F	11 11			694 6152
4	Derrick George	M	753 West Minister			672 1121
5	Abena Joseph	F	579 Rechtzeit Doors			692 5577
6	Evadnee Joseph	F	11 11			661 9940
7	Simone Cornelius	F	761 Parfaite Harmony			687 5671
8	Yonette Maxwell	F	582 Onderneeming			694-2569
9	Adl Harding	M	1939 Onderneeming			668 4982
10	Comal Singh	M	568 Rechtzeit Door 2nd			698-5755

Ministry of Housing and Water
Central Housing and Planning Authority
Community Development Department
Adequate Housing and Urban Accessibility Program
Attendance Register

Date: 22/05/2021

Venue: Parfaite Harmonie

NO.	Name	Gender (M/F)	Address/Organization	Designation	Email Address	Telephone Number
1	Lavern Adonis	F	1992 West Minister			694 2772
2	Zena La Rose	F	1604 ~~Par~~ West Minister			664 4017
3	Eleen Ramharan	F	2799 Parfaite Harmony			688 95 45
4	Charles Singh	M	2799 Parfaite Harmony			697 9202
5	Shara Lambert	F	962 Parfaite Harmony			666 63 63
6	Yvonne Shaw	F	4013 Pl. West Minister			647 2457
7	Audrey Thomas	F	266 Parfaite Harmony			676 4175
8	Hayanna Baksh	M	4223 West Minister			695 5569
9	Eulah Mc Curdy	F	West Minister 2200 Parfaite Harmony			615 1802
10	Kathlene Somaran	F	4229 West Minister			691 7516

Ministry of Housing and Water
Central Housing and Planning Authority
Community Development Department
Adequate Housing and Urban Accessibility Program
Attendance Register

Date: 2021/05/22nd

Venue: Public Disclosure Meeting Environment & Social Assessment - Residents La Parfaite Harmonie Primary School

NO.	Name	Gender (M/F)	Address/Organization	Designation	Email Address	Telephone Number
1	Donell Bess Bascom	F	CHPA	Deputy Director Community Development	donellb@chpa.gov.gy	227-3647 ext 224
2	Sunil Gopaul	M	CHPA	Environment & Social Safeguard Coordinator	sunilg@chpa.gov.gy	227-8856
3	Shennel Moore	F	CHPA	Community Development Officer III	shennelm@chpa.gov.gy	227-3647 ext 218
4	Amanda Thompson	F	CHPA	Data Entry Clerk	amandat@chpa.gov.gy	
5	Padmini Ramsammy	F	CHPA	Community Development Officer III	padminir@chpa.gov.gy	227-3647 ext 222
6	Ezekiel Manget	M	CHPA	Data Entry Clerk	ezekielm@chpa.gov.gy	
7	Camesha Pereira	F	CHPA	Community Development Officer II	cameshap@chpa.gov.gy	227-3647 ext 218
8	Kishan Permanand	M	CHPA	(System Analyst) Information Technology Officer	kishanp@chpa.gov.gy	227-3647 ext 223
9	Enrique Monize	M	87 a Cove & John, ECD	Environmental & Geographic Information Systems Consultant	enrique.george@gmail.com	610-5602
10	Richard Persaud	M		Social Specialist	richardpersaud@yahoo.com	

Ministry of Housing and Water
Central Housing and Planning Authority
Community Development Department
Adequate Housing and Urban Accessibility Program
Attendance Register

Public Disclosure Meeting
Environment & Social Assessment - Residents

Date: 2020/05/22nd

Venue: La Fargate Harmonie Primary School

NO.	Name	Gender (M/F)	Address/Organization	Designation	Email Address	Telephone Number
1	Calvin Prince	M	CHPA	Office Assistant		226-1806
2	Harvin Thomas	M	CHPA	Driver		225-4810 &t 213
3	Odel August	M	CHPA	Driver		225-4810 &t 213
4	Ramole Garraway	M	CHPA	Driver		225-4810 ext 213
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