TRINIDAD AND TOBAGO URBAN REGENERATION AND REVITALIZATION PROGRAMME (TT-L1056 and TT-L1057)

INFRASTRUCTURE DEVELOPMENT WORKS AT: SAHODEEN TRACE, VEGA DE OROPOUCHE, SANGRE GRANDE BOIS BANDE, SANGRE GRANDE; and FACTORY ROAD, DIEGO MARTIN

ENVIRONMENTAL AND SOCIAL ASSESSMENT APPENDIX A: ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

LAND SETTLEMENT AGENCY

This Appendix contains the Environmental and Social Management Plan (ESMP) for the proposed Infrastructure Development Works at Sahodeen Trace, Vega de Oropouche, Sangre Grande (see figure a-1); Bois Bande, Sangre Grande; and Factory Road, Diego Martin. This plan presents, in summary format, the actions necessary to mitigate and monitor the potential adverse impacts of the project as identified and discussed in the corresponding Environmental and Social Assessment (ESA) Report. This ESMP consists of the following subsections:

- General Information;
- Management Structures;
- Records, Reporting and Revision;
- Actions and Procedures; and
- Summary of Monitoring.

A.1 GENERAL INFORMATION

A.1.1 Background and Approach

Project Description

The Government of Trinidad and Tobago (the Government) requested a Loan for an Urban Upgrading and Revitalization Program with an amount of US$50 million. While the operation will finance a needed extension of informal settlement upgrading and affordable housing programs implemented under the recently concluded Neighbourhood Upgrading Program - NUP (2469/OC-TT), this new loan, the fourth successive IDB-financed operation, will prioritize upgrading in the main urbanized corridors and also contribute to the revitalization of urban centers, as part of a strategy to foster a pattern of more sustainable built development.

Objectives

The Urban Upgrading and Revitalization Program is structured around two modalities: TT-L1056, a Multiple Works Program (MWP) that finances urban residential infrastructure and urban regeneration of public spaces; and TT-L1057, a Specific Investment Project (ESP) which finances affordable housing subsidies and strengthening of housing and urban development sector stakeholders' capacities. The general objective of the program is to contribute to the improvement of the quality of the urban built environment. The specific objectives of TT-L1056 are to: (i) improve the habitability in urban settlements on State-owned lands; and (ii) improve the physical quality and economic performance of urban public spaces. The specific objectives of TT-L1057 are to: (iii) enhance housing conditions for low income households; and (iv) strengthen the capacity of supply-side stakeholders to satisfy effective housing demand and urban development needs. The first component of TT-L1056 is:

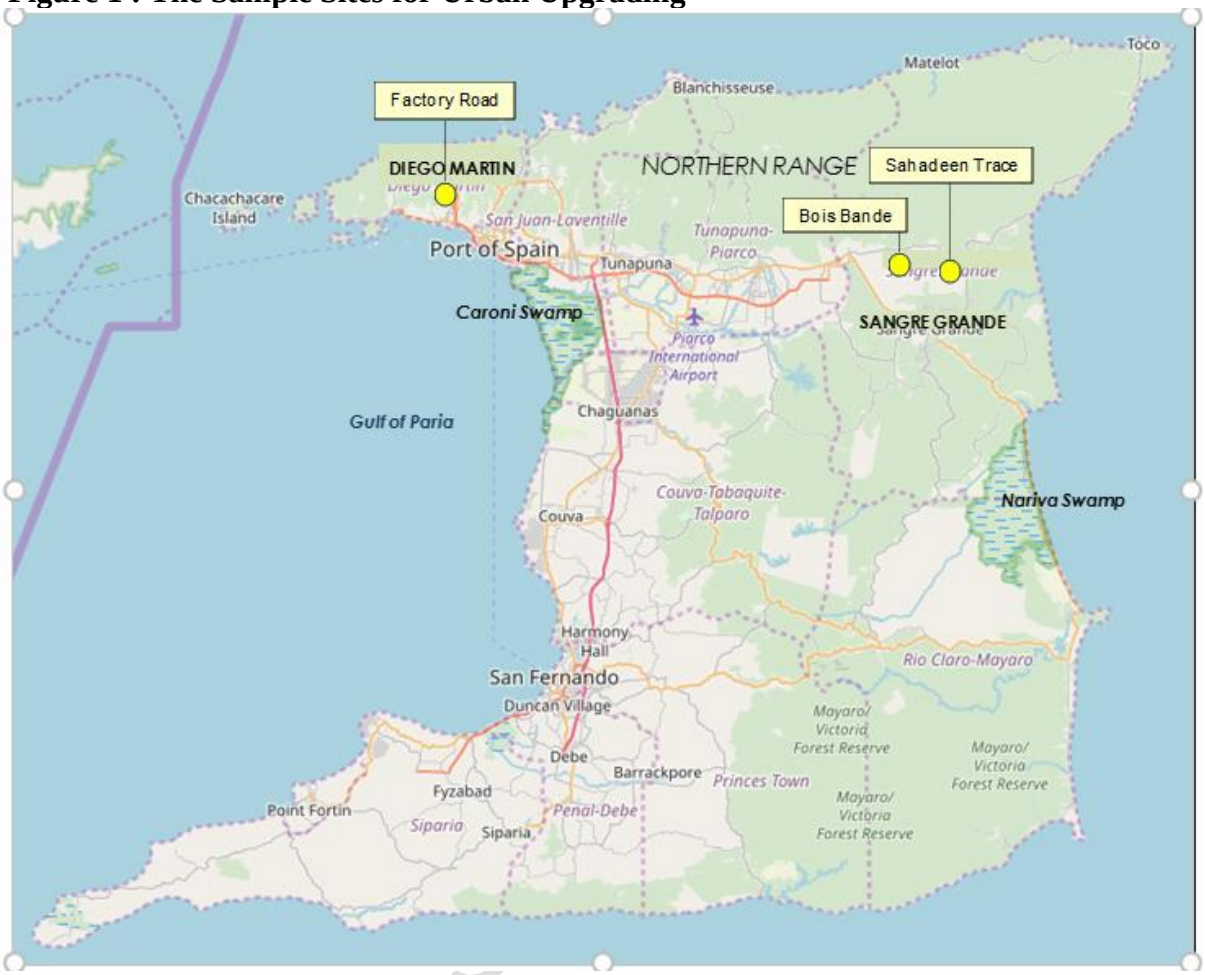
Urban Residential Infrastructure. This Component will finance a cohort of independent, urban residential infrastructure sub-projects of similar scope, to either upgrade living conditions in informal settlements on State lands or to develop, planned, residential sub-divisions in well-located State-owned greenfield sites, for systematic allocation to low-income households. Locationally, the focus will be on the main urban corridors, and on sites not previously upgraded. This component's specific investments will include: (i) construction or upgrading of resilient site infrastructure, including drainage systems, waste-water management systems, road and accessibility systems, streetlights, potable water supply, fire-hydrants and social infrastructure, such as community centers and recreational facilities (with

gender-sensitive designs), when appropriate; (ii) solid-waste management, including installation of recycling collection points and receptacles within upgraded settlements; and (iii) regularization of electricity supply. Infrastructure will be designed to cope with anticipated climate change effects and common natural hazard threats. Community labor, including women and at-risk young men, would be engaged in construction activities where appropriate. While sites along the main urban corridors will be subject to the comprehensive infrastructure upgrades described above, in densely populated, urban, hillside communities, early and emergency works will be the focus, primarily improving accessibility to homes through paved pathways, stairways and railings, as well as alleviating urgent drainage and land slippage challenges.

The representative Multiple Works Program sample for this component comprises three sites in the highly-urbanized East-West corridor, including two sites (Shadeen Trace and Bois Bande C) in the Sangre Grande region which saw very significant population growth between the last two censuses. The third sample site is Factory Road in the Diego Martin region which is home to some of the nation's largest informal settlements,[1] and is representative of sites that will receive the more limited treatment of early and emergency infrastructure works.

[1] According to LSA's 2018 mapping and survey of informal settlements on State lands.

Figure 1 : The Sample Sites for Urban Upgrading



Ilesi Consultants Limited prepared an Environmental and Social Assessment (ESA), and this ESMP serves as an action document arising from that ESA. The aim is to guide all parties involved in the proposed works, so that they fully understand the environmental and social mitigation measures, as well as the monitoring which must be done. The objective is to ensure that mitigation and monitoring are undertaken in a timely fashion.

Information from the LLESI ESA and the draft ESMP prepared by Ecoengineering for another subproject in the proposed loan (Renovation of Eastside Plaza), were the primary inputs to this ESMP.

A.1.2 Format of Procedures

Guidance on the implementation of mitigation measures will be presented in a series of Procedures. These list the following:

- The potential impact to be addressed,
- Mitigation measures to minimize or eliminate the impact,
- Person(s) responsible for implementing the mitigation measures,

- Timing for implementing the mitigation measures,
- Specialized equipment or material necessary to implement the mitigation measures, and
- Frequency of monitoring/verification,
- Reporting of any monitoring which may be required, and/or concerns or issues which may arise.

A.2 MANAGEMENT STRUCTURES

To understand the assignment of responsibilities in the various procedures, it is necessary to document the organization structures during the construction phase.

A.2.1 Construction Phase

Figure A-2 shows the proposed organization structure for the management of the construction phase of this development. The roles and responsibilities of the various parties are discussed below.

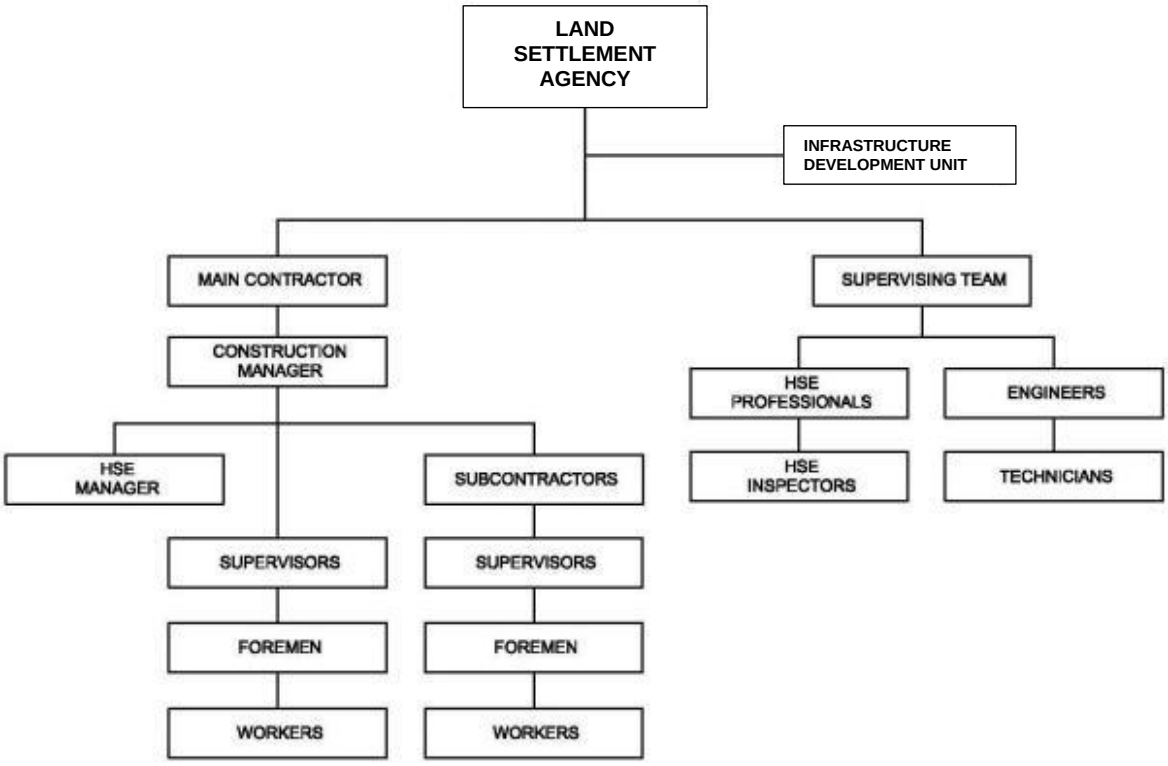


FIGURE A-2: ORGANIZATION CHART (CONSTRUCTION PHASE)

A.2.1.1 LAND SETTLEMENT AGENCY (Developer)

The construction of this project will be undertaken with the Land Settlement Agency fulfilling the role of "the Developer". LSA will make the decision to proceed with construction and will hire the Prime Contractor (see Section A.2.1.3) and a Supervising Team (see Section A.2.1.4). LSA will have the overall responsibility of overseeing all aspects of the construction phase and will also be responsible for liaising with the Environmental Management Authority regarding compliance with the terms and conditions listed in the Certificate of Environmental Clearance.

A.2.1.2 Prime Contractor

The Prime Contractor will be responsible for undertaking the proposed renovation works in accordance with the design drawings and specifications. The contractor is committed to comply with the ESMP. The Prime Contractor's team will be headed by a Construction Manager, who will manage the work of his/her staff. The Contractor's Health, Safety and Environment (HSE) Manager will report to the Construction Manager. Each team on the Contractor's staff will be headed by a Construction Supervisor, who will manage the work of foremen, skilled construction workers and laborers. The Contractor's HSE Manager will assist the Construction Manager in managing the environmental and occupational health and safety aspects of the contract. All of the posts discussed in this sub-section are a normal part of a contractor's team, and therefore would not represent a separate cost to the LSA Upgrading Project.

A.2.1.3 Supervising Team

The Supervising Team will fulfill the role of "The Engineer" as described in the FIDIC Form of Contract. That is, this team will represent LSA in the day-to-day oversight of the construction works. It will include HSE Professional(s) and HSE Inspector(s) to verify that the mitigation measures are effectively implemented during the construction phase. An HSE Professional and HSE Inspectors are now a normal part of a supervising team, and therefore would not represent a separate cost to the LSA Upgrading Project. The supervision team will incorporate social and environment specialists to report on compliance with the ESMP.

A.2.2 Operation Phase

LSA is currently operated under its own Board of Directors and Management, who are responsible to the Permanent Secretary of the Ministry of Housing and Urban Development and to government regulatory agencies (including the EMA). This arrangement will continue when the Infrastructure development Works is completed.

A.2.3 Competence and Training

This section specifies the competence and training required for key HSE personnel on this project. During construction, key HSE personnel will include the Prime Contractor's HSE Manager and the HSE Professional and HSE Inspectors on the Supervising Team. During operation, the key HSE person will be the officer or manager of East Side Plaza who has been

assigned responsibility for HSE matters. Typical qualifications for these personnel are as follows.

A.2.3.1 Prime Contractor's HSE Manager

This manager will typically have a degree in Health, Safety and Environmental Management, and at least five (5) years of experience in managing and implementing relevant mitigation measures and monitoring. Experience in the preparation and implementation of Environmental Management Plans and Emergency Response Plans would be a key asset.

A.2.3.2 Supervising Team's Personnel

The HSE Professional would typically have a post graduate degree in Health Safety and Environmental Management with 7 years of experience monitoring the work of contractors. Experience in the preparation of Environmental, Health and Safety Management Plans would be an asset.

HSE Inspectors would typically have technician-level training in Occupational Safety and Health as well as Environmental Protection. These Inspectors would also typically have a minimum of 3 years of experience in monitoring the work of contractors on construction projects.

A.3 RECORDS, REPORTING AND REVISION

This section describes records to be kept in implementing this ESMP, reporting relationships and the periodic review and revision of the ESMP Document.

A.3.1 Record Keeping

A.3.1.1 Construction Phase

During the construction works, a variety of records will have to be maintained onsite by the Prime Contractor's HSE Manager. These include:

- A register of accidents and incidents which may occur during the construction works, and documentation of the responses.
- A register of spills and leaks of hydrocarbons which may occur, and documentation of clean-up.
- A register of public complaints arising from impacts such as noise, air quality, traffic, damage to infrastructure, loss of access, and health and safety concerns; and documentation of the responses.
- A register for documenting how frequent portable toilets and garbage bins are emptied, including the haulage and disposal manifests (records).
- A register of other types of waste collected and disposed of (including hazardous wastes) and manifests of removal from site, treatment and disposal.
- A register documenting the maintenance of vehicles and equipment.

- Reports of any environmental testing done by the Prime Contractor to satisfy requirements of the contract or for quality control.

In addition, the HSE Professional on the Supervising Team will keep the following records:

- A register of accidents and incidents noted by the Supervising Team, and notes on the Prime Contractor's responses.
- A register of spills and leaks of hydrocarbons noted by the Supervising Team, and notes on the Prime Contractor's clean-up efforts.
- A register of public complaints received directly by the Supervising Team, and documentation that these were brought to the attention of the Prime Contractor.
- Reports of all inspections undertaken by the Supervising Team, highlighting any non-conformances that were observed and documentation that these non-conformances were brought to the attention of the Prime Contractor.
- Reports of any environmental testing done by the Supervising Team to satisfy requirements of the CEC or for quality verification.

A.3.1.2 Operation Phase

During the operational phase, the officer or manager of LSA who has been assigned responsibility for HSE matters will similarly need to keep the following records:

- A register of accidents and incidents which may occur at the facility, and documentation of responses.
- A register of public or resident complaints pertaining to HSE matters, and documentation of the responses.
- A register for documenting how frequent the area is maintained (including cleaning of garbage bins, maintenance of air conditioning units, servicing of elevators, etc.).
- Reports of any environmental testing done to satisfy requirements of the CEC or for management of the facility.

A.3.2 Reporting

A.3.2.1 Construction Phase

The chain of reporting during the construction phase will be as follows:

- The Prime Contractor's HSE Manager will report any HSE incident or non-compliance to the Construction Manager immediately through verbal communication followed by a written report.
- The HSE Professional on the Supervising Team will simultaneously report the HSE incident or non-compliance to the leader of the Head of the Supervising Team

- The Construction Manager will report the HSE incident non-compliance to LSA, along with documentation of steps taken or to be taken to address the problem.

- LSA will report the HSE incident or non-compliance and response to the EMA in accordance with the requirements of the CEC, or to other regulatory agencies with jurisdiction in accordance with their rules and regulations.

- Reports on testing will be forwarded to LSA by the Prime Contractor or the Supervising Team, and these will be transmitted onward to the EMA in accordance with the requirements of the CEC, or to other regulatory agencies with jurisdiction in accordance with their rules and regulations.

A.3.2.2 Operation Phase

During the post-construction phase, the management of LSA will be responsible for reporting HSE Incidents and response, HSE Non-compliance and corrective actions and HSE Monitoring reports to the EMA in accordance with the requirements of the CEC, or to other regulatory agencies with jurisdiction in accordance with their rules and regulations.

A.3.3 Corrective / Preventative Actions

The following sub-sections describe the approach to be taken if any occur on this project, either during the construction phase or during the operation phase.

A.3.3.1 Construction Phase

If any HSE Incident or non-compliance is noted during the construction phase, it will be reported to the Construction Manager by the Prime Contractor's HSE Manager or the HSE Professional on the Supervising Team. The Construction Manager will then consult with these two persons, other construction personnel and specialists outside the organization chart (if required) to devise an appropriate response strategy. Instructions will then be given to implement this strategy, either by on-site personnel of the Prime Contractor and subcontractors or by specialists hired specifically for this purpose. With regard to timing:

i. In the case of acute environmental damage or threat to human health, the Construction Manager will immediately proceed with the necessary corrective and/or prevention actions. This may require that all construction works be stopped, to protect workers or to facility emergency actions. The decision to stop work will be taken by the Construction Manager.

ii. For non-emergency works, the Construction Manager will consult with the Head of the Supervising Team before implementing the corrective actions, in accordance with the contract.

Implementation of these corrective measures will be observed by the HSE Professional and Inspectors on the Supervision Team. Reporting will be as described in Section A.3.4, above.

A.3.3.2 Operation Phase

During the operation phase, the Manager of LSA will be responsible for determining and implementing corrective and/or preventative actions in response to any HSE Incidents or Non-compliances which are reported to her/him. Reporting will be as described in Section A.3.4, above.

A.3.4 Audit and Review of the ESMP

This ESMP will be reviewed and updated on the following occasions:

i. Prior to the start of construction works, to allow review and comments by the Prime Contractor. It will then be issued as "Final for Construction".

ii. After any HSE Incident or Non-compliance has occurred and been responded to, the adequacy of the ESMP will be audited and it will be amended as required.

iii. At 3-year intervals during the operation phase of the upgraded Plaza, the effectiveness of this ESMP will be audited and it will be amended as required.

Each amended version of this ESMP will be assigned a sequential revision number (Revision 1, Revision 2, etc.), and older versions of the ESMP document will be retrieved when revised versions are circulated. If the preparation of this ESMP is a requirement of a CEC issued for this project, copies of amended versions must be submitted to the EMA.

A.4 ACTIONS AND PROCEDURES

This section summarizes actions to be taken Pre-Construction, During Construction and Post-Construction, with procedures to be followed in the latter two cases. Costs are included where they represent a separate cost to this project, but not where the mitigation measures or monitoring actions are considered a normal part of the work of the contractor or the supervising team.

A.4.1 Pre- Construction

These sets of actions must be undertaken prior to the start of construction work:

- Ensure that Design Engineers maintain the standards set by the Regulatory Agencies in their design;
- Contractor's Plans (see Section A.4.1.2);
- Consultation with Utility Providers;
- Baseline noise monitoring be conducted to determine the background noise levels within the study area;
- In the event that residents are to be relocated to another suitable lot, ensure that lot is safe and there are adequate amenities and security; and

- If compensation is to be paid for temporary relocation, levels and recipients must be determined.

A.4.1.1 Design Plans

Final designs will be defining considering minimizing impacts, particularly those causing economic displacement; In order to maintain the community of Sahodeen Trace, the Design Engineers will need to hold community consultations to ensure that the proposed works are undertaken in such a manner so as not to adversely impact the existing community.

A.4.1.2 Contractor's Plans

During the construction phase, the Prime Contractor must comply with the requirements of this ESMP. In addition, before beginning construction work, the Prime Contractor must prepare three management plans for approval by LSA:

i. An Emergency Response Plan,

ii. A Traffic Management Plan, and

iii. A Waste Management Plan.

iv. Health and safety for workers and community

If a CEC is issued for this project, these plans may also be subject to review and approval by the EMA.

A.4.1.2Consultation with Utility Providers

Also prior to the start of construction, the management of LSA will be responsible for consulting with utility providers in order to:

- verify the location of existing infrastructure (potable water lines, sewers and electricity lines) in proximity to the proposed site, and

- determine whether there are any special conditions to be observed during construction to protect these utilities.

POTENTIAL ADVERSE SOCIAL AND ENVIRONMENTAL IMPACTS OF THE THREE PROJECTS

The Table below summarized the Social and Environmental Impacts that are common to the three project sites.

	SOCIAL IMPACTS
	Pre-construction and Design Phase
1	Limited resident participation due to fear that the project will lead to eviction, displacement or new/higher taxes
2	Social tensions with new squatters with knowledge of the impending project who opportunistically occupy the project site
3	Social tensions among different groups within the community who may advance competing development agendas and priorities, and with some residents who may oppose the proposed development design e.g. because it reduces the size of the plot they currently occupy or places communal infrastructure (e.g. detention pond) close to their homes
	Construction Phase
4	Social tensions and obstruction of works caused by residents demands for use of local labor
5	Extortion and security threats to the contractor by persons who strongly oppose the project or who seek to illicitly profit off of it
6	Obstruction of works by opportunistic new squatters who may erect structures in the infrastructure Rights of Way or proposed open/public areas, or on lots identified for communal facilities
7	Impeding of civil works and lotification caused by an increase in unregulated home expansion and renovations, including boundary structures, garages etc.
8	Occupational health and safety risks for workers engaged in construction
9	Safety/accident risks for residents, especially young children, associated with increased vehicular traffic, heavy equipment operation, and building materials storage on the site
10	A few households may be required to adjust their plot boundaries or relocate within the site in order to implement a rational and sustainable land use plan for the site, which can be resisted by those squatters affected.
11	Unforeseen delays to the works, in the form of adverse weather or unforeseen environmental factors, which can lead to social dissent.
	Post-Construction and Operation Phase
12	Social tensions between existing residents and new squatters attracted to the site by the improved living conditions, and who occupy vacant sites, public areas and plots identified for communal facilities

	ENVIRONMENTAL IMPACTS
	Pre-construction and Design Phase
	None identified (limited or no impact as these activities will not directly affect the communities during these phases)
	Construction Phase
13	Flooding and land slippage risks caused by surface water diversion due to earthworks and associated loss of vegetation
14	Failure of the Contractor to implement key mitigation measures to reduce the effects of excessive storm water runoff that can lead to flooding or contamination through siltation of the downstream water course.
15	Impaired ambient air quality due to high levels of dust and gaseous particles from construction activities and equipment
16	Environmental risks which can lead to heath concerns among the squatters during the works. These can be excessive dust, mud, noise.
17	Vibration and Noise pollution caused by earthworks and construction equipment
18	Exacerbated flooding in low lying parts of the site as well as downstream of the site, due to higher rates of stormwater runoff due to paving of roads and drains
19	Health and safety risks for residents and workers associated with improper handling of construction waste
20	Surface water contamination as a result of sediment run off from exposed soils
	Post-Construction and Operation Phase
21	Compromised functioning of built infrastructure due to inadequate maintenance e.g. brush encroaching on drains may lead to stagnant water and flooding
22	Health and drowning risks associated with ponding of water in inadequately secured detention/retention ponds and deep drains
23	Flooding or land slippage risks for neighbors due to indiscriminate or poorly designed on-plot drainage associated with increased potable water supply to homes
24	Soil instability caused by Clearing and Grubbing of the site which can lead to land slippage and potential structural issues to homes that occupy the site.

MITIGATION MEASURES AND ARRANGEMENTS FOR SOCIAL IMAPCTS

	POTENTIAL IMPACT	**Pre-construction Phase Social Impacts: Limited resident participation due to fears about the project; Social tensions with new squatters; Social tensions among different groups within the community; and Post-construction impact: Social tensions between existing residents and new squatters attracted to the site by the improved living conditions**
MITIGATION MEASURES		• Executing Agency conducts meaningful consultations with the residents, explaining the purpose of the project • Executing Agency briefs the Member of Parliament and Regional Corporation on the Project • Community Development Officer assigned to each site • Community Development Officer visits the site weekly, reinforces the purpose of the Project, listens to resident views, and provides clarifications • Residents to elect/nominate representatives to a Community Council for each site • Executing Agency and Community Council conduct bi-monthly Community Meetings • LSA to report new squatting/encroachment to the Regional Corporation and Commissioner of State Lands on a monthly basis
ACTION BY		• Land Settlement Agency
TIMING		• Throughout the pre-construction phase
MONITORING / VERIFICATION		
HOW / BY WHOM/, WHAT / WHERE/, FREQUENCY		• LSA to delegate supervisory staff to verify level of information sharing with residents on a monthly basis (quarterly for post-construction phase) • LSA Management to receive and discuss written updates from its Community Development Officers assigned to the project sites on a bi-weekly basis (quarterly for post-construction phase) • LSA Management to brief PMCEU Director at monthly meetings (quarterly for post-construction phase)
REPORTING		• LSA Community Development Officers to produce bi-weekly Status Reports summarizing feedback from the community and clarifications provided • LSA to produce bi-monthly Minutes of Community Meetings in Project sites • LSA C.E.O to produce monthly written report on new squatting on project sites with less formal communications in the interim according to the urgency and severity of the issue

COST	
Preparing the Status Reports	• The cost of Community Development Officers is approximately TT$15,000 per month but will be absorbed in the recurrent budget of the LSA. • The costs of conducting Community Meetings to be kept nominal by choosing free public venues within the site and utilizing Public Address equipment owned by the LSA

	POTENTIAL IMPACT	**Construction Phase Social Impacts: Social tensions over use of local labor; and Extortion and security threats**
MITIGATION MEASURES		• Executing Agency conducts meaningful consultations with the residents, assesses residents' skills base, and explains the opportunities for use local labor • Executing Agency arranges or coordinates training for some residents to develop or sharpen skills relevant to the project • Community Development Officer visits the site weekly, and monitors the situation • Executing Agency and Community Council conducts Community Meetings monthly (or more frequently as needed) at which labor and contractor security issues are discussed; external stakeholders such as Regional Corporation, police, and Member of Parliament to be invited • Civil Works contract negotiations to include strong representation for use of local labor by contractors or for direct use of local labor, as appropriate • LSA and Contractor to report any security threats to the Police • Contractor to be accompanied by security escorts as needed
ACTION BY		• Land Settlement Agency and Contractor
TIMING		• Throughout the construction phase
MONITORING / VERIFICATION		
HOW / BY WHOM/, WHAT / WHERE/, FREQUENCY		• PMCEU and LSA delegate supervisory staff to verify use of local labor and security threats • LSA Management to receive and discuss written updates from its Design and Supervision Engineering Consultants assigned to the project sites on a bi-weekly basis (or more frequently as needed) • LSA Management to brief PMCEU Director at monthly meetings

REPORTING	• Briefings from LSA's Design and Supervision Engineering Consultants • LSA to produce monthly Minutes of Community Meetings in Project sites • Police Reports of any security threats
COST	
Security Escorts and Community Meetings	• The cost of Security escorts for contractors is normally included in the contractor's contingency budget (typically 10% of the contract sum) or in exceptional cases may be borne by the LSA • The costs of conducting Community Meetings to be kept nominal by choosing free public venues within the site and utilizing Public Address equipment owned by the LSA

	POTENTIAL IMPACT	**Construction Phase Social Impacts: Obstruction of works by opportunistic new squatters; and Impeding of civil works and lotification caused by an increase in unregulated home expansion and renovations**
MITIGATION MEASURES		• Executing Agency conducts meaningful consultations with the residents, and emphasizes the adverse consequences of any unregulated expansions/renovations and new squatting, and the need for residents to alert authorities as soon as it is observed • Site selection eligibility criteria under the Loan to preclude conducting upgrading in sites with more than 70% vacant land after accounting for proposed hard infrastructure • Contractor to immediately report any new encroachment and its impacts to the LSA's Design and Supervision Engineering Consultants • LSA's Design and Supervision Engineering Consultants to immediately report any new encroachment and its impacts to the LSA • LSA to report new squatting/encroachment to the Regional Corporation and Commissioner of State Lands on a monthly basis, with less formal communications in the interim according to the urgency • Contractor to clearly demarcate all infrastructure Rights of Way • LSA to clearly demarcate lots for public/communal purposes (e.g. site for a daycare facility) and to ensure residents know these locations
ACTION BY		• Land Settlement Agency and Contractor
TIMING		• Throughout the construction phase
MONITORING / VERIFICATION		

HOW / BY WHOM/, WHAT / WHERE/, FREQUENCY	• LSA delegates field staff to detect and report new encroachment as soon as it is initiated • LSA Management to discuss feedback on new squatting from its field staff and its Design and Supervision Engineering Consultants on a weekly basis (or more frequently as needed) • LSA Management to brief PMCEU Director at monthly meetings
REPORTING	• Briefings from LSA's Design and Supervision Engineering Consultants • LSA to produce monthly Minutes of Community Meetings in Project sites • LSA C.E.O to produce monthly written report on new squatting on project sites with less formal communications in the interim according to the urgency and severity of the issue
COST	
New Squatting Monitoring Reports and Communications	• The cost of an LSA (Community Development Officer) field staff is approximately TT$15,000 per month but the task of monitoring any new squatting will be absorbed in the LSA's recurrent budget • The costs of conducting Community Meetings to be kept nominal by choosing free public venues within the site and utilizing Public Address equipment owned by the LSA • Cost of demarcation and signage for infrastructure Rights of Way to be included in contractor's costs

	POTENTIAL IMPACT	**Construction Phase Social Impacts: Occupational health and safety risks for workers; and accident risks for residents**
MITIGATION MEASURES		• Executing Agency and Community Council conducts Community Meetings monthly (or more frequently as needed) at which information on pending works and the work schedule are clearly shared with residents; Contractor's representative participates in this meeting to help answer pertinent questions • Contractor installs clears signage and adequate temporary lighting • Contractor properly secures all equipment, machinery, and materials • Use of proper working gear for health and safety to be mandated by contract • Temporary barriers and signage to be installed around dangerous features (e.g. excavated ditch for a pond)
ACTION BY		• Contractor
TIMING		• Throughout the construction phase
MONITORING / VERIFICATION		
HOW / BY WHOM/, WHAT / WHERE/, FREQUENCY		• LSA's Design and Supervision Engineering Consultants to monitor contractor compliance and Report to LSA on a weekly basis
REPORTING		• Briefings from LSA's Design and Supervision Engineering Consultants • LSA to produce monthly Minutes of Community Meetings in Project sites
COST		
Health and Safety Equipment, Lighting, Barriers, Signage and Communications		• The cost of health and safety equipment, temporary barriers and lighting, and demarcation and signage to be included in Contractors financial proposal • The costs of conducting Community Meetings to be kept nominal by choosing free public venues within the site and utilizing Public Address equipment owned by the LSA

	POTENTIAL IMPACT	**Construction Phase Social Impacts: A few households may be required to adjust their plot boundaries or relocate within the site in order to implement a rational and sustainable land use plan for the site**
MITIGATION MEASURES		• Executing Agency prepared the land use plan through a highly consultative process; • Executing Agency and contractor seeks to minimize the need for any relocations, including exploring alternative viable alignments of infrastructure • Executing Agency conducts meaningful consultations and community meetings with the residents, explaining the need and rationale for a limited number of relocations and boundary adjustments within the site • Executing Agency prepares a Resettlement Plan and a Livelihoods restoration plan if applicable • Executing Agency facilitates and finances a limited number of cases of relocation and reconstruction within the site, striving to maintain social network proximity and equivalent or superior access to livelihood
ACTION BY		• Land Settlement Agency and Contractor
TIMING		• Throughout the construction phase
MONITORING / VERIFICATION		
HOW / BY WHOM/, WHAT / WHERE/, FREQUENCY		• LSA Management to brief PMCEU Director at monthly meetings • MHUD/PMCEU to independently verify the number and manner of any relocations
REPORTING		• Resettlement Plan (RP) • Livelihoods Restoration Plan (LRP) - if applicable • LSA Management Reports on any relocations and on application of RP and LRP
COST		
Relocation and Communications		• The cost of relocating a household is approximately TT$40,000 (timber construction) and will be a project cost eligible to be financed by the loan • The costs of conducting Community Meetings to be kept nominal by choosing free public venues within the site and utilizing Public Address equipment owned by the LSA

MITIGATION MEASURES AND ARRANGEMENTS FOR ENVIRONMENTAL IMAPCTS[2]

A.4.2.1.1	POTENTIAL IMPACT	Impaired Air Quality
MITIGATION MEASURES		< Require the Contractor to prepare and implement a Traffic Management Plan prior to the start-up of any works, which will reduce emissions from slow-moving vehicles in congested traffic. < Cover waste materials on all transport vehicles moving materials away from the site to minimize dust emissions. < Properly service all vehicles and equipment to ensure that there are no visible sooty emissions. < Defective vehicles should be taken out to service and should not be permitted to operate until they are repaired.
ACTION BY		< The Construction Manager to delegate these actions to subordinates and subcontractors.
TIMING		Throughout the construction phase
SPECIALIZED EQUIPMENT OR MATERIAL		Securely fitted covers on dump trucks.
HSE COMPETENCE AND TRAINING		See Section A.2.3
MONITORING / VERIFICATION		
HOW / BY WHOM/, WHAT / WHERE/, FREQUENCY		▸ The Contractor's HSE Manager to conduct daily inspections to ensure that all dust control measures are implemented. ▸ The Supervising Team's HSE Inspector to undertake daily inspections on the site and note any instances of vehicles and equipment emitting abnormal quantities and quality of exhaust, and uncovered dump trucks. The HSE Inspector will also review maintenance records for vehicles and equipment.
RECORD KEEPING		See Section A.3.1.1
REPORTING		See Section A.3.2.1
COST		
Preparing the Traffic Management Plan		The cost of preparing a Traffic Management Plan for a project of this size is estimated at $TT5,000 per Plan, which may be considered a direct project cost. However, the implementation of this Plan may be considered a normal requirement for construction work of this kind and so will be included in the contractor's preliminary costs.

[2] Before finalization of this Report, Mitigation Tables will be added for additional impacts that were identified in the ESA

A.4.2.1.2 POTENTIAL IMPACT	Noise
MITIGATION MEASURES	< Inform the residents and neighbours of noisy construction activities. < Regularly inspect and maintain construction vehicles and equipment (including mufflers on this equipment) to ensure noise emission control systems are properly functioning.
ACTION BY	< Management of LSA to inform residents and neighbours of the onset of noisy construction activities. < Construction Manager to schedule highly noise-intensive activities to minimize effects. < Prime Contractor's HSE Manager to inspect equipment and vehicles, and instruct corrective action where necessary.
TIMING	< Inform adjacent receptors of noisy activities prior to the start of such activities. < Implement all other mitigation measures throughout the construction phase
MONITORING / VERIFICATION	
HOW / BY WHOM/, WHAT / WHERE/, FREQUENCY	▸ Prime Contractor's HSE Manager to verify maintenance and repairs to noise controls on vehicles and equipment. ▸ The Supervising Team's HSE Inspector to conduct daily inspections and note any instances of vehicles and equipment creating excessive noise. The HSE Inspector will also review the maintenance records of vehicles and equipment to verify that maintenance and repairs are current. ▸ The Supervising Team's HSE Manager or HSE Inspector to conduct instrumental periodic noise monitoring.,
SPECIALIZED EQUIPMENT OR MATERIAL	A noise meter that satisfies the requirements of the Noise Pollution Control Rules.
HSE COMPETENCE AND TRAINING	< See Section A.2.3 < Training and experience in the use of the noise meter.
RECORD KEEPING	See Section A.3.1.1
REPORTING	See Section A.3.2.1
COST	
Provision of a Noise Meter	The cost of providing a noise meter for use by the HSE Inspectors is estimated at $TT 1,000.00 per day, which may be considered a direct project cost.

A.4.2.1.3	POTENTIAL IMPACT	Vibration
MITIGATION MEASURES		< Inform residents, neighbours etc. of the potentially vibration generating activities. Provide a mechanism by which feedback can be received from the surrounding businesses and school and take steps to address any complaints whenever possible. < Choose alternative, lower-impact equipment or methods whenever possible. < Schedule the use of vibration-causing equipment such as jack-hammers at the least sensitive times of day (if possible) < Sequence the operations so that different / multiple vibration causing activities do not occur simultaneously. < Keep the vibration-producing equipment well maintained.
ACTION BY		< Management of LSA to notify residents and neighbours of potentially vibration-producing activities. < Construction Manager and Prime Contractor's HSE Manager to implement other mitigation measure.
TIMING		< Inform adjacent receptors prior to the beginning of any activities which may produce noticeable vibrations. < Implement all other mitigation measures throughout the construction phase
MONITORING / VERIFICATION		
HOW / BY WHOM/, WHAT / WHERE/, FREQUENCY		▸ Prime Contractor's HSE Manager to verify implementation of mitigation measures to control vibration impacts. ▸ The Supervising Team's HSE Inspector to conduct daily inspections and note instances of noticeable vibration.
SPECIALIZED EQUIPMENT OR MATERIAL		---
HSE COMPETENCE AND TRAINING		See Section A.2.3
RECORD KEEPING		See Section A.3.1.1
REPORTING		See Section A.3.2.1

A.4.2.1.4 POTENTIAL IMPACT	Impaired Water Quality from Hydrocarbon Spills and Leaks
MITIGATION MEASURES	< Any fuel or construction chemicals which are stored on site must be kept in secure containers with secondary containment. < "Hosing down" spills or leaks of fuel/lubricant must be avoided. In the event of a leak, use dry clean up and mopping up techniques as appropriate and absorbent material to clean up. Place contaminated material in a plastic drum that is to be kept covered at all times and remove offsite for proper disposal. < Continuously maintain vehicles and heavy equipment to ensure no leakage. < Service all faulty equipment and machinery as soon as possible in a designated area on site.
ACTION BY	< Construction Manager to designate area for refuelling and arrange for secondary containment. < Prime Contractor's HSE Manager to supervise implementation of all other mitigation measures.
TIMING	< The area for refuelling should be designated prior to the start of construction works. < Other measures to be implemented throughout the construction phase.
SPECIALIZED EQUIPMENT OR MATERIAL	< Appropriately sized and sealed containers with secondary containment for the storage of fuels and spent lubricants. < Spill clean-up equipment (absorbents, secure bins, etc.). < Approved remediation facility to receive spilled or leaked hydrocarbons.
HSE COMPETENCE AND TRAINING	< See Section A.3.2 < Facility approved for remediating contaminated material
MONITORING / VERIFICATION	
HOW / BY WHOM/, WHAT / WHERE/, FREQUENCY	< Prime Contractor's HSE Manager to conduct daily visual inspections on vehicles and equipment for evidence of spills and leaks. < The Supervising Team's HSE Inspector to conduct weekly inspections to ensure that all mitigation measures are being implemented, and that they are effective.
HSE COMPETENCE AND TRAINING	See Section A.2.3
RECORD KEEPING	See Section A.3.1.1
REPORTING	See Section A.3.2.1

A.4.2.1.5 POTENTIAL IMPACT	Improper Disposal of Solid Waste
MITIGATION MEASURES	< Require the Contractor to prepare and implement a Waste Management Plan prior to the start-up of any works. This should make provision for secure collection and storage of any hazardous waste which may be present (such as PCB-containing equipment). < Remove all garbage for disposal at an appropriate landfill. < Send all hazardous material to an approved facility for treatment and disposal.
ACTION BY	▸ Prime Contractor's HSE Manager, in consultation with the Construction Manager, to prepare the WMP. ▸ Construction Manager to mandate implementation of the WMP, and schedule removal of waste from the site.
TIMING	▸ Prepare the Waste Management Plan prior to the start of construction ▸ Comply with WMP and implement other mitigation measures throughout the construction phase.
SPECIALIZED EQUIPMENT OR MATERIAL	Approved facility to receive, treat and dispose of hazardous waste (if present).
HSE COMPETENCE AND TRAINING	See Section A.2.3
MONITORING / VERIFICATION	
HOW / BY WHOM/, WHAT / WHERE/, FREQUENCY	▸ HSE Manager to visually inspect the site daily for signs of accumulated waste. ▸ The HSE Inspector to undertake daily inspections on the site and note any instances of improper waste disposal. The HSE Inspector will also review manifests and disposal certificates.
RECORD KEEPING	See Section A.3.1.1
REPORTING	See Section A.3.2.1

SUMMARY OF MONITORING OF ENVIRONMENTAL IMPACTS

This section summarizes the monitoring and verification required by the Environmental and Social Management Plan. Throughout the construction phase, the Supervising Team's HSE Inspector will be conducting periodic audits of the construction site to ensure that mitigation measures are being implemented. Similarly, throughout the operation phase, the Sangre Grande Regional Corporation and/or, the EMA may conduct periodic audits of the site to ensure that mitigation measures are being implemented. If a CEC is issued for this project, the EMA's Environmental Technician will conduct inspections and monitoring (in accordance with predetermined parameters) throughout both construction and operation phases. Record keeping and reporting are discussed in detail in Sections A.3.1 and A.3.2, respectively.

TABLE A-1: SUMMARY OF MONITORING OF KEY ENVIRONMENTAL IMPACTS

POTENTIAL IMPACT	PARAMETER TO BE MONITORED OR VERIFICATION	FREQUENCY OF MONITORING
CONSTRUCTION PHASE		
Impaired Air Quality	Visually inspect site to ensure that dust control measures are implemented	Daily throughout the construction phase
	Maintain log book of records of vehicles and equipment maintenance	
	Maintain complaints register relating to exhaust emissions from the passage of vehicles and equipment	As they occur
	Maintain construction vehicles and equipment to ensure their proper functioning	Daily throughout the construction phase
Noise	Maintain log book of vehicles and equipment maintenance records	Daily throughout construction phase
	Daily inspections of vehicles and equipment for evidence of excessive noise	
	Maintain complaints register relating to noise	
	Monitor sound pressure levels arising during the construction phase	Weekly
Vibration	Maintain complaints register relating to noise	As they occur
	See items under Noise	Daily throughout construction phase
Improper Disposal of Solid Waste	Visual inspections of the site for signs of accumulated waste	Daily throughout construction
	Record any complaints received.	As they arise
	Maintain a log (including certificates) of disposal of wastes from the site	As they occur