



INTER-AMERICAN DEVELOPMENT BANK
**TRINIDAD & TOBAGO FLOOD ALLEVIATION AND
DRAINAGE PROGRAM (TT-L1036)**

***ENVIRONMENTAL AND SOCIAL ANALYSIS AND
OUTLINE ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN WITH
DRAFT RESETTLEMENT FRAMEWORK***
(FINAL)

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PREPARED BY

**Uche Osuji,
Consultant Environmental Specialist**

ucheosuji@gmail.com

EXECUTIVE SUMMARY

The Inter-American Development Bank (IDB) is preparing a Flood Alleviation and Drainage Program (FAP) (TT-L1036) for Trinidad & Tobago. The general objective of the proposed FAP is to minimize impacts from the lack of, or insufficient, urban drainage infrastructure in critical areas of the city of Port of Spain (POS).

The preparation of this Environmental and Social Analysis (ESA) and Outline Environmental and Social Management Plan (ESMP) form part of this Program, are specific to the proposed works and represent a requirement of the IDB's Environmental and Social Due-Diligence.

Proposed Intervention Program

The POS FAP proposes intervention geared towards improving catchment management through:

- (i) The implementation of critical drainage infrastructure to mitigate flooding events in the POS area. The works are going to be located within the sub-catchment formed between the St. Ann's and Maraval Rivers. The main type of works to be included are interceptors, drainage systems, detention/retention facilities and pumping stations constituted into 8 (eight) packages to be built predominantly utilizing the design-build modality;
- (ii) Improving flood alleviation measures while providing public linked (residential and commercial) spaces for cultural and recreational use along the river for the population within the central area through a 1.4 km Linear Park extending from Belmont Circular Road to South Quay;
- (iii) Institutional Strengthening of the Drainage Division (DD) of the Ministry of the Environment and Water Resources (MEWR) geared towards transforming the DD into an autonomous government agency and modernizing the institutional arrangement for management of water resources.

Policy, Legal and Administrative Framework

Agencies with jurisdiction over this FAP of intervention include:

- The Ministry of the Environment and Water Resources, Drainage Division (DD);
- The Environmental Management Authority (EMA);
- The Town and Country Planning Division (TCPD); and
- The Inter-American Development Bank (IDB).

Executing Agency, DD, as governed by the Waterworks and Water Conservation Act Ch.54:41 will be responsible for several aspects of this Program including approving designs related to the proposed drainage works. The POS City Corporation will own and maintain the works once completed.

The EMA has several pieces of legislation which govern this Program. The Certificate of Environmental Clearance (CEC) Rules, The Water Pollution Rules, The Noise Pollution Rules and the draft Air Pollution Rules. The EMA has issued 2 CECs thus far. Additional CECs will be required to cover works associated with Packages 2, 4, 5, 6, 7 and for the Linear Park. It is not expected that an Environmental Impact Assessment (EIA) will be required for these Packages. A redesigned Package 1 and/or Package 5, however, may require the conduct of an EIA in attainment of a CEC based on the final options chosen. Based on effluent criteria, the DD will be required to submit an application for Source Registration under the Water Pollution Rules, however, it is not expected that the DD will have to apply for a Permit under these Rules. The DD will also be required to apply for a Noise Variation if it proposes to undertake construction work at night.

The TCPD and its relevant legislation will govern applications made relating to the Linear Park as well as related interventions under Package 8.

From the IDB perspective, the Program must conform with its applicable Operational Policies and Directives including Environment and Safeguards Compliance Policy (OP-703), Natural Disaster Risk Management Policy (OP-704), and (if resettlement becomes relevant) the Involuntary Resettlement Policy (OP-710). The Program is classified as Category B under the IDB's Environmental and Safeguards Policy and as such requires a ESA and ESMP; requirements satisfied by this document and its appendices.

With particular reference to IDB's Involuntary Resettlement Policy (OP-710), this Program of intervention by the IDB proposes to mitigate the flooding problem caused by insufficient capacity of existing main collectors and channels by increasing the dimensions of pipes, adding new collectors or building detention/retention basins (where space is already available such as in Victoria and Adam Smith Squares and the Queen's Park Savannah) and creation of a Linear Park.

Additionally, resettlement of individual households would be a preferred strategy under the following conditions:

1. **Environmental Hazard:** A site is deemed unsuitable for in situ upgrading by virtue of significant environmental hazards being present that cannot be mitigated or where the site occupies an environmentally protected zone.
2. **Engineering Standards:** Acceptable standards for water, sanitation, drainage, roads or transport cannot be met without resettlement/relocation.
3. **Public Rights of Way:** Where lot setbacks must be reclaimed or existing structures removed in order to accommodate a public right of way or any needed public works

Consequently, given the nature and scope of this particular Program, and the special considerations of the Policy related to Dimension, it is not likely that affected persons would have to be resettled, obviating the need for a Resettlement Plan at this time.

It must be noted that a 30 m setback is required from the edge of the Maraval and St. Ann's watercourses for all building lines (DD, pers. commun., 2013). This setback is more often breached, without enforcement, than observed. This specification is not enshrined in law, but is based on specifications arrived at during studies conducted in the 1960s. This may very well mean that when the issue is addressed via an institutionally strengthened DD, previous setback breaches may have to be reclaimed prompting resettlement to become an issue.

Based on field reconnaissance carried out singly as well as jointly with other stakeholder agency representatives during the conduct of this ESA, it is unclear at this stage that resettlement would be an issue from a flood alleviation standpoint. A better understanding of the hydrological and hydrodynamic functionality of the Program area is being sought and would be based on the results from the currently commissioned study by Consultants DHI. The study outcome would inform the Final Designs.

A Draft Resettlement Framework (RF) – Appendix C has been prepared and would be included in the ESMP. If during Program execution resettlement becomes an issue, the IDB policy will be triggered and a Resettlement Plan would be prepared in accordance with procedures established by the Resettlement Framework and approved by the IDB. This would constitute a clause in the Program's Operations Manual.

To facilitate the preparation of the Draft Resettlement Framework, an IDB Social Safeguards Team worked together with the Project Team and the GORTT. The Resettlement Framework would be included as an annex to the Proposal for Operation Development (POD) and would consist of the following components:

- Resettlement objectives and policy framework;
- Procedures for the preparation and approval of Resettlement Plans;
- Socio-economic studies needed for the preparation of a Resettlement Plan;
- Mechanisms for compensation, relocation and income restoration;
- Public consultation, participation and disclosure mechanisms;
- Institutional Capacity and Strengthening mechanisms;
- Mechanisms for claims attendance;
- Monitoring, reporting and evaluation system; and
- Estimated budget.

Several other pieces of legislation relate to and govern activities under this Program including:

- The Occupational Safety and Health Act;
- The Municipal Corporations Acts;
- The Litter Act;
- The Motor Vehicles and Road Traffic Act; and
- Miscellaneous Water-Related Laws including:
 - The Malaria Abatement Act

- The Dry River Act
- The Summary Offences Act
- The Public Health Ordinance
- The Water and Sewerage Authority Act

Environmental Setting

Key aspects of the environmental setting based on observations during site reconnaissance as well as referenced baseline data include:

- The highly urbanized setting of POS is located on gently sloping land, some of which has been reclaimed and is in some places less than 1.5 m above sea level. Alluvial deposits in POS are of extreme importance to the groundwater supplies of POS with the Queen's Park Savannah representing an important water catchment area. The extent of development and anthropogenic influence in POS and environs has led to decreases in rainfall infiltration and groundwater recharge rates. Simultaneously, surface runoff has increased causing physical pollution and occasional flooding resulting in 5 (five) fatalities as recent as 1998.
- The Maraval and St. Ann's Rivers are biologically diverse but also among the most degraded. Significantly impacted estuarine mangrove stands comprise wetlands at the river mouths and provide refuge for squatters.
- Several street dwellers transiently inhabit the East Dry River. Several squatter settlements are present along the lower reaches of the East Dry River with homes constructed crudely and without any setback from the watercourse.
- The roads in POS are heavily congested with traffic during peak hours making traffic conditions in downtown POS generally very poor.
- The POS area is prone to natural hazards with main disaster risks related to flooding, hurricanes and earthquakes. POS is not immune to climate change impacts.

Potential Impacts and Mitigation

Several direct and indirect significant **positive impacts** are anticipated from this Program and its activities, including:

- Significant reduction in the degree of and propensity for flooding in the POS area;
- Abatement of nuisances and public health hazards in the flood-prone areas of POS;
- Reduced peak flows and improvement to receiving water quality of the Gulf of Paria;

- Improved adaptive capacity of POS to anticipated impacts due to Climate Change and Sea Level Rise;
- Reduction in land based sources of marine pollution by solid waste in particular;
- Promotion of an integrated approach to storm water management promoting enhanced recharge of groundwater aquifers in the region of the Queen's Park Savannah;
- Assist in bridging social divide between east and west regions of the East Dry River, alleviate crime and increase amenity value derived from the use of the Linear Park;
- Improved socio-economic benefit related to improvements in the quality of life as well as productivity to the users of the Program area;
- Improved institutional capacity and ability to handle issues surrounding urban environmental management; and
- Short-term economic activity during construction stemming mostly from contracts being awarded to local contractors.

Potential **adverse impacts** relate to the following:

POTENTIAL ADVERSE IMPACTS	SIGNIFICANCE
Impaired Air Quality	Minor
Noise and Vibration	Moderate
Odours	Minor
Water Quality	Moderate
Utility Services Disruptions	Major
Obstruction of Access	Major
Traffic Disruptions	Major
Aesthetics	Minor
Waste Management	Minor
Cultural Heritage	Minor
Health and Safety	Moderate to Major
Emergency Situation Response	Moderate to Major

Possible mitigation measures have been identified to address these concerns.

Potentially adverse moderate to major **cumulative impacts** are possible and relate to four (4) proposed projects that have advanced to the public disclosure stage or reasonably foreseeable projects but have not yet advanced to the Certificate of Environmental Clearance (CEC) stage. These impacts would be determined on a case-by-case basis throughout the Program and appropriate mitigation measures implemented cognizant of all construction.

With regard to **climate change**, while projected sea-level rise is not expected to alter the potential impacts during the construction phase, there would be altered impacts during the operation phase. This can only be reasonably mitigated during the design phase that treats urban drainage from the standpoint of long-term sustainability by incorporating adequate provision for increased peak flows (frequencies and intensities) likely to be associated with climate change. Climate change considerations are currently being mainstreamed into the design phase via the commissioned study by Consultants DHI.

Natural hazards of particular concern are earthquakes, hurricanes and floods. Hurricanes and flooding from heavy rainfall have a high possibility of occurrence and can exacerbate the existing flooding issues in the Program area during construction. Mitigation measures identified would rely on proper construction practices as well as appropriate emergency situation response.

Monitoring and Management Plans

Several measures have been proposed not only to ensure untoward impacts of this Program are mitigated, but that appropriate monitoring is proposed to ensure compliance with environmental regulations during the construction and operation phases. During construction, typical monitoring measures proposed include noise monitoring. Operation phase monitoring measures proposed include in-situ field water sediment testing of outflows i.e. $TSS \leq 50\text{mg/L}$. Equipment for monitoring shall have valid and current calibration certification prior to use.

An Outline ESMP has been prepared for this Program (Appendix B) and would be finalized in collaboration with the MEWR, DD. Other plans and measures to be prepared include:

- Traffic Management Plan;
- Emergency Prevention and Response Plan;
- Quality Assurance Project Plan (QAPP);
- Field Monitoring Checklist based on typical CEC requirements; and
- Infrastructure Cleaning and Maintenance Plan focussed on sedimentation and water quality.

Indicators have been identified to measure implementation of key elements of this ESMP.

Public Participation

Public meetings with potentially affected local communities (residents, institutions and businesses) are to be held in compliance with the issued CECs. As a requirement of this ESA (IDB policies OP-102 and OP-703), a public consultation meeting was held at the East Mucurapo Secondary School on 7 November, 2013.

A Key Stakeholders consultation meeting was held at the Kapok Hotel on 13 September, 2013 with Key Stakeholders, affected groups and NGOs in fulfillment of requirements by the EMA as well as complementary to the ESA for this Program of intervention by the IDB.

Details of all meetings have been recorded in Appendix A.

Additional CECs will be required in fulfillment of activities governing this Program. Public and key stakeholder consultation will be a requirement of each of these CECs.

Institutional Capability

There is a need to increase the skills and institutional capacity of DD generally to implement satisfactory measures of flood control and mitigation based on a more holistic and comprehensive catchment management approach. This is the undertaking of Component 3.

Notwithstanding this, it is envisaged that the DD will be assigned the following environmental work items of this Program:

- Preparing the Application forms for the Additional CECs (and TCPD Approvals) for the drainage works and Linear Park;
- Organizing and Hosting Public and Stakeholder Meetings;
- Advertising the Start of Construction;
- Finalizing the Environmental and Social Management Plan (ESMP);
- Coordinate preparation of an Emergency Prevention and Response Plan;
- Coordinate preparation of a Traffic Management Plan; and
- Preparing a QAPP.

Given the present staffing arrangements and related capacity issues, the DD does not presently have or is not considered to have the resources and capabilities to undertake these work items in a timely manner. There are two recommendations for executing these items: In the first, the DD could utilize the resources of the Environmental Unit within the MWI. Alternatively, executing these work items could be the responsibility of an Environmental Specialist resident in the DD. The preparation of the Traffic Management Plan and the Emergency Prevention and Response Plan should be prepared by the Contractor since these are integral to his work. Finally, the preparation of the QAPP would be most efficient if assigned to an Environmental Specialist resident in the DD.

Contract Requirements

It is expected that the MEWR will contract a combination of Design-Bid-Build Firms (re Package 1) and Design-Build Firms to undertake the different aspects of this Program (see

Appendix B). Both instances will have Design Engineers, Supervising Engineers and Contractors in either discrete or seamless arrangements. Recommendations for items to be included in these contracts include:

- All relevant CECs should be made a part of the contract with both Design and Supervising Engineers with a requirement for conformance with all relevant clauses.
- Surveys of the finalized areas (in arriving at Final Designs) for drainage works and the Linear Park should be included in the Design Engineer's Scope of Work. This would facilitate ascertaining the degree of setback encroachment and any recommendations for resettlement that would need to be further elaborated in a Finalized Resettlement Plan. The services of an Urban Sociologist may be needed to fulfil this requirement.
- Finalizing the ESMP should be included in the Design Engineer's Scope of Work with the finalized ESMP incorporating the mitigation, monitoring and supervision measures established by the CECs. The finalized ESMP should then be made part of the contract with the Supervising Engineer and the Contractor with a requirement that the procedures be followed and adhered to.
- This ESA Report, including the Outline ESMP, should be made available to the Design Engineer as a reference document.
- The preparation of a Traffic Management Plan and an Emergency Prevention and Response Plan should be included in the Contractor's Scope of Work.

Cost Estimates

Cost estimates are provided to satisfy a wide range of environmental requirements associated with this Program of intervention by the IDB and include those required to execute structured mitigation measures of the ESMP. A synopsis of annual estimated costs is provided as follows:

Year	Estimated Cost (\$TT)
2013	1,615,000
2014	717,000
2015	680,000
TOTAL	3,012,000

These estimates include costs likely to arise and associated with the operation and maintenance phase. They do not however, include implementation costs for mitigation measures considered construction "good practices". These costs are intrinsic to rates charged for various construction activities.

Conclusions and Recommendations

Conclusions

The overall assessment is that the ESA, as presented, was reasonably complete and fair and revealed nothing that was or could be construed as being overly significant in concern. However, the ESA did identify some gaps and areas requiring some more detailed investigations.

Key gaps and areas where further analysis may be warranted include the following:

1. Baseline data – At the time of preparing this document there was an insufficiency of data that could be referenced on the baseline environmental conditions of the Maraval and St. Ann's Rivers. This may seem to be due to the relative unpopularity of these rivers within the scientific community. The currently commissioned DHI Consultancy would serve to address these data gaps via field measurement campaigns as well as the introduction of a GIS modeling platform
2. Climate Change – The influence of climate change and natural hazards may be poorly understood and likely to give rise to adaptation issues. This is also currently being addressed via the commissioned DHI Consultancy.
3. The need for a Resettlement Framework – This would require further analysis given future potential for resettlement, the extent of breaches to watercourse setback requirements, the tendency for public opposition or concerns and the country's relative inexperience with and poor handling of resettlement issues. This is currently being developed and would be incorporated into the Program's execution; should the need arise.
4. Certificate of Environmental Clearance (CEC) – Time constraints associated with obtaining requisite environmental approvals given the urgent need to expedite proposed flood alleviation activities. All the outstanding CECs (see Chapter 3) would be sought prior to and as conditions before commencement of works or the bidding/procurement process.
5. MEWR, DD capacity – This would need to be bolstered, possibly even prior to the commencement of this Program.
6. Alternative Solutions Analysis – Given the attendant and significant negative impacts related to traffic disruption and utility services disruptions in particular that would occur

for months, there would be a need to sufficiently analyze likely alternatives from several standpoints prior to commencement of any preferred solution.

Recommendations

The ESA recommendations fall into three categories:

- (i) Areas where more study or work is required that should be completed prior to the IDB making a decision about a Loan Operation;
- (ii) Requirements that should be put into place as conditions of the Loan; and
- (iii) Other practices to be considered in the Program's planning and execution.

(i) More Study or Work Required Prior to Decision-Making

1. Analysis and mitigation of **impacts related to climate change and natural hazards** should be the subject of more detailed engineering studies aimed at more precisely informing design criteria and increasing resilience prior to the Final Design stage of both the Design-Bid-Build and Design-Build modalities. This is currently being undertaken via the recently commissioned DHI Consultancy.

(ii) Requirements that Should be Put in Place as Conditions of Financing

1. It is recommended that the **Institutional Strengthening** components of this Program be engaged as soon as practical to bolster capacity of the DD. This would have significant positive impacts on the Program's successful execution. Given the present staffing arrangements and related capacity issues, the DD does not presently have or is not considered to have the resources and capabilities to undertake work items identified in this ESA and ESMP in a timely manner. It is recommended that the DD utilize the resources of the Environmental Unit within the MWI; a unit that would have been utilized prior to DD's detachment from the MWI. Alternatively, executing these work items could be the responsibility of an Environmental Specialist resident in the DD.
2. Given that improper solid waste disposal is one of the main contributors to the flooding problem in POS, it is strongly recommended that serious consideration be given to exploring opportunities for a **concomitant, synergistic Solid Waste Operation** (either separate or as part of an extended Emerging and Sustainable Cities Initiative) that would see recyclables and white waste, the major contributors, being addressed. This would serve to magnify the effect of the alleviation provided by this Program. Alternatively, and in the least, an intensified campaign can be initiated aimed at reducing, if not eliminating, the incidence of improper solid waste disposal in these watercourses while awaiting passage of the imminent Beverage Container Bill. This could quite simply take the form of an intensified Litter Wardenship for POS. It is also suggested that, as part of the Institutional Strengthening Component,

- the **regulatory framework required to comprehensively address hillside development (in accordance with TCPD's Hillside Policy) and harmful agricultural practices in the upper catchment areas be approved and adopted.** This should be accompanied by a reforestation effort aimed at reducing run off and sedimentation. In the final analysis, this multi-pronged approach would not only serve to alleviate the flooding problem in POS, but would also reduce the exorbitant sums of money spent on drainage O&M related to sediment and solid waste removal in these watercourses, on land and now the coastal and marine environments via the marine branch of the Community Environmental Protection and Enhancement Programme (CEPEP); a programme under the auspices of the Ministry of Housing Land and Marine Affairs.
3. While the positive impacts of the Linear Park cannot be disputed, this component would bring potential users into proximity of the existing polluted water of the East Dry River. It is strongly recommended that measures be initiated, within this Program, to **address poor water quality** issues originating from improperly disposed solid waste and poor wastewater systems. Recommendations to address this would emerge from the currently commissioned DHI study with cleaning and maintenance related recommendations being coordinated between DD and POSCC. Issues related to wastewater would require the involvement of WASA. Additionally, the Linear Park component of this Program should not only be governed and informed by findings of more detailed engineering studies and a better understanding of the hydrology and hydraulics of the catchment, but should also benefit from a properly installed and well maintained **Flood Warning System**; part of the institutional strengthening component of the Program
 4. While it is agreed that there is no present need for resettlement, a **Draft Resettlement Framework** has been prepared for future needs likely to emerge due to potential for scope modification based on further recommended engineering studies, Final Designs particularly related to the Linear Park and associated Package 8 components of this Program, and any future attempt at reclaiming setbacks under an institutionally strengthened DD.

(iii) Other Practices to be Integrated into Mitigation and Monitoring Programs

1. Outcomes of the recently commissioned DHI Consultancy would need to be integrated into the mitigation and monitoring arrangements of this Program.
2. It is recommended, given commonalities in the nature and scope of the proposed drainage works, that a **programmatic approach to the CEC applications** be adopted that would see all the packages and the Linear Park being the subject of one rather than discrete applications. This approach presupposes that all packages are at similar design stages. This recommendation is worthy of exploit given time constraints, a CEC validity period of three (3) years and the overall benefits likely to be derived. Exploratory discussions with the EMA have endorsed the use of this

approach, but this would have to be the subject of more extensive discussions with the EMA prior to lodgement of the application.

3. It is recommended that measures to **reduce the propensity for exacerbated disaster risk and vulnerability during construction** to an acceptable level be embarked upon prior to commencement of this Program. This would be reliant principally on the development of a POSCC/ODPM-approved contingency plan - **Emergency Prevention and Response Plan** prior to commencement of works.

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ABBREVIATIONS AND ACRONYMS

ACRONYM	MEANING
CEC	Certificate of Environmental Clearance
COPE	Council of Presidents of the Environment
CSO	Central Statistical Office
DOMA	The Downtown Owners and Merchants Association (Trinidad and Tobago)
EIA	Environmental Impact Assessment
EMA	Environmental Management Authority
EPOSDCTT	East Port of Spain Development Company of Trinidad and Tobago Limited
EPRP	Emergency Prevention & Response Plan
ESA	Environmental and Social Assessment
ESMP	Environmental and Social Management Plan
FLOW	Columbus Communications
GIS	Geographical Information Systems
GORTT	Government of the Republic of Trinidad and Tobago
IDB	Inter-American Development Bank
IMA	Institute of Marine Affairs
IPCC	Intergovernmental Panel on Climate Change
MEWR, DD	Ministry of the Environment and Water Resources, Drainage Division
MFP, FD	Ministry of Food Production, Fisheries Division
MLG, LARPDU	Ministry of Local Government, Local Area Regional Planning and Development Unit
MPSD	Ministry of Planning and Sustainable Development
MWI	Ministry of Works and Infrastructure
NGC	The National Gas Company of Trinidad and Tobago Limited
NIDCO	National Infrastructure Development Company Limited
ODPM	Office of Disaster Preparedness and Management
OSHA	Occupational Health and Safety Authority
POSCC	Port of Spain City Corporation
POS FAP	Port of Spain Flood Alleviation Program
PPE	Personal Protective Equipment
RF	Resettlement Framework
SRC	Seismic Research Centre, UWI
T&TEC	Trinidad & Tobago Electricity Commission
TCPD	Town and Country Planning Division
TMP	Traffic Management Plan
TSS	Total Suspended Solids
TSTT	Telecommunication Service of Trinidad & Tobago
USGS	United States Geological Survey
UWI	University of the West Indies
WASA	Water and Sewerage Authority
WRA	Water Resources Agency

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INTER-AMERICAN DEVELOPMENT BANK
TRINIDAD & TOBAGO FLOOD ALLEVIATION AND DRAINAGE
PROGRAM (TT-L1036)

***ENVIRONMENTAL AND SOCIAL ANALYSIS AND
OUTLINE ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN WITH DRAFT
RESETTLEMENT FRAMEWORK***

25 October, 2013

1 INTRODUCTION

1.1 Context and Report Layout

The Inter-American Development Bank (IDB) is preparing a Flood Alleviation and Drainage Program (TT-L1036) for Trinidad & Tobago. The general objective of the proposed Program is to minimize impacts from the lack of, or insufficient, urban drainage infrastructure in critical areas of the city of Port of Spain (POS). The specific objective is to improve the catchment management through:

- (iv) The implementation of critical drainage infrastructure;
- (v) Improving flood alleviation and urban planning measures to the population within the central area through a Linear Park; and
- (vi) Modernizing the institutional arrangement for water resources management.

The preparation of an Environmental and Social Analysis (ESA) and an Environmental and Social Management Plan (ESMP) for this Program was undertaken in accordance with IDB's policies for category 'B' Projects. This document is specific to the proposed works and represents a component required in fulfillment of the IDB's Environmental and Social Due-Diligence (ESDD). The main objective of the ESDD is to summarize the relevant characteristics of the Program related to the environmental, social, and health and safety aspects and evaluate the adequacy of the proposed Program's environmental, social, and health and safety assessments, plans and procedures to adequately mitigate and control all Program-related impacts and risks. The results of the ESDD are used to confirm the Program's feasibility for Bank support and to identify any Program-specific recommendations or requirements.

This document consists of ten chapters and three appendices. The remainder of this introductory chapter provides the background to this assignment, and indicates the scope of the Program and its objectives. **Chapter 2** describes the proposed works to be taken in the POS area, and **Chapter 3** lists laws, regulations and policies that would govern these works.

Chapter 4 describes the Program's environmental setting, including the physical, biological and socio-cultural/economic environments. **Chapter 5** identifies potential impacts of this Program, listing positive, adverse as well as cumulative impacts. This Chapter also includes a classification of the Program under the IDB system, discusses the expected effects of climate change on the predicted impacts, and identifies natural hazards and liability issues. **Chapter 6** provides information on mitigation of adverse impacts, monitoring and management plans for the environmental aspects of this Program. **Chapter 7** discusses the need for and recommends additional public and stakeholder involvement in the Program. **Chapter 8** is a discussion of the capability of the Drainage Division (DD) within the Ministry of Environment and Water Resources (MEWR) to undertake certain aspects of the environmental requirements for this Program and a listing of Contract Requirements. Finally, **Chapter 9** provides preliminary cost estimates. **Chapter 10** provides conclusions and recommendations based on outcomes of this ESA.

1.2 Background

POS, the nation's capital city and the area of interest and intervention for the Program, is located on the low-lying coastal plain surrounded by steep hills in North and North-East and the sea in South-West. The Program area is triangular and delineated by two urban water courses – the East Dry River (St. Ann's River) in the East, and the Maraval River in the North-West, and the sea in South-East. The two rivers have been partially realigned from their original courses in the past in order to provide additional space for the city's development, and the river channels have been lined with concrete.

The drainage situation in POS has been aggravated over the past 30 years by urban developments which spilled outside the area demarcated by the two rivers onto the hills slopes, and by significant land reclamation works in front of the original sea front. While the former development created additional storm runoff loads on the drainage system, the latter has effectively inhibited capacity of gravitational drainage of the internal town area. Additionally, decades of neglect of the storm water drainage infrastructure and ad hoc and uncoordinated solutions to acute problems have contributed to the present drainage system disfunctionality. All this has resulted in frequent floods in several critical locations around the city and causes serious damages, traffic disruptions and general uncertainty.

This IDB Program is intended to assist the MEWR, DD implement an improved catchment management plan via necessary improvement works.

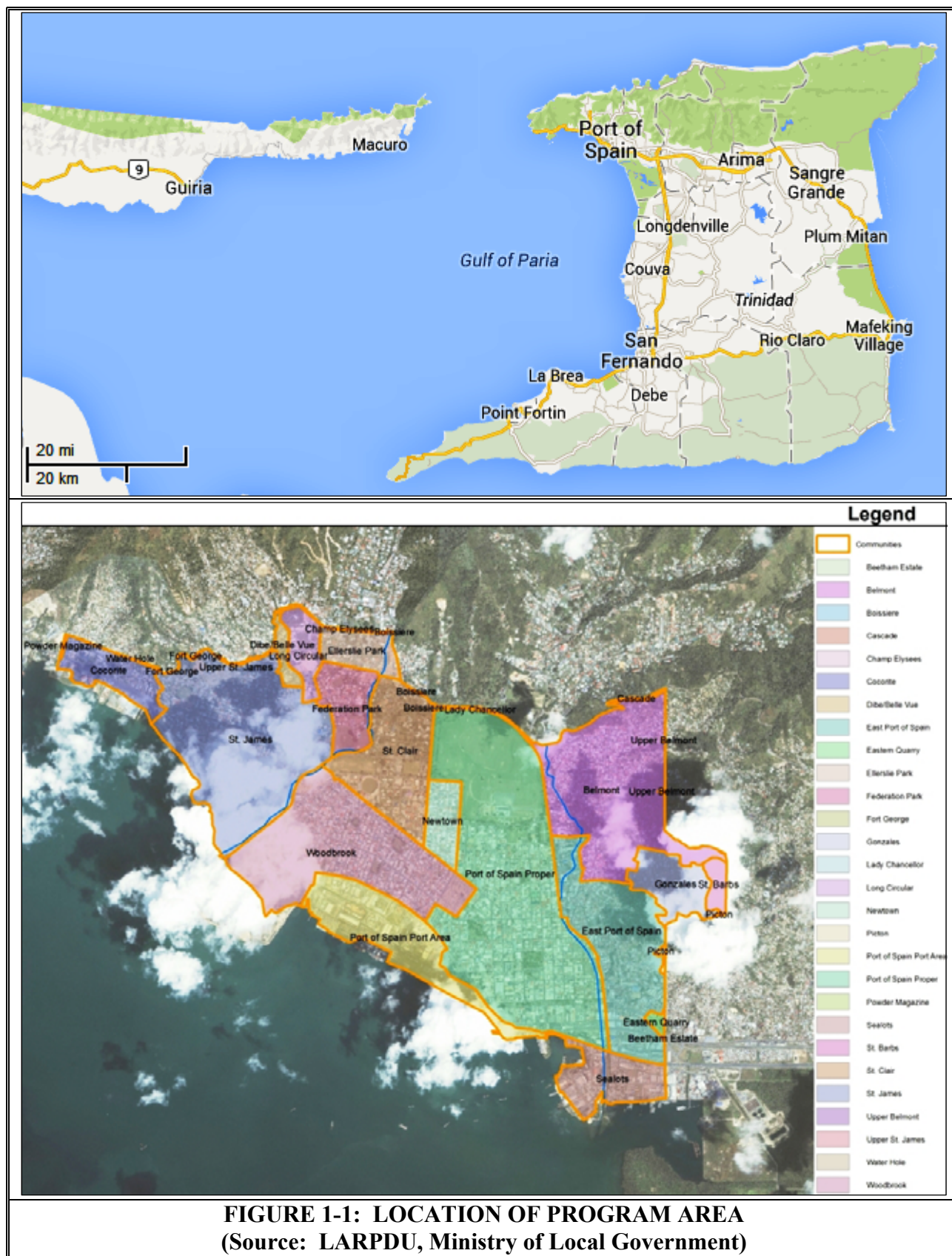
1.3 Multiple-Works Approach

This IDB Program of intervention will follow the multiple-works approach used when the Program interventions are similar in nature yet independent from one another. Utilizing this approach, a representative sample (30%) of the proposed intervention is identified and sufficiently analyzed to begin the operation (in this case, prioritized drainage works for the

critically flood-prone areas in POS) and future interventions in the POS area will be identified based on specific criteria and specifications, including environmental and social criteria.

1.4 Scope of Intervention

This IDB Program of intervention is specific to the triangular area of the POS proper region bounded by the low-lying coastal plain, surrounded by steep hills in North and North-East and the Gulf of Paria in the South-West. The specific area is triangular and delineated by two urban water courses – the St. Ann’s River in the East, and the Maraval River in the North-West (see Figure 1-1).



1.5 Objectives of the ESA

Objectives of this ESA include:

- Assess environmental and social potential impacts, risks and mitigation requirements.
- Assess compliance with applicable IDB environmental and social policies and directives.
- Assess compliance with applicable environmental, social health & safety, and labour legal requirements in Trinidad and Tobago.
- Prepare an Outline ESMP.
- Assess DD's (as well as other key stakeholders) capacity to take responsibility for implementation of the ESMP.
- Assess the disaster risk vulnerability and define measures necessary for disaster preparedness.
- Assess the need for resettling individuals/households/businesses, and if needed, provide support on the preparation of a resettlement plan.
- Assist the DD in coordinating the ESA/EMP with relevant agencies and in consulting with affected groups.

2 PROJECT DESCRIPTION

This Chapter provided a brief description of the problem and the Program interventions proposed in the POS Program area under IDB Loan TT-L1036. A brief analysis of alternatives to the proposed Program is also present in this Chapter.

2.1 Problem Outline

The city of POS suffers frequent flood events caused by storm runoff generated within the confines of the city as well as from upstream catchments. In the past five years alone, six flood events have been recorded. In 1993 flash floods in St. Ann's, Maraval, and POS caused the loss of five lives (ODPM, 2013).

Repeated flooding has caused property damage, traffic disruption, loss of productivity and is a general nuisance and inconvenience to POS city users. Flooding also negatively affects the investment climate. This has placed the storm drainage and related problems into political focus, with clear expectations for quick and efficient mitigation.

This situation developed gradually over several decades as a consequence of failure to follow-up POS's development with adequate improvements to the storm drainage infrastructure in addition to general physical decay and neglect of the storm drainage system. This has left the storm system incapable of handling the increasing runoff. Based on evidence of flooding incidents, the St. Ann's River does not provide the necessary safety level against flooding due to the continuous changes to land use in the catchment (urbanization, consolidation of already urbanized areas, hill slope deforestation and degradation) which contribute to increased runoff loads and reduce the safety margin. Further compounding this problem is the changing external operational conditions due to climate change. Recent flood events are depicted in Figures 2-1 and 2-2.



FIGURE 2-1: POS FLOODING NOV. 8, 2012

(Source: GENIVAR, 2013)



FIGURE 2-2: POS FLOODING - NOV. 13, 2012

(Source: GENIVAR, 2013)

2.2 Proposed Program

The IDB Flood Alleviation and Drainage Program is comprised of the following intervention components aimed at providing sustainable solutions to the existing problem.

2.2.1 Component 1 - Drainage Works for Critically-Flooded Areas of POS

This intervention will cover necessary civil works to mitigate flooding events in the area of POS. Some of the works have already been identified and defined by the DD and will be implemented within the modality of design-built schemes. The future interventions are going to be validated under a catchment management framework that is going to be implemented in parallel in order to give sustainability to the system. The catchment management approach will also consider climate change events that are reflected in the likely modifications of design storms in terms of frequency, return period and intensity as well as sea level rise scenarios. The works are going to be located within the sub-catchment formed between the St. Ann's and Maraval Rivers. The main types of works to be included are: interceptors, drainage systems, detention/retention ponds and pumping stations.

This intervention has been materialized into nine separate project packages focused on specific areas. These areas and their respective scope of works appear in Table 2-1. A map indicating the position of each of the packages and their anticipated impact zones is presented in Figure 2-3.

TABLE 2-1: FLOOD ALLEVIATION PROGRAM - PROJECT PACKAGES

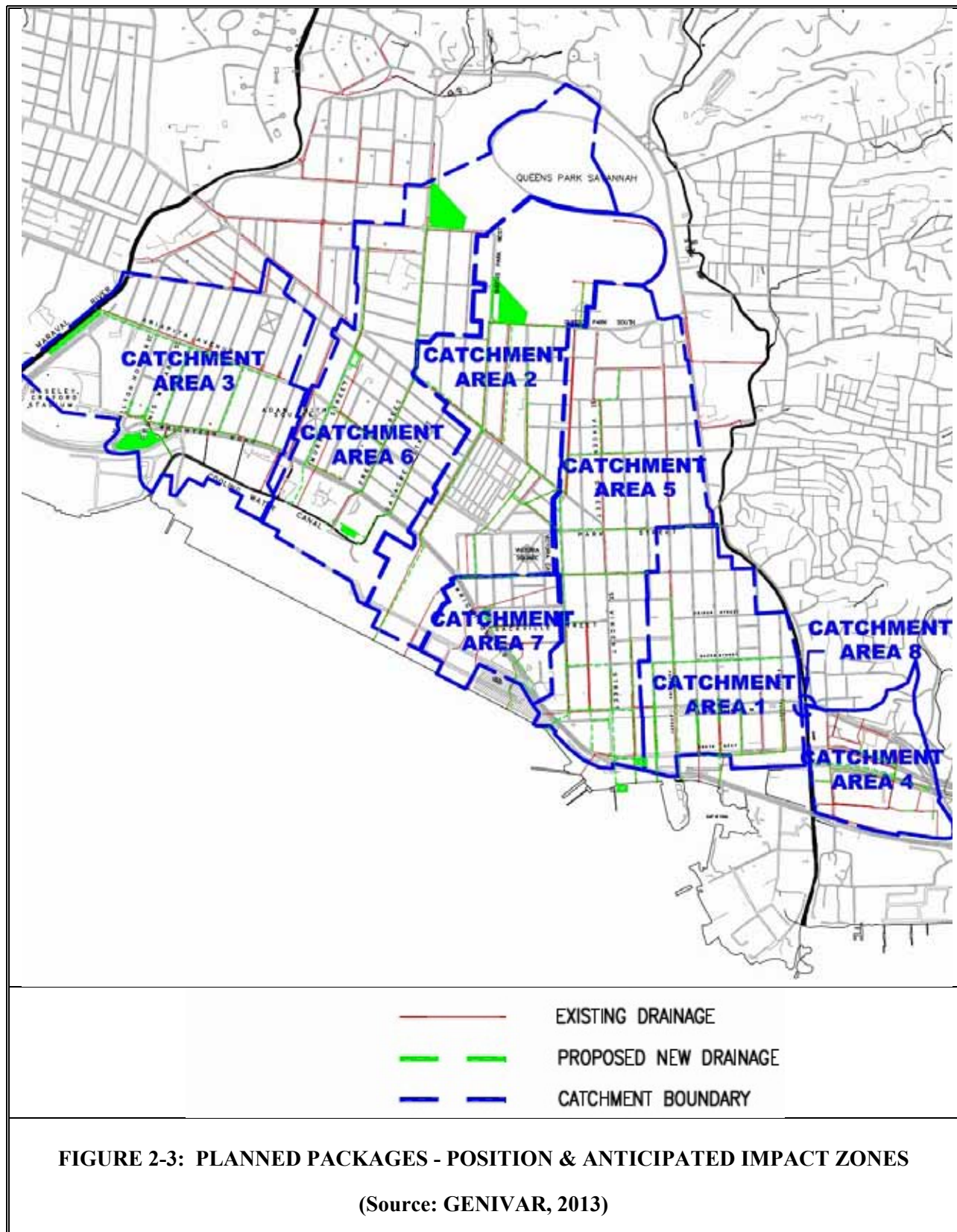
Package No.	Area	Scope
1	Frederick St., Queen St., Broadway, Independence Square and South Quay.	Consists of the design and construction of 3.0 km of drainage conduits along Chacon Street, Frederick Street and Broadway, Queen Street, Duncan Street, George Street, Charlotte Street, Henry Street, Independence Square North and South Quay. In addition, the package will also include outfitting the drainage outfalls along the St. Ann's River in the vicinity of Queen Street with flap gates to prevent water from the River from flowing back into the Street when the river levels are high. These works will relieve flooding in lower downtown, particularly on South Quay, between Abercromby Street and East Dry River. <i>This package is presently being redesigned under a separate Design-Bid-Build modality that could include a retention facility in the Sea Lots Cove area.</i>
2	Queen's Park Savannah South & Uptown and Downtown Port of Spain West.	Consists of the design and construction of approximately 4.8 km of drainage conduits along Cipriani Boulevard, Colville Street, Tragarete Road, Stanmore Avenue, Victoria Avenue, Kew Street, Duke Street and Stone

Package No.	Area	Scope
		<p>Street. In addition, an enhanced detention basin is proposed in the south western corner of the Savannah. These works are expected to relieve flooding at the south western corner of the Savannah (at the top of Cipriani Boulevard), as well as Ariapita Avenue, Tragarete Road, and the properties in their vicinity.</p> <p>The package will also include outfitting the detention pond and the drainage outfalls into the Gulf of Paria with floating trash collectors, as well as the design and construction of “enhanced recharge areas” in the Queen’s Park Savannah.</p> <p>The detention pond will be shallow (about 0.6m deep) and can be built by raising the level of the sidewalk and a narrow strip of the ground behind it to create a wide berm in this corner of the Savannah. The rest of the berm can be surfaced in grass and landscaped. The berm will not greatly impact the use of this corner of the Park.</p>
3	Woodbrook West	<p>Consists of the design and construction of approximately 2.3 – 2.8 km of drainage conduits along Ariapita Avenue, Dennis Mahabir Street, Hamilton Holder Street, Petra Street, Alberto Street and Wrightson Road. The package will also include outfitting drainage outfalls along the Maraval River with permanent flap gates to prevent water from the River from flowing back into Ariapita Avenue and Fitzblackman Road. In addition, retention ponds are proposed in one or two locations. These works are expected to relieve flooding along Ariapita Avenue, Dennis Mahabir and Hamilton Holder Streets and Wrightson Road and the properties in their vicinity.</p>
4	East Port of Spain	<p>Consists of the design and construction of approximately 0.8 – 1.0 km of drainage conduits along the Eastern Main Road and the Priority Bus Route east of the St. Ann’s River, along Abattoir Road, and within the compound of the Port of Spain Market. These works are expected to relieve flooding in East Port of Spain, particularly along the Eastern Main Road, the Priority Bus Route, Abattoir Road, and the properties in their vicinity. The package will also include installing floating trash collectors at certain key points in the drainage system – particularly within the Market.</p>
5	Lower St. Vincent St. & Foreshore Retention	<p>Consists of the design and construction of approximately 4.5 km of drainage conduits along Dundonald Street,</p>

Package No.	Area	Scope
	Tank	Richmond Street, Abercromby Street, St. Vincent Street, Gordon Street, Oxford Street, Park Street, Duke Street, Sackville Street, Queen Street, Edward Street, Independence Square and South Quay. The package will also include outfitting new drainage outfalls into the Gulf of Paria with floating trash collectors. In addition, a detention basin is proposed either at South Quay or in the sea off of the Port of Port of Spain. These works are expected to relieve flooding along South Quay, Independence Square South, Richmond Street, St. Vincent Street, Abercromby Street, and the properties in their vicinity.
6	Woodbrook East	Consists of the design and construction of approximately 3.3 km of drainage conduits along Gatacre Street, Maraval Road, French Street, Gray Street, Murray Street, Ariapita Avenue and Wrightson Road. In addition, three detention basins are proposed: one in the western corner of the Savannah, one in the Augustus Williams Playground, and one behind the D.R.E.T.C.H.I. Compound (south of Wrightson Road). These works are expected to relieve flooding at the western corner of the Savannah (at the top of Maraval Road), as well as at Warner Street, Ariapita Avenue, Methuen Street, McDonald Street, Wrightson Road (between Fitt Street and Gatacre Street), the lower portions of Fitt, Cornelio, French and Gatacre Streets, and the properties in their vicinity. The package will also include outfitting the detention basins and the drainage outfalls into the Cooling Water Channel with floating trash collectors, as well as the design and construction of “enhanced recharge areas” in the Queen’s Park Savannah.
7	Charles St., Sackville St., and London St.	Consists of the design and construction of approximately 2.2 km of drainage conduits along Wrightson Road, Charles Street, Scott Bushe Street, Sackville Street, and through the International Waterfront. In addition, a detention basin is proposed under Victoria Square at the intersection of Charles Street and Sackville Street with Wrightson Road and Scott Bushe Street. The package will also include outfitting the detention pond and the drainage outfall into the Gulf of Paria with floating trash collectors. These works are expected to relieve flooding along Sackville Street, Charles Street, Scott Bushe Street, London Street, and the properties in their vicinity.

Package No.	Area	Scope
8	Eastern Main Rd. Bridge over St. Ann's River	Consists of the design and construction of an innovative new Eastern Main Road Bridge over the East Dry River which will reduce the occurrence of flooding caused by the River.
9	Eastern main Rd. Wet Detention Pond East Dry River (<i>Status: completed</i>)	<i>Wet Detention Pond completed.</i> This pond is only a temporary effort to reduce flooding within the area.





2.2.2 Component 2 - Institutional Strengthening of the Drainage Division

This component will include all the necessary activities to support the GORTT in transforming the DD into an independent Authority within the MEWR that could build, operate and maintain all the future and existing drainage infrastructure in the country. Although the DD has adopted many actions toward this direction it does not operate within a comprehensive institutional framework. GORTT has already developed some studies to support the transformation of the DD into an autonomous government agency and modernizing the institutional arrangement for management of water resources.

2.2.3 Component 3 - Linear Park

The East Dry River is a paved channel for most of its length through East Port of Spain. The capacity of the River is estimated to be 202,500 m³ with 14% used capacity in the dry season and 40% in the wet season. It is estimated that the river overflows its banks approximately three times during the rainy season, usually in the vicinity of the South Quay Bridge where the river crosses the Eastern Main Road. Comprehensive studies of the river currently underway by Consultants DHI would identify the range of flood alleviation measures that need to be implemented.

With regards to the East Dry River, a solution is being sought through a multidisciplinary “Longitudinal Park Project” considered in the context of measures to alleviate flooding and improve urban drainage. The proposed solution is intended to convert the river itself and the currently deteriorated surrounding public areas into attractive urban content delivering valuable urban space for public use, while at the same time ensuring adequate stream flow especially during storm events. The East Dry River Linear Park will comprise of a number of hardscaped public areas with plazas and other public open spaces and landscaped promenade interspersed with formal plantings of trees and flowers and a mix of buildings and public facilities along selected sections of the East Dry River (St. Ann’s River). The Park will allow for public use of the space, links to private residential and other uses and spaces for cultural and recreation activity at selected locations.

This component is comprised of all civil and landscaping works for the implementation of a 1.4 km Linear Park located at the St. Ann’s River. The Linear Park will be designed in conjunction with the catchment analysis (hydrology, hydraulics and modeling) and drainage works design criteria emerging from the comprehensive studies presently being conducted by Consultants DHI. The river discharge is one of the most problematic areas in POS in terms of flooding. This area needs to have an integral solution which will contemplate the redesign of the civil works at the discharge area including road bridges, diversion chambers, river bed works, etc. (Component 1). Therefore it will be necessary to adapt the linear park to the final layout of these works in order to give desired functionality of the park.

Currently, this component receives great attention through IDB’s Emerging and Sustainable Cities Initiative (ESCI); a collaborative project led by the Swiss Federal Institute of Technology (ETHI).

For the purpose of the Flood Alleviation Program of intervention by the IDB, the initial phase of the East Dry River Linear Park will extend 1.4 km from Belmont Circular Road in the vicinity of the General Hospital to the bridge at South Quay and will encompass the following broad elements:

- Elevated bridges
- Biofiltration trench and pervious street cover
- Flood warning and monitoring system

Specific elements of the Linear Park appear in Table 2-2 and is depicted in Figure 2-4.

TABLE 2-2: LINEAR PARK – PROPOSED SCOPE

Item No.	Scope
1	Establish two bicycle/jogging tracks along each side of the river channel (one-way north/south on each side of the centre channel).
2	Resurface and install solar lights on the side walls of the channel to illuminate the cycle track and surroundings, enabling use at night and increasing security.
3	Design and install iconic pedestrian bridges (in a style and material that reflects the history and culture of East POS) across the river at 3-4 locations to connect uses on either side of the river and symbolically to bridge the divide between east and west Port of Spain.
4	Develop a public promenade along Piccadilly Street between Park Street and Queen Street with seats, landscaped areas, pedestrian pathways, public conveniences, vendor booths/street markets.
5	Develop landscaped areas within the adjacent public housing compounds to create urban gardens and sport/recreation facilities.
6	Upgrade and clearly sign/identify pedestrian access and egress points to and from the river and the street.
7	Install Early Warning and Flood Monitoring systems along the river with appropriate audible and visual alarms.



2.3 Conceptual Schedule

In a Program of this size, the need to conclude the works as soon as possible, for environmental reasons, has been reconciled against the requirements of minimizing disruptions to the affected communities. With cognizance given to this, the works have not only been divided into a number of manageable packages but are also programmed for phased implementation.

The IDB has indicated that the implementation of this Flood Alleviation Program for POS could extend over a couple years. A conceptual schedule is provided below:

Activity	Remarks	Earliest Start	Latest End	Est. Duration (mnths.)	2013				2014				> 2014
					Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
POS FAP (all packages)	Design and Regulatory Approvals	May '13	Aug. '13	3									
Package 1	Tendering & Construction	Nov. '13	?	?									
Package 2		Nov. '13	?	?									
Package 3		May '13	?	?									
Package 4		May '13	?	?									
Package 5		May '13	?	?									
Package 6		May '13	?	?									
Package 7		May '13	?	?									
Package 8	Consider integrated urban solution with City Gate and Linear Park.	Feb. '14	?	?									

2.4 Analysis of Alternatives

2.4.1 Description of Alternatives

The main measures being proposed under this Program are structural in nature. Two options may exist for minimizing structural measures which are disruptive environmentally:

- Revising operations of existing structural components to provide at least partial alleviation of flood risk; and
- Using non-structural means, to the extent possible, to reduce flooding risk.

The no action alternative is evaluated to demonstrate potential changes to the baseline environment in the absence of the proposed Program.

2.4.2 No Action Alternative

Implementation of the no action alternative would result in the elimination of all potential environmental impacts associated with the proposed Program. This would also result in the continuance and potential exacerbation (increased intensity, frequency and extent) of flooding in POS. With proper mitigation, management and monitoring of potential environmental impacts, the proposed Program will potentially contribute significantly to POS, and by extension, the national economy of Trinidad and Tobago. Additionally, this Program will increase the adaptive capacity of POS to climate impacts and sea level rise by mainstreaming their potential impacts into the design. Where the no action alternative is implemented, this benefit would not be realized.

3 POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

This Chapter outlines the policy, legal and administrative framework under which the interventions of this Program are subject. For ease of presentation, the policy, legal and regulatory sources are grouped as follows:

1. Development Control and the National Environmental Policy;
2. Laws, Policies and Rules relating to the environment, where the regulatory authority is the Environmental Management Authority (EMA);
3. Other Applicable National Laws and Regulations;
4. Multilateral Environmental Agreements; and
5. IDB Operational Policies and Directives.

A table summarizing the permits, approvals and notifications that will be required prior to starting activities of this Program is also provided.

3.1 Development Control and the National Environmental Policy

Development controls exist within various legal and regulatory instruments including international and regional treaties. The main pieces of local legislation are the Environmental Management Act No. 3 of 2000 (EM Act) and the Town and Country Planning Act, 1982, Chap 35:01 (TCP Act).

The National Environmental Policy, 2005 (NEP) is intended to satisfy the requirements of the EM Act and provides overall governmental objectives for environmental management. Its goal is the conservation and wise use of the environment of Trinidad and Tobago and to provide adequately for meeting the needs of present and future generations and enhancing the quality of life.

The policy recognizes the linkages among the human resources, natural systems and development processes and the competition for use of the same resources by different interests. It offers a framework for the management and use of resources to yield sustainable benefits for the population.

With respect to the activities under the proposed Program, the NEP seeks to:

- Prevent, reduce or eliminate various forms of pollution to ensure adequate protection of health and well-being of the environment and consequently, of humans;
- Regulate sources of noise pollution;
- Abate air pollution from motor vehicles;

- Ensure that waste is recovered or disposed of without endangering human health and without using methods which could harm the environment and, in particular, without risk to air, soil and plants and animals, without causing a nuisance through noise or odours and without adversely affecting the landscape;
- Prevent the degradation of water quality which shall cause the water quality in an area to fall below that necessary to protect the uses of the water and to protect human health including any activity which may include discharging or depositing a pollutant into any waters thereby causing several negative environmental consequences;
- Promote employers' responsibility to secure health, safety and welfare of persons at work and to provide for the protection to the public from work activities; and
- Undertake retrospective analyses or evaluations to correct past development decisions that might be detrimental to the continued environmental health of the country.

The Town and Country Planning Division (TCPD), utilizing the unratified land use National Physical Development Plan 1984, is the agency responsible for implementing the provisions of the TCP Act. This Act makes provisions for the orderly and progressive development of land in both urban and rural areas and requires that Planning Permission ought to be obtained for conducting development of land or the granting of permission to develop land. Development is defined as:

- The carrying out of building, engineering, mining or other operations in, over, or under any land;
- The making of any material change in the use of any buildings or other land; and
- The subdivision of any land.

The Minister with responsibility for the TCPD has the authority to grant permission for conducting any development of land. The TCPD is the agency responsible on behalf of the Minister for processing the applications required for permission to develop land. Under the TCP Act, the Minister may also direct that applications be made to the relevant local Authority for permission to develop land.

With respect to activities under this Program of intervention, the Linear Park and its associated Package will be the subject of and would require TCPD pre-approval. With respect to drainage works under this Program, the Executing Agency, DD, as governed by the Waterworks and Water Conservation Act Ch.54:41 would be responsible for approvals. This approval-seeking process is normally engaged via applications to TCPD for planning approval that would see, along the way, final design approval from the DD.

3.2 Laws, Policies and Rules relating to the Environment

The enabling legislation for the EMA is the EM Act which provided the framework for its four pieces of subsidiary legislation relevant to this Program:

- The Certificate of Environmental Clearance (CEC) Rules;
- The Water Pollution Rules;
- The Noise Pollution Rules; and
- The draft Air Pollution Rules.

3.2.1 The Environmental Management Act

The EM Act empowers the EMA to undertake the following:

- Develop and establish national environmental standards and criteria;
- Monitor compliance with the standards, criteria and programmes relating to the environment; and
- Take all appropriate action for the prevention and control of pollution and conservation of the environment.

The following subsidiary legislation pursuant to the EM Act are relevant to this Program.

3.2.2 Certificate of Environmental Clearance Rules

This section discusses the requirements for CECs for this Program, the CEC process, the CECs which have already been obtained, and the need for any additional CECs for aspects of this Program.

3.2.2.1 CEC Requirement and Process

Under the CEC Rules 2001, a CEC is required if a development activity or project includes one or several of the 44 Designated Activities listed in the CEC (Designated Activities) Order, 2001. The purpose of the CEC is to determine the environmental impacts of the proposed activity. Activities that are considered by the EMA to have a significant impact on the environment require an Environmental Impact Assessment (EIA) in support of a CEC.

The works proposed under this Program are subject to the CEC Rules under the following Designated Activities:

	ACTIVITY	DEFINITION
8	Clearing, excavation, grading and land filling	(a) The clearing, excavation, grading or land filling of an area of more than 2 hectares during a two-year period.
9	Waterproofing/caulking/paving	The establishment of a paved area (inclusive of associated works) of more than 4500 square metres during a two-year period.
13	Coastal or offshore construction or modification and dredging activities	(a) The establishment, modification, expansion, decommissioning or abandonment (inclusive of associated works) of marinas, piers, slipways, jetties or other coastal features.
		(c) The dredging or cutting of coastal or marine areas.
31	Establishment of parks, nature trails and other recreational areas	(a) The establishment, modification, expansion, decommissioning or abandonment (inclusive of associated works) of a park, nature trail, board walk or other recreational facility supporting a potential visitor use of 500 or more individuals per day.
39	Establishment of surface impoundments, dams or reservoirs for storage of water	(a) The establishment, modification, expansion, decommissioning or abandonment (inclusive of associated works) of surface impoundments, dams or reservoirs for storage of water.
41	Establishment of land drainage and irrigation schemes	(a) The establishment, modification or expansion (inclusive of associated works) of a land drainage or irrigation scheme for a parcel of land more than 1 hectare during a two-year period.
		(b) The establishment of a flood control system or a water supply impoundment for a parcel of land of more than 1 hectare during a two-year period.
		(c) The realignment or modification of drainage or river systems.

3.2.2.2 CEC Process

The CEC process as described in the CEC Rules, 2001 is depicted for clarity in the process flow diagram of Figure 3-1 and can be summarized as follows:

- Submission of an Application for CEC and payment of an application fee.
- Determination by the EMA as to whether an EIA is required within 10 working days.

- Further information may be required. Once the proponent has submitted further information such that it satisfies the requirements of the EMA, a decision as to whether the CEC is granted is given within 30 working days of receipt of that information.
- Preparation of a draft Terms of Reference (TOR) by the EMA within 21 working days following the determination that an EIA is required.
- Discretionary public consultations by the project proponent and submittal of comments on the draft TOR within 28 calendar days.
- Preparation of the final TOR by the EMA and payment of statutory fee.
- Submission of EIA to the EMA.
- Publication of the EIA for public comment for minimum statutory period of 30 days.
- Discretionary public hearing if there is sufficient public interest.
- Further information, if necessary, sought by the EMA.
- Grant or refusal of the CEC Application within 80 working days after EIA submittal.

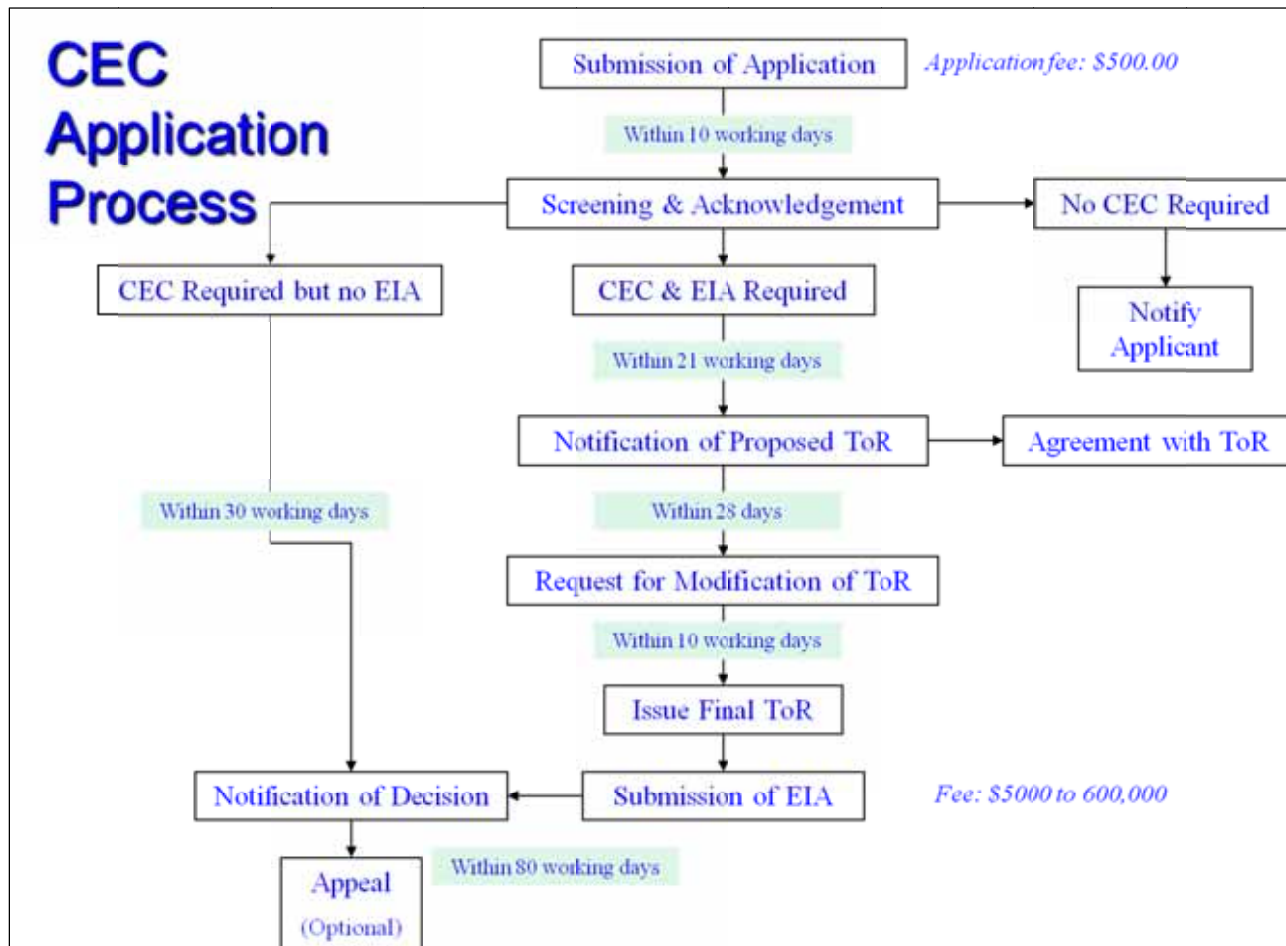


FIGURE 3-1: CEC APPLICATION PROCESS FLOW DIAGRAM (Source: EMA)

3.2.2.3 Existing CECs

Applications for CECs for some of the packages have been submitted to the EMA in accordance with the CEC Rules 2001. Determinations were made and CECs issued in accordance with Table 3-1.

TABLE 3-1: EXISTING CEC STATUS

IDB Intervention Component	Package No.	CEC Applicant	Application Date	Status	CEC Issue Date	CEC No.
Drainage Works	1	MWT	8 Apr. 2011	Issued	8 Jun. 2011	3093/2011
	2	TBD	-	-	-	-
	3	NIDCO	1 Nov. 2011	Issued	5 Mar. 2012	3306/2011
	4	TBD	-	-	-	-
	5	TBD	-	-	-	-
	6	TBD	-	-	-	-
	7	TBD	-	-	-	-
	8	TBD	-	-	-	-
	9	NIDCO	24 May 2011	Issued*	29 Jun. 2011	3144/2011
Linear Park	n/a	TBD	-	-	-	-
Institutional Strengthening	n/a	n/a	n/a	n/a	n/a	n/a
n/a – Not Applicable, TBD – To Be Determined, * – Works Completed.						

3.2.2.4 Additional CECs

A CEC typically only validates activities included in the scope of work submitted during the initial application. Should the design, layout or scope of work change significantly resulting in increased environmental impacts, then this would necessitate either a separate or new application based on whether the CEC validity period of three years has elapsed. Requests for modifications which either do not result in any increased environmental impact and/or risk or which reduce the environmental impact and/or risk must be submitted to, and approved by the EMA prior to commencement of any works related to such modification(s).

Notwithstanding the sole discretion being that of the EMA, it is not anticipated that EIAs would be requested for the outstanding CECs related to Packages 2, 4, 6, 7, 8 or the Linear Park. A redesigned Package 1 and/or Package 5, however, may require the conduct of an EIA in attainment of a CEC based on whether the final options chosen are likely to include dredging and reclamation activity associated with the Sealots Cove area. For each of these Packages, CECs will have to be obtained prior to the commencement of any construction-related bidding/procurement process. The comprehensive study presently being conducted by Consultants DHI includes an EIA of the storm drainage system and would serve as a basis for any EIA required by the EMA.

3.2.2.4.1 3.2.2.4.1 3.2.2.4.1 3.2.2.4.1 3.2.2.4.1 3.2.2.4.1 3.2.2.4.1 3.2.2.4.1 3.2.2.4.1 3.2.2.4.1

It is recommended, given commonalities in the nature and scope of the proposed drainage works, that a programmatic approach to the CEC applications be adopted that would see all the

packages and the Linear Park being the subject of one application rather than discrete applications. This approach presupposes that all packages are at similar design stages. This recommendation is worthy of exploit given time constraints, CEC validity period and the overall benefits likely to be derived.

Exploratory discussions with the EMA have endorsed the use of this approach, but this would have to be the subject of more extensive discussions with the EMA prior to lodgement of the application.

3.2.3 Water Pollution Rules

The Water Pollution Rules 2001 (amended 2006) (WPR) are in effect and the activities of this Program are subject to these Rules. This is also a condition of the issued CECs. Accordingly, works must be designed in conformance with these Rules. Submission of a Source Application to register a source of release of a water pollutant within 45 working days prior to the release of any pollutant into the environment would be required to ensure that any effluent from the drainage works of the Program is in compliance with the permissible levels prescribed in the WPR. With particular reference to this Program, releases would include storm water and releases from detention ponds. The EMA will then advise whether or not a permit to release is required. If a permit is to be issued, there would be certain conditions that would need to be complied with, including monitoring. It is not anticipated that a permit to release will be required. The overall process is depicted in the flow diagram of Figure 3-2.

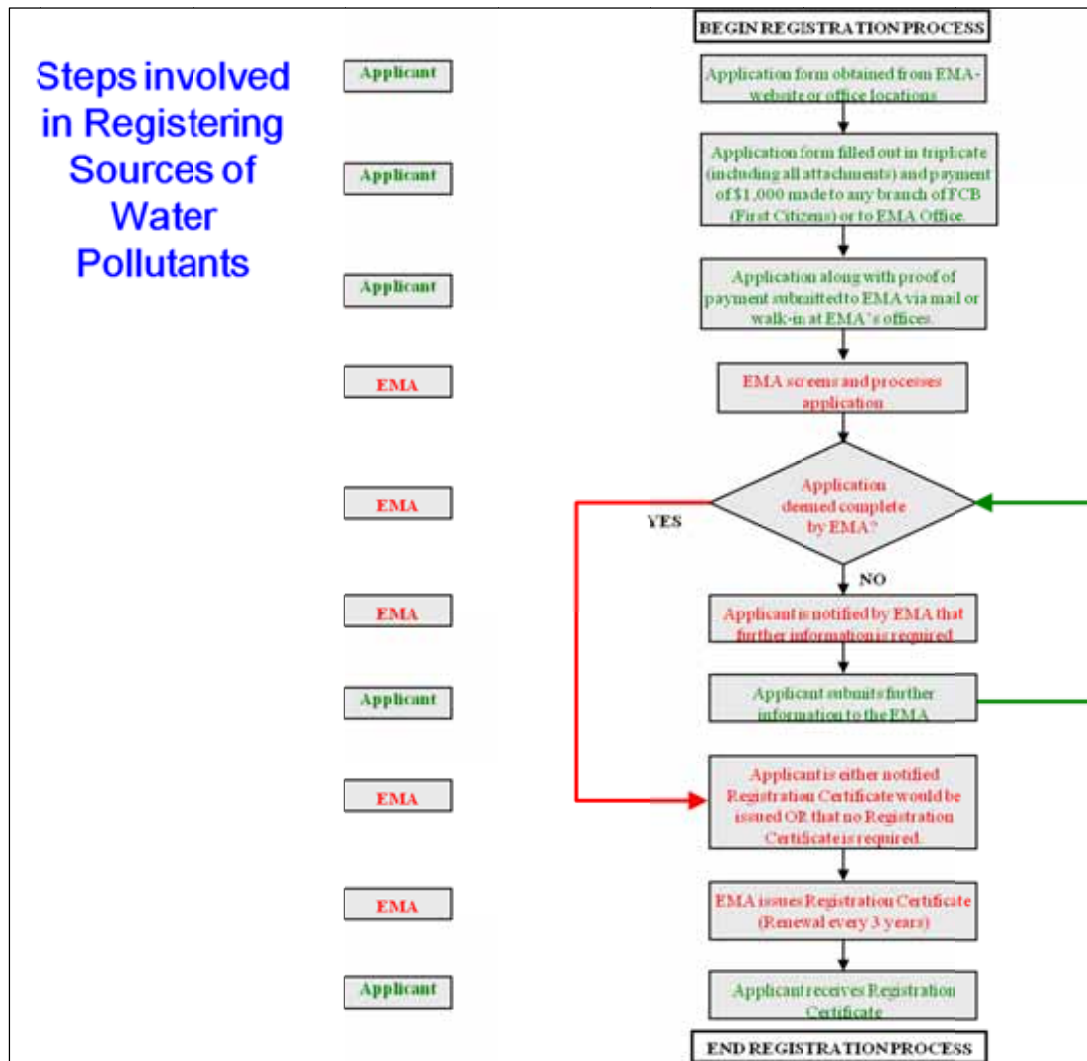


FIGURE 3-2: SOURCE REGISTRATION PROCESS FLOW DIAGRAM (Source: EMA)

3.2.4 Noise Pollution Control Rules

The main piece of legislation that regulates the emission of noise in Trinidad and Tobago is the Noise Pollution Control Rules, 2001, (NPCR) pursuant to the EM Act. These rules recognize the following noise zones:

- Zone I - Industrial Areas
- Zone II - Environmentally Sensitive Areas
- Zone III - The General Area

The applicable zone for activities of this Program is Zone III (General Area) and as such should be designed to conform to prescribed daytime and night-time limits:

Clause 7(k) of the Rules exempts construction activity carried out between the hours of 7:00 am and 7:00 pm on the same day. However, work outside these hours (during the night) is subject to certain limits. In addition, Clause 9(i) of the Rules specify that a person who proposes to conduct an activity or event which will cause sound in excess of the prescribed standards must apply for a Noise Variation. Therefore, if the contractor schedules work between the hours of 7:00 pm on one day and 7:00 am on the following day, he must apply for a Noise Variation under the NPCR. Baseline noise levels would need to be established.

3.2.5 Draft Air Pollution Rules

Pursuant to the EM Act these draft Air Pollution Rules, 2013, establish legal standards for the management of air pollution. The Rules are yet to become law. However, this Program will be guided by its stipulations and the limits proposed for fugitive emissions likely to arise due to Particulate Matter (PM_x), Oxides of Sulphur (SO_x), Oxides of Nitrogen (NO_x) Carbon Monoxide (CO) and Volatile Organic Compounds (VOCs).

3.3 Other Applicable National Laws and Regulations

Prior to the enactment of the EM Act, Trinidad and Tobago relied on a progression of administrative and penal laws to protect certain resources and manage specific elements of the environment. There are several laws, which are not primarily concerned with protecting natural resources or environmental health, but include clauses to ensure activities are conducted without any destruction to the environment. This section identifies the more relevant pieces of legislation for activities of this Program.

3.3.1 Occupational Safety and Health Act

The Occupational Safety and Health Act, 2004 (amended 2006) (OSH Act) is a comprehensive law governing all aspects of health and safety.

The activities of this Program will require the implementation of an Occupational Health and Safety Management System that is in compliance with the requirements of the OSH Act thereby ensuring compliance from the start of the Program.

3.3.2 Municipal Corporations Act

The Municipal Corporation Act, 1990 creates a legal and regulatory framework in which development planning and approval falls to local governing bodies, i.e. Regional Corporations or City Corporations. The provisions of the Act for development planning approval is restricted to the certification of compliance of structures, erected or expanded, with building regulations. The

Act states that Municipal Corporations are responsible for the construction and maintenance of all drains and water-courses except main water-courses and highway water-courses.

With respect to activities of this Program, the responsible local government body is the POS City Corporation (POSCC) and they are entitled to inspect and approve all design drawings for buildings, water reticulation systems, waste water treatment systems and on-site solid waste disposal facilities. This would have specific development planning applicability for the proposed Linear Park. Additionally, this regulation would also govern the solid waste collection requirements of this Program.

3.3.3 Litter Act

The Litter Act (1980) creates the principle offence of littering and regulates the disposal of solid waste. This is administered by the Ministry of Local Government (MOLG) and specifically, the Municipal Corporations. These regulations would govern littering in public places and premises, including water courses and drains.

3.3.4 Motor Vehicles and Road Traffic Act

The Motor Vehicles and Road Traffic Act, 1980 pertains to the control of air emissions which addresses visible exhaust emissions from vehicles.

3.3.5 Miscellaneous Water-Related Laws

The following contain clauses applicable to activities under the proposed Program:

- The Malaria Abatement Act (1980)
- The Dry River Act (1980)
- The Waterworks and Water Conservation Act (1980)
- The Summary Offences Act (1980)
- The Public Health Ordinance (1950)
- The Water and Sewerage Authority Act (1980)

3.4 Environmental Role of TCPD

With the implementation of the CEC Rules, the law requires that, for all projects which require Planning Permission, the CEC Application must be submitted to the TCPD. The role of the

TCPD in this instance is simply to forward the application to the EMA within 5 working days of receipt.

A two-tier system of planning permission exists in Trinidad and Tobago, administered by the TCPD. This consists of:

1. Outline Planning Permission; and
2. Final Planning Permission.

In principle Outline Planning Permission is based on land use and planning grounds and seeks to ensure that the proposed development is compatible with the intended land use in the area, as defined in national, regional or local area plans. The TCPD confirms that 'in principle' there is no objection to the proposed use of the land, based on existing policy frameworks. TCPD however reserves the right to determine the suitability of proposed details of the development with respect to standards etc.

The grant of Final Planning Permission is only one of the requirements to be satisfied before the start of construction. Another is Final/Building Approval from the respective Regional Corporation of the MOLG and deals with engineering and architectural details of the development in determination of the structural integrity of the proposed buildings/structures.

Under the EM Act developments must be sanctioned by a CEC from the EMA. Where a CEC is not granted by the EMA, the planning permission may be withheld by the TCPD.

The Linear Park component of this Program will be subject to attainment of these approvals prior to construction.

3.5 Multilateral Environmental Agreements

Multilateral Environmental Agreements (MEAs) are those protocols and conventions made under international law or through international cooperative agreements that provide guiding principles and best practices for dealing with global environmental issues. The responsibility for accepting or complying with these protocols and conventions reside with a country's government.

With regard to the activities governing this Program, one convention is particularly applicable. This is the Protocol concerning Pollution from Land-Based Sources (LBS Protocol) and Activities to the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region. The LBS Protocol was adopted by Trinidad and Tobago on October 6, 1999 and entered into force on August 13, 2010. Parties are required to take appropriate measures to prevent, reduce and control pollution of the Convention area from land-based sources and activities utilizing the best practicable means at its disposal and in accordance with its capabilities.

The Protocol identifies run-off (including sediment and solid waste) from land as the main non-point source of pollution. Since the effluent from works under this Program will flow ultimately into the Caribbean Sea, addressing obligations include the development and implementation of appropriate plans, programmes and measures to prevent, reduce or control pollution from land-based sources and activities on national territory, including the use of most appropriate technology and management approaches such as integrated coastal area management.

3.6 IDB Operational Policies and Directives

In order to assure the environmental and social sustainability of the projects and activities the IDB promotes, environmental and social safeguard policies have been developed to be applied throughout the project cycle. The guidelines for the application of the Environmental and Social Policies are available on the IDB's web site (<http://www.iadb.org/en/about-us/sector-policies,6194.html>).

This Program of intervention is not expected to have any large scale, significant and/or irreversible negative environmental or social impacts. Negative expected impacts and risks are mainly related to transient drainage and flood protection infrastructure construction works, including noise, dust, waste generation, traffic disruption and occupational risks.

Key policies and directives potentially triggered by this Program include:

1. **Environment and Safeguards Compliance Policy (OP-703)** - B.04 (other risks and factors), due to the vulnerability of the operation to onset changes in climatic variables, B.05 (environmental assessment requirements), B.06 (consultation), B.07 (supervision and compliance), B.9 (natural habitats and cultural sites) and B.11 (pollution prevention and abatement);
2. **Access to Information Policy (OP-102);**
3. **Natural Disaster Risk Management Policy (OP-704);** and
4. **Involuntary Resettlement Policy (OP-710).**

Although several key IDB policies and directives are triggered in this Program, the only ones that may be potentially applicable to this particular Program are:

- Environment and Safeguards Compliance Policy (OP-703);
- Natural Disaster Risk Management Policy (OP-704)
- Involuntary Resettlement Policy (OP-710).

3.6.1 Environment and Safeguards Compliance Policy

This section describes the classification of projects under IDB's Environment and Safeguards Policy (dated January 19, 2006) and summarizes relevant aspects.

3.6.1.1 *Classification of Projects*

The Policy provides for the classification of projects into three categories:

Category A includes any operation that is likely to cause significant negative environmental and associated social impacts, or have profound implications affecting natural resources. These operations will require an environmental assessment (EA), Environmental Impact Assessment (EIA) or a Strategic Environmental Assessment (SEA). Category "A" operations are considered high safeguard risk.

Category B includes operations that are likely to cause mostly local and short-term negative environmental and associated social impacts and for which effective mitigation measures are readily available. These operations will normally require an environmental and/or social analysis and an environmental and social management plan (ESMP).

Category C includes operations that are likely to cause minimal or no negative environmental and associated social impacts. These operations do not require an environmental or social analysis beyond the screening and scoping analysis for determining the classification. However, where relevant, these operations will establish safeguard, or monitoring requirements.

The classification of this Program will be addressed in Chapter 5.

3.6.1.2 *Summary of Relevant Requirements*

Table 3-2 lists aspects of the Policy that apply to this Program. All requirements are addressed throughout this document.

**TABLE 3-2: RELEVANT REQUIREMENTS OF
THE IDB ENVIRONMENT AND SAFEGUARDS COMPLIANCE POLICY**

POLICY CLAUSE	REQUIREMENTS	RELEVANCE TO THIS PROGRAM
4.17	All Bank-financed operations will be screened and classified according to their potential environmental impacts.	As will be explained in Chapter 5, this project is classified Category B, requiring an ESA and ESMP. This document satisfies those requirements.
4.18	The Bank will identify and manage other risk factors that may affect the environmental sustainability of its operations.	Trinidad is subject to earthquakes, hurricanes and floods, as will be discussed in Chapter 4.
4.19	The preparation of environmental assessments and associated management plans and their implementation are the responsibility of the Borrower.	As was explained in Chapter 3, above, CECs have been prepared and received for 2 packages within this Program. CECs for the other 6 packages and the Linear Park remain outstanding presently but will be applied for prior to the commencement of this Program and will be a condition prior to the commencement of any bidding/procurement process.
4.20	Category “A” and “B” operations will require consultations with affected parties and consideration of their views.	As is explained in Chapter 7, some Stakeholder Consultation meetings were held in fulfilment of the issued CEC applications. Due not only to the time that has elapsed since, but also to the outstanding CECs, further Stakeholder and Public consultation are recommended.
4.23	The Bank will not support operations that significantly convert or degrade critical natural habitats or damage critical cultural sites.	As is explained in Chapter 4, Natural habitats and non-critical cultural sites exist in the Program area. Natural habitats have been extensively transformed. Non-critical sites have appropriate measures recommended to protect their integrity and function.
4.28	Bank-financed operations will include as appropriate, measures to prevent, reduce or eliminate pollution emanating from their activities.	This Program is aimed at improving receiving water quality by significantly reducing the extent of potential contaminants. Other measures to reduce pollution will be discussed in Chapter 6.

3.6.2 Natural Disaster Risk Management Policy

Trinidad is subject to earthquakes, hurricanes and flooding as discussed in Chapter 4.

This section addresses concerns related to the Natural Disaster Risk Management Policy (dated February 22, 2007).

Directive A-2 is relevant to this Program given its general potential to exacerbate risks due to flooding occurring during construction and operation. Additionally, there may be some uncertainty surrounding the ability of the design criteria to adequately deal with exacerbated flooding and storm events generally and more specifically due to more poorly understood climate change influences.

This document recommends measures to reduce the propensity for exacerbated disaster risk and vulnerability to an acceptable level reliant principally on the development of an approved contingency plan - Emergency Prevention and Response Plan prior to commencement of works. Analysis and mitigation of impacts related to climate change are currently the subject of more detailed engineering studies by Consultants DHI aimed at informing increased resilience prior to the Final Design stage of both the Design-Bid-Build and Design-Build modalities.

3.6.3 Involuntary Resettlement Policy

If it is thought necessary to acquire land for any of the works under this project, the IDB's Involuntary Resettlement Policy (OP-710) will apply. According to the Operational Policy, operations which may require resettlement must be evaluated and prepared according to two fundamental principles:

1. **Every effort** must be made to avoid or minimize the need for involuntary resettlement. A thorough analysis of project alternatives must be carried out in order to identify solutions that are economically and technically feasible while eliminating or minimizing the need for involuntary resettlement. Particular attention must be given to socio-cultural considerations, such as any cultural or religious significance of the land.
2. **When displacement is unavoidable**, a resettlement plan must be prepared to ensure that the affected people receive fair and adequate compensation and rehabilitation.

There are however **special considerations** and certain contextual characteristics that will affect preparation of the resettlement components of the IDB's operations.

This Program of intervention by the IDB proposes to mitigate the flooding problem caused by insufficient capacity of existing main collectors and channels by increasing the dimensions of pipes, adding new collectors or building detention/retention basins (where space is already

available such as in Victoria and Adam Smith Squares and the Queen's Park Savannah) and creation of a Linear Park.

Additionally, resettlement of individual households would be a preferred strategy under the following conditions:

4. **Environmental Hazard:** A site is deemed unsuitable for in situ upgrading by virtue of significant environmental hazards being present that cannot be mitigated or where the site occupies an environmentally protected zone.
5. **Engineering Standards:** Acceptable standards for water, sanitation, drainage, roads or transport cannot be met without resettlement/relocation.
6. **Public Rights of Way:** Where lot setbacks must be reclaimed or existing structures removed in order to accommodate a public right of way or any needed public works

Consequently, given the nature and scope of this particular Program, and the special considerations of the Policy related to Dimension, it is not likely that affected persons would have to be resettled, obviating the need for a Resettlement Plan at this time.

It must be noted that a 30 m set back is required from the edge of the Maraval and St. Ann's watercourses for all building lines (DD, pers. commun., 2013). This setback is more often breached, without enforcement, than observed. This specification is not enshrined in law, but is based on specifications arrived at during studies conducted in the 1960s. This may very well mean that when the issue is addressed via an institutionally strengthened DD, previous setback breaches may have to be reclaimed prompting resettlement to become an issue.

Based on field reconnaissance carried out singly as well as jointly with other stakeholder agency representatives during the conduct of this ESA, it is unclear at this stage that resettlement would be an issue from a flood alleviation standpoint. A better understanding of the hydrological and hydrodynamic functionality of the Program area is being sought and would be based on the results from the currently commissioned study by Consultants DHI. The study outcome would inform the Final Designs.

A Draft Resettlement Framework has been prepared and would be included in the ESMP. If during Program execution resettlement becomes an issue, the IDB policy will be triggered and a Resettlement Plan would be prepared in accordance with procedures established by the Resettlement Framework and approved by the IDB. This would constitute a clause in the Program's Operations Manual.

To facilitate the preparation of the Draft Resettlement Framework, an IDB Social Safeguards Team worked together with the Project Team and the GORTT. The Resettlement Framework would be included as an annex to the Proposal for Operation Development (POD) and would consist of the following components:

- Resettlement objectives and policy framework;

- Procedures for the preparation and approval of Resettlement Plans;
- Socio-economic studies needed for the preparation of a Resettlement Plan;
- Mechanisms for compensation, relocation and income restoration;
- Public consultation, participation and disclosure mechanisms;
- Institutional Capacity and Strengthening mechanisms;
- Mechanisms for claims attendance;
- Monitoring, reporting and evaluation system; and
- Estimated budget.

3.7 Relevant Approval Agencies

The relevant approval agencies governing activities of the Program include:

- Environmental Management Authority;
- Town and Country Planning Division;
- Ministry of Environment and Water Resources, Drainage Division; and
- POS City Corporation.

3.7.1 Outline of Required Approvals

Based on the information available, an outline of the required approvals for the proposed Program is summarized in Table 3-3.

TABLE 3-3: PROGRAM PERMITS, APPROVALS AND NOTIFICATIONS

REQUIRED APPROVALS	APPROVAL AGENCY
Certificate of Environmental Clearance	– EMA
Surface Water Drainage	– MEWR, DD – POSCC
Nearshore Outfall Point	– EMA – MEWR, DD
Safety and Health of Workers	– OSHA – Ministry of Labour – Local Health Authority
Emergency Prevention & Response Plan	– POSCC – ODPM
Disposal and Control of Non-Toxic, Non-Hazardous Garbage and other Solid Waste	– Solid Waste Management Company of Trinidad and Tobago Limited – EMA
Disposal and Control of Toxic or Hazardous	– EMA

REQUIRED APPROVALS	APPROVAL AGENCY
Solid Waste, Oily Waste	- Solid Waste Management Company of Trinidad and Tobago Limited
Monitoring Program	- EMA
Landscaping	- TCPD
Advertisements/Signs	- TCPD (Control of Advertisements)
Approval of Planning Permission related to the Linear Park	- TCPD

#

4 PROJECT SETTING

This Chapter describes the relevant baseline environment in the urbanized and residential settings of POS where the proposed Program will be conducted. Some of the findings were based on observations during site reconnaissance.

The decision was made to also use referenced baseline data as this would represent a far superior treatment to any brief sampling of baseline parameters unchangeable by the relatively transient activities of this particular Program as well as given time constraints.

For convenience and appropriateness to the Program, it is divided into the following headings:

- The Physical Environment;
- The Biological Environment; and
- The Socio-cultural/economic environment.

4.1 The Physical Environment

This section describes relevant referenced baseline characteristics of the physical environment in the proposed Program areas under the following headings:

- Climate;
- Natural Hazards;
- Topography;
- Geology and Soil Characteristics;
- Hydrogeology;
- Water Quality; and
- Air Quality.

4.1.1 Climate

Trinidad and Tobago experiences a tropical marine climate. Its seasons and precipitation are driven largely by the occurrence of both the Northeast Tradewinds and the Inter-Tropical Convergence Zone (ITCZ). The two seasonal regimes per year include: a dry season, a continuous period of low precipitation extending from January to May, and a wet season extending from June to November interrupted by a brief dry spell in September known as the Petit Careme. Transition periods occur during June and December. Specific characteristics exhibited in these months vary from year to year. Earthworks related to construction projects in Trinidad tend to be scheduled during the dry season.

Meteorological data collected at the Trinidad and Tobago Meteorological Services (TTMS) in Piarco is taken as representative of the entire island's average weather condition and will be used as references for the climatology of the Program areas.

4.1.1.1 Rainfall

Figure 4-1 is an excerpt from the isohyetal map of Trinidad prepared by the Piarco Meteorological Services (EMA, 2004), and depicts the Program area in a zone where the annual rainfall is around 1500 mm.

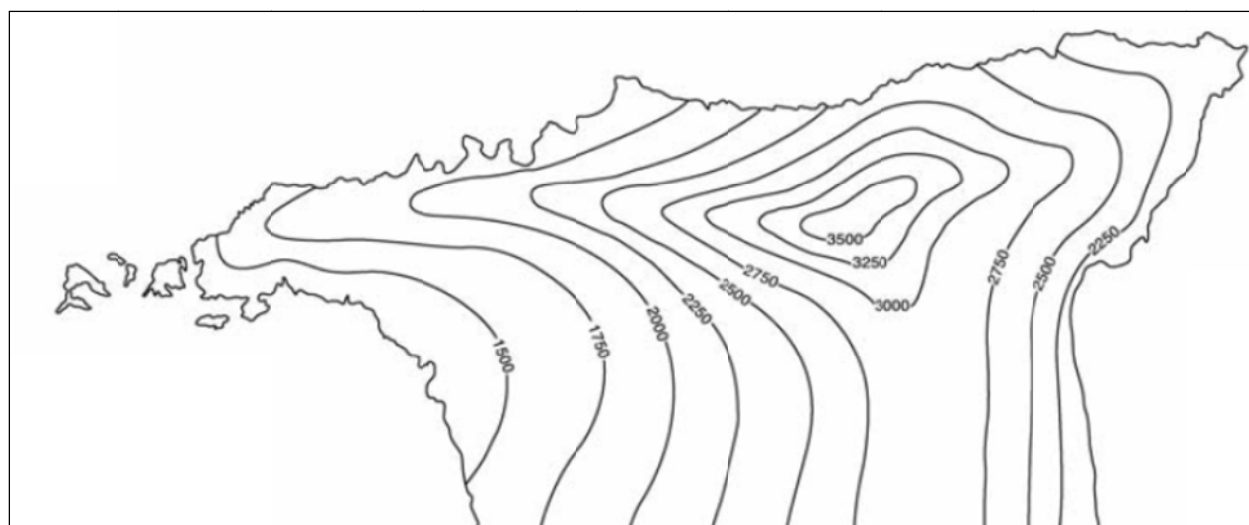


FIGURE 4-1: ISOHYETAL MAP OF NORTHERN TRINIDAD (Source: EMA, 2004)

4.1.2 Natural Hazards

Trinidad, like other countries, is prone to many natural hazards. Whether these hazards result in a disaster depends on the area in which it occurs and the effect the event has on the population. Natural hazards have occurred in the POS area. The different potential event types are discussed in the context of the Trinidad and with particular reference to communities within the Program area where these disasters have occurred, or where due to existing conditions, these communities are likely to have a high incident possibility.

Trinidad is also vulnerable to the effects of natural disasters and the consequences of climate change. Coastal cities such as POS are particularly at risk, as a number of areas have been developed on reclaimed land, and as such, are likely to be among the first to be affected by rising sea levels.

Within the city, the main disaster risks relate to flooding, hurricanes, earthquakes and tsunamis.

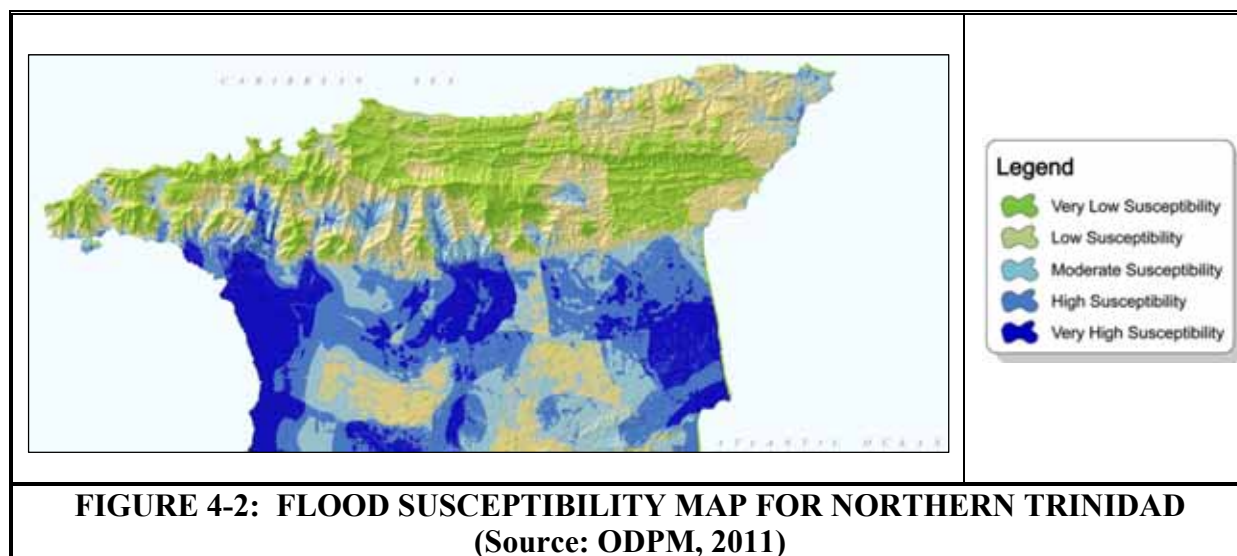
4.1.2.1 Floods

Flooding is a natural hazard that occurs frequently in the City of POS during the wet season and is the result of a number of factors including inadequate drainage infrastructure. It is particularly severe in low lying coastal areas and is exacerbated by rising tides. Flooding is also associated with sedimentation and debris from development in upstream areas. The limited capacity of many existing water courses also increases the risk of flooding during peak rainfall periods. The severity of flooding is also worsened by hillside developments which reduce vegetation cover and increase impermeable surfaces. This usually results in erosion and landslides in hillside areas and flooding in the plains (Interplan, 2010). The effects are well known and have in recent times resulted in fatalities as shown in Table 4-1.

TABLE 4-1: FLOOD EVENT FATALITIES
(Source: ODPM, 2013)

Date	Flood Location	No. of Fatalities
05/10/1993	POS, St. Ann's, Maraval	5
10/01/2008	POS and environs	1
18/01/2008	POS to Mt. Hope	1

The Flood Susceptibility Maps for Trinidad and POS in Figures 4-2 and 4-3 respectively depict the predominantly high susceptibility for the Program area. The map was generated from a model utilizing meteorological, hydrological, geological and physical factors to estimates areas that would be susceptible to flooding. Rainfall, elevation, slope, drainage density, road density and land use were used to generate GIS layers for the Multi-Factor Modelling. Satellite imageries and field observations also assisted in the creation and validation of this model (ODPM, 2013).





4.1.2.2 Hurricanes

Hurricanes are common to the Caribbean region because it is in the direct path of the Atlantic Hurricane Track. Hurricanes typically form on the west coast of Africa and intensify as they move over the Atlantic Ocean towards the Caribbean. Trinidad is located slightly southwest of the track and, as a result, is not in the direct path of these hurricanes. The hurricane season in Trinidad coincides with the wet season. Hurricanes that pass close to Trinidad still cause heavy rainfall, flooding, rough waters and high winds. Figure 4-5 depicts hurricane routes from 1851 to 2008. Table 4-2 lists the names and wind speeds of these hurricanes and tropical storms.

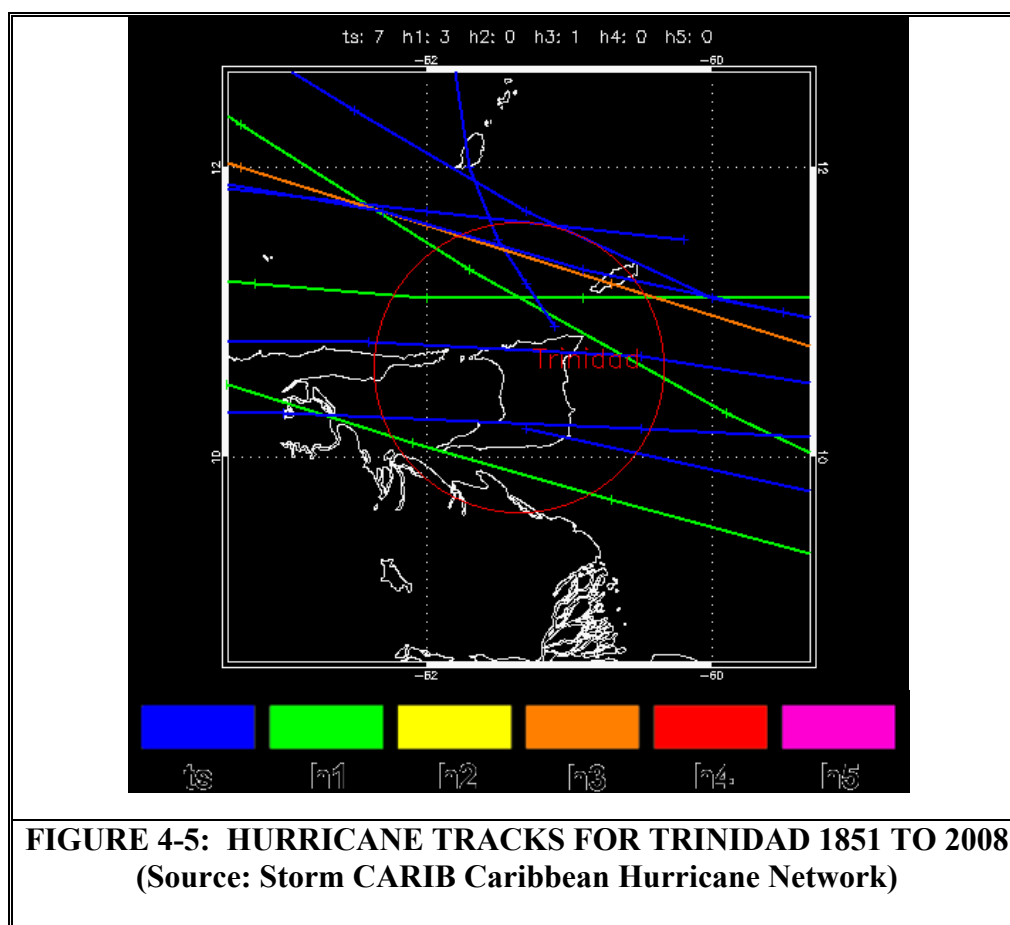


TABLE 4-2: LIST OF HURRICANES AND TROPICAL STORMS AFFECTING TRINIDAD

Name of Hurricane/Tropical Storm	Date	Category	Wind Speed (km/hr)
Not Named	2 Sep 1878	1	148
Not Named	7 Oct 1892	1	130
Not Named	27 Nov 1896	Tropical Storm	74
Not Named	Aug. 1928	Tropical Storm	64
Not Named	27 Jun 1933	1	130
Anna	20 Jul 1961	Tropical Storm	84
Flora	1 Oct 1963	3	204
Alma	14 Aug 1974	Tropical Storm	74
Arthur	25 July 1990	Tropical Storm	84
Fran	14 Aug 1990	Tropical Storm	64
Bret	7 Aug 1993	Tropical Storm	93
Joyce	1 Oct 2000	Tropical Storm	64

The National Oceanic and Atmospheric Administration (NOAA) updated 2013 Atlantic Hurricane Season Outlook (issued: 8/8/2013) is reported as saying that the season is shaping up to be above normal with the possibility that the season could be very active. The outlook indicates a 70% chance of an above-normal season, a 25% chance of a near-normal season, and only a 5% chance for a below-normal season. The season has already produced four named storms, with the peak of the season – mid-August through October – yet to come (NOAA, 2013). NOAA's updated Seasonal Outlook (which includes the activity to date of tropical storms that have occurred) projects a 70% chance for each of the following ranges:

- 13 to 19 named storms (top winds of 39 mph or higher), including:
 - 6 to 9 hurricanes (top winds of 74 mph or higher), of which
 - 3 to 5 could be major hurricanes (Category 3, 4 or 5; winds of at least 111 mph).

These ranges are above the 30-year seasonal averages of 12 named storms, six hurricanes and three major hurricanes. This would have attendant risks and implications for the Program area of POS.

4.1.2.3 Earthquakes

Trinidad and Tobago is located at the boundary of the Caribbean and South American Plates and is therefore earthquake prone. Major earthquakes have been prevalent in recent times within the Lesser Antilles. Seismic activity records from 1900 to 2005 show earthquake epicentres mainly in coastal regions. See Figure 4-6.

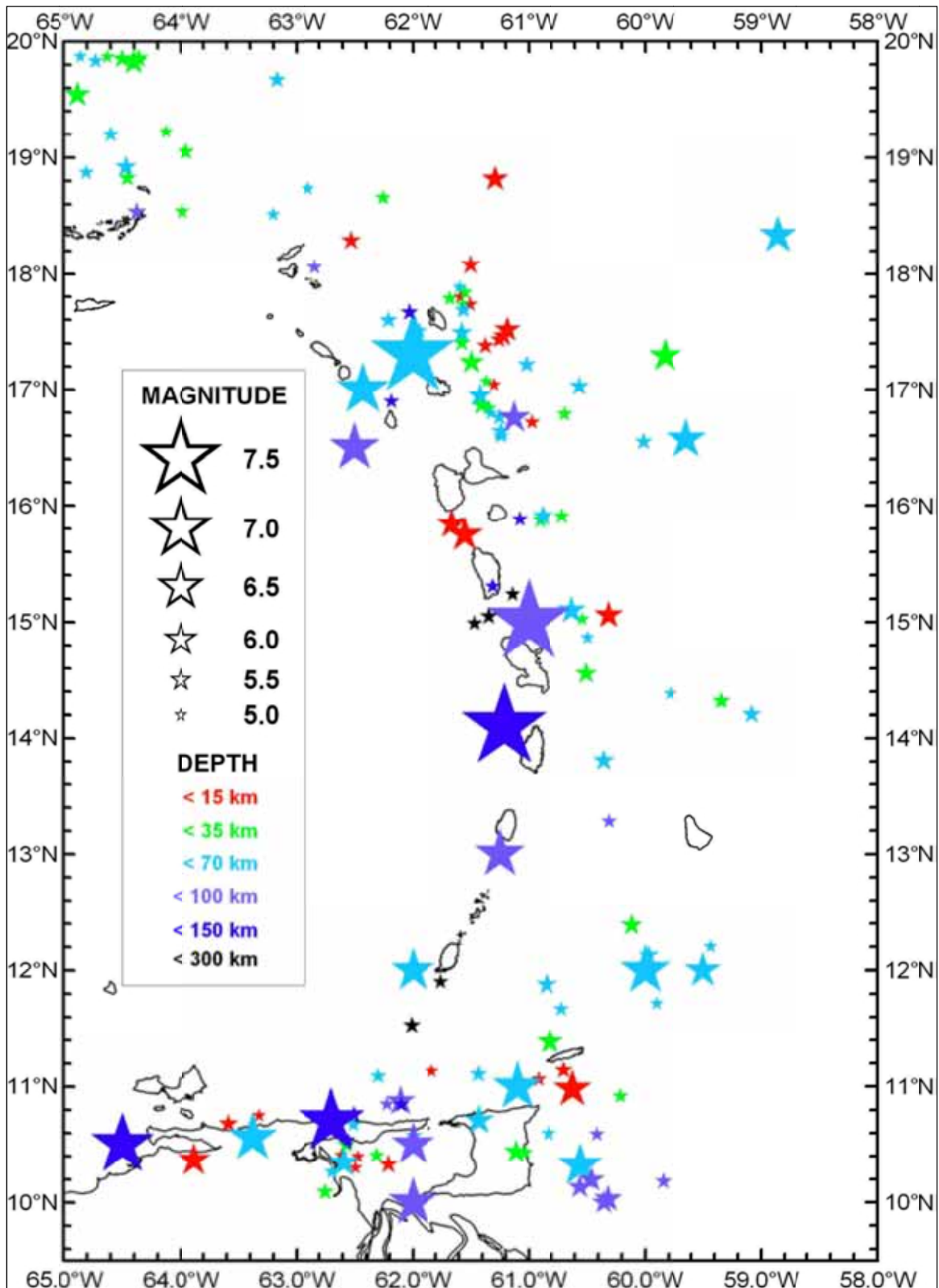


FIGURE 4-6: EARTHQUAKE EPICENTRES WITH MAGNITUDES > 5 - 1900 TO 2005
(Source: UWI SRC)

Most that occur close to Trinidad are low magnitudes, the last one having occurred on 8 August, 2013 North of the Paria Peninsula with a magnitude of 3.8 and depth of 77 km. The activity was reportedly felt in POS (UWI SRC, 2013).

Past earthquakes have been felt in POS. Figure 4-7 depicts the locations of 56 seismic events of varying magnitudes and depths that occurred between 2000 and 2010.



FIGURE 4-7: SEISMIC ACTIVITY IN TRINIDAD FROM 2000-2010 (Source: USGS)

Earthquakes occur regularly and some have historically caused damages, injuries and fatalities. See Table 4-3.

**TABLE 4-3: HISTORICAL EARTHQUAKE DISASTERS IN POS
(Source: ODPM & UWI SRC)**

Year	Location and Magnitude	Effects
2006	5.8	Felt throughout Trinidad. 3 reported injuries in Point Lisas.
1997	6.1	Significant damages to Tobago, 2 persons injured and 15 left homeless.
1954	North of Trinidad. M = 6.5	In Port-of-Spain good quality masonry structures collapsed. One person killed and many injured.
1918	North-west of Trinidad. M = 6.5	Most masonry buildings in Port of Spain destroyed.

1766	Close to Antigua. M > 8	Total destruction of all masonry buildings in Trinidad. Complete destruction of the economy. Casualties and cost unknown.
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Figure 4-8 depicts the seismic hazard map of PGA (g) for 2475 years return period for Trinidad and shows that accelerations of 0.55-0.60 g can occur on land Trinidad, with the higher values expected in the POS area. Expected impacts would take the form of damage ranging from severe to catastrophic. Ground failure would be expected in much of the reclaimed areas leading to loss of function of structures located there (UWI SRC, 2011).

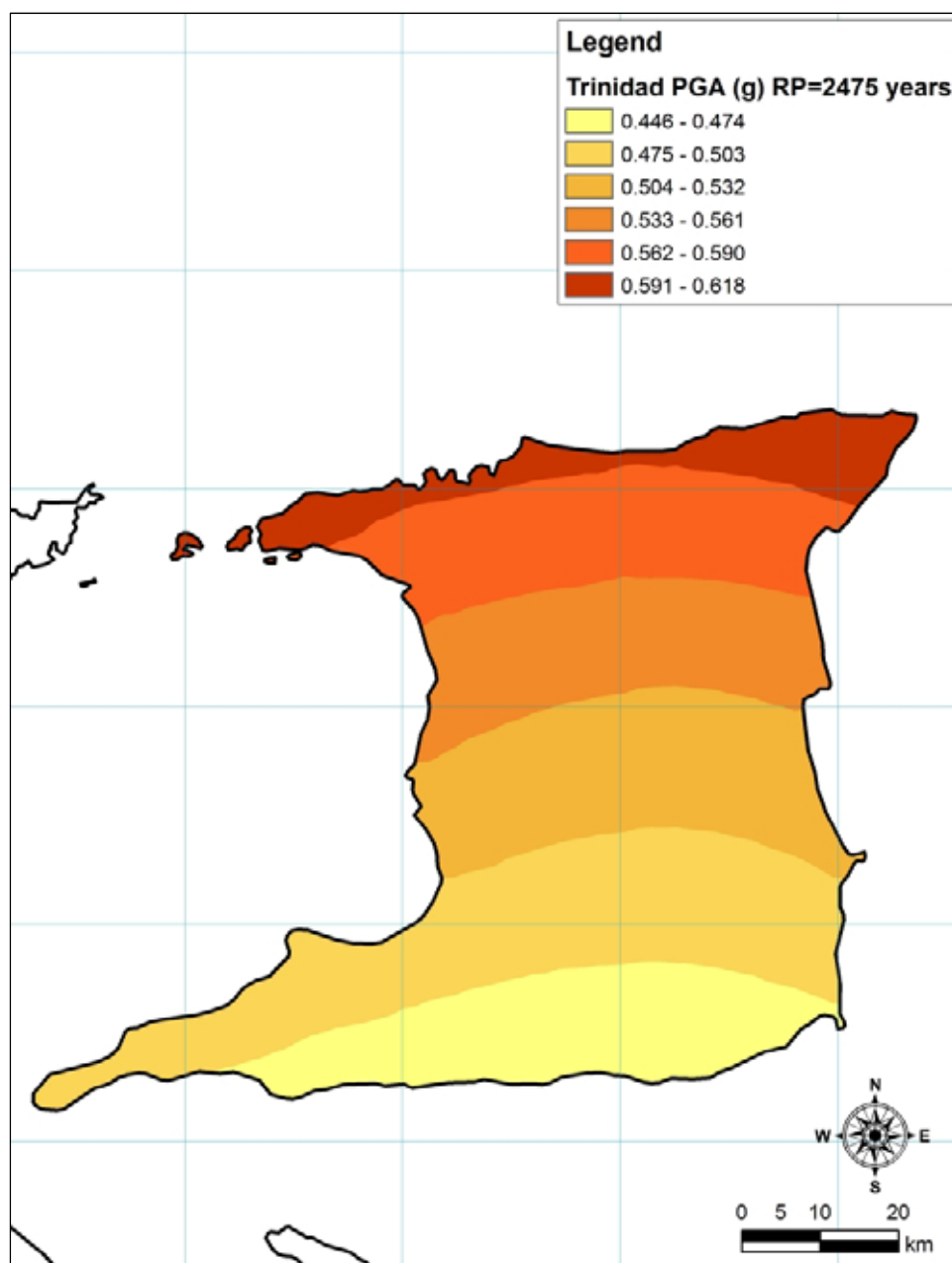


FIGURE 4-8: SEISMIC HAZARD MAP OF TRINIDAD (Source: UWI SRC)

The possible effects of earthquakes activity include:

- Collapsed structures;
- Damaged infrastructure;
- Slope movement;
- Tsunamis; and
- Liquefaction.

4.1.2.4 *Tsumamis*

Tsunamis in the Caribbean region have not created as much destruction to life and property as the other natural hazards. According to the Seismic Research Centre, a tsunami can form within the Caribbean in three instances:

- Regional shallow earthquakes (< 50 km depth) with magnitude > 6.5. In the past 500 years there have been ~50 local earthquakes with the potential to cause a tsunami but only 10-20% of these earthquakes actually generated tsunamis that caused significant flooding;
- Distant earthquakes occurring outside the Caribbean but producing ‘tele-tsunamis’; and
- Submarine volcanic eruption displacing water to generate a tsunami.

The recurrence rate for tsunamis in the Caribbean is approximately: 1 destructive tsunami per century for local earthquakes and 1 destructive tsunami per 200 years for distant earthquakes. It should be noted that these recurrence rates are small, but not negligible.

Even though Trinidad has not been affected by a major tsunami event, the possibility exists.

4.1.3 *Topography*

The geographical feature common to the POS region is the Northern Range. The Range stretches across the entire island width, a distance of approximately 96 km, between the Chaguaramas peninsula in the west and Toco in the east, but only 48 km of this falls within the Program area defined as POS (TCPD, 1975).

POS is a coastal city located on the north-western peninsula of Trinidad and on the foothills of the Northern Range. Most of the city is located on the gently sloping flat area bordered on the south by the Gulf of Paria. Some of the land is reclaimed from the sea and is in places less than 1.5 m above sea level. In the St. Ann’s catchment, the land rises sharply to form steep hillsides. In the Maraval catchment the rise is more gradual but culminates in similar steep hillsides. See Figure 4-9.



FIGURE 4-9: TOPOGRAPHY OF POS (Source: WRA)

4.1.4 Geology and Soil Characteristics

Bedrock throughout POS consists of low-grade metamorphic rocks of the Northern Range. The predominant lithology is phyllite and containing quartz lenses in variable quantities, and of varying sizes. Subordinate lithologies are fine grained limestone, and occasionally metaquartzite.

Surficial deposits of recent alluvium are present at the surface in the POS area, and in the valleys of Maraval and St. Ann's Rivers. The surface alluvium is mainly sand and gravel, with an appreciable clay and silt content (Millette, 1983).

Geological formations in the POS area and environs are of the oldest on the island dating back to the Upper Jurassic and Cretaceous period and are mainly of the Grand Riviere, Laventille and Rio Seco Formations. According to the Explanatory Notes to the Hydrogeological Maps of Trinidad and Tobago, published by the WRA in 1990, the deposits on which POS is built....are composed of mainly gravel with boulders interbedded with thin layers of sand and subordinate clay, derived from erosion of the Northern Range phyllites, limestone and quartzose rocks. See Figure 4-10.

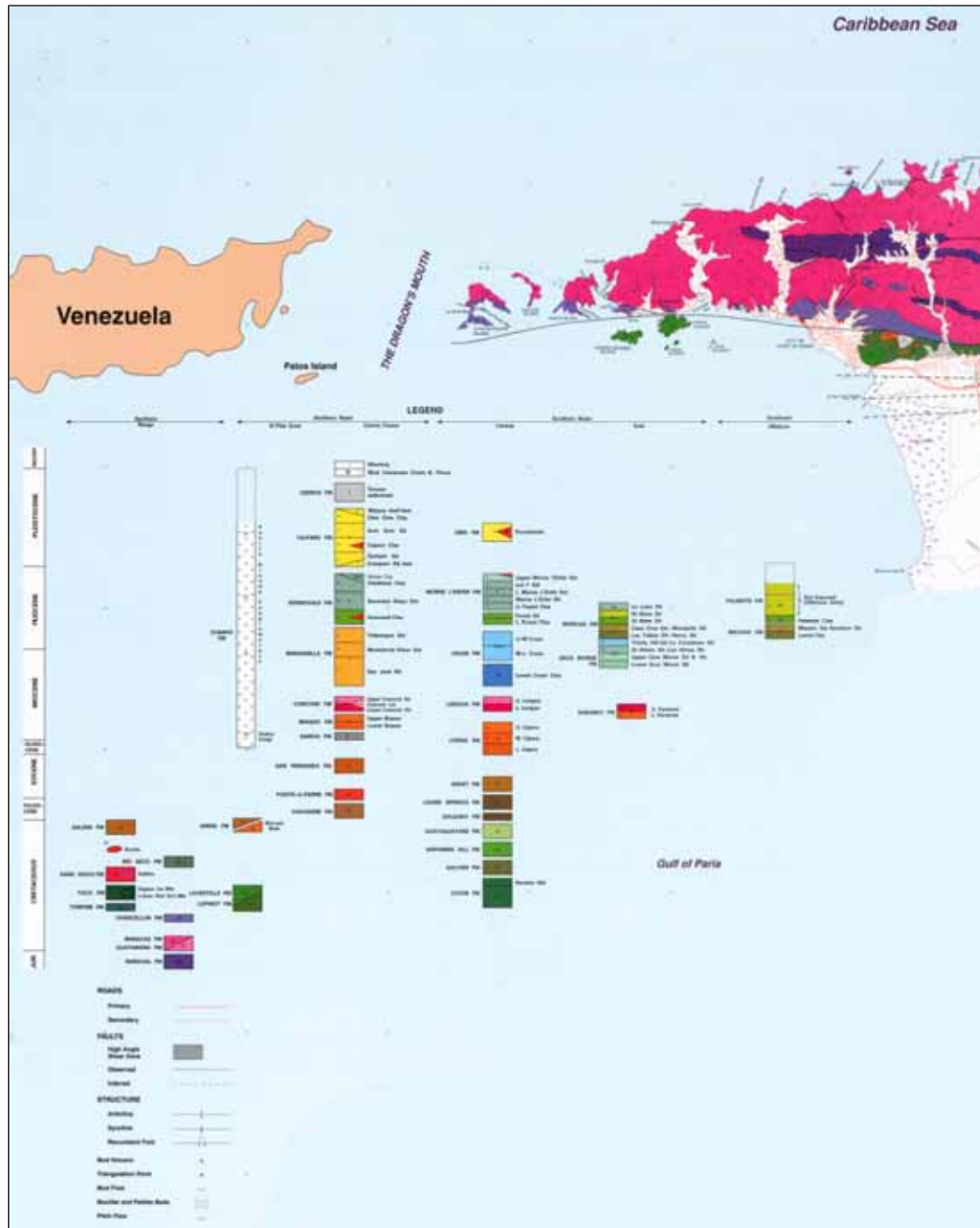


FIGURE 4-10: GEOLOGICAL MAP OF TRINIDAD SHOWING POS
(Source: WRA)

4.1.5 Hydrogeology

The alluvial deposits of the valley of the North-west Peninsula (North-west Peninsula Gravels) are of extreme importance to the groundwater supplies of POS since these POS Gravels are the main areas of groundwater occurrence and abstraction see Figure 4-11. Recharge to aquifers of the POS/Maraval well fields comprising the North-west Peninsula Gravels is provided mainly by rainfall entering the soil and reaching the impervious bed by normal filtration and by the passage of water through fractures and solution channels. Stream flow and subsurface flow are also significant contributors by which these large underground storage reservoirs are recharged (WRA, 1990).

The Queen's Park Savannah is an important water catchment area in POS. WASA pumps roughly one million gallons of water per day from this aquifer to supply Woodbrook and other areas.

4.1.6 Water Quality

4.1.6.1 Groundwater

Groundwater quality analyses show that the aquifers are of good quality and within limits set by World Health Organization for potability. However, there are problems associated with high iron, sulphate and phosphate content as well as saltwater intrusion in the POS Gravels due to large-scale withdrawal (EMA, 2004).

4.1.6.2 Surface Water

The extent of development and anthropogenic influence in POS and environs has led to decreases in rainfall infiltration and groundwater recharge rates. Simultaneously, surface runoff has increased causing physical pollution and occasional flooding.

The two major river systems which drain to the Gulf of Paria through POS become more polluted after passing through densely populated settlements in POS since they are informally providing low-cost receiving environments for both solid and liquid waste disposal. Solid waste ranges from household garbage to vehicles and white waste (appliances) while liquid waste includes sewage (from unsewered areas with improperly constructed and poorly maintained septic tanks or soak aways and pit latrines) and household grey water and industrial effluents. This has contributed to high BOD loading, faecal coliforms and low dissolved oxygen along the rivers. These rivers also show symptoms of moderate nutrient enrichment as they absorb and incorporate non-point source runoff and domestic wastes into enhanced organism biomass and abundance (EMA, 2004).

Indiscriminate solid waste dumping and improper land development in the upper parts of the catchment have also contributed to flash-flooding, especially in periods of unusually high rainfall and where drainage systems are inadequate. Soil erosion and siltation of these rivers has

HYDROGEOLOGICAL MAP OF TRINIDAD

SCALE 1:200,000

LEGEND

GROUNDWATER OCCURRENCE AND LITHOLOGY

- Integrating aquifers (sand)
- Integrating aquifers (gravel)
- Barren sands
- North West Porosity Sands
- East Porosity
- Upper Sand / Limestone
- Lower Sand / Limestone
- San Juan / Manganese Sand
- Barren Sand
- Manganese Sand
- Plutonic aquifer (basaltic)
- Plutonic aquifer to be investigated
- Sands with local and limited groundwater resources or none with potential to groundwater resources

STRATIGRAPHIC SYMBOLS

- Geological hydrogeological profile showing thickness of the aquifer system in metres
- Geological units
- Unconsolidated
- Consolidated
- Metamorphic
- Plutonic
- Basaltic
- Manganese

MAN-MADE FEATURES AND ALTERATIONS OF THE NATURAL GROUNDWATER

- Drilled well with screen in confined groundwater
- Group of drilled wells with piezometric or confined groundwater
- Drilled well, unconfined flowing
- Observation well
- 1-Basin aquifer system
- 2-Depth of well (m) or type of representative soil profile in cross-section
- 3-Plutonic water level (m)
- 4-Specific capacity (m³/hr) or electrical conductivity (mhos/cm)
- 5-Number of production wells in basin
- Private well
- Line of area of intense groundwater resources
- Flow lines
- Line with capacity of the aquifer in m³/hr

GROUNDWATER QUALITY

- Area of salt water intrusion
- Groundwater quality

GEOLOGICAL INFORMATION

- Fault (catastrophic fault line) or normal fault (normal line)
- Anticline
- Syncline
- Geological (hydrogeological or hydrogeological boundary)
- Line of area within (2) shallow depth

SURFACE WATER

- Stream with definite water course
- Stream with indefinite water course
- Open surface water divide
- Secondary water divide
- Primary flow gauging system
- Secondary flow gauging system
- Drilled area (m²)
- Area of record
- Dam
- Periodic fresh water use (including non-salty stream)

AQUIFER PRODUCTIVITY

- Specific capacity of wells superior to 4 m³/hr
- Specific capacity of wells between 1 and 4 m³/hr
- Specific capacity of wells between 0.1 and 1 m³/hr
- Specific capacity of wells superior to 1 m³/hr
- Specific capacity of wells superior to 0.1 m³/hr
- Without information

GEOGRAPHIC DATA

- Capital city Port of Spain
- Industrial city San Fernando
- Selected towns
- Department boundaries, in metres
- Main roads

GROUNDWATER AND SPRINGS

- Line of area with confined groundwater
- Line of area with significant natural groundwater in the groundwater

50

4.1.7 Air Quality

The main environmental issues for this Program are related to the generation of CO₂, other air pollutants and noise.

Historical long-term air quality data is not available for the Program area, but ambient air quality is expected to be good based on the following characteristics of POS.

- Atmospheric Dispersion - Moderately effective dispersion of airborne contaminants by the prevailing winds, absence of large topographical features and the absence of atmospheric inversions;
- Road Traffic - Traffic flows in the Program area varies from high to low. The dispersion characteristics of the areas suggest that air emissions from road traffic will not accumulate to concentrations in excess of the limits set for human health by the World Health Organization;
- Industries - There are no large manufacturing industries in these areas that would significantly degrade ambient air quality. The small number of potential emission points coupled with good dispersion characteristics of the areas suggests that there would be no accumulation of air contaminants to concentrations that would significantly degrade ambient air quality.

4.2 The Biological Environment

The City of POS is surrounded by varied environmental features. To the north is the Northern Range surrounding the city on 3 sides. To the south of the POS City is the Caroni Plain.

All packages of activities within this Program are situated within highly urbanized areas where original vegetation has been cleared and secondary vegetation is mostly confined to a few designated parks. Remaining natural features include the Queen's Park Savannah and the coastal areas of the Gulf of Paria.

In addition to being one of the oldest and largest urban parks in Trinidad and Tobago, the Queen's Park Savannah contains approximately 100 ha. of valuable habitat for a variety of species within a heavily urbanized area. The Savannah is also an important water catchment area with WASA pumping roughly one million gallons of water per day from this aquifer to supply Woodbrook and other areas.

The Maraval and St. Ann's Rivers delineating the area for intervention are themselves considered biologically diverse areas and accommodate pathways for fauna that spend part of their lifecycle in different locations.

Aquatic fish species within the lotic environment characterizing the higher reaches of the Maraval River include the abundant *Molliensia sphenops* (mollies), found only in this river in

Trinidad; the commercially important *Hypostomus robinii* (tetras), which is exported in large numbers as a popular aquarium fish. This particular species has a suckorial mouth which enables it to cling to its habitat surfaces and survive flooding. *Poecilia reticulatus* (guppies) and *Synbranchus marmoratus* (zanges) also characterize this environment (IMA, 1985). Various fauna, including a striated heron among other avifauna, were observed during site reconnaissance See Figure 4-12.



Little referenced information exists in the literature with respect to the biological environments of these rivers. However, recent attempts at ranking river basins in the northwest of Trinidad by degree of degradation revealed that these rivers are among the most degraded (EMA, 2004).

Lower Maraval River has also been reported to contain high levels of Zinc and trace concentrations of Cadmium (UWI, 2007).

Use of benthic organisms to assess anthropogenic impacts in the rivers of Trinidad and Tobago revealed that the upper and lower Maraval River was severely affected by land conversion. Upper Maraval River displayed severe levels of eutrophication. Lower Maraval River was severely impacted by organic pollution (UWI, 2007). Similar studies were not conducted for the St. Ann's River.

Implicit in the reliance on a Linear Park along the East Dry River is the preservation of the limnology of this river.

Within the Gulf of Paria to the south-west of the Northern Range, low gradients in conjunction with discharge of local rivers have produced now extensively transformed estuarine mangrove stands. Stands of mangrove forest exist along the Audrey Jeffers Highway, Mucurapo. Based on 2009 studies, these mangrove stands were collectively ~ 9.5 ha. At the mouth of the Maraval River and just south of it was an estuarine mangrove system estimated at 6 ha. and associated with tidal marshes, Figures 4-13, 4-14 and 4-15. The mangrove forest was mixed with red, white, black mangrove and the occasional buttonwood tree. Marsh species include *Sesuvium portulacastrum* (seaside purselane), *Cyperus ligularis* (sedge) and grass species, *Panicum spp.* and *Paspalum spp.* Some seaside mahoe (*Thespesia populnea*), seagrape (*Coccoloba uvifera*) and mangrove vine (*Rhabdadenia biflora*) were also present (Juman and Ramsewak, 2010).

Faunal species recorded in this wetland include Fiddler crabs (*Uca spp.*), mangrove crab (*Cardisoma gunahumi*), and birds - Cattle egret (*Bubulcus ibis*), Brown pelican (*Pelecanus occidentalis*), Yellow-crowned night heron (*Nyctanassa violacea cayennensis*), Great kissidee (*Ptyangus sulphuratus*) and Carib grackle (*Quiscalus lugubris*). There are also unconfirmed reports of Scarlet ibis (*Eudocimus ruber*), a locally designated vulnerable species and the National Bird of Trinidad and Tobago (Juman and Ramsewak, 2010).

North of the Maraval River system are mangrove stands fringing the coast while there is also a heavily impacted and fragmented stand east of the Audrey Jeffers Highway. This eastern stand has also been deprived of tidal flushing and has been partly cleared for built development and for dumping of derelict vehicles and solid waste (Juman and Ramsewak, 2010).

Just west of the eastern stand, mangroves fringe a polluted canal that opens to the sea. This was cleared in 2008 for the construction of a heliport. The other northern mangrove stands are fronted by mudflats and are impacted by unplanned housing (squatters) as well as pollution from solid waste. Some trees appear unhealthy as they show signs of fungal infestation and herbivory.

In the Sea Lots area existed ~1.8 ha. of fringe mangrove forest that once bordered the St. Ann's River mouth, Figures 4-16, 4-17 and 4-18. Most of this has been reclaimed for industrial areas as well as squatting (unplanned housing). The existing mangrove was heavily impacted and used for dumping of solid waste. The system opens into a shallow muddy bay rich in organic matter.

The mangrove communities in Mucurapo and Sealots have been going through cycles of loss and re-generation and would no doubt be impacted by activities on land and within the river systems.

This would include reclamation, hydrological alterations, sewage discharges, solid waste and chemical pollution. The residual communities in and around the mouths of the Maraval and St. Ann's River are worthy of protection; one of the positive impacts of this Program of intervention and its improvements to receiving water quality, solid waste and sediment loads. Proper mitigation measures will be applied during the construction phase in order to minimize any work-related impacts.



FIGURE 4-13: GOOGLE MAP OF MANGROVE AT MOUTH OF MARAVAL RIVER



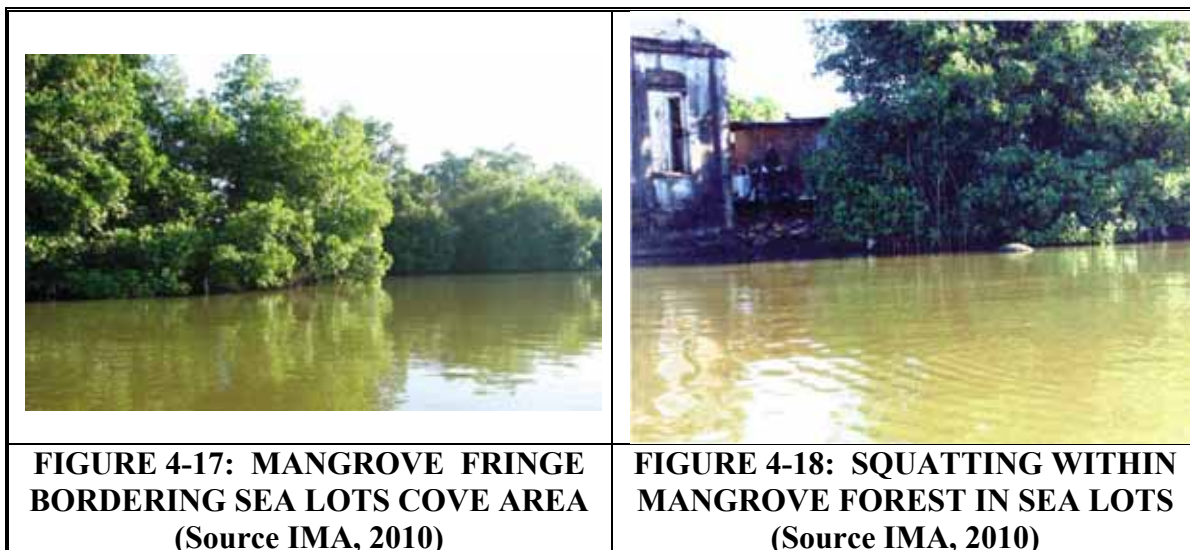
FIGURE 4-14: MANGROVE AT MOUTH OF MARAVAL RIVER. SILTED-UP IN 2009.
(Source: IMA)



FIGURE 4-15: MANGROVE AT MOUTH OF MARAVAL RIVER. 2013



FIGURE 4-16: SATELLITE IMAGE OF MANGROVE AT ST. ANN'S RIVER MOUTH & SEA LOTS COVE



Discharges from these watercourses with their land-based pollutants eventually outfall into the quasi-closed and sheltered Gulf of Paria (the mouth of the Caroni River) with flows driven during tidal flushing indirectly onto the Caroni Swamp. The Caroni Swamp is the largest mangrove wetland in Trinidad and Tobago, a declared RAMSAR site, a Prohibited Area under the Forestry Act and an ecologically diverse area consisting of marshes, mangrove, lagoons and tidal mudflats. The Gulf of Paria is an area of extensive commercial and artisanal fishing. There is a fish landing site in the Sea Lots area of POS with several local fish types being landed.

4.3 The Socio-cultural/economic environment

This section describes relevant referenced baseline characteristics of the social-cultural/economic environment in the proposed Program areas under the following headings:

- Population;
- Population and Employment Projections;
- Heritage and Culture;
- Squatting; and
- Traffic Conditions.

4.3.1 Population

Based on the 2011 census (CSO, 2011), the overall POS area has a de jure municipal population of 37,074. (Non-institutional - 35,914; Institutional - 854; Street Dwellers - 307).

The POS area in this Program correlates with the area identified as the “City of POS” in the census. The City of POS, which has one of the smallest administrative land areas (12 km²), is the most densely populated municipality, having ~ 3,090 persons/km² in 2011. This area

comprises 12,333 households with an average household size of 2.9 and an average annual rate of growth in population and households of -2.3% and -1.5% respectively over 2000 figures.

4.3.2 Population and Employment Projections

Census data has shown that the population within the administrative borders of the city of POS has decreased over a period of the 21 years between 1990 (46,901 persons) and 2011 (37,074 persons). A continuation of this trend might suggest that much of the population is being consumed by areas outside the boundaries of the POSCC. This decline is also attributable to a combination of conversion of housing to commercial use, and the decrease in household size.

The city of POS is the country's most developed centre and serves as the primary retail and administrative centre. It is also an important financial services centre for the Caribbean. Carnival is the city's main cultural festival and tourist attraction. The city is also home to the largest container port and is one of several major shipping hubs of the Caribbean.

Although Trinidad's economy is based on natural gas and oil, no heavy industrial sites are located in the city of POS. However, the major oil and gas companies and some service companies are headquartered here to be in close proximity to government services, infrastructure and high quality of life. Employment in the POS area is therefore characterized by a high reliance on private sector employment.

Figure 4-19 illustrates the distribution of commercial and institutional employers within and around POS in 2000; a significant aspect of which is the concentration of employment in the downtown core; part of the Program area. More recent data puts the number of business places and institutions at 5097 (Business Places – 5029; Institutions – 68) (CSO, 2011).

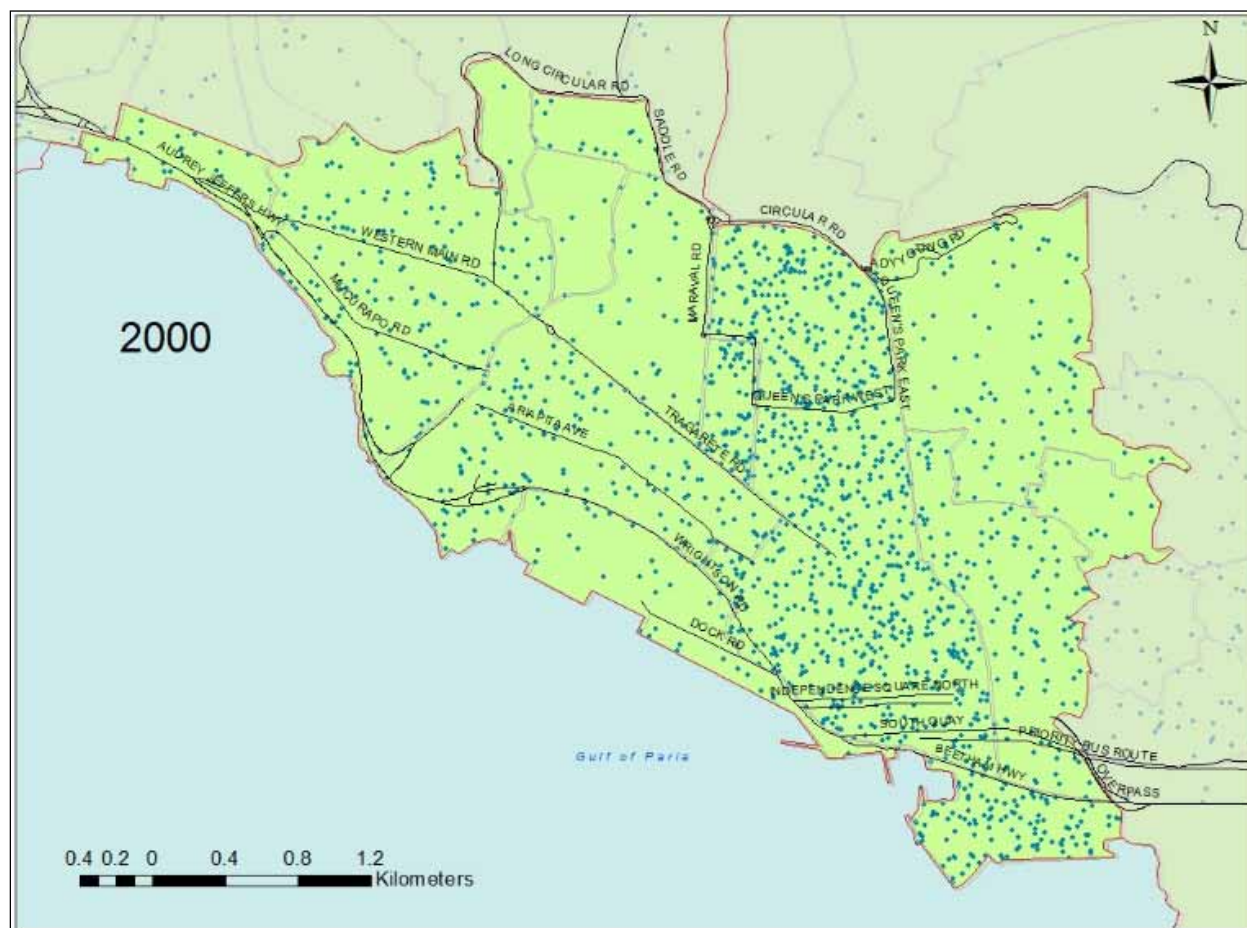


FIGURE 4-19: COMMERCIAL & INSTITUTIONAL EMPLOYERS IN POS
(Source: Interplan, 2010)

4.3.3 Heritage and Culture

The city of POS does have some heritage districts though there is no specific available inventory of historic buildings or sites.

Buildings located in the historical core between Independence Square and Park Street and between Richmond Street and Charlotte Street, i.e. Downtown, fall within the Program area and should be protected.

Other heritage districts include:

1. Surroundings of Victoria Square and St. Clair, including the Magnificent Seven buildings,
2. Lapeyrouse Cemetery,
3. Memorial Park,
4. Woodford, Lord Harris and Jackson Squares, and
5. Queen's Park Savannah.

Landmark buildings of Old POS include:

1. The Magnificent Seven (to be among buildings officially listed by National Trust as legally protected heritage sites by 31/8/2013 – T&T Guardian 8/8/2013),
2. Red House (among buildings awaiting assessment for listed status by National Trust – T&T Guardian 8/8/2013),
3. President's House,
4. Queen's Hall,
5. Grand Stand,
6. Trinity Cathedral, and
7. The Cathedral of the Immaculate Conception.

There are also several facilities known for accommodation of cultural events within the city of POS. Some are official, some commercial and others are used informally. Those cultural spaces located within the Program area include:

1. Museums,
2. Queen's Hall,
3. The National Academy for the Performing Arts,
4. Queen's Park Oval,
5. Community Centres,
6. Churches,
7. Mosques and Temples,
8. Pan Yards and Mas Camps, and
9. Schools and Playgrounds.

The street together with open spaces, however, remains the cultural space of first choice for public festivals and celebrations, e.g., Carnival, concerts, walkathons, marathons, public awareness events, etc. (Interplan, 2010).

4.3.4 Squatting

Surveys of the Program area revealed the presence of squatters at the mouth of the Maraval River, Figure 4-20. Squatter settlements are also present along the lower reaches and mouth of the St. Ann's River, Figure 4-21, as well as within the Sea Lots Cove area, Figure 4-22 with homes constructed crudely and without any setback from the watercourse. Over 80% of the residential population of Sea Lots relies on pit latrines for sewage disposal.

Several street dwellers also transiently inhabit the East Dry River Figure 4-23. They utilize the river for bathing, cooking and as a toilet. Recent attempts at quantifying this segment of the population place the street dweller population in all of POS at between 46 and 307 (CSO, 2011).

If during the execution of the Program the need for relocation of families is determined, the Bank's Policy for Involuntary Resettlement will be triggered and an Involuntary Resettlement Plan will be developed under the Program and according to the principles of the Draft

Resettlement Framework of Appendix C. The results of the detailed integrated hydrological modeling and assessment will be key in determining the need for setbacks or relocation of people. The model will provide detailed catchment information that will inform Final Design for projects under this Program. An evaluation of potential resettlement needs for the population at risk has been included in the TOR for this study being done by Consultants DHI.



FIGURE 4-20: SQUATTING IN MANGROVE AT MOUTH OF MARAVAL RIVER. 2013



FIGURE 4-21: SQUATTING IN MANGROVE AT MOUTH OF ST. ANN'S RIVER. 2013



FIGURE 4-22: SQUATTING IN MANGROVE IN SEA LOTS COVE AREA. 2013



FIGURE 4-23: SEGMENT OF 1.4 KM LINEAR PARK WITH STREET DWELLERS. 2013

4.3.5 Traffic Conditions

The traffic conditions in downtown POS are generally very poor.

Narrow one-way streets with restricted flow due to illegal parking, illegal stopping, double parking, delivery off-load, and a shortage of good arterial routes for cross town traffic all contribute to very poor traffic flow during most daylight hours when businesses and offices are open. Morning and afternoon rush hours have trended toward one continuous period of heavy traffic. The traffic light sequence combined with the length of street between traffic lights and traffic volume has significantly impacted on the traffic condition in POS.

Collector streets include Richmond, Park, Charlotte, Pembroke, Henry, Cipriani Blv., Belmont Circular Road. Arterial streets include Wrightson Road and Queens Park West, Ariapita, and Tragarete. These roads are also heavily congested with traffic during peak hours, and throughout the week days. Figure 4-18 illustrates the average daily traffic volumes in POS on the above roads, and also indicates the direction of one-way streets.

Significant disruption to traffic is anticipated in the Program area for the duration of construction.

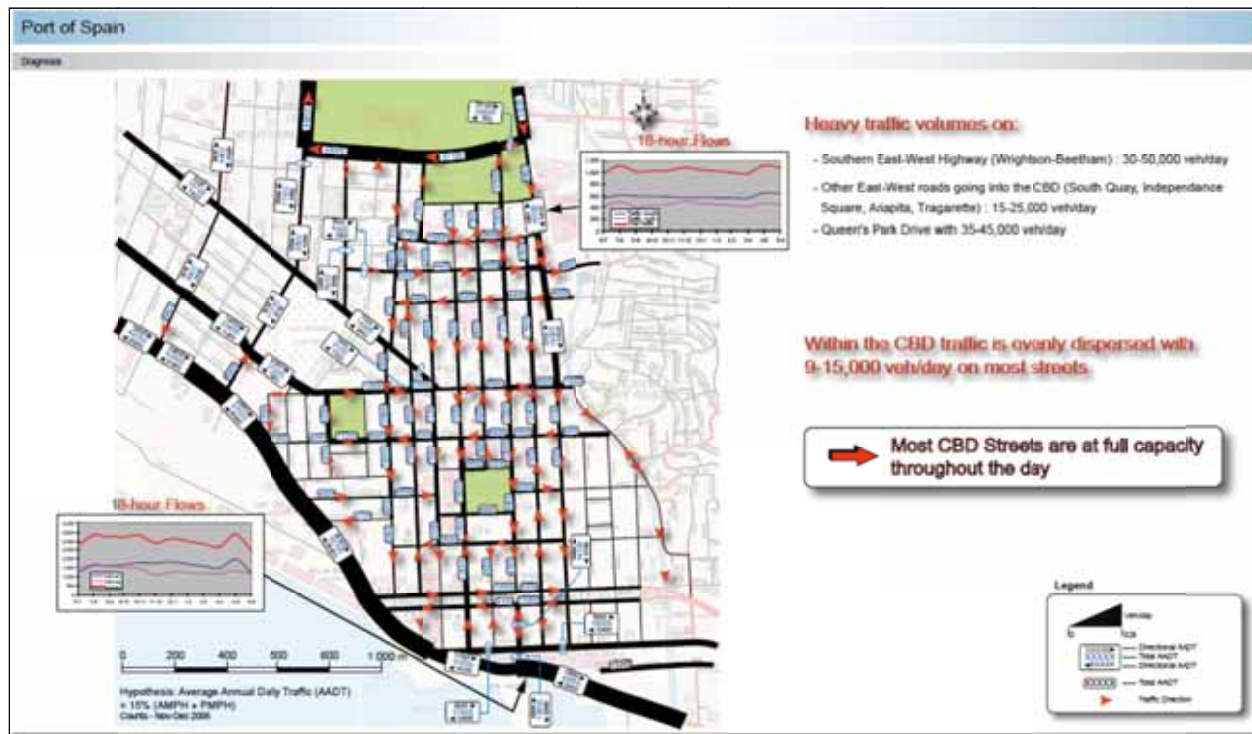


FIGURE 4-24: POS TRAFFIC VOLUMES (Source: GENIVAR)

5 IDENTIFICATION OF POTENTIAL IMPACTS

This Chapter identifies, presents and evaluates the following likely environmental and social impacts of the proposed Program through a systematic analysis of the likely or predicted environmental effects on the physical and social-economic/cultural resources:

- The Positive Impacts and expected benefits of the proposed Program;
- The potential Adverse Impacts associated with the activities of the Program;
- Cumulative Impacts;
- Potential Economic Impacts;
- Classification of this Program;
- Climate Change and possible long-term potential impacts of this Program; and
- Natural Hazards.

To ensure that likely impacts were identified in a comprehensive manner, a variety of resources were used to identify likely impacts. These included:

- Overlaying the project components with baseline information on the environment;
- Experience from similar projects in Trinidad and worldwide; and
- Published information about impacts of similar projects.

Impacts were identified along the following categories:

5.1 Positive Impacts

This intervention Program would have and contribute significantly to increased overall socio-economic benefit as there would be a significant reduction in the degree of and propensity for flooding in the POS area.

Given the attendant effects of urban flooding on both the human and natural environment, the overall net environmental impact is positive. Additionally, several of the identified positive impacts are expected to be significant, long in duration and local to national in scope.

Direct positive impacts of this Program include:

- Abatement of nuisances and public health hazards in the flood-prone areas of POS;

- Reduced peak flows and improvement to receiving water quality of the Gulf of Paria. This would be due to reduced sediment load from upper catchment related soil erosion and organic waste derived mostly from unsewered areas utilizing improperly constructed and leaking septic tanks / pit latrines and illegal storm drain connections;
- Improved adaptive capacity of POS to anticipated impacts due to Climate Change and Sea Level Rise;
- Reduction in land based sources of marine pollution by solid waste in particular due to extensive use of floating trash collectors. This positive impact would be increased several-fold if the Program area should become the beneficiary of any incentivized solid waste intervention targeting recyclables in the first instance;
- Reduced risk of health problems likely to arise due to contamination of water bodies when sewage disposal systems (septic tanks, pit latrines) are disrupted by flooding;
- Promotes an integrated approach to storm water management serving the dual objective of winning additional water for WASA by promoting runoff infiltration and thus providing enhanced recharge of groundwater aquifers in the region of the Queen's Park Savannah;
- Assist in bridging social divide between east and west regions of the East Dry River, alleviate crime and increase amenity value derived from the use of the Linear Park;
- Improved socio-economic benefit related to improvements in the quality of life as well as productivity to the users of the Program area; and
- Improved institutional capacity and ability to handle issues surrounding urban environmental management.

This Program of intervention is also expected to have the indirect benefit of stimulating economic activity during construction stemming mostly from contracts being awarded to local contractors and subcontractors together with the purchase of locally-produced construction material.

5.2 Adverse Impacts

In order to objectively evaluate potential impacts resulting from the proposed project activities, a simplified significance class was developed and used.

The objective of this methodology was to identify environmental resources most at risk from the proposed Program and to focus mitigation and management strategies to reduce this risk to as low as reasonably practicable.

The significance of each potential environmental impact identified was evaluated and assigned one of three significance classes.

Impacts were evaluated given information provided, information gathered during site reconnaissance and meetings and use of a number of composite criteria representing an overall impact significance rating detailed in Table 5-1 including:

- Duration;
- Intensity;
- Spatial Extent;
- Type (direct, indirect, cumulative); and
- Probability.

TABLE 5-1: ASSESSMENT OF IMPACT SIGNIFICANCE

Duration	What is the length of the negative impact?
Short	< 0.5 year.
Medium	0.5-1 year.
Long	> 1 year.
Intensity	What is the effect on the environment within the Program area?
Low	Affecting < 5% of the environmental.
Medium	Affecting 5-15% of the environment.
High	Affecting > 15% of the environment.
Spatial Extent	What is the scale of the impact in terms of area, considering cumulative impacts and national importance?
Small	Impacting the immediate site, localized.
Medium	Impacting site surroundings.
Large	Impacting the region or wider.
Type	What is the impact?
Direct	Caused by the Program and occurs simultaneously with Program activity.
Indirect	Associated with the Program and may occur at a later time or wider area.
Cumulative	Combined effects of the Program with other existing/planned activities
Probability	What is the likelihood of an impact occurring?
Seldom	< 25%, or Program conditions unlikely to allow impact to occur.
Occasional	25-75%, or conditions could allow impact to occur in the Program.
Probable	> 75%, Impact reasonably expected to result from Program.

Comparison of the evaluation criteria yielded three levels of overall impact significance. The final significance class established and used is shown in Table 5-2

TABLE 5-2: IMPACT SIGNIFICANCE CLASS

Class	Significance	Description/Comments
3	Major Negative Impact	Impacts are likely to be medium to long term, not easily reversible, high intensity, regional to wider in extent, direct/indirect and occasional to probable in occurrence.
2	Moderate Negative Impact	Impacts are considered to be short to medium term, reversible, medium intensity, regional in extent, direct/indirect and seldom to occasional in occurrence.
1	Minor Negative Impact	Impacts are considered to be short term, highly reversible, low intensity, localized in extent, direct/indirect and seldom in occurrence.

The potential adverse impacts of this Program are listed in Table 5-3, showing the various broad task categories of the Program during which each impact may arise. The potential adverse impacts are discussed in the following sections.

TABLE 5-3: POTENTIAL ADVERSE UNMITIGATED IMPACTS OF THE PROGRAM

POTENTIAL ADVERSE IMPACT	BROAD TASK CATEGORIES		
	DEMOLITION	EXCAVATION & EARTHWORKS	BACKFILLING & REINSTATEMENT
Air Quality			
Noise and Vibration			
Odours			
Water Quality			
Utility Services Disruptions			
Obstruction of Access			
Traffic Disruptions			
Aesthetics			
Waste Management			
Cultural Heritage			
Health and Safety			
Emergency Situation Response			

As a compliment to the qualitative evaluation of the environmental impacts presented, the comprehensive hydrological study currently being undertaken by Consultant DHI will include an EIA utilizing detailed modelling of the Program area and would include a module for water quality and sediment loading. The model will provide a detailed technical and quantitative basis for impact assessment that will be considered in the Final Design of the projects within this Program and will allow for a better mitigation measures. The technical recommendations from this analysis will be included in the studies needed in attainment of the CECs.

5.2.1 Air Quality

Degradation of ambient air quality would occur during the construction related activities related mostly to the demolition and excavation activities of this Program. These potential air quality impacts are primarily from emissions of combustion products and the production of dust as a consequence of the movement of vehicles and equipment and loose soil and aggregates.

Products of combustion, such as nitrous oxides (NO_x), sulphur dioxide (SO₂), particulate material (PM_x), carbon monoxide (CO) and volatile organic compounds (VOCs) will be emitted. Combustion products can affect the pulmonary system of humans and animals. Some are also known asphyxiants.

Dust, in addition to being a nuisance, is a health hazard linked to asthma and other breathing disorders. Exposed loose soil arising from the construction activities of this Program would contribute to emissions, particularly if construction activities occur during the dry season.

Emissions from all sources and during all phases are very likely to be localized and transient with minor impacts on ambient air quality.

5.2.2 Noise and Vibration

Fugitive noise emissions will occur during the construction phases of this Program. Most of the noise will be attributable to the use of equipment and large vehicles as well as general construction noise related to demolition and excavation activities. The impact will be tempered by the recognition that the noise will be generated in an existing urban area where ambient noise levels are already elevated such that added noise sources will be somewhat merged rather than absolutely added.

All noise emissions are likely to be localized and transient with moderate impacts.

5.2.3 Odours

Fugitive odours will occur during intermittent sewer pipe connection/reconnections. Again, these emissions are likely to be localised and transient with minor impact.

5.2.4 Water Quality

Soil erosion and increased sedimentation affecting surface water quality are likely to occur with the construction related activities of this Program. Soil erosion and sedimentation of runoffs are likely to be exacerbated during the rains resulting in possible sedimentation of nearby water bodies and the coastal wetlands at the mouths of the rivers due largely to exposed earthworks and trenching. If the impact is significant, it is likely to result in the creation of standing water bodies, affect local drainage patterns and possibly contribute to localized flooding and reduced drainage flows. This impact is likely to be moderate, but can be significant if construction activity occurs during the rainy season and in the absence of proper construction practices. Proper mitigation and abatement measures will be deployed to minimize such impacts.

Surface water quality is also likely to be affected during the construction related activities by improperly disposed solid waste as well as by spills and leaks of hydrocarbon (fuels and lubricants) from construction equipment. This impact is considered minor given normal construction practices in Trinidad and Tobago.

Groundwater quality is unlikely to be significantly affected. The POS area is known to have a high water table, particularly as one gets closer to the coastline. Any groundwater encountered during the Program activities will be shallow groundwater that is not commercially exploitable, meaning that this water is not from an aquifer that is used by WASA or other private well owners. Because the excavation and trenching is relatively shallow, groundwater is unlikely to be encountered during these activities. Groundwater, however, can be impacted if there are spills of oil or fuel from construction vehicles or spills of hazardous material used during construction.

5.2.5 Utility Services Disruptions

The proposed Program can potentially impact existing utility pipes/lines (T&TEC, TSTT, NGC, WASA, Columbus FLOW etc.) and services (e.g. waste collection) as a consequence of excavation works during the construction activities. The risk of accidental rupture/interference of existing utility lines is particularly great for unmapped or improperly mapped utilities. Additionally, there may also be the temporary intentional service interruptions to facilitate excavation and other works. This impact is considered major and can be localized to widespread in scope.

5.2.6 Obstruction of Access

The impact due to obstruction of access within the Program area is expected to be significant for the duration of the construction related activities. This is anticipated to impact access to institutional services, residential and commercial areas. It is likely that there would be a subsequent temporary decline in the level of economic activity in the commercial areas. This impact is expected to be major and likely to have more than a localized effect.

5.2.7 Traffic Disruptions

The most significant and widespread predicable impact of this Program would be to the vehicular and pedestrian traffic. During various phases there will be road closures, particularly where the road is very narrow. It is expected that without mitigation, the Program area would experience severe vehicular and pedestrian traffic disruptions, delays and obstructions.

Increased traffic congestion and temporary obstruction of access to community services, residential and commercial areas during the execution of construction works could occur. Increases in travel times and the likelihood of traffic accidents are also predicted.

A Traffic Management Plan would be developed prior to commencement of works and in collaboration with the POSCC and the Traffic Management Branch of the Trinidad and Tobago Police Service. This will ensure that when construction works begin, traffic disruptions and disruptions to lifestyle and commerce within the Program area will be minimized. This plan would cover vehicular traffic, pedestrian traffic and equipment transport. It is expected to comprise of a schedule of temporary road closures, and the appropriate detours to be used. The plan is expected to outline details for minimizing disruption to business, minimizing dust generated and delay to public transport.

5.2.8 Aesthetics

The proposed Program is expected to produce temporary loss in aesthetic character for the duration of the Program. This impact is expected to be minor and transient.

5.2.9 Waste Management

The proposed Program will generate large amounts of waste. Construction activity will generate large amounts of construction waste (e.g. removed and possibly contaminated pipe portions, unusable earth material etc.) and domestic type solid waste and human waste by the labour force. The impact is anticipated to be minor.

During the operation and maintenance phase, the generation of solid waste and sediment is likely. Proper mitigation measures will be included under an Operation and Maintenance Plan. Special attention will be given to the management of hazardous material (e.g. hydrocarbon contaminated sediment) needing disposal and arising from the cleaning activity.

5.2.10 Cultural Heritage

The proposed Program can potentially cause loss of value arising from accidental encroachment, damage or destruction to historical/archeological/cultural artifacts, remains, areas, monuments and buildings. The impact is anticipated to be minor based on appropriate construction measures being taken to protect their integrity and function.

5.2.11 Health and Safety

Potential impacts to public health and safety are likely to arise during all construction related activities along public roadways. Additionally, there is an increased risk of accidents and sickness to workers. Ensuing chaos, downtime and injury during emergency situations can potentially exacerbate the likelihood of this impact. Worker safety issues are considered to be major particularly during the demolition and excavation tasks. For all tasks, the public is exposed to danger due to inadvertently wandering onto improperly hoarded construction sites. An additional risk exists during the refurbishment related activities as well as during the operational phase regarding the detention and retention facilities. However with proper fencing and security, this concern would be reduced to a minimum. Contractors hired for works will be responsible for the implementation of the Health and Safety Plans. These would be budgeted for each project and included in the bidding requirements.

5.2.12 Emergency Situation Response

Activities of the proposed Program can potentially affect response time to and management of emergency situations in the affected areas and/or work sites and especially during a natural hazard likely to compound existing flooding problems. This may be exacerbated by inadequate provisioning of resources (fire services, police, EHS etc.) as well as the absence of an Emergency Prevention and Response Plan prior to the commencement of works. This impact can be moderate to major in significance and can be localized to widespread in scope.

5.3 Cumulative Impacts

Potential environmental impacts occurring solely from the proposed Program activities may not be considered to represent risk that warrants significant management action. However, when a specific potential impact is added to an existing impact or impacts from ongoing or other known future proposed projects, the risk may be unacceptable to project stakeholders.

Extensive searches were conducted utilizing EMA's database of CEC applications for POS and environs to determine whether there were potential projects likely to be implemented at the same time. At the time of conducting this analysis there were no other activities presently or likely to be underway in the areas of the proposed Program that would contribute to significant and potentially negative cumulative environmental impacts.

There are, however, four (4) proposed projects (projects that have been advanced to the public disclosure stage or reasonably foreseeable projects) that could contribute potentially negative cumulative impacts to this project. While not having yet advanced to the CEC stage, these projects are:

- The POS Central Business District Infrastructure Rehabilitation Project;

- Projects ensuing from the Urban Master Plan for the Greater POS;
- Port of POS Relocation (*T&T Guardian*, 07/04/2013, 06/08/2013; *T&T Newsday*, 28/04/2013, 06/08/2013); and
- Sea Lots Dry Dock Facility (EMA, pers. commun., 2013).

While there is uncertainty surrounding when, if at all, these projects would commence, potentially negative cumulative impacts would be related to those already discussed with the respective impacts likely to be moderate to major. This would be determined on a case-by-case basis throughout the Program and appropriate mitigation measures implemented cognizant of all construction.

5.4 Economic Impacts

Only one potentially adverse impact is relevant to this Program and is mentioned here for completeness.

5.4.1 Resettlement Issues

Based on the information related to the Program, it does not appear that resettlement will be required at this time. If resettlement becomes necessary, it must be done in conformance with provisions of the IDB's Involuntary Resettlement Policy (OP-710). According to this Policy, operations which may require resettlement will be evaluated and prepared according to two fundamental principles:

1. Every effort must be made to avoid or minimize the need for involuntary resettlement. A thorough analysis of project alternatives must be carried out in order to identify solutions that are economically and technically feasible while eliminating or minimizing the need for involuntary resettlement. Particular attention must be given to socio-cultural considerations, such as any cultural or religious significance of the land.
2. When displacement is unavoidable, a resettlement plan must be prepared to ensure that the affected people receive fair and adequate compensation and rehabilitation.

A Draft Resettlement Framework has been prepared and would be included in the ESMP. If during Program execution resettlement becomes an issue, the IDB policy will be triggered and a Resettlement Plan would be prepared in accordance with procedures established by the Resettlement Framework and approved by the IDB. This would constitute a clause in the Program's Operations Manual.

5.5 Classification of this Program

The classification of operations under IDB Environmental and Safeguards Compliance Policy was described in Chapter 3. This Program is classified as **Category “B”** – Operations likely to cause mostly local and short-term negative environmental and associated social impacts and for which effective mitigation measures are readily available. These operations require this prepared ESA, according to and focussing on, the specific issues identified in the screening process, and an Outline ESMP, provided in Appendix B.

5.6 Climate Change and Sea Level Rise

As is the case for most Small Island Developing States (SIDS), Trinidad and Tobago is particularly vulnerable to climate change due to:

- Coastal zone concentration of population, socio-economic activity and infrastructure.
- High population densities, especially in urbanized coastal areas.
- Limited physical size.
- Susceptibility to frequent and more intense tropical storms, hurricanes and associated storm surges and floods as a consequence of being located at the southernmost outskirts of the Atlantic Hurricane Belt. Trinidad and Tobago is also located on the Circum-Caribbean Tectonic Belt, which has produced several large earthquakes since 1990.
- Dependence on water resources for freshwater supplies that are sensitive to sea-level changes.

5.6.1 Climate Change Predictions

The United Nations Development Program (UNDP, 2008) has established Climate Change Country Profiles for the world.

Observed trends in climate change for Trinidad and Tobago since 1960 include:

- Mean annual temperature increased by $\sim 0.6^{\circ}\text{C}$, an average rate of 0.13°C per decade.
- Mean rainfall has decreased fractionally but is not a statistically significant trend. The largest changes are in the wet season months of June, July and August where, on average, rainfall has decreased by 6.1 mm per month (2.6%) per decade.

Projections of future climate in Trinidad and Tobago include:

- Mean annual temperature projected to increase by 0.7 to 2.6°C by the 2060s, and 1.1 to 4.3°C by the 2090s. Projections also indicate substantial increases in the frequency

of days and nights that are considered ‘hot’ and decrease in the frequency of days and nights that are considered ‘cold’.

- Mean annual rainfall projected to decrease with median projections varying between -13 and -21% by the 2090s. The proportion of total rainfall that falls in heavy events decreases, changing by -20 to +7% by the 2090s. Maximum 5-day rainfalls tend to decrease changing by -29 to +20 mm by the 2090s.

Additional regional climate change information includes:

- Wide disagreement in projected changes in amplitude of future El Nino events, contributing to uncertainty in future climate variability in projections for the region.
- The Caribbean islands are vulnerable to sea-level rise. Sea-level projected to rise by as much as 0.18 to 0.56 m by the 2090s, relative to 1980-1999 sea-level.

5.6.2 Altered Impacts

Urban drainage in POS is vulnerable to sea-level rise. Although flooding is influenced by a large number of factors, and despite large uncertainties in sea-level rise projections, a projected increase in sea-level of up to 2.15 m by 2100 will significantly change hydraulic condition in the lower reaches of POS’s urban rivers and in the low parts of the storm drainage network. This was the outcome of a study commissioned by DHI under continuous IDB support, by Technical Cooperation, to the GORTT for Climate Change and Sea Level Rise (DHI, 2012).

While climate change is not expected to alter the potential impacts during the construction phase, there would be altered impacts during the operation phase. This can only be reasonably mitigated during a design phase that treats urban drainage from the standpoint of long-term sustainability by incorporating adequate provision for increased peak flows (frequencies and intensities) likely to be associated with climate change. Climate Change and Sea Level Rise considerations are presently being incorporated into the design phase through the currently commissioned study by Consultants DHI.

5.7 Natural Hazards

The possibility of a natural hazard affecting the Program area is described in Chapter 4. The likeliness of an earthquake is moderately high with the POS area being affected in the same magnitude as the rest of Trinidad. Hurricanes and flooding from heavy rainfall have a high possibility of occurrence and can exacerbate the existing flooding issues in the Program area during construction. This impact is likely to be major. Flooding mitigation is not only inherent in the design and design criteria, but also in the best practices to be utilized during construction.

6 MITIGATION, MANAGEMENT AND MONITORING

This Chapter discusses:

- Mitigation Measures that may be applied to reduce (or where possible, eliminate) adverse impacts;
- The Outline Environmental and Social Management Plan for this Program; and
- Other Management Plans for this Program.

6.1 Mitigation Measures

6.1.1 Construction Phase

Table 6-1 summarizes mitigation and management measures which may be employed to reduce (or, where possible, eliminate) adverse impacts arising during the construction phase of this Program.

6.1.2 Operational Phase

Table 6-2 summarizes mitigation and management measures which may be employed to reduce (or, where possible, eliminate) adverse impacts arising during the operation phase of this Program. These impacts are considered relatively minor and can be readily mitigated.

TABLE 6-1: PROPOSED MITIGATION MEASURES DURING CONSTRUCTION PHASE

POTENTIALLY ADVERSE IMPACTS	IMPACT DESCRIPTION	PROPOSED MITIGATION MEASURES
Air Quality	1. Impairment and degradation of ambient air quality from vehicular and equipment emissions (VOCs, NO _x , SO _x , CO, PM _x) and dust caused by movement of vehicles, personnel, etc. Nuisance and health hazards for travelers, residents and users of the area.	<ul style="list-style-type: none"> – Minimize emissions through periodic maintenance of vehicles and equipment/machinery to manufacturer's specifications. This will ensure compliance with guidance provided by the EMA Draft Air Pollution Rules. – Enhance traffic management to optimize and control pre-construction and construction traffic. – Establish and enforce speed limits (< 20km/hr) within construction zone and periodically wet roads (and sites) where necessary using aqueous Calcium Chloride (or water) as a dust palliative to minimize fugitive dust. Wash truck tyres prior to leaving work site. – Clear only area needed for construction. – Keep stockpiles to a minimum and utilize as soon as practical. – Install, operate and maintain dust control measures (e.g. geotextiles/ tarpaulins) on stockpiles, esp. fine-grain granular material /aggregates and other raw materials, topsoil etc. when not used or store aggregates in bins or silos. – Securely cover all transport vehicles hauling fill material and spoil. Material should be transported in a dampened state, where practicable. Minimize handling fine-

POTENTIALLY ADVERSE IMPACTS	IMPACT DESCRIPTION	PROPOSED MITIGATION MEASURES
		grain granular material from significant heights above ground to reduce dust generation and dispersion.
Noise and Vibration	2. Noise pollution produced during the movement and use of heavy equipment, tools and vehicles. Nuisance and health hazard for travelers, residents and users of the area.	<ul style="list-style-type: none"> - Use quiet equipment, where possible. - Enhance exhaust inspection. Installation (and maintenance) of mufflers/silencers on all noise-producing tools, vehicles and equipment requiring them. If noise is excessive, vehicle or machinery wouldn't be used. - Regularly schedule equipment and vehicular maintenance and tune-up to keep their noise at a minimum. - Pursuant to the Noise Pollution Control Rules 2001, perform all work strictly during regular business hours. (i.e. active working daytime hours instead of resting late night and early morning hours). 7:00 am to 7:00 pm Mon. to Fri. 8:00 am to 1:00 pm Sat. No work on Sun. or Public Holidays. If work must be performed work outside these hours and noise levels are likely to exceed the specified standards, MEWR, Drainage Division would apply for and obtain a noise variation from the EMA. - Periodically monitor to ensure that noise and vibration levels meet acceptable statutory requirements detailed in the EMA Noise Pollution Control Rules, 2001 i.e.

POTENTIALLY ADVERSE IMPACTS	IMPACT DESCRIPTION	PROPOSED MITIGATION MEASURES
		<p>120dB for Zone III – General areas.</p> <ul style="list-style-type: none"> – Erect appropriate hoarding and physical/vegetative temporary noise barriers/screens and heightening fencing walls, where possible and according to monitoring results. – Inform area residents and users in advance about the nature of the proposed project one (1) month prior to the commencement of works through advisories and public announcement and at least two (2) public consultations. – Develop comprehensive public and agency consultation Program to ensure stakeholder input.
Odours	3. Transient odours during drainage and potential sanitary sewer reconstruction. Nuisance and health hazard for travelers, residents and users of the area	<ul style="list-style-type: none"> – Minimize odours by maintenance of good work practices. – Cover dumpsters/trucks used to temporarily contain drain waste. – Use vacuum tankers to receive septage, if needed. – Ensure all waste is hauled off-site on a scheduled and timely basis. – Use odour suppressing chemicals ensuring use is compliant with OSH rules.
Water Quality <ul style="list-style-type: none"> – drainage and flooding – soil erosion & sedimentation – landscape degradation – leaks and spills 	4. Flash flooding or standing water conditions due to blockage of natural watercourses and modification of natural drainage patterns.	<ul style="list-style-type: none"> – Use of temporary storm drainage diversion channels (in consultation with MEWR, Drainage Division) around trenches that do not interfere with natural water flows. – Shore adequately to protect against trench

POTENTIALLY ADVERSE IMPACTS	IMPACT DESCRIPTION	PROPOSED MITIGATION MEASURES
	<p>5. Soil erosion and landscape degradation during rains with possible sedimentation/siltation of nearby water bodies due to exposed earthworks (cuts, fills and construction works).</p> <p>6. Landscape degradation and contamination of water bodies due to inadequate disposal of removed road/sidewalk/pavement/curb (concrete, asphaltic base and subgrade materials).</p>	<p>collapse.</p> <ul style="list-style-type: none"> - Conduct site works only in required areas. - Protect erodible areas temporarily with mulch or fabric and re-instate work sites as soon as practical following completion of site works. - As far as practically possible, schedule works during the dry season or in periods of light or moderate rainfall (i.e. precipitation rate < 10mm/hr). - Ensure temporary erosion and sedimentation control measures installed before project work begins, and remains in place until erosion hazard no longer exists, e.g., sediment retention nets, sediment ponds, channels, siltation traps etc. within drains to trap silt before it enters any watercourse outside site. - Limit access for heavy machinery. - Ensure topsoil in construction areas is stripped and stored for future reuse. - Temporary confinement of excavated stockpiles or fill material using wooden cribs or geofabric screens on stakes. - Store fill material at bermed designated lay-down sites (empty lots and open recreational areas) far from municipal drains or watercourses. - Reuse excavated material, where possible.

POTENTIALLY ADVERSE IMPACTS	IMPACT DESCRIPTION	PROPOSED MITIGATION MEASURES
	7. Reduced water quality from fugitive drainage and potential sanitary sewer flows, hydrocarbon spills, spent lubricants, fuel, etc.	<p>Pre-arrange use of adequate sites for final disposal of non-reusable excavated materials.</p> <ul style="list-style-type: none"> – Minimize impairment to water quality and ensure compliance with the Water Pollution Rules, 2001 through “good practice” construction techniques. – Use interim pipelines to convey any wastewater encountered to nearby sewers, or use interim holding tanks. – Reconstruct damaged or broken wastewater systems in accordance with WASA’s requirements. – Provide impermeable bunds around fuel storage tanks. – Re-fuel vehicles and equipment off-site or at specific bunded areas at least 30.5 m from surface water bodies. Use appropriate pumps and nozzles. – Place disconnected hoses in containers to prevent residual fuel spills. – Provide ongoing maintenance of vehicles and machinery to ensure no leakage from equipment. – Minimize spills during construction utilizing “good practice” construction techniques such as use of appropriate containers, avoiding overfilling, etc. – Store chemicals and fuels in bunded areas of adequate capacity.

POTENTIALLY ADVERSE IMPACTS	IMPACT DESCRIPTION	PROPOSED MITIGATION MEASURES
		<ul style="list-style-type: none"> – Promptly clean up spills and remove all soil which may become contaminated during the course of construction to a bioremediation cell for treatment (on-site remediation may be considered if the volumes are small). – Dispose of spent chemical and fuel containers in a proper and timely manner. – Avoid “hosing down” of spills and construction material. Instead, use dry clean up and mopping techniques as appropriate.
Utility Services Disruptions	<p>8. Accidental rupture/interference of existing utility pipes and lines (power cables, communication, gas, water and sewer) due to construction excavation works and during operational lifetime. This is particularly for unmapped or improperly mapped utilities.</p> <p>9. Temporary intentional service interruptions to facilitate excavation and other works</p>	<ul style="list-style-type: none"> – On-site consultation and coordination with MWI, MLG, TTEC, TSTT, NGC, Columbus FLOW, Fire Services Division and WASA before commencement of works as well as during the work activities. – Map consultations to facilitate work execution. – Adopt Contractor provisions, in the case of accidents, to ensure the prompt restoration of interrupted services. – Coordinate and cooperate with utility companies and Local Government to establish alternative schedules and mechanisms for implementation. – Conduct electronic and print media information campaigns/blitz about service interruption times, the affected areas and

POTENTIALLY ADVERSE IMPACTS	IMPACT DESCRIPTION	PROPOSED MITIGATION MEASURES
		alternative arrangements, if any.
Obstruction of Access	10. Temporary restriction/obstruction of pedestrian access to community services and residential and commercial areas. Decreased economic activity.	<ul style="list-style-type: none"> – Maintain access during work execution as far as safely possible. – Obey all traffic safety and road closure regulations. – Prohibit unauthorized public use of work site areas and non-public access roads. – Leave gaps in rows of spoil to coincide with access tracks and obvious walkways.
Traffic Disruptions	11. Vehicular and pedestrian traffic disruptions, delays, obstructions. Traffic congestion and temporary obstruction of access to community services and residential and commercial areas during the execution of construction works. Increase travel times and likelihood of traffic accidents. Creation of hazardous driving conditions, particularly in low visibility conditions e.g. nighttime and during inclement weather.	<ul style="list-style-type: none"> – Prepare, develop and implement detailed approved Traffic Management Plan (TMP) prior to commencement of works and in consultation with the Traffic Management Branch with feedback through monitoring. TMP should consider night and weekend work as likely on major streets as well as street closures and detours. – Active enforcement of temporary rules and regulations of the TMP with the aid of the City Police. Reinstating roads as soon as possible. – Schedule transport of material and equipment to avoid peak traffic hours. – Use designated areas for off-loading, away from roads. – Train truck drivers in defensive driving. – Avoid use of long truck convoys. – Arrange for police outriders to accompany particularly large loads. – Phase works and possible execution of

POTENTIALLY ADVERSE IMPACTS	IMPACT DESCRIPTION	PROPOSED MITIGATION MEASURES
		<p>heavy works during off-peak hours.</p> <ul style="list-style-type: none"> – Prohibit off-road traffic outside designated areas. – Implement of detours and alternate routes with adequate signage, signaling, road markers, demarcation, lighting/illuminating devices and safety signal devices. – Repave/repair excavated road areas. – Public consultations (at least two (2)), information campaigns and media blitz to inform stakeholders about the nature of the proposed activity and traffic arrangements.
Landscape Aesthetics and Amenity value	<p>12. Temporary disturbance of landscape aesthetics and loss of scenic value arising from full or partial intervention at local and surrounding area.</p> <p>13. General reduced amenity value of construction and work site areas.</p>	<ul style="list-style-type: none"> – Minimize affected area. Clearly demarcate spaces not to be affected by construction works. If such spaces are inadvertently or otherwise affected, make all attempts to restore to original or better condition. – Ensure proper landscaping, reconstruction and replanting of construction areas and work site after completion of works.
Waste Management	<p>14. Littering, contamination and degradation of construction sites and adjacent areas with removed pipe portions, discarded materials, construction waste, roadside litter, spent lubricants etc.</p>	<ul style="list-style-type: none"> – Conduct site works only in required areas. – Provide and ensure proper sorted disposal and disposal facilities for all non-hazardous solid waste. – Recycle/reuse all excavated materials where suitable for backfilling. – Proper disposal of contaminated soil and other hazardous waste utilizing appropriate Contractors.

POTENTIALLY ADVERSE IMPACTS	IMPACT DESCRIPTION	PROPOSED MITIGATION MEASURES
	15. Poor sanitation in construction camps and work sites	<ul style="list-style-type: none"> – Collect all spent lubricants for recycling, reuse or appropriate disposal. – Promptly collect, secure transport and dispose of all non-hazardous solid waste at Beetham landfill via approved Contractor; prior permission having been sought from SWMCOL. – Collect asbestos containing pipe portions and contract services to facilitate proper final disposal at approved Forres Park landfill. – Use appropriate absorbent material to collect spills prior to appropriate disposal. – Ensure relevant chain of custody records and disposal/remediation certificates are maintained. – Clean-up of all sites and adjacent streets used by trucks daily. – Ensure washings from premix cement trucks are contained according to BMPs and not discharged into drains or watercourses. – Use of adequately located and maintained portable toilets for workers. – Enforce proper waste disposal practices.
Cultural Heritage/Property	16. Loss of value arising from accidental encroachment, damage or destruction to historical/archaeological/cultural artifacts, remains, areas, monuments and buildings.	<ul style="list-style-type: none"> – Conduct survey of sites prior to the commencement of any construction works. Establish buffer zones/temporary protective fencing and use of care and caution around

POTENTIALLY ADVERSE IMPACTS	IMPACT DESCRIPTION	PROPOSED MITIGATION MEASURES
		<p>historical sites etc.</p> <ul style="list-style-type: none"> - Include notification and protection procedures for cultural properties in construction contract documents. - Conduct survey at end of work for comparison to clearly establish responsibility in potential damage claims.
Health and Safety	<p>17. Worker Safety - Risk of on-the-job accidents and sickness for workers esp. in trenching operations.</p> <p>18. Public Safety - Increased public safety risk.</p>	<ul style="list-style-type: none"> - Undertake Job Hazard Analyses and relevant safety induction and training prior to commencement. - Ensure Contractors submit detailed Health and Safety, Emergency and First Aid Plans for prior approval. - Appoint suitably qualified Safety Coordinator and support personnel, including suitably trained First Aid/CPR personnel for Emergency Response Team providing prompt response and transfer to off-site health facility, upon stabilization and if required. - Enforce on-site regulations (clothing, equipment use, breaks etc.) and Health and Safety Plans/Requirements in accordance with the OSH Act and the National Occupational Standards. - Undertake weekly safety and periodic toolbox meetings. - Use of appropriate Personal Protective Equipment (PPE) to minimize risk.

POTENTIALLY ADVERSE IMPACTS	IMPACT DESCRIPTION	PROPOSED MITIGATION MEASURES
		<ul style="list-style-type: none"> – Enclose/hoard work site/s where possible with fencing for safety. Post warning signs, 24-hour sentries and lighting where needed to ensure public not permitted onto construction site/zone. – Plan specific itineraries for site machinery traffic and daily clean-ups. Large pieces of equipment transported during off-peak hours whenever possible. – Maintain appropriate setback distances and identify and agree upon any requirements for relocation. – Inform public utilizing advisories and announcements of construction activities and safety hazards. – Ensure First Aid/CPR Personnel available on site as part of site Emergency Response Team providing prompt response and transfer to off-site health facility, upon stabilization and if required. – Take steps where possible to avoid creating temporary breeding habitats for mosquito vectors. – Designate a Community Relations Officer/s responsible for interfacing with residents, institutions and businesses affected by the activities as well as with the EMA. – Establish and maintain a register of complaints as part of a Complaints Management System. – Ensure all complaints are investigated and

POTENTIALLY ADVERSE IMPACTS	IMPACT DESCRIPTION	PROPOSED MITIGATION MEASURES
	19. Road Traffic Safety.	<p>concerns addressed.</p> <ul style="list-style-type: none"> – Establish and publicize complaints contact telephone number to arrange appropriate response by MEWR site representatives. – Comply with Highways Act, the Motor Vehicles and Road Traffic Act. – Ensure drivers comply with regulation and are trained in defensive driving. – Designate off-loading areas away from roads. – Issue public advisories and announcements to inform residents and users.
Emergency Situation Response	20. Chaos, downtime, and possible injury to site workers and others esp. during natural hazards and disasters.	<ul style="list-style-type: none"> – Ensure Emergency Prevention and Response Plan (EPRP) is prepared, well known and rehearsed prior to commencement of construction. – Ensure POSCC and ODPM aware of and can assist in coordination of Plan. – Conduct of (daily) site induction training that will, amongst other objectives, inform all workers (esp. new personnel) of emergency response procedures. – Ensure emergency procedures are displayed in a prominent position within the site working area. – Conduct construction works during dry season only to minimize exacerbated risk due to flooding.

TABLE 6-2: PROPOSED MITIGATION MEASURES DURING OPERATIONAL PHASE

POTENTIALLY ADVERSE IMPACTS	IMPACT DESCRIPTION	PROPOSED MITIGATION MEASURES
Health and Safety	1. Public Safety - Increased public safety risk.	<ul style="list-style-type: none"> - Ensure appropriate steps are taken to control interactions with and reduce pollutant (wastewater and solid waste) load of the East Dry River as relates to the Linear Park and its enjoyment. - Ensure all necessary HSE considerations to address Public Health and Safety are implemented. - Take steps where possible to avoid creating breeding habitats for disease vectors. - Ensure areas of detention/retention are adequately fenced, have appropriate warning signage and hazard notices and are well lit to minimize likelihood of accidents and prevent unauthorized access; esp. by children. - Establish proper program of inspection and maintenance to ensure areas of detention/retention function properly and to safeguard against sediment retention, slope protection and trash collection esp. for outfall sections. Use of trash collectors prior to and inside detention/retention facilities as well as before outfall.
	2. Potential for structural failure and floodwaters higher than capacity of control structure/measures leading to increased risk	<ul style="list-style-type: none"> - Implement non-structural measures (regulation of areas through zoning,

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6.2 Environmental and Social Management Plan

An Outline Environmental and Social Management Plan for this Program is included in Appendix B and consists of:

- An introduction outlining scope of the plan and a description of the management structure;
- A description of the proposed works under the Program of intervention;
- A discussion of personnel, training, awareness, competence and toolbox meetings;
- Guidelines for communications and document control;
- HSE procedures during construction and operation;
- A listing of related plans;
- Monitoring and measurement;
- Records; and
- Auditing and Management review.

Development of this Outline ESMP into its final form may be undertaken in collaboration with MEWR, DD.

6.3 Other Plans and Measures

The CECs governing activities for this Program specify the development and maintenance of a Field Monitoring Checklist outlining all the precautionary and mitigation measures listed within the CEC and the need to demonstrate adherence to all the requirements during the proposed Program. The Checklist is to be made available to any EMA Inspector upon request.

The CECs governing activities for this Program also specify the need to prepare and make available Emergency Prevention and Response Plans prior to commencement of related works.

Another Plan that would be critically required, although not explicitly stated in the CECs, is a Traffic Management Plan. Table 6-2 indicates which party would be responsible for preparing each Plan.

TABLE 6-3: OTHER MANAGEMENT PLANS AND MEASURES

PLAN	Explicit CEC Requirement	INTENT	RESPONSIBLE FOR PREPARING
Traffic Management Plan	Yes (in CEC 3306/2011)	Minimize traffic congestion, accident risk, dust and noise associated with traffic to and from the Program sites.	Contractor (or Contractor-outsourced Traffic Management Specialist) in collaboration with MEWR, DD and the Traffic Management Branch of the Police Service.
Emergency Prevention and Response Plan	No	Response procedures to natural hazards and site emergencies, with incident reporting procedures.	Contractor (or Contractor-outsourced HSE Specialist).
Quality Assurance Project Plan	No	To ensure compliance with plans and specifications during construction.	QAPP Consultant
Field Monitoring Checklist	Yes	To ensure adherence with and based on specific CEC requirements.	Contractor
Operation and Maintenance Plan	No	To ensure measures identified to prevent sedimentation and water quality impairment during operation phase.	Contractor

7 PUBLIC PARTICIPATION

This Chapter summarizes public meetings held as part of the requirements of the CECs issued thus far as well as to satisfy requirements for this ESA and the Program of intervention by the IDB.

7.1 Public Consultation Meetings

Public meetings with potentially affected local communities (residents, institutions and businesses) are to be held in compliance with the issued CECs. As a requirement of this ESA (IDB policies OP-102 and OP-703), a public consultation meeting was held as shown in Table 7-1.

TABLE 7-1: PUBLIC CONSULTATION MEETINGS

DATE	VENUE
7 November, 2013	East Mucurapo Secondary School

7.1.1 Public Consultation Meeting Outcomes

Details of the Public Meeting have been recorded in Appendix A and includes a record of people consulted (list of attendees, contact addresses), date and location of consultation event (e.g. meetings, workshops), key comments and concerns received.

7.2 Key Stakeholder Consultation Meeting

MEWR, DD held consultations with Key Stakeholders, affected groups and NGOs at the Kapok Hotel on 13 September, 2013 in fulfillment of requirements by the EMA as well as complementary to the ESA for this Program of intervention by the IDB.

The following Key Stakeholders were identified as required invitees, as shown in Table 7-2.

TABLE 7-2: KEY STAKEHOLDER CONSULTATION MEETING

KEY STAKEHOLDERS
MLG – POSCC (incl. City Eng., City Police, Bldg. and Public Health Inspectorates)
MLG – San Juan/Laventille
MLG – Diego Martin
MLG
Parliamentary Representatives
DOMA
Traffic Management Branch & Highways Div.

KEY STAKEHOLDERS
Utility Agencies: T&TEC, TSTT, FLOW, NGC, WASA
MWI
EMA
Min. of National Security - Fire Services Div.
Min. of National Security - ODPM
MPSD - TCPD
COPE
EPOSDCTT
Min. of Community Development
Principals of Schools in Vicinity (4 Secondary, 2 Primary, 2 Vocational, 1 Private)
Chamber of Commerce
MEWR, DD
GENIVAR
NIDCO

For convenience and logistical ease, Key Stakeholders were invited to one meeting.

In addition to satisfying the need to document the meeting and its outcomes, the meeting intent served the following:

- To introduce the Program and the respective project activities;
- To ascertain critical information (e.g. location of utilities) and ensure proper coordination of activities so as not to impact infrastructure; and
- To document and address concerns to the extent that these can be factored into the design, redesign and implementation of the Program and its activities.

7.2.1 Key Stakeholder Meeting Outcomes

Details of the Key Stakeholder meeting have been recorded in Appendix A and includes a record of people consulted (list of attendees, contact addresses), date and location of consultation meeting, key comments received and summary minutes.

7.3 Requirements of the Existing CECs

CECs issued thus far include a number of requirements for MEWR, DD to interact with the public prior to and during the construction stages. These are summarized in Table 7-3.

TABLE 7-3: CEC PUBLIC OUTREACH REQUIREMENTS

SUMMARY OF REQUIREMENTS
Consult and co-ordinate project activities with other entities that own / operate / maintain underground drains, cables and pipelines in the area.
Publish Advisory Notices in at least two local newspapers.
Notify residents, communities and businesses two weeks prior to the commencement of works.
Designate a Community Relations Officer.

7.4 Requirements for the Additional CECs

As discussed in Chapter 3, additional CECs will be required in fulfillment of activities governing this Program. Public consultation will be a requirement of each of these CECs, whether or not EIAs are required. In each instance, the process is described below.

7.4.1 When an EIA is not Required

Typically, in projects where EIAs have not been required, The EMA simply requests evidence of consultations with potentially affected local stakeholders (residents, institutions and businesses) within the vicinity of the project area, as well as relevant agencies, including the EMA. This usually takes the form of notifications at least two (2) weeks prior to commencement of activities via distributed fliers inviting feedback, hosting meetings to introduce the project and receive comments and concerns and use of the media. The consultation outcomes are documented and submitted to the EMA. CECs are not granted unless and until the EMA has received and reviewed these submissions.

7.4.2 When an EIA is Required

If an EIA is required for any of the additional CECs related to this Program (see Chapter 3), then the precise requirements for public consultation are stipulated in detail in the Terms of Reference governing the conduct of the EIA and issued by the EMA. The Terms of Reference would stipulate the following:

- The list of Stakeholders to be invited to public meetings;
- Venue and Date;
- Advertising;
- Handout Material; and
- Meeting Format.

8 MEWR CAPABILITY AND CONTRACT REQUIREMENTS

This Chapter discusses the capability of the Drainage Division (DD) of the Ministry of the Environment and Water Resources (MEWR) to manage the environmental and social requirements alluded to throughout this document and summarizes specific requirements to be included in the Contracts for this Program.

8.1 MEWR, DD Capability

The Drainage Division (DD) within the Ministry of Environment and Water Resources (MEWR), referred to as the competent authority in the Waterworks and Water Conservation Act, is mainly responsible for:

1. Flood Control;
2. Drainage;
3. Irrigation; and
4. Erosion and Sedimentation Control.

This includes constructing and carrying out any waterworks for supplying, conveying, measuring, regulating or disposal of (storm) water subject to the provisions of the Act or special directions from the Minister. This also includes irrigation, drainage or reclamation; protection of lands against water; and the widening, deepening, straightening, improving, diversion, stopping up or joining up of watercourses. Until recently the DD was within the Ministry of Works and Infrastructure (MWI); the shift to the MEWR is consistent with the GORTT's policy direction to consolidate water resources agencies.

The DD is divided into 2 Branches:

1. The Construction & Maintenance Branch: in charge of the 4 Regions of Trinidad (North, Central, South and East) and mainly deal with recurrent works and public complaints; and
2. The Planning Branch: responsible for strategic planning of the DD, formulates the Drainage Development Program for the Country, including formal Drainage approval for land development.

For major infrastructure works, the GORTT and DD rely on the National Infrastructure Development Company Limited (NIDCO), a special purpose state company wholly owned by the GORTT, which provides procurement, project and contract management services to the GORTT for assigned major infrastructure projects, such as roads, bridges, drainage and flood mitigation, and transportation projects, among others. POSCC has some responsibility for operation and maintenance of drainage works in POS.

The current facility for staffing for the DD was designed in the 1970's and was contemplated when the DD had significantly less drainage assets to manage. A number of positions are currently vacant and a number of technical posts at the DD are filled by personnel assigned to other MWI Divisions. DD lacks "experienced" engineers and doesn't have an in-house Environmental Unit. Additionally, there is no established unit dedicated to undertaking highly specialized projects which are becoming increasingly necessary given the increasing complexities of the operating environment (e.g. implementation of flood mitigation works in the Maraval River Basin) (DD, unpublished; pers. commun., 2013).

Consequently, there is a need to increase the skills and institutional capacity of DD generally to implement satisfactory measures of flood control and mitigation based on a more holistic and comprehensive catchment management approach. This approach calls for a wide variety of professional skills in the planning and policy-making process. In addition to inputs from engineers, economists, and land use planners, contributions are needed from various natural scientists.

The government unit(s) responsible for flood control must have the planning and regulatory capability to:

- Determine the causes, frequency and extent of flooding;
- Determine the actual or potential effect of various types of development on flood levels;
- Plan, install or implement required structural and non-structural means for flood control;
- Implement a flood warning system;
- Determine areas that are flood prone and take measures to prevent developments that will create flooding risk;
- Monitor changes that alter flooding risk and also the effects of flood control measures; and, most importantly,
- **Coordinate plans and activities with other agencies responsible for activities in the watershed.**

Notwithstanding this, it is envisaged that the DD will be assigned the following environmental work items of this Program:

- Preparing the Application forms for the Additional CECs (and TCPD Approvals) for the drainage works and Linear Park with support from the Consultant Environmental Specialist;

- Organizing and Hosting Public and Stakeholder Meetings;
- Advertising the Start of Construction;
- Finalizing the Environmental and Social Management Plan (ESMP);
- Finalizing the Resettlement Plan (once required) with support from the IDB Team;
- Coordinate preparation of an Emergency Prevention and Response Plan;
- Coordinate preparation of a Traffic Management Plan; and
- Preparing a QAPP.

Given the present staffing arrangements and related capacity issues identified during the Institutional Assessment, the DD does not presently have or is not considered to have the resources and capabilities to undertake these work items in a timely manner. This would be addressed during the Institutional Strengthening Component of this IDB intervention and would serve to create requisite capacity. In the interim, there are two recommendations for executing these items: In the first, the DD could utilize the resources of the Environmental Unit within the MWI. Alternatively, executing these work items could be the responsibility of an Environmental Specialist resident in the DD.. The preparation of the Traffic Management Plan and the Emergency Prevention and Response Plan should be prepared by the Contractor since these are integral to his work. Finally, the preparation of the QAPP would be most efficient if assigned to an Environmental Specialist resident in the DD.

This ESA also recommends that the opportunity be taken to undertake requisite training within the DD to address capacity issues. While provision has been made under this IDB intervention Program for Institutional Strengthening of the DD, this should be augmented by increases to the budgetary allocation of the DD.

8.2 Contract Requirements

It is expected that the MEWR will contract a combination of Design-Bid-Build Firms (re Package 1) and Design-Build Firms to undertake the different aspects of this Program (see Appendix B). Both instances will have Design Engineers, Supervising Engineers and Contractors in either discrete or seamless arrangements. Recommendations for items to be included in these contracts are presented below.

8.2.1 Design-Build / Design-Bid-Build Contracts

While the Design-Build modality allows for seamless integration and flow between the discrete approaches of the Design-Bid-Build, the following items are recommended to be included in MEWR's contract in both instances:

- All relevant CECs should be made a part of the contract with both Design and Supervising Engineers with a requirement for conformance with all relevant clauses.
- Surveys of the finalized areas (in arriving at Final Designs) for drainage works and the Linear Park should be included in the Design Engineer's Scope of Work. This in combination with the results from the integrated hydrological assessment would facilitate ascertaining the need for setback, the degree of setback encroachment and any recommendations for resettlement that would need to be further elaborated in a Finalized Resettlement Plan.
- Finalizing the ESMP should be included in the Design Engineer's Scope of Work. The finalized ESMP should then be made part of the contract with the Supervising Engineer and the Contractor with a requirement that the procedures be followed and adhered to.
- This ESA Report, including the Outline ESMP, should be made available to the Design Engineer as a reference document.
- The preparation of a Traffic Management Plan and an Emergency Prevention and Response Plan should be included in the Contractor's Scope of Work.

9 COST ESTIMATES

This Chapter provides cost estimates for various items listed in this document. Costs are estimated based on unit rates for commercial entities to undertake the work.

9.1 CEC Requirements, Management Plans, etc.

Cost estimates are provided for:

- Additional CECs;
- Public Meetings;
- Finalizing the Environmental and Social Management Plan;
- Preparing a Traffic Management Plan;
- Preparing an Emergency Prevention and Response Plan;
- Possible Resettlement Plan;
- Advertising the Start of Construction; and
- Preparing a QAPP.

9.1.1 Additional CECs

A CEC must be obtained for each of the work packages constituting this Program. The application should be prepared by the MEWR, DD with support from the Consultant Environmental Specialist. The cost of having a Consultant prepare and submit the application for any additional CECs, inclusive of the \$TT 500.00 application fee, is estimated at \$TT 25,000.00 each. This amount should be included in the DD's in-house budget for this Program. This cost can be avoided if an Environmental Specialist resident in the DD prepares these applications.

Should the EMA make the determination that an EIA is required in fulfillment of a CEC for any of the Packages, a determination of the scope and additional costs to conduct the EIA would be made at that time and would be based on the Final Terms of Reference issued by the EMA for the conduct of the EIA.

9.1.2 Public Meetings

As noted in Chapter 7, the EMA is expected to request public meetings as part of any Additional CEC Application, whether or not an EIA is requested. Costs associated with meetings include newspaper advertisements, venue rental, provision of a public address system, recording and transcribing the discussions and refreshments. Hosting of one public meeting is estimated to cost \$TT 45,000.00. This amount should also form part of the DD's in-house budget for this Program.

9.1.3 Finalizing the ESMP

The ESMP will be finalized when Final Designs are available for the various Program elements. The recommendation is for the final ESMP to be prepared by the Environmental Engineer on the Design Engineer's team (see Chapter 8). The cost to prepare the final ESMP, is estimated at \$TT 50,000.00. This amount should be included in the budget for the Environmental Specialist on the Design Engineer's team.

9.1.4 Traffic Management Plan

CEC 3306/2011 stipulates that a Traffic Management Plan (TMP) be developed prior to the commencement of works. A TMP should be prepared by the Contractor or a Contractor-outsourced Traffic Management Specialist prior to commencement of works as indicated in Chapter 6. The cost of having a TMP prepared is estimated at \$TT 45,000.00. Adequate budgetary provision should be made to have this amount included in the Contractor's contract.

9.1.5 Emergency Prevention and Response Plan

Although not explicitly identified as a CEC requirement, an Emergency Prevention and Response Plan (EPRP) should be prepared by the Contractor or a Contractor-outsourced HSE Specialist prior to commencement of works as indicated in Chapter 6. This is estimated to cost \$TT 90,000 and should be included in the Contractor's contract.

9.1.6 Finalizing the Resettlement Plan

Should resettlement become necessary when Final Designs are available for the various Program elements, the Draft Resettlement Framework would have to be finalized into a Resettlement Plan. This is estimated to cost \$TT 90,000 and should be done by an Urban Sociologist with experience in resettlement and IDB policies and in collaboration with the IDB team.

9.1.7 Advertizing the Start of Construction

MEWR, DD is required to advertise the start of construction by placing advertisements in at least two newspapers, and by distributing fliers in potentially affected communities. The cost of two advertisements plus the printing and distribution of fliers is estimated at \$TT 35,000.00. This amount should be included in the DD's in-house budget for this Program.

9.1.8 Quality Assurance Project Plan

While the need for a Quality Assurance Project Plan has not been clearly articulated in the CECs attained thus far, it is an expectation likely to emerge from the CEC application for the Linear Park components. This plan is best prepared by a consultant hired by MEWR. The cost of having a consultant prepare the QAPP is estimated at \$TT 52,000.00. This amount should be included in the DD's in-house budget for this Program.

9.2 Mitigation Measures

Mitigation measures identified in Chapter 6 will be the Contractor's responsibility. By virtue of these measures being intrinsic to construction "good practices", the costs are not identified separately but should form part and parcel of rates charged for the various construction activities.

9.2.1 Baseline Noise Studies

Baseline noise studies may be required during the construction activities of this Program. The potential conduct of Noise Baseline Studies during construction activities and particularly if a Noise Variation is sought for construction works undertaken at night, is estimated to cost \$TT 20,000 at any one location. This should be included in the Contractor's Contract.

9.3 Monitoring

9.3.1 HSE Inspector

Contemporary arrangements with construction projects coupled with requirements of the OSH Authority warrant the need for a full-time HSE Inspector on the Supervising Engineer's Team. The estimated cost based on a site presence of 10 hours per day and 6 days per week is \$170,000.00 per quarter. This amount should be included in the Supervising Engineer's contract.

9.4 Summary of Costs

Table 9-1 provides a summary of estimated costs by Program phase.

TABLE 9-1: SUMMARY OF COSTS FOR ENVIRONMENTAL REQUIREMENTS

YEAR / QUARTER	PROJECT PHASE	ITEM	ESTIMATED COST (\$TT)
2013 Qtr. 4	Design	Prepare and Submit 7 CEC Applications	\$175,000.00
		Host 16 Public Meetings	\$1,440,000.00
		Quarterly Sub-Total	\$1,615,000.00
		Annual Total for 2013	\$1,615,000.00
2014 Qtr. 1	Design	Finalize the Environmental and Social Management Plan	\$50,000.00
		Finalize Resettlement Plan	\$90,000.00
		Quarterly Sub-Total	\$140,000.00
2014 Qtr. 2	Construction	Prepare Traffic Management Plan	\$45,000.00
		Prepare Emergency Prevention & Response Plan	\$95,000.00
		Prepare a Quality Assurance Project Plan	\$52,000.00
		Advertising the Start of Construction	\$35,000.00
		Potential Baseline Noise Studies at 9 Locations	\$180,000.00
		HSE Inspector	\$170,000.00
		Quarterly Sub-Total	\$577,000.00
		Annual Total for 2014	\$717,000.00
2015 Qtr. 1	Operation	HSE Inspector	\$170,000.00
		Quarterly Sub-Total	\$170,000.00
2015 Qtr. 2	Operation	HSE Inspector	\$170,000.00
		Quarterly Sub-Total	\$170,000.00
2015 Qtr. 3	Operation	HSE Inspector	\$170,000.00
		Quarterly Sub-Total	\$170,000.00
2015 Qtr. 4	Operation	HSE Inspector	\$170,000.00
		Quarterly Sub-Total	\$170,000.00
		Annual Total for 2015	\$680,000.00
		TOTAL	\$3,012,000.00

10 CONCLUSIONS AND RECOMMENDATIONS

10.1 Conclusions

The overall assessment is that the ESA, as presented, was reasonably complete and fair and revealed nothing that was or could be construed as being overly significant in concern. However, the ESA did identify some gaps and areas requiring some more detailed investigations.

Key gaps and areas where further analysis may be warranted include the following:

1. Baseline data – At the time of preparing this document there was an insufficiency of data that could be referenced on the baseline environmental conditions of the Maraval and St. Ann's Rivers. This may seem to be due to the relative unpopularity of these rivers within the scientific community. The currently commissioned DHI Consultancy would serve to address these data gaps via field measurement campaigns as well as the introduction of a GIS modeling platform
2. Climate Change – The influence of climate change and natural hazards may be poorly understood and likely to give rise to adaptation issues. This is also currently being addressed via the commissioned DHI Consultancy.
3. The need for a Resettlement Plan – This would require further analysis given future potential for resettlement, the extent of breaches to watercourse setback requirements, the tendency for public opposition or concerns and the country's relative inexperience with and poor handling of resettlement issues. A Draft Resettlement Framework has been developed and can be finalized into a Resettlement Plan incorporated into the Program's execution; should the need arise.
4. Certificate of Environmental Clearance (CEC) – Time constraints associated with obtaining requisite environmental approvals given the urgent need to expedite proposed flood alleviation activities. All the outstanding CECs (see Chapter 3) would be sought prior to and as conditions before commencement of works or the bidding/procurement process.
5. MEWR, DD capacity – This would need to be bolstered, possibly even prior to the commencement of this Program.
6. Alternative Solutions Analysis – Given the attendant and significant negative impacts related to traffic disruption and utility services disruptions in particular that would occur for months, there would be a need to sufficiently analyze likely alternatives from several standpoints prior to commencement of any preferred solution.

10.2 Recommendations

The ESA recommendations fall into three categories:

- (i) Areas where more study or work is required that should be completed prior to the IDB making a decision about a Loan Operation;
- (ii) Requirements that should be put into place as conditions of the Loan; and
- (iii) Other practices to be considered in the Program's planning and execution.

(i) More Study or Work Required Prior to Decision-Making

- 1. Analysis and mitigation of impacts related to climate change and natural hazards should be the subject of more detailed engineering studies aimed at more precisely informing design criteria and increasing resilience prior to the Final Design stage of both the Design-Bid-Build and Design-Build modalities. This is currently being undertaken via the recently commissioned DHI Consultancy.

(ii) Requirements that Should be Put in Place as Conditions of Financing

- 1. It is recommended that the Institutional Strengthening components of this Program be engaged as soon as practical to bolster capacity of the DD. This would have significant positive impacts on the Program's successful execution. Given the present staffing arrangements and related capacity issues, the DD does not presently have or is not considered to have the resources and capabilities to undertake work items identified in this ESA and ESMP in a timely manner. It is recommended that the DD utilize the resources of the Environmental Unit within the MWI; a unit that would have been utilized prior to DD's detachment from the MWI. Alternatively, executing these work items could be the responsibility of an Environmental Specialist resident in the DD.
- 2. Given that improper solid waste disposal is one of the main contributors to the flooding problem in POS, it is strongly recommended that serious consideration be given to exploring opportunities for a **concomitant, synergistic Solid Waste Operation** (either separate or as part of an extended Emerging and Sustainable Cities Initiative) that would see recyclables and white waste, the major contributors, being addressed. This would serve to magnify the effect of the alleviation provided by this Program. Alternatively, and in the least, an intensified campaign can be initiated aimed at reducing, if not eliminating, the incidence of improper solid waste disposal in these watercourses while awaiting passage of the imminent Beverage Container Bill. This could quite simply take the form of an intensified Litter Wardenship for POS. It is also suggested that, as part of the Institutional Strengthening Component, the **regulatory framework required to comprehensively address hillside development (in accordance with TCPD's Hillside Policy) and harmful agricultural practices in the upper catchment areas be approved and adopted.**

This should be accompanied by a reforestation effort aimed at reducing run off and sedimentation. In the final analysis, this multi-pronged approach would not only serve to alleviate the flooding problem in POS, but would also reduce the exorbitant sums of money spent on drainage O&M related to sediment and solid waste removal in these watercourses, on land and now the coastal and marine environments via the marine branch of the Community Environmental Protection and Enhancement Programme (CEPEP); a programme under the auspices of the Ministry of Housing, Land and Marine Affairs.

3. While the positive impacts of the Linear Park cannot be disputed, this component would bring potential users into proximity of the existing polluted water of the East Dry River. It is strongly recommended that measures be initiated, within this Program, to address poor water quality issues originating from improperly disposed solid waste and poor wastewater systems. Recommendations to address this would emerge from the currently commissioned DHI study with cleaning and maintenance related recommendations being coordinated between DD and POSCC. Issues related to wastewater would require the involvement of WASA. Additionally, the Linear Park component of this Program should not only be governed and informed by findings of more detailed engineering studies and a better understanding of the hydrology and hydraulics of the catchment, but should also benefit from a properly installed and well maintained Flood Warning System; part of the institutional strengthening component of the Program
4. While it is agreed that there is no present need for resettlement, a Draft Resettlement Framework has been prepared for future needs likely to emerge due to potential for scope modification based on further recommended engineering studies, Final Designs particularly related to the Linear Park and associated Package 8 components of this Program, and any future attempt at reclaiming setbacks under an institutionally strengthened DD.

(iii) Other Practices to be Integrated into Mitigation and Monitoring Programs

1. Outcomes of the recently commissioned DHI Consultancy would need to be integrated into the mitigation and monitoring arrangements of this Program.
2. It is recommended, given commonalities in the nature and scope of the proposed drainage works, that a programmatic approach to the CEC applications be adopted that would see all the packages and the Linear Park being the subject of one rather than discrete applications. This approach presupposes that all packages are at similar design stages. This recommendation is worthy of exploit given time constraints, a CEC validity period of three (3) years and the overall benefits likely to be derived. Exploratory discussions with the EMA have endorsed the use of this approach, but this would have to be the subject of more extensive discussions with the EMA prior to lodgement of the application.

3. It is recommended that measures to reduce the propensity for exacerbated disaster risk and vulnerability during construction to an acceptable level be embarked upon prior to commencement of this Program. This would be reliant principally on the development of a POSCC/ODPM-approved contingency plan - Emergency Prevention and Response Plan prior to commencement of works.

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**TRINIDAD & TOBAGO FLOOD ALLEVIATION AND
DRAINAGE PROGRAM (TT-L1036)**

ENVIRONMENTAL AND SOCIAL ANALYSIS

***APPENDIX A: KEY STAKHOLDER AND PUBLIC
CONSULTATION SUMMARY***

APPENDIX A: KEY STAKEHOLDER AND PUBLIC CONSULTATION SUMMARY

KEY STAKEHOLDER CONSULTATION

The POS FAP Key Stakeholder Consultation was held on Friday 13 September, 2013 at the Kapok Hotel.

The consultation started at 10:00 a.m. with the introduction of the members of the panel by the Chairperson, Ms. Anusha Narine, of the MEWR and ended at 1:00 p.m.

Lists of invitees and eventual attendees are presented at the end of this summary.

The panel was comprised of:

Mr. Vijai Lal	Head, Project Execution Unit, MEWR
Ms. Elizabeth Inglefield	Civil Engineer, GENIVAR
Mr. Nico Kersting	Civil Engineer, GENIVAR
Mr. Uche Osuji	Consultant Environmental Specialist, IDB

AGENDA

The Agenda was as follows:

Meeting Opening	Senator the Honorable Minister Ganga Singh/PS
Program Overview	Head, Project Execution Unit, MEWR
Presentation of Conceptual Design Plan	GENIVAR
Presentation of ESA	Consultant Environmental Specialist, IDB
Question and Answer Session	
Closing Remarks	

SUMMARY

A detailed verbatim account of the consultation was recorded. However, for brevity, and for the purpose to which this summary is geared, the following sections serve to summarize the overall proceedings of the consultation and the critical concerns that emerged.

Mr. Vijai Lal gave a synopsis of POS FAP and its intentions. He continued by explaining why the need for the POS FAP and how the Program was going to be executed. He concluded by giving assurances that the works would be executed in a manner that would minimize disruptions.

GENIVAR's presentation featured the locations and scope of the Packages comprising the POS FAP Intervention.

The environmental and social considerations stemming from the Program were presented by the IDB Consultant Environmental Specialist.

MAJOR CONCERNS AND RESPONSES

While those attending the Key Stakeholder Consultation welcomed the POS FAP, there were a few concerns raised, the major ones of which included:

1. The POSCC Mayor expressed concerns surrounding how realistic treatment of breaches to watercourse setback requirement of 30m would be given the general scant regard for law.
2. The Trinidad and Tobago Fire Services expressed a desire to utilize water in detention/retention facilities to assist with fire fighting. Present fire fighting arrangements utilize metered water from WASA. They also expressed interest in being part of any committee formed in relation to construction-related emergency planning.
3. POSCC City Engineer raised concerns surrounding maintenance responsibility for drainage infrastructure post construction given the significant investment and capital costs.
4. Concerns were raised surrounding the roles of specific versus regional Regional Corporations.
5. Utility agencies expressed concerns surrounding utility relocation fees as well as the general need for detailed easement and right-of-way plans particularly as relates to all utilities in common locations.
6. Concerns were expressed surrounding the quality of water within the detention/retention facilities and how this may impact groundwater quality.
7. Concerns were raised surrounding uncontrolled hillside development and the approval process.

LIST OF INVITEES AND ATTENDEES

Invitees

Select invitations were sent out to representative of the agencies tabulated below:

Invited Agency/Organization
MLG – POSCC (incl. City Eng., City Police, Bldg. and Public Health Inspectorates)
MLG – San Juan/Laventille
MLG – Diego Martin
DOMA
Utility Agencies: T&TEC, TSTT, FLOW, NGC, WASA
EMA
Min. of National Security - Fire Services Div., ODPM
COPE
Min. of Community Development
Chamber of Commerce

Attendees

A registry of attendees was kept. Those attending the consultation are indicated in the table below:

Name	Organization	Phone Number / e-mail
Vidiah Ramkhelawan	Perm. Sec., MEWR	
Vijai Lal	MEWR	
Revan Ganesh	MEWR	
Anusha Narine	MEWR	
David Narine	MEWR,DD	
Shamshad Mohammed	MEWR,DD	
Kenneth Crichlow	NIDCO	
Elizabeth Inglefield	GENIVAR	
Nico Kersting	GENIVAR	683-6426; nkerstin@gmail.com
Uche Osuji	IDB	468-4229; ucheosuji@gmail.com
Kenny Gopaul	T&T Fire services	777-9617; kenpaul26@hotmail.com
Arande Piggot	MWI	749-2611; apiggott@mowt.gov.tt
Christian Harragin	EMA	628-8042; charragin@ema.co.tt
Laurayne Lucky	WASA	497-2023; luck5099@wasa.gov.tt
Roger Karim	WASA	707-0429; rkarim@wasa.gov.tt
Derrick Jones	TSTT	682-7210; dwjones@tstt.co.tt
Faied Mohammed	TSTT	684-4688; fmohamml@tstt.co.tt
Kirtson George	TSTT	682-0837; kmgeorge@tstt.co.tt

Name	Organization	Phone Number / e-mail
Rayadh Mayrhoo	Min. of Planning	303-3913; rayadh.mayrhoo@planning.gov.tt
Rishma Maharaj	ODPM	755-4302; rmaharaj@mns.gov.tt
Mayor Loius Lee Sing	POSCC	
Chanka David	POSCC	340-0554
Michael Modeste	T&TEC	

PUBLIC CONSULTATION

The POS FAP Public Consultation was held on Thursday 7 November, 2013 at the East Mucurapo Secondary School.

The event was made known to concerned and interested members of the public by placement of advertisements in the daily newspapers.

The consultation started at 6:00 p.m., with the introduction of the members of the panel, by the Facilitator / Presenter, Ms. Anusha Narine, of the MEWR. The consultation ended promptly at 8:30 p.m.

A list of eventual attendees is presented at the end of this summary.

The panel was comprised of:

Mr. Vijai Lal	Head, Project Execution Unit, MEWR
Mr. Shamshad Mohammed	Director, Drainage Division, MEWR
Mr. Uche Osuji	Consultant Environmental Specialist, IDB

AGENDA

The Agenda was as follows:

Welcoming Remarks & Introductions	Anusha Narine
Program Overview	Vijai Lal
Presentation of ESA	Uche Osuji
Question and Answer Segment	

SUMMARY

A detailed verbatim account of the consultation was recorded. However, for brevity, and for the purpose to which this summary is geared, the following sections serve to summarize the overall proceedings of the consultation and the critical concerns that emerged.

Mr. Lal provided a synopsis of the Program. He continued by explaining why the need for the POS FAP and how the Program was going to be executed. He concluded by giving assurances to the public that the works would be executed in a manner that would minimize disruptions.

Mr. Osuji then presented a slideshow which featured the environmental considerations highlighted during the conduct of the ESA as well as some of the proposed mitigation measures.

MAJOR CONCERNS AND RESPONSES

While those attending the Public Consultation welcomed the POS FAP, there were a few concerns raised, the major ones of which included:

- Traffic;
- Hillside Policy; and
- River Mouth Dredging.

Traffic

Audience members were mainly concerned with traffic disruptions due to the POS FAP. Fears were allayed based on proposed mitigation measures.

Hillside Policy

Some slight opposition was expressed concerning the need for a Hillside Policy. The response alluded to the impacts thus far of unplanned development in the upper catchment regions and the need to regulate these as an avenue for safeguarding the large infrastructural investment in the Program and well as to ensure lowered O&M cost and optimized functionality.

River Mouth Dredging

Concerns were raised regarding the absence of a program of regular dredging of the river mouths in the context of flood alleviation and as a prelude to carrying out such a significant Program and at great costs. Concerns emanating for the T&T Port Authority in particular related to the implementation of just the simple measure of dredging particularly as a first step.

LIST OF ATTENDEES

Attendees

A registry of attendees was kept. Those attending the consultation are indicated in the table below:

Name	Organization	Phone / e-mail
Anusha Narine	MEWR	
Vijai Lal	MEWR	
Revan Ganesh	MEWR	
Avanti Supersad	MEWR	
Kema Gardner	MEWR	
David Narine	MEWR,DD	
Shamshad Mohammed	MEWR,DD	
Chanka David	POSCC	340-0554
Elizabeth Inglefield	GENIVAR	
Makesi Quashie	GENIVAR	
Uche Osuji	IDB	468-4229; ucheosuji@gmail.com
David Ramjohn	EMA	
Gregory DeSouza	EMA	gdesouza@ema.co.tt
Marcia Tinto	EMA	379-0681; mtinto@ema.co.tt
Olivia Sinnette	East Mucurapo Secondary School	319-8415; sinnette36@gmail.com
Leon Therrior	East Mucurapo Secondary School	477-4210
Derrick Phillip	East Mucurapo Secondary School	622-6446; eastmucurapo@gmail.com
Christopher Mendez	T&T Port Authority (retired)	678-7257; chriswmendez@gmail.com
Kareem Khan	NGC	620-4105
Mahindra Maharaj	NGC	741-1450
Ancil Edwards	MoWI (TMB)	347-3051
Bridges Rattan	TSTT	682-7293
Zahra Gordon	Guardian Media Ltd.	zahra.gordon@guardian.co.tt
Roland Herrera	Capital Signal	396-5511

**TRINIDAD & TOBAGO FLOOD ALLEVIATION AND
DRAINAGE PROGRAM (TT-L1036)**

ENVIRONMENTAL AND SOCIAL ANALYSIS

***APPENDIX B: OUTLINE ENVIRONMENTAL
AND SOCIAL MANAGEMENT PLAN***

APPENDIX B: OUTLINE ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

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B.1 INTRODUCTION

B.1.1 Scope

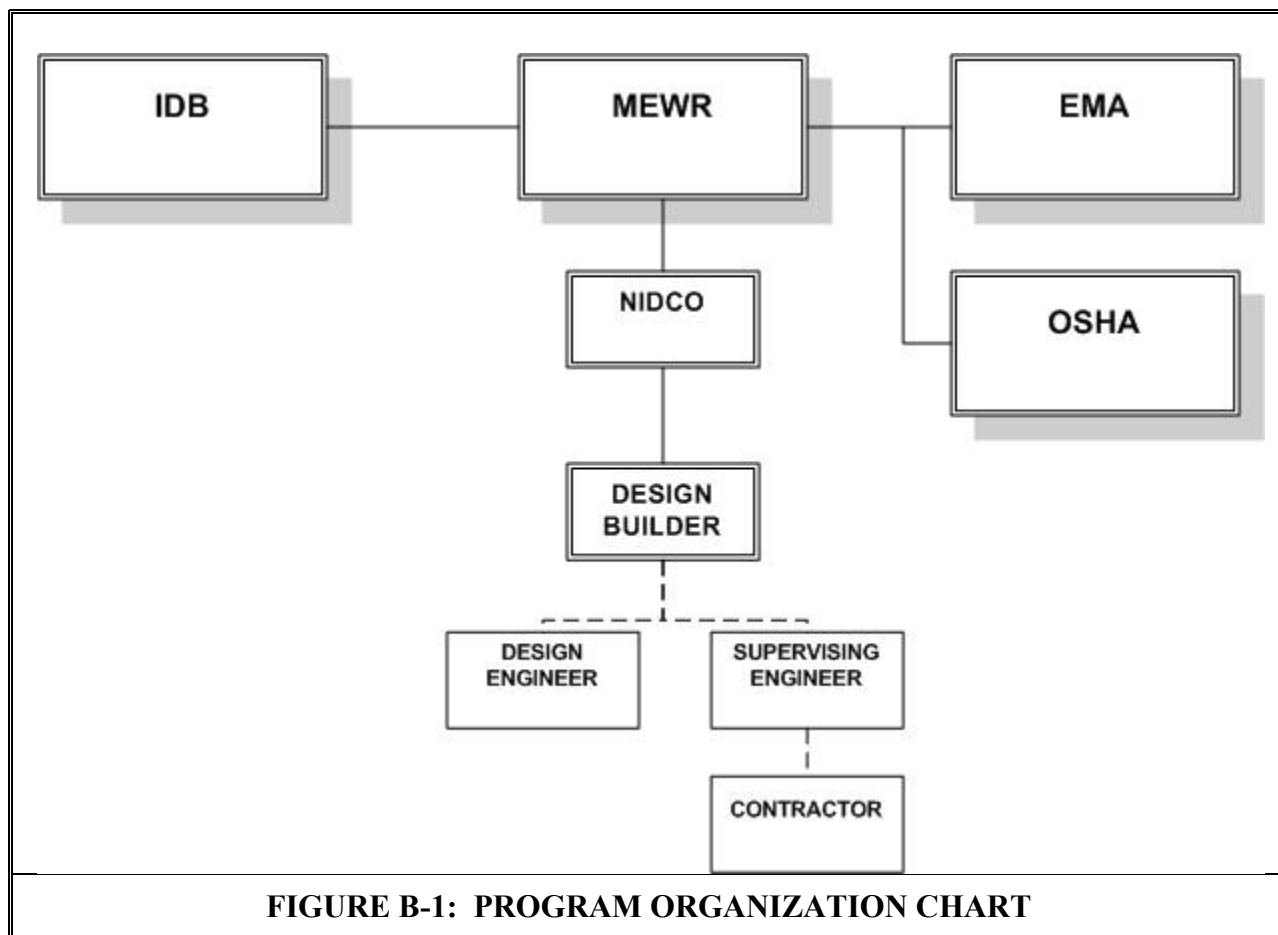
This Outline Environmental and Social Management Plan (ESMP) has been prepared for both the construction and the operation phases of the proposed Flood Alleviation Program (FAP) within the POS Region and should be reviewed, finalized and approved prior to its implementation.

B.1.2 Management Structure

Key agencies on this FAP are:

- The Funding Agency – The Inter-American Development Bank (IDB);
- The Executing Agencies – The Ministry of the Environment and Water Resources, Drainage Division (MEWR, DD) & The National Infrastructure Development Company (NIDCO);
- The Design-Build Firm;
- The Environmental Regulator – The Environmental Management Authority (EMA); and
- The Occupational Safety and Health (OSH) Regulator – The OSH Authority.

The organization chart for this Program is shown in Figure B-1 with agency roles described below.



B.1.2.1 The Inter-American Development Bank

The IDB is the funding agency for this project. They will review all aspects of the project to ensure compliance with Bank Policies as a precondition to the Loan Operation.

B.1.2.2 MEWR, DD

The MEWR, DD, referred to as the competent authority in the Waterworks and Water Conservation Act, 1980, is responsible for works regarding any waterworks for supplying, conveying, measuring, regulating or disposal of (storm) water subject to the provisions of the Act or special directions from the Minister. Under the Act the competent authority is responsible for irrigation, drainage or reclamation; protection of lands against water; and the widening, deepening, straightening, improving, diversion, stopping up or joining up of watercourses. Until recently the DD was within the Ministry of Works; the shift to the MEWR is consistent with the GORTT's policy direction to consolidate water resources agencies. MEWR, DD will function as the Executing Agency for the proposed works.

B.1.2.3 NIDCO

For major infrastructure works, the Government of the Republic of Trinidad and Tobago (GORTT) and DD rely on NIDCO, a special purpose state company wholly owned by the GORTT, which provides procurement, project and contract management services to the GORTT for assigned major infrastructure projects, such as roads, bridges, drainage and flood mitigation, and transportation projects, among others. NIDCO will function as the Co-executing Agency and Project Manager for the proposed works.

B.1.2.4 The Design-Build Firm

MEWR, with assistance from NIDCO, will tender for the involvement of Design-Build Firms with Design Engineers, Supervising Engineers and Contractors to design the proposed works, prepare Contract Documents and Drawings and oversee the construction of the works. The Supervising Engineer's team will include Resident Engineers, Clerks-of-Works and Health, Safety and Environmental (HSE) Inspectors. The Contractor's site staff will include a Liaison Officer to receive complaints, comments and queries from the public.

B.1.2.5 The Environmental Management Authority

The EMA is the environmental regulatory authority in Trinidad & Tobago. As such, they will oversee environmental performance throughout the life of this project, both during construction and during operation. Specifically, they will receive and process applications for Certificates of Environmental Clearance (CEC), Noise Variations, Registration under the Water Pollution Rules, etc. They will also take enforcement action where there are non-compliances with Environmental Rules or CEC conditions.

B.1.2.6 The Occupational Safety and Health Authority

The OSHA is the regulatory agency for worker health and safety in Trinidad & Tobago. As such, they will oversee worker health and safety throughout the life of this project, both during construction and during operation. Specifically, they will receive and review Risk Assessments and Occupational Safety and Health Management Plans, as well as accident reports, etc. They will also take enforcement action where there are violations of the OSH Act.

B.2 PROJECT DESCRIPTION

This Chapter describes the proposed intervention in the POS area under IDB Loan TT-L1036.

The IDB FAP is comprised of the following intervention components aimed at providing sustainable solutions to the existing problem.

B.2.1 Component 1 - Drainage Works for Critical Areas Flooded in POS

This intervention will cover necessary civil works to mitigate flooding events in the area of POS. Some of the works have already been identified and defined by the DD and will be implemented within the modality of design-built schemes. The future interventions are going to be validated under a catchment management framework that is going to be implemented in parallel in order to give sustainability to the system. The catchment management approach will also consider climate change events that are reflected in the likely modifications of design storms in terms of frequency, return period and intensity as well as sea level rise scenarios. The works are going to be located within the sub-catchment formed between the St. Ann's and Maraval Rivers. The main types of works to be included are: interceptors, drainage systems, detention ponds and pumping stations.

This intervention has been materialized into nine separate project packages focused on specific areas. These areas and their respective scope of works appear in Table B-2.1. A map indicating the position of each of the packages and their anticipated impact zones is presented in Figure B-2.1.

TABLE B-2.1: FLOOD ALLEVIATION PROGRAM - PROJECT PACKAGES

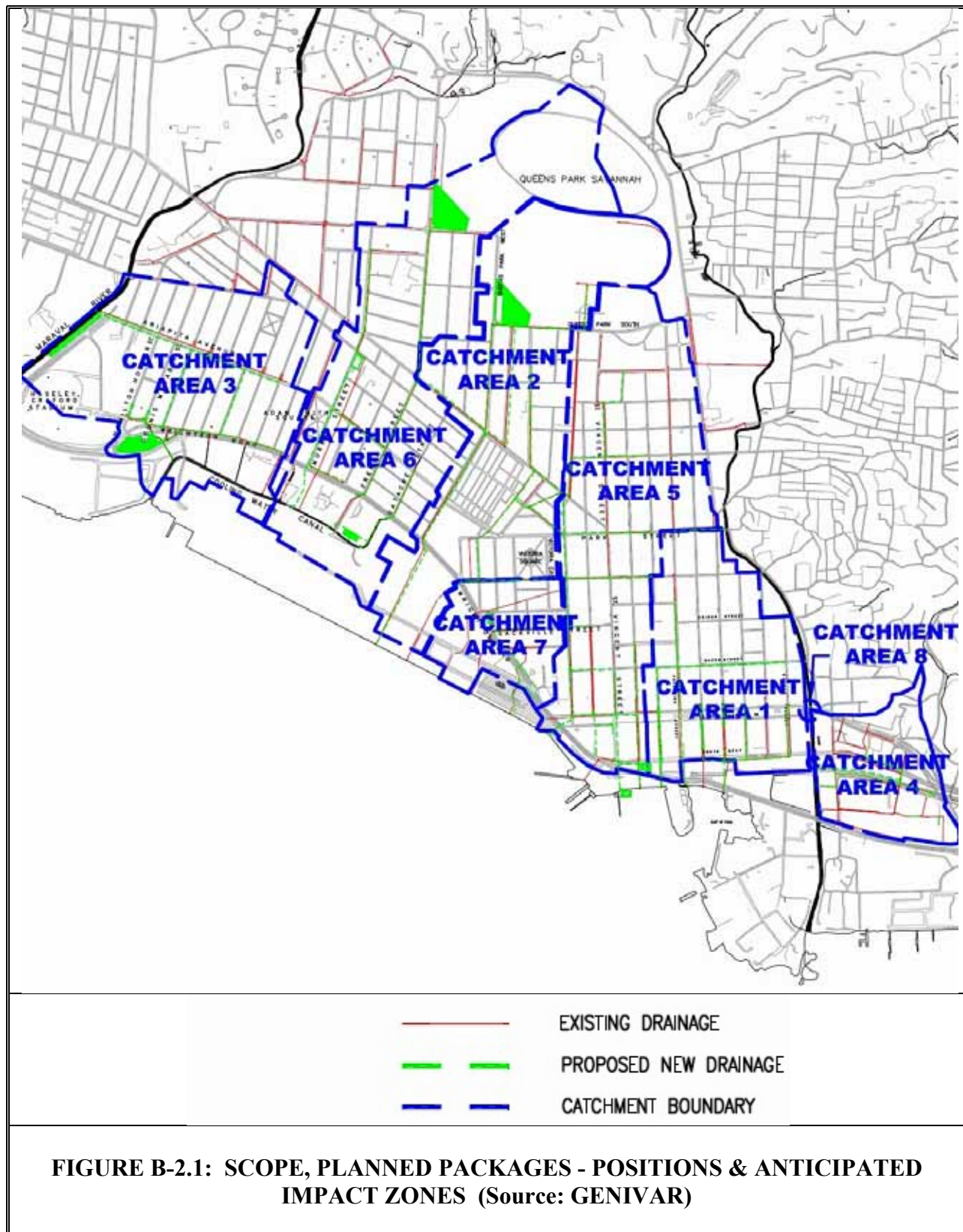
Package No.	Area	Scope
1	Frederick St., Queen St., Broadway, Independence Square and South Quay.	Consists of the design and construction of 3.0 km of drainage conduits along Chacon Street, Frederick Street and Broadway, Queen Street, Duncan Street, George Street, Charlotte Street, Henry Street, Independence Square North and South Quay. In addition, the package will also include outfitting the drainage outfalls along the St. Ann's River in the vicinity of Queen Street with flap gates to prevent water from the River from flowing back into the Street when the river levels are high. These works will relieve flooding in lower downtown, particularly on South Quay, between Abercromby Street and East Dry River. <i>This package is presently being redesigned under a separate Design-Bid-Build modality that could include a retention facility in the Sealots Cove area.</i>

Package No.	Area	Scope
2	Queen's Park Savannah South & Uptown and Downtown Port of Spain West.	<p>Consists of the design and construction of approximately 4.8 km of drainage conduits along Cipriani Boulevard, Colville Street, Tragarete Road, Stanmore Avenue, Victoria Avenue, Kew Street, Duke Street and Stone Street. In addition, an enhanced detention basin is proposed in the south western corner of the Savannah. These works are expected to relieve flooding at the south western corner of the Savannah (at the top of Cipriani Boulevard), as well as Ariapita Avenue, Tragarete Road, and the properties in their vicinity.</p> <p>The package will also include outfitting the detention pond and the drainage outfalls into the Gulf of Paria with floating trash collectors, as well as the design and construction of "enhanced recharge areas" in the Queen's Park Savannah.</p> <p>The detention pond will be shallow (about 0.6m deep) and can be built by raising the level of the sidewalk and a narrow strip of the ground behind it to create a wide berm in this corner of the Savannah. The rest of the berm can be surfaced in grass and landscaped. The berm will not greatly impact the use of this corner of the Park.</p>
3	Woodbrook West	<p>Consists of the design and construction of approximately 2.3 – 2.8 km of drainage conduits along Ariapita Avenue, Dennis Mahabir Street, Hamilton Holder Street, Petra Street, Alberto Street and Wrightson Road. The package will also include outfitting drainage outfalls along the Maraval River with permanent flap gates to prevent water from the River from flowing back into Ariapita Avenue and Fitzblackman Road. In addition, retention ponds are proposed in one or two locations. These works are expected to relieve flooding along Ariapita Avenue, Dennis Mahabir and Hamilton Holder Streets and Wrightson Road and the properties in their vicinity.</p>
4	East Port of Spain	<p>Consists of the design and construction of approximately 0.8 – 1.0 km of drainage conduits along the Eastern Main Road and the Priority Bus Route east of the St. Ann's River, along Abattoir Road, and within the compound of the Port of Spain Market. These works are expected to relieve flooding in East Port of Spain, particularly along the Eastern Main Road, the Priority Bus Route, Abattoir Road, and the properties in their vicinity. The package will also include installing floating trash collectors at</p>

Package No.	Area	Scope
		certain key points in the drainage system – particularly within the Market.
5	Lower St. Vincent St. & Foreshore Retention Tank	Consists of the design and construction of approximately 4.5 km of drainage conduits along Dundonald Street, Richmond Street, Abercromby Street, St. Vincent Street, Gordon Street, Oxford Street, Park Street, Duke Street, Sackville Street, Queen Street, Edward Street, Independence Square and South Quay. The package will also include outfitting new drainage outfalls into the Gulf of Paria with floating trash collectors. In addition, a detention basin is proposed either at South Quay or in the sea off of the Port of Port of Spain. These works are expected to relieve flooding along South Quay, Independence Square South, Richmond Street, St. Vincent Street, Abercromby Street, and the properties in their vicinity.
6	Woodbrook East	Consists of the design and construction of approximately 3.3 km of drainage conduits along Gatacre Street, Maraval Road, French Street, Gray Street, Murray Street, Ariapita Avenue and Wrightson Road. In addition, three detention basins are proposed: one in the western corner of the Savannah, one in the Augustus Williams Playground, and one behind the D.R.E.T.C.H.I. Compound (south of Wrightson Road). These works are expected to relieve flooding at the western corner of the Savannah (at the top of Maraval Road), as well as at Warner Street, Ariapita Avenue, Methuen Street, McDonald Street, Wrightson Road (between Fitt Street and Gatacre Street), the lower portions of Fitt, Cornelio, French and Gatacre Streets, and the properties in their vicinity. The package will also include outfitting the detention basins and the drainage outfalls into the Cooling Water Channel with floating trash collectors, as well as the design and construction of “enhanced recharge areas” in the Queen’s Park Savannah.
7	Charles St., Sackville St., and London St.	Consists of the design and construction of approximately 2.2 km of drainage conduits along Wrightson Road, Charles Street, Scott Bushe Street, Sackville Street, and through the International Waterfront. In addition, a detention basin is proposed under Victoria Square at the intersection of Charles Street and Sackville Street with Wrightson Road and Scott Bushe Street. The package will also include outfitting the detention pond and the

Package No.	Area	Scope
		drainage outfall into the Gulf of Paria with floating trash collectors. These works are expected to relieve flooding along Sackville Street, Charles Street, Scott Bushe Street, London Street, and the properties in their vicinity.
8	Eastern Main Rd. Bridge over St. Ann's River	Consists of the design and construction of an innovative new Eastern Main Road Bridge over the East Dry River which will reduce the occurrence of flooding caused by the River.
9	Eastern main Rd. Wet Detention Pond East Dry River (<i>Status: completed</i>)	Wet Detention Pond completed. This pond is only a temporary effort to reduce flooding within the area.





B.2.2 Component 2 - Institutional Strengthening of the Drainage Division

This component will include all the necessary activities to support the GORTT in transforming the DD into an independent Authority within the MEWR that could build, operate and maintain all the future and existing drainage infrastructure in the country. Although the DD has adopted many actions toward this direction it does not operate within a comprehensive institutional framework. GORTT has already developed some studies to support the transformation of the DD into an autonomous government agency and modernizing the institutional arrangement for management of water resources.

B.2.3 Component 3 - Linear Park

The East Dry River is a paved channel for most of its length through East Port of Spain. The capacity of the River is estimated to be 202,500 m³ with 14% used capacity in the dry season and 40% in the wet season. It is estimated that the river overflows its banks approximately three times during the rainy season, usually in the vicinity of the South Quay Bridge where the river crosses the Eastern Main Road. It is necessary to conduct a comprehensive study of the river to identify the range of flood alleviation measures that need to be implemented.

With regards to the East Dry River, a solution is being sought through a multidisciplinary “Longitudinal Park Project” considered in the context of measures to alleviate flooding and improve urban drainage. The proposed solution is intended to convert the river itself and the currently deteriorated surrounding public areas into attractive urban content delivering valuable urban space for public use, while at the same time ensuring adequate stream flow especially during storm events. The East Dry River Linear Park will comprise of a number of hardscaped public areas with plazas and other public open spaces and landscaped promenade interspersed with formal plantings of trees and flowers and a mix of buildings and public facilities along selected sections of the East Dry River (St. Ann’s River). The Park will allow for public use of the space, links to private residential and other uses and spaces for cultural and recreation activity at selected locations.

This component is comprised of all civil and landscaping works for the implementation of a 1.4 km Linear Park located at the St. Ann’s River. The Linear Park will be designed in conjunction with the catchment analysis and drainage works design. The river discharge is one of the most problematic areas in POS in terms of flooding. This area needs to have an integral solution which will contemplate the redesign of the civil works at the discharge area including road bridges, diversion chambers, river bed works, etc. (Component 1). Therefore it will be necessary to adapt the linear park to the final layout of these works in order to give desired functionality of the park.

Currently, this component receives great attention through IDB’s Emerging and Sustainable Cities Initiative (ESCI); a collaborative project led by the Swiss Federal Institute of Technology (ETHI).

For the purpose of the Flood Alleviation Program of intervention by the IDB, the initial phase of the East Dry River Linear Park will extend 1.4 km from Belmont Circular Road in the vicinity of the General Hospital to the bridge at South Quay and will encompass the following broad elements:

- Elevated bridges
- Biofiltration trench and pervious street cover
- Flood warning and monitoring system

Specific elements of the Linear Park appear in Table B-2.3 and is depicted in Figure B-2.3.

TABLE B-2.3: LINEAR PARK – PROPOSED SCOPE

Item No.	Scope
1	Establish two bicycle/jogging tracks along each side of the river channel (one-way north/south on each side of the centre channel).
2	Resurface and install solar lights on the side walls of the channel to illuminate the cycle track and surroundings, enabling use at night and increasing security.
3	Design and install iconic pedestrian bridges (in a style and material that reflects the history and culture of East POS) across the river at 3-4 locations to connect uses on either side of the river and symbolically to bridge the divide between east and west Port of Spain.
4	Develop a public promenade along Piccadilly Street between Park Street and Queen Street with seats, landscaped areas, pedestrian pathways, public conveniences, vendor booths/street markets.
5	Develop landscaped areas within the adjacent public housing compounds to create urban gardens and sport/recreation facilities.
6	Upgrade and clearly sign/identify pedestrian access and egress points to and from the river and the street.
7	Install Early Warning and Flood Monitoring systems along the river with appropriate audible and visual alarms.

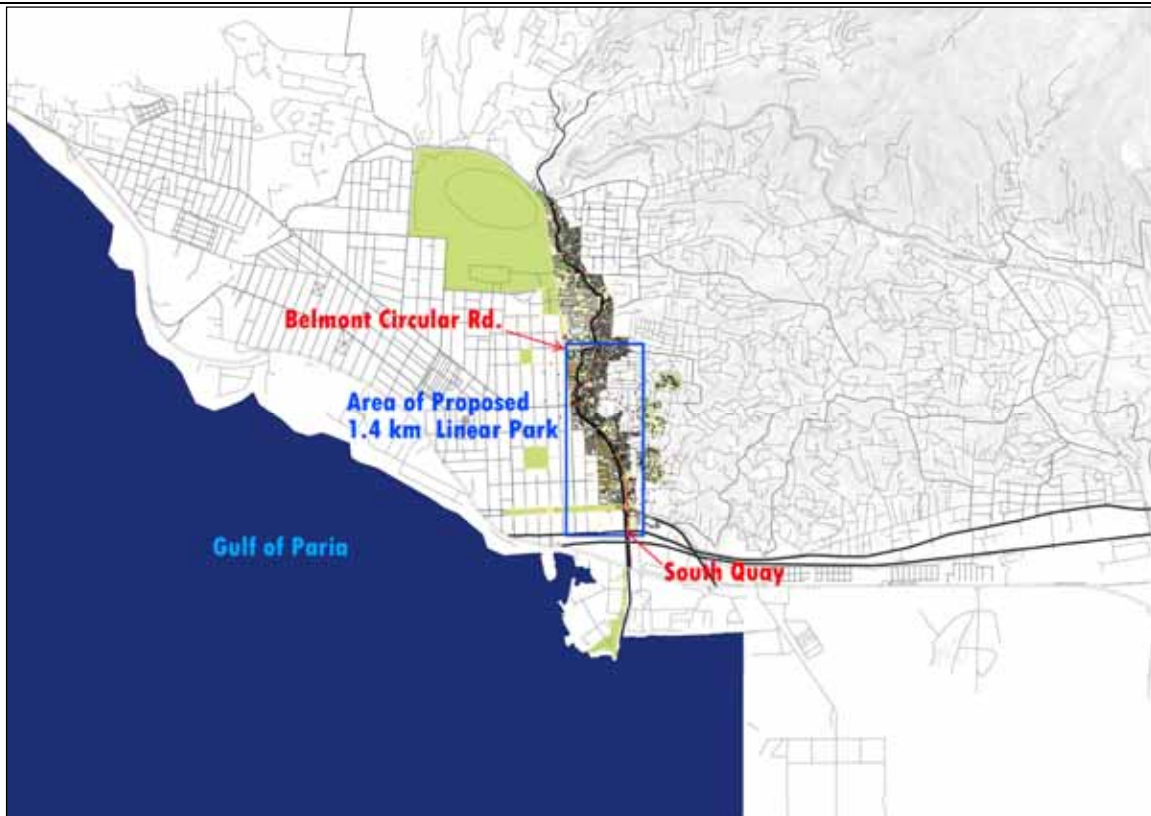
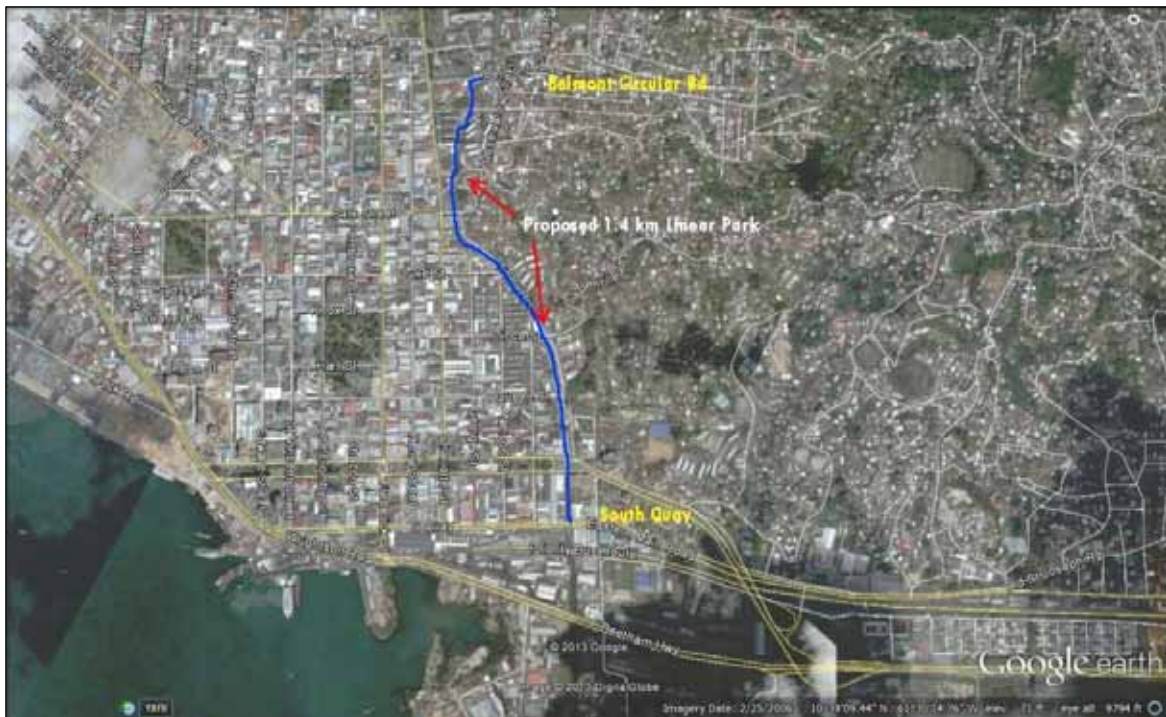


FIGURE B-2.3: AREA OF PROPOSED LINEAR PARK (Source: Google and EHTI Adapted)

B.3 PERSONNEL, TRAINING, AWARENESS, COMPETENCE AND TOOLBOX MEETINGS

This Chapter will address the hiring of personnel, continued training, awareness, competence and tool-box meetings.

B.3.1 Personnel

Each worker on this project must be competent in performing the work activities in which he / she is involved. At the time of hiring, prospective workers' competence will be judged based on training and past experiences. The Personnel Department of the Contractor and the Supervising Engineer will verify experience claimed by the applicant by phone calls to previous employers.

The hiring process will also include testing to verify competence in specific areas (for example, testing of welders or plumbers). Once hired, workers may be re-tested for competence where problems have arisen on the job, or may be tested for higher competence prior to being promoted.

Once hired, each worker will be given a formal site orientation/induction and (as required) training sessions such as formal courses, toolboxes and hands-on instruction and demonstrations. This can be consolidated by the implementation of a "buddy system", which gives the opportunity to a worker to work in cooperation with another more experienced worker who is familiar with the job and requirements.

Records of all training and competence testing will be kept in each worker's personnel file.

B.3.2 Training, Awareness and Competence

The Contractor's Personnel Manager will arrange for and maintain training programs to promote and ensure awareness of environmental, social and Health and Safety performance on the job. Awareness will also be promoted through information documents, review of work plans, issue of work instructions, and highlighting of related incidents on other projects.

The Personnel Manager will be required to review staff performance and identify future training needs. Details of training activities will be kept in each worker's personnel file.

The following is a non exhaustive list of training that should be planned by the Contractor's Personnel Manager:

- Introduction Training: Each employee or worker, including subcontractor, who starts working on the construction site, will be given a specific introduction to ensure full conformity to the legal, contractual and HSE procedures to be applied on site;
- Personal Protective Equipment Use;
- Reporting on Pollution;

- Reporting Safety Incidents; and
- Spill Prevention and Response.

B.3.3 Toolbox Meetings

Toolbox Meetings are designed to raise the awareness of the workers with regard to the generic risks they are exposed to on work sites and to develop their ability to communicate on HSE aspects.

Toolbox Meetings will be conducted by trained HSE specialists and adapted specifically to the type of work that will be performed on the construction site. Workers will be briefed on their tasks and they will be thoroughly informed of their duty to observe environmental requirements and safeguards, safe work practices, etc.

The main following themes are examples of what will be covered by the Toolbox meetings:

- Waste Sorting;
- Noise Level & quality of life;
- Storage of Hazardous Products;
- Spills and Leakage, and their control;
- Dust Emissions; and
- Health and Safety Aspects, including Emergency Prevention and Response.

B.4 COMMUNICATIONS AND DOCUMENT CONTROL

This Chapter will set out guidelines for internal/external communications and document control related to this Program.

B.4.1 Internal Communications

With regard to communication among MEWR, DD, NIDCO, the Design Engineer, the Supervising Engineer and the Contractor:

- Each party will designate a primary contact and also indicate other persons to be copied on all correspondence.
- All contract-related correspondence from the Contractor must be directed to the Supervising Engineer in the first instance.
- All correspondence from NIDCO to the Contractor must be copied to the Supervising Engineer.
- The Design Engineer, the Supervising Engineer and the Contractor must obtain prior clearance from MEWR, DD before sending correspondence to Government Agencies, Utility Companies or Community Groups.

Archiving and retention of documentation communications with all parties will be a specific requirement.

Communication with the Site Workforce will take the following forms:

- Project Specific Poster Campaigns;
- Minutes of Meetings and Memos placed on Notice Boards;
- Project Specific Toolbox Meetings (All attendance will be recorded); and
- Site Representative (chosen from the workforce).

B.4.2 External Communication

Communication with external third parties (government agencies, regulatory agencies, community representatives) will be formalized such that control and responsibility of the MEWR, DD is maintained at all times. MEWR, DD may, at its sole discretion, delegate responsibility for specific communications to the Design Engineer, the Supervising Engineer, or the Contractor. The extent of external communication of significant environmental aspects will

be reviewed in response to changing circumstance by the MEWR, DD under the advice of the Supervising Engineer.

Archiving and retention of documentation communications with all parties will be a specific requirement.

MEWR, DD will issue all press releases pertaining to this project. The Design Engineer, the Supervising Engineer and the Contractor will only release information to the media if and when instructed to do so by MEWR, DD.

B.4.3 Document Control

All documentation relating to the ESMP, including plans and procedures will be held by the MEWR, DD Document Control Department to ensure full traceability (versions, authors and approvals) of all documents. Updates/revisions will be issued to all relevant personnel. A formal Document Control Procedure will apply. Uncontrolled copies of all documentation will be available to all staff on the dedicated site of for e.g., a SharePoint Project Server designed for storage of all relevant material.

Allocated resources will be used for quality assurance, liaison, internal and external project meetings, and project team supervision as well as for the SharePoint site administration.

B.5 HSE PROCEDURES DURING CONSTRUCTION

This Chapter contains procedures for management and monitoring of HSE performance during construction in a tabular format, where each table consists of two sections. The upper part of each table covers HSE management aspects including:

- Identification of the impact;
- Proposed mitigations measures;
- Responsible party;
- Timing to implement the required actions;
- Specialised equipment or material required;
- Special training required to realise the proposed actions; and
- A cost estimate.

The lower part of each table describes the proposed monitoring to ensure effectiveness of the HSE actions including:

- Description of the monitoring activity proposed;
- Frequency at which it should be realized;
- How and by whom it is to be done;
- Specialized equipment or special training requirements; and
- An estimate of the associated costs.

This ESMP contains procedures for all construction-phase mitigation measures identified in the ESA.

B.5.1 Air Quality

B.5.1.1	Potential Impact	Impaired Air Quality from Fugitive Dust and Vehicle/Equipment Emissions			
Mitigation Measures		<ul style="list-style-type: none">▪ Clear only area needed for construction.▪ Keep stockpiles to a minimum and utilize as soon as practical.▪ Install, operate and maintain dust control measures (e.g. geotextiles/ tarpaulins) on stockpiles, esp. fine-grain granular material /aggregates and other raw materials, topsoil etc. when not used or store aggregates in bins or silos.▪ Securely cover all transport vehicles hauling fill material and spoil. Material should be transported in a dampened state, where practicable. Minimize handling fine-grain granular material from significant heights above ground to reduce dust generation and dispersion▪ Minimize emissions through periodic maintenance of vehicles and equipment/machinery to manufacturer’s specifications.▪ Enhance traffic management to optimize and control pre-construction and construction traffic.▪ Establish and enforce speed limits (< 20km/hr) within construction zone and periodically wet roads (and sites) where necessary using aqueous Calcium Chloride (or water) as a dust palliative to minimize fugitive dust. Wash truck tyres prior to leaving work site.			
Action by		<ul style="list-style-type: none">▪ Contractor			
Timing		<ul style="list-style-type: none">▪ Throughout the construction phase			
Specialized Equipment or Material		<ul style="list-style-type: none">▪ Adequate number of water trucks.▪ Equipment for washing truck wheels on leaving the site.▪ Covers on all trucks.			
Special Training		<ul style="list-style-type: none">▪ None			
Monitoring					
What / Where	Observe exhaust from equipment and construction vehicles	Measure Respirable Matter (PM10) at Sensitive Receptors	Measure Respirable Matter (PM10) at the closest human receptors	Public Complaints	
Frequency	On continuous basis	Fortnightly	As needed	On continuous basis	
How / By Whom	Visual inspection by the HSE Inspector	Instrumental monitoring by the HSE Inspector		Verbal or written communication with the Liaison Officer	
Specialized Equipment or Material	Environmental Checklists	HiVol Monitors or MiniVol Samplers		Complaints Register	
Special Training	Training in the use of the environmental checklists	Training in air quality monitoring		Good public communication and relation skills	
B.5.1.2	Potential Impact	Impaired Air Quality from Noise and Vibration			
Mitigation Measures		<ul style="list-style-type: none">▪ Use quiet equipment, where possible.			

	<ul style="list-style-type: none">▪ Enhance exhaust inspection. Installation (and maintenance) of mufflers/silencers on all noise-producing tools, vehicles and equipment requiring them. If noise is excessive, vehicle or machinery wouldn't be used.▪ Regularly schedule equipment and vehicular maintenance and tune-up to keep their noise at a minimum.▪ Pursuant to the Noise Pollution Control Rules 2001, perform all work strictly during regular business hours. (i.e. active working daytime hours instead of resting late night and early morning hours). 7:00 am to 7:00 pm Mon. to Fri. 8:00 am to 1:00 pm Sat. No work on Sun. or Public Holidays.▪ If work must be performed work outside these hours and noise levels are likely to exceed the specified standards, MEWR, DD would apply for and obtain a noise variation from the EMA.▪ Periodically monitor to ensure that noise and vibration levels meet acceptable statutory requirements detailed in the EMA Noise Pollution Control Rules, 2001 i.e. 120dB for Zone III – General areas.▪ Erect appropriate hoarding and physical/vegetative temporary noise barriers/screens and heightening fencing walls, where possible and according to monitoring results.▪ Inform area residents and users in advance about the nature of the proposed project one (1) month prior to the commencement of works through advisories and public announcement and at least two (2) public consultations.			
Action by	<ul style="list-style-type: none">▪ Contractor			
Timing	<ul style="list-style-type: none">▪ Throughout the construction phase			
Specialized Equipment or Material	<ul style="list-style-type: none">▪ Adequate number of sound meters.			
Special Training	<ul style="list-style-type: none">▪ Use of sound meters			
Monitoring				
What / Where	Baseline noise monitoring	Conduct SPL, L_{eq} , L_{peak} monitoring at site	Conduct SPL, L_{eq} L_{peak} monitoring at nearest human receptors north, south, east, west within 1 km	Public Complaints
Frequency	Prior to onset and over 2 week period	Monthly	Monthly	On continuous basis
How / By Whom	Use of meter by HSE Inspector	Instrumental monitoring by the HSE Inspector		Verbal or written communication with the Liaison Officer
Specialized Equipment or Material	Sound Meters	Sound Meters		Complaints Register
Special Training	Training in the use of sound meters	Training in sound level monitoring		Good public communication and relation skills
B.5.1.3	Potential Impact	Transient Odours		
Mitigation Measures	<ul style="list-style-type: none">▪ Minimize odours by maintenance of good work practices.			

	<ul style="list-style-type: none">▪ Cover dumpsters/trucks used to temporarily contain drain waste.▪ Use vacuum tankers to receive septage, if needed.▪ Ensure all waste is hauled off-site on a scheduled and timely basis.▪ Use odour suppressing chemicals ensuring use is compliant with OSH rules.	
Action by	<ul style="list-style-type: none">▪ Contractor	
Timing	<ul style="list-style-type: none">▪ Throughout the construction phase	
Specialized Equipment or Material	<ul style="list-style-type: none">▪ Dumpsters▪ Vacuum Tankers.	
Special Training	<ul style="list-style-type: none">▪ None	
Monitoring		
What / Where	Observations during construction activity	Public Complaints
Frequency	Incidentally	On continuous basis
How / By Whom	HSE Inspector	Verbal or written communication with the Liaison Officer
Specialized Equipment or Material	Dumpsters Vacuum Tankers	Complaints Register
Special Training	None	Good public communication and relation skills
Indicator	No. of Reportable Incidents to the EMA	

B.5.2 Water Quality

B.5.2.1	Potential Impact	Impaired Water Quality from Siltation		
Mitigation Measures		<ul style="list-style-type: none">Conduct site works only in required areas.Use of temporary storm drainage diversion channels (in consultation with MEWR, Drainage Division) around trenches that do not interfere with natural water flows.Shore adequately to protect against trench collapse.Protect erodible areas temporarily with mulch or fabric and re-instate work sites as soon as practical following completion of site works.As far as practically possible, schedule works during the dry season or in periods of light or moderate rainfall (i.e. precipitation rate < 10mm/hr).Ensure erosion and sedimentation control measures installed before project work begins, and remains in place until erosion hazard no longer exists e.g., sediment retention nets, sediment ponds, channels, siltation traps etc. within drains to trap silt before it enters any watercourse outside site.Limit access for heavy machinery.Ensure topsoil in construction areas is stripped and stored for future reuse.Temporary confinement of excavated stockpiles or fill material using wooden cribs or geofabric screens on stakes.Store fill material at bermed designated lay-down sites (empty lots and open recreational areas) far from municipal drains or watercourses.Reuse excavated material, where possible. Pre-arrange use of adequate sites for final disposal of non-reusable excavated materials.		
Action by		<ul style="list-style-type: none">Contractor		
Timing		<ul style="list-style-type: none">Throughout the construction phase		
Specialized Equipment or Material		<ul style="list-style-type: none">Silt trapsGeo-fabric screens		
Special Training		<ul style="list-style-type: none">None		
Monitoring				
What / Where	Visually inspect drains and rivers for visible turbidity and solid deposits.	Turbidity levels in watercourses next to construction sites.	Public Complaints	
Frequency	Daily	Fortnightly or coinciding with excavation works	Continuous basis	
How / By Whom	Visual Observations by the HSE Inspector	Sampling and testing by the HSE Inspector	Verbal or written communication with the Liaison Officer	
Specialized Equipment or Material	None	Turbidity meters	Complaints Register	

Special Training		Environmental training and Checklists	- Trained personnel for in-situ sampling	Good public communication and relation skills
B.5.2.2	Potential Impact	Impaired Water Quality from Fugitive Drainage and Sanitary Sewer Flows, Hydrocarbon Spills and Spent Lubricant		
Mitigation Measures		<ul style="list-style-type: none">Minimize impairment to water quality and ensure compliance with the Water Pollution Rules, 2001 through “good practice” construction techniques.Use interim pipelines to convey any wastewater encountered to nearby sewers, or use interim holding tanks.Reconstruct damaged or broken wastewater systems in accordance with WASA’s requirements.Provide impermeable bunds around fuel storage tanks.Re-fuel vehicles and equipment off-site or at specific bunded areas at least 30.5 m from surface water bodies. Use appropriate pumps and nozzles.Place disconnected hoses in containers to prevent residual fuel spills.Provide ongoing maintenance of vehicles and machinery to ensure no leakage from equipment.Minimize spills during construction utilizing “good practice” construction techniques such as use of appropriate containers, avoiding overfilling, etc.Promptly clean up spills and remove all soil which may become contaminated during the course of construction to a bioremediation cell for treatment (on-site remediation may be considered if the volumes are small),Store chemicals and fuels in bunded areas of adequate capacity.Dispose of spent chemical and fuel containers in a proper and timely manner.Avoid “hosing down” of spills and construction material. Instead, use dry clean up and mopping techniques as appropriate.		
Action by		<ul style="list-style-type: none">Contractor		
Timing		<ul style="list-style-type: none">Throughout the construction phase		
Specialized Equipment or Material		<ul style="list-style-type: none">Secondary containment (bund walls)Proper pumps, hoses and nozzles for fuellingPersonal protective equipmentAppropriate biological remediation product		
Special Training		<ul style="list-style-type: none">Training of workers in use of spill reduction equipment.Approved bioremediation facilityTrained personnel in spill response		
Monitoring				
What / Where		<ul style="list-style-type: none">Visually inspect drains and rivers within the construction area for oil sheen and fugitive sewer discharges.	<ul style="list-style-type: none">Public Complaints	
Frequency		<ul style="list-style-type: none">Daily	<ul style="list-style-type: none">Continuous basis during the construction phase	
How / By Whom		<ul style="list-style-type: none">Visual Observations by the HSE Inspector	<ul style="list-style-type: none">Verbal or written communication with Liaison Officer	

Specialized Equipment or Material	<ul style="list-style-type: none"> ▪ Environmental Checklists 	<ul style="list-style-type: none"> ▪ Complaints Register
Special Training	<ul style="list-style-type: none"> ▪ Training in the use of the environmental checklist 	<ul style="list-style-type: none"> ▪ Good public communication and relation skills
Indicator	In-Situ Field Testing of Sediment Content of Outflows, i.e. TSS \leq 50 mg/L	

B.5.3 Utility Services Disruptions

B.5.3.1	Potential Impact	Intentional and Accidental Disruptions to Existing Utilities	
Mitigation Measures	<ul style="list-style-type: none">On-site consultation and coordination with MWI, MLG, TTEC, TSTT, NGC, Columbus FLOW, Fire Services Division and WASA before commencement of works as well as during the work activities.Map consultations to facilitate work execution.Adopt Contractor provisions, in the case of accidents, to ensure the prompt restoration of interrupted services.Coordinate and cooperate with utility companies and Local Government to establish alternative schedules and mechanisms for implementation.Conduct electronic and print media information campaigns/blitz about service interruption times, the affected areas and alternative arrangements, if any.		
Action by	<ul style="list-style-type: none">Contractor		
Timing	<ul style="list-style-type: none">Throughout the design and construction phases		
Specialized Equipment or Material	<ul style="list-style-type: none">None		
Special Training	<ul style="list-style-type: none">None		
Monitoring			
What / Where	Ensure no disruption to utilities in construction areas	Public Complaints	
Frequency	Incidental	On continuous basis	
How / By Whom	Visual inspections by Utility Representative, Contractor and by the HSE Inspector	Verbal or written communication with the Liaison Officer	
Specialized Equipment or Material	Environmental Checklists	Complaints Register	
Special Training	Training in the use of the environmental checklists	Good public communication and relation skills	
Indicator	No. of Complaints to POSCC or Utility Agencies		

B.5.4 Traffic Disruptions

B.5.4.1	Potential Impact	Vehicular and Pedestrian Traffic Disruptions, Delays and Congestion	
Mitigation Measures	<ul style="list-style-type: none">▪ Prepare, develop and implement detailed approved Traffic Management Plan (TMP) prior to commencement of works and in consultation with the Traffic Management Branch with feedback through monitoring. TMP should consider night and weekend work as likely on major streets as well as street closures and detours.▪ Active enforcement of temporary rules and regulations of the TMP with the aid of the City Police. Reinstating roads as soon as possible.▪ Schedule transport of material and equipment to avoid peak traffic hours.▪ Use designated areas for off-loading, away from roads.▪ Train truck drivers in defensive driving.▪ Avoid use of long truck convoys.▪ Arrange for police outriders to accompany particularly large loads.▪ Phase works and possible execution of heavy works during off-peak hours.▪ Prohibit off-road traffic outside designated areas.▪ Implement detours and alternate routes with adequate signage, signaling, road markers, demarcation, lighting/illuminating devices and safety signal devices.▪ Repave/repair excavated road areas.▪ Information campaigns and media blitz to inform stakeholders about the nature of the proposed activity and traffic arrangements.		
Action by	<ul style="list-style-type: none">▪ Contractor		
Timing	<ul style="list-style-type: none">▪ Throughout the construction phase		
Specialized Equipment or Material	<ul style="list-style-type: none">▪ Approved TMP		
Special Training	<ul style="list-style-type: none">▪ None		
Monitoring			
What / Where	Adhere to TMP	Public Complaints	
Frequency	On continuous basis	On continuous basis	
How / By Whom	Visual observations by the Contractor (or Contractor-appointed Traffic Manager)	Verbal or written communication with the Liaison Officer	
Specialized Equipment or Material	- TMP - Environmental Checklists	Complaints Register	
Special Training	Training in the use of the environmental checklists	Good public communication and relation skills	
Indicator	No. of Complaints to the POSCC		

B.5.5 Waste Management

B.5.5.1	Potential Impact	Landscape Degradation due to Littering and Contamination of Construction Sites	
Mitigation Measures		<ul style="list-style-type: none">Conduct site works only in required areas.Provide and ensure proper sorted disposal and disposal facilities for all non-hazardous solid waste.Recycle/reuse all excavated materials where suitable for backfilling.Proper disposal of contaminated soil and other hazardous waste utilizing appropriate Contractors.Collect all spent lubricants for recycling, reuse or appropriate disposal.Promptly collect, secure transport and dispose of all non-hazardous solid waste at Beetham landfill via approved Contractor; prior permission having been sought from SWMCOL.Collect asbestos containing pipe portions and contract services to facilitate proper final disposal at approved Forres Park landfill.Use appropriate absorbent material to collect spills prior to appropriate disposal.Ensure relevant chain of custody records and disposal/remediation certificates are maintained.Clean-up of all sites and adjacent streets used by trucks daily.Ensure washings from premix cement trucks are contained according to BMPs and not discharged into drains or watercourses.Use of adequately located and maintained portable toilets for workers.Enforce proper waste disposal practices.	
Action by		<ul style="list-style-type: none">Contractor	
Timing		<ul style="list-style-type: none">Throughout the construction phase	
Specialized Equipment or Material		<ul style="list-style-type: none">Use of approved waste disposal ContractorsUse of approved disposal facilities	
Special Training		<ul style="list-style-type: none">None	
Monitoring			
What / Where	Observe state of construction areas	Public Complaints	
Frequency	On continuous basis	On continuous basis	
How / By Whom	Visual observations and inspections by the HSE Inspector	Verbal or written communication with the Liaison Officer	
Specialized Equipment or Material	Environmental Checklists	Complaints Register	
Special Training	Training in the use of the environmental checklists	Good public communication and relation skills	
Indicator	No. of Complaints to the POSCC		

B.5.6 Cultural Heritage/Property

B.5.6.1	Potential Impact	Accidental Damage to Historical/Archaeological/Cultural Artifacts, Areas, Monuments and Buildings	
Mitigation Measures	<ul style="list-style-type: none">Conduct survey of sites prior to the commencement of any construction works. Establish buffer zones/temporary protective fencing and use of care and caution around historical sites etc.Include notification and protection procedures for cultural properties in construction contract documents.Conduct survey at end of work for comparison to clearly establish responsibility in potential damage claims.		
Action by	<ul style="list-style-type: none">Contractor		
Timing	<ul style="list-style-type: none">Throughout the construction phase		
Specialized Equipment or Material	<ul style="list-style-type: none">None		
Special Training	<ul style="list-style-type: none">None		
Monitoring			
What / Where	Observe progress of construction works	Public Complaints	
Frequency	Incidental	On continuous basis	
How / By Whom	Visual inspection by the HSE Inspector	Verbal or written communication with the Liaison Officer	
Specialized Equipment or Material	Environmental Checklists	Complaints Register	
Special Training	Training in the use of the environmental checklists	Good public communication and relation skills	
Indicator	No. of Complaints		

B.5.7 Health and Safety

B.5.7.1	Potential Impact	Increased Worker, Public and Road Safety Risks
	Mitigation Measures	<ul style="list-style-type: none"> ▪ Undertake Job Hazard Analyses (JHA) and relevant safety induction and training prior to commencement. ▪ Ensure Contractors submit detailed Health and Safety, Emergency and First Aid Plans for prior approval. ▪ Appoint suitably qualified Safety Coordinator and support personnel, including suitably trained First Aid/CPR personnel for Emergency Response Team providing prompt response and transfer to off-site health facility, upon stabilization and if required. ▪ Enforce on-site regulations (clothing, equipment use, breaks etc.) and Health and Safety Plans/Requirements in accordance with the OSH Act and the National Occupational Standards. ▪ Undertake weekly safety and periodic toolbox meetings. ▪ Use of appropriate Personal Protective Equipment (PPE) to minimize risk. ▪ Enclose/hoard work site/s where possible with fencing for safety. Post warning signs, 24-hour sentries and lighting where needed to ensure public not permitted onto construction site/zone. ▪ Plan specific itineraries for site machinery traffic and daily clean-ups. Large pieces of equipment transported during off-peak hours whenever possible. ▪ Maintain appropriate setback distances and identify and agree upon any requirements for relocation. ▪ Inform public utilizing advisories and announcements of construction activities and safety hazards. ▪ Ensure First Aid/CPR Personnel available on site as part of site Emergency Response Team providing prompt response and transfer to off-site health facility, upon stabilization and if required. ▪ Take steps where possible to avoid creating temporary breeding habitats for mosquito vectors. ▪ Designate a Community Relations Officer/s responsible for interfacing with residents, institutions and businesses affected by the activities as well as with the EMA. ▪ Establish and maintain a register of complaints as part of a Complaints Management System. ▪ Ensure all complaints are investigated and concerns addressed. ▪ Establish and publicize complaints contact telephone number to arrange appropriate response by MEWR site representatives. ▪ Comply with Highways Act, the Motor Vehicles and Road Traffic Act. ▪ Ensure drivers comply with regulation and are trained in defensive driving.

B.5.7.1	Potential Impact	Increased Worker, Public and Road Safety Risks			
		<ul style="list-style-type: none">▪ Designate off-loading areas away from roads.▪ Issue public advisories and announcements to inform residents and users.			
Action by		<ul style="list-style-type: none">▪ Contractor			
Timing		<ul style="list-style-type: none">▪ Throughout the construction phase			
Specialized Equipment or Material		<ul style="list-style-type: none">▪ JHA▪ HSE Plans▪ PPE			
Special Training		<ul style="list-style-type: none">▪ HSE (incl. First Aid/CPR)			
Monitoring					
What / Where	Conduct regular checks to ensure HSE regulations adhered to on-site	Site Safety Inductions and Regular Meetings	Toolbox Meetings	Public Complaints	
Frequency	Daily	Daily, Weekly	Periodic	On continuous basis	
How / By Whom	Visual inspection by the HSE Inspector	HSE Inspector			Verbal or written communication with the Liaison Officer
Specialized Equipment or Material	- JHA - HSE Plans - PPE - Environmental Checklists	Audit outcomes		Complaints Register	
Special Training	- HSE - Training in the use of the environmental checklists	HSE		Good public communication and relation skills	
Indicator	No. of Reportable Incidents to the POSCC and/or the OSH Authority				

B.5.8 Emergency Situation Response

B.5.8.1	Potential Impact	Increased Chaos, Downtime and Injury to Site Workers and Others esp. During Natural Hazards		
Mitigation Measures	<ul style="list-style-type: none">As for 5.7.1. above. Additionally:Ensure Emergency Prevention and Response Plan (EPRP) is prepared, well known and rehearsed prior to commencement of construction.Ensure POS City Corp. and ODPM aware of and can assist in coordination of Plan.Conduct of (daily) site induction training that will, amongst other objectives, inform all workers (esp. new personnel) of emergency response procedures.Ensure emergency procedures are displayed in a prominent position within the site working area.Conduct construction works during dry season only to minimize exacerbated risk due to flooding.			
Action by	<ul style="list-style-type: none">Contractor			
Timing	<ul style="list-style-type: none">Throughout the construction phase			
Specialized Equipment or Material	<ul style="list-style-type: none">ERPJHAHSE PlansPPE			
Special Training	<ul style="list-style-type: none">HSE (incl. First Aid/CPR)			
Monitoring				
What / Where	Conduct regular checks to ensure HSE regulations adhered to on-site	Site Safety Inductions and Regular Meetings	Toolbox Meetings	Public Complaints
Frequency	Daily	Weekly	Periodic	On continuous basis
How / By Whom	Visual inspection by the HSE Inspector	HSE Inspector		Verbal or written communication with the Liaison Officer
Specialized Equipment or Material	<ul style="list-style-type: none">- ERP- JHA- HSE Plans- PPE- Environmental Checklists	Audit outcomes		Complaints Register
Special Training	<ul style="list-style-type: none">- HSE- Training in the use of the environmental checklists	HSE		Good public communication and relation skills
Indicator	No of Reportable Incidents to the POSCC and/or ODPM			

B.6 HSE PROCEDURES DURING OPERATION

This Chapter will contain procedures for management and monitoring of HSE performance during the operation phase of the proposed Program, in a similar tabular format to the one introduced in Section B.5. This ESMP contains procedures for all mitigation measures for the operation phase identified in the ESA.

B.6.1 Regulatory Approvals

B.6.1.1	Target	Register the Detention/Retention Facilities as a Source under the Water Pollution Rules
Tasks		<ul style="list-style-type: none"> Assemble necessary inputs for the Source Registration Form, including effluent quality information. Complete the Source Registration Form and submit to the EMA.
Action by		<ul style="list-style-type: none"> MEWR, Drainage Division
Timing		<ul style="list-style-type: none"> Within 45 working days prior to release of any water pollutant, as defined by Rule 3(1) of the Water Pollution Rules, into the environment
Specialized Equipment or Material		<ul style="list-style-type: none"> None
Special Training		<ul style="list-style-type: none"> None
Verification		
What / Where		<ul style="list-style-type: none"> Verify that form has been submitted.
Frequency		<ul style="list-style-type: none"> Once; 45 working days prior to release of water pollutant into the environment
How / By Whom		<ul style="list-style-type: none"> MEWR, Drainage Division
Specialized Equipment or Material		<ul style="list-style-type: none"> None
Special Training		<ul style="list-style-type: none"> None
Indicator		EMA Non-Compliance

B.6.2 Public Health and Safety

B.6.2.1	Target	Address Public Health and Safety
Tasks		<ul style="list-style-type: none"> Ensure appropriate steps are taken to control interactions with and reduce pollutant (wastewater and solid waste) load of the East Dry River as relates to the Linear Park and its enjoyment. Ensure all necessary HSE considerations to address Public Health and Safety are implemented. Take steps where possible to avoid creating breeding habitats for disease vectors. Ensure areas of detention/retention are adequately fenced, have appropriate warning signage and hazard notices and are well lit to minimize likelihood of accidents and prevent unauthorized access; esp. by children. Establish proper program of inspection and maintenance to ensure areas of detention/retention function properly and to safeguard against sediment retention, slope protection and trash collection esp. for outfall sections. Use of trash collectors prior to and inside detention/retention facilities as well as before outfall.
Action by		<ul style="list-style-type: none"> MEWR, DD; POSCC
Timing		<ul style="list-style-type: none"> Throughout the operation phase.
Specialized Equipment or Material		<ul style="list-style-type: none"> Fencing, signage, lighting, trash collectors and methodology to avoid creating habitats for disease vectors
Special Training		<ul style="list-style-type: none"> None
Verification		
What / Where		<ul style="list-style-type: none"> Ensure that all attempts are made to fence and display appropriate warning signage and hazard notices and areas are lit, as needed.
Frequency		<ul style="list-style-type: none"> Continuously.
How / By Whom		<ul style="list-style-type: none"> POSCC
Specialized Equipment or Material		<ul style="list-style-type: none"> Fencing, signage, lighting, trash collectors and methodology to avoid creating habitats for disease vectors
Special Training		<ul style="list-style-type: none"> None
Indicator		No of Reportable Incidents to the POSCC and/or the OSH Authority

B.6.3 Water Quality

B.6.3.1	Potential Impact	Localized Flooding
Mitigation Measures		<ul style="list-style-type: none"> Ensure drains and watercourses are kept free from obstruction such as construction debris, refuse and rubbish. Continuously maintain permanent drains by regular inspection and removal of solid waste, silt or other debris. Implement an inspection and maintenance program for all pumps, purge/clean-out points and pipelines.
Action by		<ul style="list-style-type: none"> MEWR,DD;,POSCC
Timing		<ul style="list-style-type: none"> Throughout the operation phase
Specialized Equipment or Material		<ul style="list-style-type: none"> None
Special Training		<ul style="list-style-type: none"> None
Monitoring		
What / Where		<ul style="list-style-type: none"> Regular visual inspection of drains for solid waste, dirt and other debris. Inspect site for flooding. Inspect site for localized pooling of water associated with impeded drainage runoff from the site.
Frequency		At least twice per month during rainy season and once per month during the dry season.
How / By Whom		POSCC.
Specialized Equipment or Material		Development and use of a Checklist.
Special Training		None
B.6.3.2	Potential Impact	Erosion and Sediment Deposition
Mitigation Measures		<ul style="list-style-type: none"> Ensure detention/retention pond slopes are protected utilizing appropriate vegetation. Employ structural measures to supplement vegetation. Routinely inspect vegetation in landscaped areas and replant areas that become denuded as soon as practical.
Action by		<ul style="list-style-type: none"> POSCC
Timing		<ul style="list-style-type: none"> Throughout the operation phase
Specialized Equipment or Material		<ul style="list-style-type: none"> None
Special Training		<ul style="list-style-type: none"> None
Monitoring		
What / Where		<ul style="list-style-type: none"> Visually inspect detention/retention facilities
Frequency		<ul style="list-style-type: none"> At least twice per month during rainy season and once per month during the dry season.
How / By Whom		<ul style="list-style-type: none"> POSCC
Specialized Equipment or Material		<ul style="list-style-type: none"> None
Special Training		<ul style="list-style-type: none"> None

B.7 RELATED PLANS

This section will list other Plans which have been prepared for this Program that address specific HSE issues, including:

- Communications Plan;
- Quality Assurance Project Plan;
- Waste and Hazardous Material Management Plan;
- Traffic Management Plan;
- Spill Prevention, Control and Countermeasures Plan;
- Emergency Prevention and Response Plan; and
- Field Monitoring Checklist based on typical CEC requirements of Package 1 (see B.11).

B.8 MONITORING AND MEASUREMENT

The requirement for monitoring and measurement of significant environmental aspects is defined within the ESMP. They will be carried out to confirm compliance/achievement of Targets while providing data to be used to demonstrate continuous improvement. In the event that monitoring and measurement reveals a non-compliance procedures will be implemented to address non-conformance, improvement and preventative actions.

Equipment for monitoring and measurement shall have valid and current calibration certification before use.

Where applicable, the results of all monitoring and measurement of environmental aspects (including those assessed by means other than using equipment) shall be recorded for comparison with the requirements of relevant environmental regulations, legislation and standards. Where applicable, the records shall also be used to demonstrate continuous improvement in environmental performance, and are used to provide input to Management Review (Chapter 10). They may also be issued to the EMA as evidence of compliance with CEC requirements.

Non-conformance may be detected in one of the following ways:

- Audit;
- Incident Reporting;
- Inspection;
- Document Reviews; and
- Customer and Third Party Complaints.

Non-conformance shall be documented and reported for Improvement Action.

Procedures for incident reporting integrate with those for Emergency Prevention and Response such that responsibility and authority for investigating the non-conformance(s), taking action to mitigate any impacts and for initiating/completing improvement and preventative action are defined.

Preventative action is integrated with training in order to optimize environmental performance and improvement.

Improvement Action is concerned with addressing the basic cause(s) of Non-conformance (or potential Non-conformance) and the avoidance of its recurrence, e.g. by amending the controlling procedures. Analysis of non-conformance will be undertaken to minimize recurrence of problems. The effectiveness of the Improvement/Preventative Action taken shall be monitored.

Relevant information on any actions taken will be addressed in the Management Review, including analysis of trends.

B.8.1 Summary of Indicators

Table B-8.1 summarizes the identified indicators that shall be used to measure the implementation of key elements of this ESMP. The preferred 3 are highlighted.

TABLE B-8.1: ESMP INDICATORS

CATEGORY	INDICATOR TYPE
NATURAL ENVIRONMENT Air Quality Water Quality	No. of reportable incidents to the EMA. In-Situ Field Testing of water sediment content of outflows i.e. TSS \leq 50mg/L.
Environment-related Human Health Waste Management (solid, haz.)	No. of complaints to the POSCC.
SOCIO-CULTURAL/ECONOMIC ENVIRONMENT Utility Services Disruptions Traffic Disruptions Cultural Heritage/Property Health and Safety Emergency Situation Response	No. of complaints to the POSCC or utility agencies. No. of complaints to the POSCC. No. of complaints. No. of reportable incidents to the POSCC and/or the OSHA. No. of reportable incidents to the POSCC and/or ODPM.

B.9 RECORDS

Environmental records shall be kept to meet legal requirements. Archiving may take the form of hard copy or electronic media and will be retained for at least the minimum period required to meet legal requirements.

These records provide evidence that the environmental performance and activities affecting the environment conform to procedures, codes, specifications and contractual obligations. Records to be retained include:

- Environmental audits;
- Training;
- Document reviews;
- Inspection;
- Incident and non-conformance reporting;
- Corrective and preventative action;
- Management Review; and
- Customer and third party complaints.

Environmental records shall be prepared and retained such that they are legible, identifiable, traceable to the activity, readily retrievable and protected from damage, deterioration or loss.

B.10 AUDITING AND MANAGEMENT REVIEW

Audit procedures will provide for the systematic review and follow up to ensure effectiveness of the ESMP and cover all aspects of environmental contract execution. Audits shall be performed by personnel independent of those having direct responsibility for the activity being audited.

The HSE Inspectors shall prepare an HSE auditing program and schedule for this Program and the ESMP as part of other auditing activities. This auditing program will assess the degree to which activities comply with the ESMP such that all mitigation and prevention measures and timely corrective action are properly understood, implemented and reported.


At least twice a year, MEWR DD's Project Manager will organise a work meeting to review and improve this ESMP, to ensure its reliability in achieving environmental protection objectives.

This review of the ESMP will include:

- Results of Audits;
- Status of ESMP documentation;
- How recorded deviations (near miss, incidents, accident) were addressed and corrected;
- Whether orientation, training and tool boxes sessions are being undertaken;
- A summary of all relevant communication / complaints from external parties / costumer, stakeholders, third parties feedback, etc.;
- Performance in achieving objectives and targets;
- Environmental trends;
- Recommended improvements to be implemented into the Environmental Management System; and
- Allocation of resources to ensure an adequate follow up of environmental aspects.


B.11 TYPICAL CEC REQUIREMENTS

CERTIFICATE OF ENVIRONMENTAL CLEARANCE



<p>Pursuant to the Environmental Management Act, Chapter 35:05, Section 36 (1), and the Certificate of Environmental Clearance Rules, Rule 7 (1) (a)</p>	
<p>The Environmental Management Authority (EMA) of Trinidad and Tobago hereby certifies the issue of a Certificate of Environmental Clearance (CEC), subject to the terms and conditions set forth in this CEC:</p>	
<p>CEC No.: 3093/2011</p>	
To:	Ministry of Works and Transport Environmental, Health and Safety Unit (hereinafter referred to as the Applicant)
of Business Address:	Level 1, Head Office Corner Richmond and London Streets PORT-OF-SPAIN
for the specific purpose of:	Modification of the drainage system along Frederick Street, Queen Street, Independence Square North and South Quay, Port-Of-Spain, including the installation of flap gates
at the following geographic location:	Frederick Street, Queen Street, Independence Square North and South Quay, Port-Of-Spain
<p>under the following designated activities) of the CEC (Designated Activities) Order (as amended):</p>	

	ACTIVITY	DEFINITION
41	Establishment of land drainage and irrigation schemes	<p>(a) The establishment, modification, or expansion (inclusive of associated works) of a land drainage or irrigation scheme for a parcel of land of more than 1 hectare during a two-year period;</p> <p>(c) The realignment or modification of drainage or river systems.</p>



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TERMS AND CONDITIONS:

1. GENERAL:

- 1.1 The project design, description and scope, as well as the prevention, mitigation and monitoring measures for the anticipated impacts presented in the application for this certificate and any other additional information provided in writing, form part of the conditions to which the Applicant shall adhere, unless modified by a listed condition within this certificate;
- 1.2 This CEC is awarded based on submissions related to the conceptual design of the project. Final designs and final regulatory approvals may result in an adjustment to the project. As such the design, layout and scope of works for which this certificate is granted, shall be as described in the application except in circumstances where:
 - a. Modifications, which do not result in any increased environmental impact and/or risk, and which do not negatively affect the environmental issues surrounding the project and the nature or main characteristics of the project are required by other regulatory agencies and public utility service providers including, but not limited to:
 - The Town and Country Planning Division (TCPD) of the Ministry of Planning, Economic and Social Restructuring and Gender Affairs;
 - The Port-of-Spain City Corporation;
 - The Traffic Management Branch of the Trinidad and Tobago Police Service;
 - The Ministry of Energy and Energy Affairs (MEEA);
 - The Occupational Safety and Health Authority and Agency of the Ministry of Labour and Small and Micro Enterprise Development (OSHA);
 - The Trinidad and Tobago Fire Service of the Ministry of National Security (Fire Services).
 - b. The Applicant wishes to make a modification or modifications which would reduce the environmental impact and/or risk of the project and which would not affect the environmental issues surrounding the project, and the nature or characteristics of the project.



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Requests for modification(s) under the circumstances above must be submitted to, and approved by, the EMA prior to the commencement of any works related to such modification(s);

- 1.3 The Applicant shall submit a finalised scope of works and a detailed scheduling for such, to the EMA at least two (2) weeks prior to the commencement of any works;
- 1.4 The Applicant shall submit to the EMA an as-built survey of the proposed drainage system and its associated appurtenances within one (1) month of the completion of works;
- 1.5 The Applicant shall ensure that all supporting infrastructure, utilities, services and management systems, described in this certificate or in the information submitted in support of the application shall be installed and functioning prior to the commencement of related works. These shall include, but not be limited to, the following:
 - Stormwater, sediment and erosion-control systems and drainage network;
 - Site security.
- 1.6 The Applicant shall ensure that all written reports or notifications submitted to the EMA in respect of this certificate shall include the CEC number in the title or cover letter of the document. Such reports/notification shall be addressed to **the Office of the Assistant Manager – Environmental Assessment, Environmental Management Authority, #8 Elizabeth Street, St. Clair, Port-of-Spain;**
- 1.7 The Applicant shall designate a contact officer who will be responsible for communicating with the EMA in respect of this certificate. The Applicant shall provide the name and contact number to the EMA at least 20 working days prior to the commencement of the activity;
- 1.8 The Applicant shall allow and facilitate any Inspector duly appointed under the Environmental Management Act, Chapter 35:05 to enter the work site of the proposed activity at any reasonable time to make observations, inspect or copy documents, interview personnel and take samples and/or photographs.



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2. WATER

- 2.1 Pursuant to Rule 4(1) of the Water Pollution Rules 2001 (as amended) (WPR), the Applicant is required to submit a source application (an application under Rule 6 to register a facility as a source of a water pollutant) to the EMA 45 working days prior to the release of any water pollutant, as defined by Rule 3(1) of the WPR, into the environment;
- 2.2 As far as practically possible, site preparation and construction shall be undertaken during the dry season or in periods of light or moderate rainfall (i.e. the precipitation rate is less than 10 mm/hr) so as to minimise the movement of silted run-off from the site;
- 2.3 Equipment, aggregate and other raw materials shall be stored on-site in specially designated areas and not along any sections of the roadway being utilised by the public for the purposes of both pedestrian and motor vehicular traffic. The area allocated for storage of aggregates shall be bermed and as far away as practically possible from any municipal drain or natural watercourse;
- 2.4 The transportation of materials (aggregate, excavated material, etc.) to and from the site shall be done in vehicles that are securely covered, so as to minimise the entrainment of particulates, or spillage along the roadway, while in transit. Such materials shall be transported in a dampened state, where practicable. Accidental spillage of such materials shall be immediately removed from access roads and drains within a 50 m radius of the project site;
- 2.5 The Applicant shall implement suitable measures to ensure that all approach roads are kept clear of mud, debris, gravel, sediments or other materials generated from construction activities, at all points of site ingress and egress for vehicles;
- 2.6 Temporary and permanent drainage systems shall be designed and maintained to ensure that there is no net increase in surface runoff from the pre-development to the post-development phase, as well as to minimise unnecessary accumulation of water within the project site. Such drainage system designs shall ensure that the drainage network is adequately sized and located to retain the maximum expected volume of runoff and discharge from built development within the vicinity of the site and minimise runoff of silted material into the surrounding environment. All temporary and permanent drainage designs shall be in accordance with Best Management Practices (BMPs). Temporary drains/roadway ditches shall be well maintained and kept clear to allow an unobstructed flow of water at all times;



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2.7 All excavation/trenching, grading, installation and reinstatement works shall be done in a manner to minimise erosion and siltation. As far as practically possible, site preparation and construction shall be scheduled for periods of minimal rainfall to minimise erosion and heavily silted runoff emanating from the site;

2.8 Sediment-retention measures shall be utilised prior to the commencement of any earthworks to minimise the amount of sediment migrating off-site. These, where applicable, shall include but not be limited to:

- Establishment of sediment sieves or silt traps within drains exiting the site;
- The protection of stockpiles of erodible material (e.g. excavated material or fill) using geo-textiles and/or geo-membrane materials;

The Applicant shall conduct weekly inspections of the sediment-retention measures, and within 24 hours or as soon as practically possible after periods of intense rainfall (i.e. in excess of 25 mm of rainfall in a 30-minute period), to verify functionality of such control measures and facilitate necessary maintenance works or upgrading.

The Applicant shall document each inspection. Documentation shall include, but not be limited to the following:

- Date the inspection was conducted;
- Prevailing weather conditions;
- Name(s) of person(s) who conducted the inspection;
- Observed site conditions.

Copies of all inspection reports shall be made available to any Inspector upon request;

2.9 Silt fences shall not be constructed in any areas where the flow of water may impede the ability of the silt fence to function efficiently. The silt fence shall be installed in accordance with ASTM International, ASTM D6462-03: Standard Practice for Silt Fence Installation, or similar codes;



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- 2.10 The Applicant shall ensure that proposed drainage outlets to existing stormwater drains are fitted with suitable filtering devices (such as silt traps and sediment sieves) during site activities as well as road and drainage reinstatement works to minimise the build-up of sediments in these systems. Any repairs that may be required to ensure the efficient functioning of these systems shall be conducted immediately upon discovery. In the event that the filtering devices become ineffective before the end of the expected usable life, these devices shall be replaced, as soon as practicable. The Applicant shall also ensure that all temporary on-site drains are well maintained and kept clear to allow an unobstructed flow of water at all times;
- 2.11 The Applicant shall conduct routine dewatering of accumulated water within trenches to minimise instability of trenches/excavations. Water extracted from trenches shall be filtered through appropriate sediment entrapment devices, such as but not limited to, sediment sieves or traps, and shall be directed to settling tanks to allow the removal of residual sediments, prior to the release to any municipal drain(s);

3. AIR

- 3.1 Equipment, machinery and vehicles shall be regularly inspected and maintained in accordance with the manufacturers' specifications to minimise the potential negative impacts on the receiving environment. No noxious or sooty vapours shall be emitted from the use of such equipment, machinery or vehicles. Vehicles used during all phases of this activity shall comply with the Trinidad and Tobago Bureau of Standards TTS 558:2001 (Motor Vehicles - Exhaust Emissions - Specification). Records of inspection and maintenance for equipment, machinery and vehicles shall be retained by the Applicant and made available to the EMA upon request. The Applicant shall ensure that the operators of the equipment, machinery and vehicles are adequately trained in their use;
- 3.2 The Applicant shall ensure that cleared areas and any stockpiled aggregates are maintained in a damp condition, especially during periods of dry conditions, to alleviate the impacts of dust on ambient air quality and public health. Excessive application of water shall be avoided to reduce the potential for the generation of turbid run-off.

Other dust-reduction measures that should be utilised, where applicable, include, but are not limited to:

- Use of dust screens in areas near to sensitive receptors;



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- Location of stockpiles downwind from built development or receptors;
- Use of non-toxic dust-suppressant chemicals.

Dust-control measures shall be monitored and maintained to ensure effectiveness;

3.3 The Applicant shall use refrigerants, fumigants, foams and aerosols, for the purposes of air-conditioning, refrigeration, pest control, soil fumigation, as solvents, in fire extinguishers, in dry cleaning or for any other intention which:

- are non-ozone depleting;
- have low global warming potential;
- are alternatives approved by the United States Environmental Protection Agency (USEPA) Significant New Alternatives Policy (SNAP) Programme.

4. NOISE AND VIBRATION

4.1 Pursuant to the Noise Pollution Control Rules (NPCR), if construction activities are scheduled to occur outside the period between 7:00 a.m. and 7:00 p.m. of any day, and noise levels are expected to exceed the standards specified in the NPCR, the Applicant shall apply for, and obtain, a Noise Variation from the EMA before proceeding with such activities;

4.2 Tools, machinery and equipment employed for all works shall be fitted with noise emission control systems that ensure compliance with standards in the NPCR. The Applicant shall conduct regular inspections on tools, machinery and equipment to ensure that noise emission control systems are properly functioning. If found to be improperly functioning, the tools, machinery and equipment shall be temporarily decommissioned and the noise emission control systems serviced before being re-used;



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5. SOLID AND HAZARDOUS WASTES/ MATERIALS MANAGEMENT

- 5.1 Any topsoil and excavated material removed to facilitate infrastructural works shall be stockpiled and re-used, to the extent practical, for backfilling and landscaping on-site. Any material that is not re-used shall be removed from the site for disposal in an environmentally acceptable manner, such as for use in a landfill or by other approved projects requiring such material;
- 5.2 During road reinstatement, the Applicant shall utilise excavated material as a source of common backfill where it meets the specifications required for material composition, strength, compactability and gradation. All roadway compaction shall be to 95% of modified proctor in accordance with ASTM International, ASTM D698 – Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort;
- 5.3 The Applicant shall ensure that at the end of the site preparation and construction phases, the project site is properly cleared of all scrap material and debris;
- 5.4 The Applicant shall ensure that washings from premix cement trucks are contained according to industry BMPs. At no time shall washings from premix cement trucks be discharged into any municipal drains or watercourses;
- 5.5 Where stationary toilets are not available, the Applicant shall ensure that securely anchored portable toilets are made available to persons working on this project. Portable toilets shall be located on level ground above flood levels. All sanitary waste generated from such facilities shall be regularly collected, transported and treated off-site by a contractor with the ability to manage such waste. At no time shall effluent from such facilities be discharged into surface drains or natural watercourses. Disposal certificates shall be maintained by the Applicant and made available for review by any Inspector upon request;



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- 5.6 Non-hazardous solid waste such as, but not limited to, domestic garbage, inert construction/demolition materials and refuse such as metal scrap and empty containers (except those previously used to contain hazardous materials), generated from all phases of the proposed project shall be collected, sorted into recyclable and non-recyclable components and stored on-site in durable and sturdy plastic or metal containers of adequate capacity with secure covers, until ready for disposal. As far as practicably possible such waste shall not be left easily accessible to vermin, or allowed to litter the ground. Disposal of non-hazardous waste shall take place at an appropriate location, that is operated by the relevant City Corporation or a waste disposal firm with the appropriate licenses, permits, trained/certified personnel, facilities, equipment and insurance to handle such waste;
- 5.7 Hazardous wastes (defined as wastes that represent a risk to human health, property or the environment due to their physical, biological or chemical characteristics¹) such as lead-acid batteries, waste chemicals and used oils, shall be segregated from non-hazardous waste and shall be securely stored then collected, treated and/or remediated by a waste disposal firm with the appropriate licenses, permits, trained/certified personnel, facilities, equipment, and insurance to handle such waste. Waste shall be stored in a manner that prevents the commingling or contact between incompatible wastes, and allows for inspection between containers to monitor leaks or spills.

The Applicant shall treat Personal Protective Equipment and materials from clean up/spill response or containers exposed to any chemicals displaying these characteristics as hazardous waste in their handling and disposal. Partially used hazardous materials shall be properly secured in their original containers, where practical, and returned to the suppliers for proper recycling or disposal.

Relevant records, such as chain of custody forms and disposal/remediation certificates, shall be maintained by the Applicant and made available for review by the EMA upon request;

- 5.8 Chemicals shall be handled, used and stored as prescribed in the Material Safety Data Sheets (MSDS) for these chemicals. MSDS shall be kept at the project location, in a readily accessible area for reference by the users of the chemicals;

¹ Materials that exhibit these characteristics can include explosives, compressed gases, including toxic or flammable gases, flammable liquids, flammable solids, oxidising substances, toxic materials including carcinogens, pathogens, teratogens and mutagens, radioactive material and corrosive substances.

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- 5.9 There shall be separate, secure, impervious bunded facilities for the storage of any fuels, lubricants and/or other chemicals during the proposed activity, so as to minimise their release to the environment through spills and accidents. These bunds shall have a capacity of at least 110 % of the maximum volume of the largest tank and shall incorporate a drainage sump and an additional minimum wall height of 150 mm to accommodate rainfall and fire-fighting foam. The bund shall be regularly inspected and accumulated water shall be removed either manually or mechanically and treated, if necessary, to comply with the Second Schedule of the WPR before being discharged to the environment.

Dispensing areas shall be on impermeable surfaces and located as far as reasonably practical from any natural water body;

- 5.10 The Applicant shall maintain a Spill Response Kit at the project site office with a stock of absorbents and related supplies to respond to any emergencies and/or incidents, and contain and/or clean up any spilled hydrocarbons and other chemicals. All personnel involved in the proposed activity shall be trained in the operation of the Spill Response Kit.

The Applicant shall be liable for damages resulting from all adverse incidents, spills or emergencies arising out of all phases of the proposed project. All leaks and spills of potential contaminants generated from the activity shall be cleaned up immediately upon detection. Leaks and spills in excess of ten (10) litres shall be treated as described by conditions of this certificate;

- 5.11 The Applicant shall, within 24 hours of discovery of a spill in excess of ten (10) litres of hydrocarbons and/or other chemicals, or for spills of any quantity of a hazardous material as defined within this certificate, notify all relevant government stakeholders, including the EMA, MEEA, OSHA, and other relevant authorities/parties of the incident.

The Applicant shall take immediate action to effect the containment/clean up of spilt material in accordance with industry BMPs;

Soil contaminated from the accidental release of any such materials identified within this condition shall be immediately remediated on-site or collected and sent off-site to an appropriate firm with the licenses, permits, trained/certified personnel, facilities, equipment and insurance to perform this function;



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5.12 Within ten (10) working days of an incident or emergency or spill, involving ten (10) litres or more, a written report shall be submitted to the EMA stating:

- Nature of the incident;
- Date of detection;
- Estimated date(s) of occurrence;
- Cause of the emergency;
- Effects of the emergency, including casualties, description and cost of impacts to the natural and built environment;
- Corrective measures (to be) taken to alleviate the situation;
- Date of resolution of situation (proposed or actual);
- Steps (to be) taken to reduce the probability of or completely prevent a recurrence.

6. PUBLIC HEALTH AND SAFETY

6.1 Excavated materials shall not be stockpiled at the edge of trenches/excavations to prevent instability and caving of the trench walls;

6.2 The Applicant shall ensure that consideration is given to trench depth, width, angle of repose, soil texture, water content and trench shoring capabilities to ensure the stability of excavated trenches.

In instances where there may be an increased risk of trench and excavation collapse (i.e. slides/cave-ins) the Applicant shall ensure that appropriate trench shoring boxes or other suitable excavation support systems are utilised for additional protection;

6.3 The Applicant shall ensure that trench walls are inspected immediately after periods of intense rainfall (i.e. in excess of 25 mm of rainfall in a 30 minute period), to determine whether maintenance of the installed stabilisation systems is needed or additional protection is required;



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- 6.4 As far as practical and particularly along roadways open for use by the public, segments of open trenches where no active work is taking place shall be covered by secured metal trench plates to allow unrestricted flow of traffic along such roadways. Trench plates shall meet international specification for load, skid resistance, movement and noise prevention;
- 6.5 The Applicant shall take all necessary safety precautions during the lifetime of the development to minimise the likelihood of accidents and prevent unauthorised access, especially by children, to the project area. Such precautions shall include, where applicable, but not be limited to:
- Compliance with guidelines outlined in existing applicable legislation (e.g. the Highways Act Chapter 48:01 and the Motor Vehicles and Road Traffic Act Chapter 48:50);
 - Posting of appropriate and visible warning signs and hazard notices, such as signs indicating any exclusion area(s) to prevent unauthorised access and activities;
 - The provision of appropriate security and lighting measures.

7. PUBLIC ENGAGEMENT

- 7.1 The Applicant shall coordinate its activities with all other entities that own/operate pipelines, utilities and other infrastructure as well as any facility that can be affected by the project's activities. Appropriate setback distances shall be developed and implemented or any requirements for relocation identified and agreed upon, in consultation with such entities, so as to reduce the likelihood of rupture or damage to such infrastructure/facilities during project works. Written documentation of all such consultations shall be made available to the EMA upon request;
- 7.2 The Applicant shall designate a Community Relations Officer or Officers who will be responsible for interacting with neighbouring residents, institutions and businesses affected by the activities. The name and contact details of the officer(s) shall be made available to the EMA and to residents, institutions and/or businesses two (2) weeks prior to the commencement of activities covered by this certificate. The officer(s) shall be responsible for relaying information to, and receiving and addressing the concerns of, the community. The Applicant shall receive, address and discuss such concerns with the EMA, as it relates to the scope of this CEC;



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- 7.3 The Applicant shall notify the potentially affected local community, (residents, institutions and businesses) within the vicinity of the project area in Port-of-Spain, as well as relevant authorities, including the EMA, of the proposed activity at least two (2) weeks prior to the commencement of activities. Notification to the local community, the general public shall be via a combination of, but not limited to, the use of the media (e.g. newspaper, television, and radio), public consultation at an appropriate time and location accessible to the public, the use of mobile information units and the distribution of flyers within the local community.

Advisory notices/flyers shall include, but not be limited to, the following information:

- Precise location of the activity;
- Activities to be conducted;
- Project scheduling and duration;
- All associated logistics, including use of resources and infrastructure;
- Roadways that will be affected by haulage vehicles;
- Notice of any detours and traffic restrictions if traffic disruption is expected to be significant;
- Health and safety measures to be taken by the public;
- The name/names and contact information of the Community Relations Officer(s);

8. OTHER

- 8.1 The Applicant shall install its lighting system for the site, during the construction phase of the proposed project, in a manner that would minimise any adverse impacts to nearby residents, institutions and business in the vicinity of the site. The layout shall ensure that the artificial lighting source(s) is/are located as far away from these receptors as reasonably practicable, and are positioned so that the source of the emitted light is directed away from such receptors;




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8.2 A Monitoring Checklist that outlines all the precautionary and mitigation measures listed within this certificate shall be established and retained by persons with relevant positions of responsibility/authority. The Checklist shall be used to demonstrate adherence to all the requirements during the proposed activity. This Checklist shall be made available to any Inspector upon request;

8.3 This CEC becomes effective from the date of issue identified below.

Date of issue 8th June 2011


Environmental Management Authority
Managing Director/Chief Executive Officer

PLEASE NOTE:

1. Under Section 81(5) (f) of the Environmental Management Act Chapter 35:05, an appeal may be made to the Environmental Commission by the Applicant against the grant of a Certificate of Environmental Clearance with conditions.
2. The issue of this certificate does not release the Applicant from any responsibility or requirements under other environmental statutes or regulations or any other applicable written law or policy of Trinidad and Tobago prior to proceeding with the activity.
3. The issue of this certificate does not convey to the Applicant any property rights of any sort, nor does it authorise the Applicant to conduct the subject activity on location which is not under the legal control or ownership of the Applicant.
4. This Certificate shall cease to have any validity, force or effect if the activity for which the Certificate was granted does not commence within three years from the date of issue.
5. The Applicant must inform the EMA of any new or relevant information related to this activity regarding adverse environmental effects.
6. Implementation of or adherence to the conditions specified in this certificate must be done in a way that ensures public and worker health and safety
7. This certificate must be displayed in public view at the place from which the Applicant carries on the designated activity for which the certificate was issued.

**TRINIDAD & TOBAGO FLOOD ALLEVIATION AND
DRAINAGE PROGRAM (TT-L1036)**

ENVIRONMENTAL AND SOCIAL ANALYSIS

APPENDIX C: RESETTLEMENT FRAMEWORK (DRAFT)

APPENDIX C: RESETTLEMENT FRAMEWORK (DRAFT)

Contents

- I. The Project
- II. Objectives of the Resettlement Framework
- III. Guiding Principles for the Preparation of the RAP
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I. The Project

Flooding in both urban and rural areas is a frequent occurrence in Trinidad and Tobago, leading to substantial losses of property, agriculture, human health and severe damage to the quality of life. Port of Spain (POS), the nation's capital city and the area of interest

of this project to ameliorate flooding, is located on the low-lying coastal plain, surrounded by steep hills in North and North-East and the sea in South-West. It has a triangular shape which is delimited by two urban water courses - the East Dry River (St. Anne River) in the East, and the Maraval River in the North-West, and the sea in South-East. The two rivers have been partially realigned from their original courses in the past, in order to provide additional space for the city development, and the river channels have been lined with concrete.

The drainage situation in POS has been aggravated over the past 30 years by urban developments which spilled outside the area demarcated by the two rivers onto the hills slopes, and by significant land reclamation works (housing, and harbour facilities) in front of the original sea front. While the former development created additional storm runoff loads on the drainage system, the latter has effectively inhibited capacity of gravitational drainage of the internal town area. Additionally, decades of neglect of the storm water drainage infrastructure and ad hoc and uncoordinated solutions of acute problems, has contributed to the present situation of dysfunctionality of the drainage system.

All this has resulted in frequent floods (as frequent as several times each year) at several critical locations around the city, which cause serious damages, traffic disruptions and general uncertainty. The Government of the Republic of Trinidad and Tobago (GORTT) has recognized that the flooding problem is hampering the development and quality of life of the city and therefore needs to be eliminated or minimized to an acceptable level.

The TT-L1036 project consists in three components. The first component comprises drainage works for the critical areas flooded in Port of Spain (US\$ 90.0M). This intervention will cover necessary civil works to mitigate flooding events in the area of Port of Spain. Some of the works have been already identified and defined by the Drainage Division and will be implemented within the modality of design-build schemes. The future interventions are going to be validated under a catchment management framework to be shaped by hydrological studies still to be completed. The works include interceptors, drainage systems, detention ponds and pumping stations. The bulk of the works will be done in the present river beds of the St. Anne's River and Maraval River.

The second component entails Institutional Strengthening of the Drainage Division (DD) of the Ministry of Environment and Water Resources (MEWR) (US\$10M). It entails supporting the strengthening of the institutional arrangement of the sector, modernization of the legal and regulatory framework, and includes the necessary activities to support the GORTT in transforming the Drainage Division and the institutional arrangements for water resources management into an independent authority within the MEWR that could build, operate and maintain all the future and existing drainage infrastructure in the country. Although the DD has adopted many actions toward this direction it does not operate within a modern, comprehensive institutional framework. GORTT has already developed some studies to support the transformation of the Drainage Division into an autonomous government agency.

The third component is the Linear Park (US\$ 20M) which will finance all the civil and landscaping works for the implementation of the 1.8 km linear park located at St. Anne's

River between Queens and Park Streets. The linear park will be designed in conjunction with the catchment analysis and drainage works design. The river discharge is one of the most problematic areas in POS in terms of flooding. This area needs to have an integral solution which will contemplate the redesign of the civil works at the discharge area including road bridges, diversion chambers, river bed works, etc. (Component 1). Therefore it will be necessary to adapt the linear park to the final layout of these works in order to give desired functionality of the park.

II. Objectives of the Resettlement Framework

It is not expected that the project will entail substantial physical or economic population displacement and involuntary resettlement. The civil works identified thus far do not cause population displacement. But future works have yet to be fully defined and designed. These designs depend upon the results of hydrological studies still underway. Nevertheless, as pointed out in the Environmental and Social Analysis and Outline Environmental and Social Management Plan (ESA/ESMP) dated September 2013, there is potential for resettlement in several areas depending on final design decisions.

Sea Lots Cove. There is a low-income squatter settlement composed of scores of residences and a few business enterprises at Sea Lots Cove on the lower reaches of St. Anne's River. One alternative being considered is converting the cove into a flood water retention facility to divert excess flood waters during periodic intense rainfall episodes by dredging, deepening, and possible berm construction. It is possible that such civil works will require displacement of households and/or businesses.

Street Dwellers. Several hundred street dwellers or homeless men and women transiently inhabit the St. Anne's River course (and perhaps Maraval River). The river bed is paved with concrete and the water diverted to a central channel permitting sporadic use of the water course margins for sleeping, cooking, washing, and for waste disposal when not flooded. There is little doubt that these street dwellers will be disturbed by the project drainage works, but that impact is expected to be partial and temporary. Theoretically the affected people will return once the works are completed because conditions will be approximately the same and permit their continued use of the river channel. The affected people are expected to move to unaffected sections while the work proceeds elsewhere. In any case, the problem has not been adequately studied and may entail population displacement and resettlement in the future. Indeed, resettlement could improve the lives of these unfortunate people.

Mangrove Squatter Refuges. At the mouths of both the Maraval and St. Anne's Rivers there are mangrove forests which are occupied by low-income squatters. These settlements are not likely to be affected by project works currently planned. However when hydrological studies are completed it may be that design

recommendations could include berms, retention ponds, interceptors or other interventions to better manage flooding. These are unlikely to require resettlement but the issue can only be studied by resettlement planners once final design decisions are made.

The objective of this Resettlement Framework is to provide guidance for the preparation of a Resettlement Action Plan (RAP) in the event that population displacement and resettlement is required in one or more of the above areas or in other parts of the overall project as yet to be discovered. The RAP should be formulated based on the norms and principles established in 1998 by the member countries of the Inter-American Development Bank (IDB) in its Operations Policy 710 (OP-710 *Involuntary Resettlement*) and the relevant legal and policy conditions that obtain in Trinidad and Tobago where these might apply.

In accordance with OP-710, the proposed RAP must be approved by the Inter-American Development Bank prior to the commitment to finance any civil works causing population displacement and resettlement.

III. Guiding Principles for the Preparation of the RAP

The design of the RAP should be based on the following basic principles. These guiding principles or their equivalents must be incorporated into the RAP in a chapter that describes the *Resettlement Policy and Legal Provisions* that will be applied in TT-L1036 Flood Alleviation and Drainage Program in the event resettlement is required.

- Avoid or minimize physical and/or economic displacement caused by the construction of project civil works in order to reduce project costs and reduce risks of impoverishment of affected people (OP-710, III, 1).
- When displacement is necessary, assist the affected people to restore their living conditions and livelihoods to levels similar to, and, if possible better than those they had before displacement (OP-710, III, 2).
- In the cases of displaced people who are vulnerable to worsening impoverishment due to physical/economic displacement, such as marginal or low-income groups, resettlement must be designed to substantially improve their livelihoods (OP-710, IV, 2).
- Eligibility for resettlement assistance is provided to all displaced people, including those belonging to marginal or low-income groups who may or may not own the property and/or structure upon which their livelihood depends (OP-710, IV.3).
- Avoid compensation in money for the most vulnerable groups and put emphasis on compensation in kind, such as replacement land, houses, and jobs, so that they can reconstruct and/or improve their livelihoods (OP-710, IV.3).

- When compensation in money is deemed appropriate the amount paid will be at replacement value or the value of purchasing an equivalent or similar property in an equivalent or similar location (OP-710, V.3).
- Offer the displaced people a choice among various options for reconstructing their livelihoods and standards of living (OP-710, V.3; V.6).
- Minimize the disruption of social networks that provide security of person and property, loans of labor and tools, child care, short-term credit, and support for the elderly (OP-710, V.3).
- Housing and public service options will, at the very least, meet minimum standards of shelter and access to basic services, regardless of conditions prior to resettlement (OP-710, V.3).
- Offer the displaced people access to opportunities for social and economic development (OP-710, III.2), including access to existing legal, technical, and social benefits, and propose additional measures to restore livelihoods to the pre-resettlement standard if needed (OP-710, V.4).
- The design of compensation packages, as well as community consultation and decision making mechanisms, will take into account the characteristics of the affected population as regards gender, ethnicity, age, and other factors pointing to special needs and/or vulnerability (OP-710, V. 3)
- Ensure project provides transition costs including legal costs, transport costs and allowance for loss of income (OP-710, V.3).
- Maintain transparency in the dissemination of information regarding the policies, the options for restoring livelihoods, the implementation timetable, and the grievance mechanisms offered by the project and ensure the right to participation of affected people in decision making regarding their futures (OP-710, V.2).
- Conduct an environmental impact assessment, including carrying capacity and socioeconomic impacts on host community, for each proposed relocation site and include an environmental management plan in the RAP (OP-710, V.5).
- The final RAP should present evidence that appropriate measures have been taken to prevent new settlements in the area subject to resettlement (OP-710, V-6).
- A final RAP will be incorporated into the Environmental and Social Management Plan (ESMP) of the TT-L1036 project and submitted for IDB approval before any commitment is made to finance works requiring resettlement (OP-710, V.7).

IV. Institutional, Policy and Process Conditions

The executor of the project is the Drainage Division (DD) of the Ministry of Environment and Water Resources, within which a Project Execution Unit (PEU) has been established to plan, design, administer, monitor, and control quality of the execution of TT-L1036. In this capacity the PEU is responsible for due diligence compliance with the laws of Trinidad and Tobago and the international standards established by the member countries of the IDB including OP-710. Application of the present Resettlement Framework to the preparation and implementation of the RAP is, therefore, the responsibility of the PEU.

According to information currently available, all the areas that might be affected by resettlement are state lands occupied by squatters. The Land Acquisition Act (No. 28 of 1994) which governs the expropriation of private property for a public purpose does not fully apply since the affected lands are already owned by the state. However, the residential and other structures, fruit trees, gardens, septic systems, fences, and/or privately-owned improvements on the state lands would require compensation for their expropriation and demolition. And in any event the population physically and/or economically displaced by project works must be resettled into conditions that are equivalent to, or, where possible, better than those prior to resettlement in accord with OP-710.

State lands are under the control of the Commissioner of State Lands (CSL). DD would have to petition CSL for a license to use such lands by submitting site and civil works drawings, a Certificate of Environmental Compliance, the IDB loan agreements, and application for survey orders. DD would then have the Commissioner of Evaluation or a private contractor carry out field surveys (property inventory and valuation) to determine compensation amounts for structures and other improvements. DD would then request either (1) the Land Settlement Agency (LSA) to identify state lands under its existing "land for the landless" program to which the displaced could be resettled, together with plans for necessary public services to be provided to make the site habitable such as water supply, electricity, sanitation, etc. for self-built housing, and propose a license for such lands to be used for resettlement to CSL; (2) or the Housing Development Corporation (HDC) to incorporate into its existing low-income housing projects the displaced population which entails no down payment but monthly payments on a heritable 99-year lease or other acceptable arrangement; or (3) some combination of these. In either event the DD would then have to present its plans worked out with LSA and/or HDC for the sites for the approval of the Town and Country Planning Division, then to the Municipal Corporation for approval, and finally to the Cabinet of Ministers for final approval.

V. Procedures for the Preparation and Approval of RAP

The Resettlement Action Plan (RAP) forms part of the ESMP for the project and the design of any project component or subcomponent that requires physical or economic displacement and resettlement of population. The sequence of steps leading to the RAP and its approval are the following.

1. Design and execution of the RAP by the Drainage Division (DD) of MEWR will be carried out by a *project resettlement team* working under the direction of DD made up of at least one Senior Civil Engineer or Senior Architect in charge of coordination of design and execution of all infrastructure works and housing and at least one Senior Social Scientist or Senior Social Worker responsible for coordination of design and execution of socio-economic re-establishment programs and strengthening social networks.
2. The *project resettlement team* will be responsible for strengthening cooperation, coordination, contribution, and communication with other agencies of government to be involved in the design and execution of the RAP, such as the offices of the Commissioner of State Lands, the Land Settlement Agency, the Housing Development Corporation, the Port Authority, the Municipal Corporation, local government offices, and so forth.
3. The *project resettlement team* will ensure the satisfactory implementation of legal acquisition of property and compensation payments, the regularization of occupants without property ownership titles so that they are compensated at replacement value, and the allocation of replacement property of a similar or better quality and location than those acquired by the project.
4. The *project resettlement team* will ensure the creation or strengthening of community organizations and/or suitable community representation mechanisms that will ensure gender balance in the design of the RAP, representation of both genders in the execution of the RAP, and implementation of measures to provide development assistance to women with special emphasis on the most vulnerable: single mothers and their children.
5. To the extent possible the *project resettlement team* will work to strengthen the gender balance of all organizations and institutions responsible for aspects of the design and execution of the RAP, including the *project resettlement team* itself.
6. The *project resettlement team* will carry out or supervise the execution of:
 - a. Socio-economic survey, census, and property inventory of the affected households;
 - b. Collection of information from third parties on the affected areas and households, such a municipal authorities, police, etc.;
 - c. Focus group consultations and discussions, perhaps separately with women, of current conditions, the impacts of the project, and possible alternative futures for them;

- d. Interviews with community leaders and/or persons of influence in the affected areas and households regarding current conditions, the impacts of the project, and possible alternative futures for them;
- e. Analysis and identification of levels of vulnerability to impoverishment present in the affected population and formulation of a structure of eligibility for development assistance tailored to the needs of different kinds of vulnerability;
- f. Based on the foregoing information, contribute to the studies of possible receiving areas for new replacement housing and infrastructure, re-establishment of viable socio-economic activity, and the impacts upon the social, economic, and cultural life of the host community of the resettlement;
- g. Ensure the execution of an Environmental and Social Impact Assessment (ESIA) of the resettlement operation for each receiving area alternative including the environmental implications for the host community and the formulation of a draft Environmental and Social Management Plan (ESMP) to be consulted with the affected and host communities to accompany the RAP;
- h. Conduct another round of focus group consultations and discussions with the affected people regarding the suitability of possible receiving areas and the development potential of those areas;
- i. Guarantee that at least 50% of the women in the affected households participate in the consultations and discussions regarding the suitability of possible receiving areas and the development potential of those areas;
- j. Contribute to the final selection of the receiving area and the social and technical design studies, plans, and programs of the development investments to be made in the receiving area, the provision of income restoration "packages," the social and technical assistance to be provided to affected households, the timetable for the evacuation, demolition of old structures and the reconstruction of new structures and infrastructure, transfer of people and belongings, and re-establishment of affected households, to be incorporated into the draft RAP;
- k. Establish targeted assistance to females, especially female-headed households and/or single mothers, as regards provision of income restoration "packages" and social and technical assistance
- l. Ensure that secure ownership titles to house plots, housing, and commons areas will be issued to resettled households in the names of both male and female household heads or both in the case of common law or formalized marriage;
- m. Establish the grievance mechanism, monitoring system, and arrangements for evaluation of outcomes as integral parts of the RPA and ESMP;
- n. Preparation of a draft RAP to be disseminated and consulted, together with the draft ESMP, with community organizations and/or representatives of affected people, cooperating and contributing governmental agencies, and civil society;
- o. Incorporate suggested modifications of the draft RAP and draft ESMP stemming from consultations with the affected people's representatives, cooperating governmental agencies, and civil society and finalize the RAP and ESMP for the approval process;

- p. Ensure the proper review, approval, and licensing by the responsible governmental institutions cooperating in the design and execution of the RAP including at least Commissioner of State Lands, the Land Settlement Agency, the Housing Development Corporation, the Port Authority, the Municipal Corporation, and the Council of Ministers.
- q. Ensure the proper review and approval of the RAP and ESMP by the Inter-American Development Bank.

VI. Chapters of the Resettlement Action Plan

The outcome of the above steps should be a RAP organized into chapters with the headings that follow below. The contents of each chapter are explained in greater detail in the paragraphs below.

1. Resettlement Policy and Legal Provisions

The first chapter of the RAP outlines the policy and legal provisions that will be applied to the resettlement operations in the TT-L1035 Flood Alleviation and Drainage Program Project. See above Guiding Principles for the Resettlement Action Plan for the policy and legal provisions derived from OP-710 of the Inter-American Development Bank. Relevant policy and legal provisions derived from the cognizant statutes of Trinidad and Tobago may be added and explained here as well.

2. Identification of Impacts

The RAP must define in technical terms the physical and economic impacts of the project causing population displacement. Socio-economic field studies are to be carried out to delineate the properties, structures, and people that will be affected by physical/economic displacement and the social, economic, cultural, and community impacts. The data required from such field studies are not intended to be exhaustive sociological studies of the population but documentation of key social, economic, cultural and community factors that may affected the design and implementation of the RAP.

Data sets to be established may include at least the following:

- Land affected – specify ownership, rental, or occupancy (squatter)
 - House plot
 - Garden
 - Fruit trees
 - Etc.;
- Structures affected – specify ownership, rental, or occupancy (squatter)
 - Dwelling

- Outbuildings such as animal pens, latrines,
 - Fences or walls
 - Etc.;
- Demographics of Population Affected – composition of the affected households
 - Age
 - Gender
 - Education
 - Kinship relationship
 - Etc.;
- Socio-economic profile of household – income streams from all sources
 - Wages
 - Self-employment, business
 - Manufacture
 - Horticulture
 - Small livestock
 - Etc.;
- Cultural characteristics
 - Language
 - Religion
 - Community organization
 - Union
 - Social club
 - Etc.;
- Community mutual aid networks
 - Kinship relations to neighbors
 - Child care networks
 - Arrangements for care of the elderly
 - Short-term credit relationships
 - Etc.

Using these baseline data an analysis is then conducted to delineate impacts of project works, identifying which properties, structures, households, incomes, cultural and community networks will be affected wholly or partially. A descriptive summary of the nature and magnitude of these impacts is incorporated into the RAP and is considered the baseline data base reflecting the nature and magnitude of impacts.

3. Vulnerability Analysis

The vulnerability analysis is used to establish priorities for resettlement assistance, in order to tailor assistance to the needs and capabilities of the households in the affected

population. Those who are less vulnerable and/or have the means to resettle themselves may require less assistance whereas those more vulnerable stand at risk of deepening impoverishment and, therefore, require greater assistance.

The following are some suggested criteria (others may be identified during analysis) for establishing vulnerability:

➤ **High Vulnerability**

- Depend economically on land and/or structure and lose everything;
- Lose part of land and/or structure but economic impact is significant;
- Do not have additional sources of income;
- Low levels of education and capacity/skills;
- Single mothers and/or dependent elderly present in household;
- Indigenous people or other excluded socio-cultural minority;
- Compensation does not reflect replacement value.

➤ **Medium Vulnerability**

- Derive portion of livelihood from property but loss will be marginal;
- Has other socio-economic activities adequate to sustain livelihood;
- No disruption in employment, social networks, systems of production;
- Schooling and capacity/skills levels medium;
- Compensation does not reflect replacement value.

➤ **Not Vulnerable**

- Do not use property for productive purposes;
- Use the property for productive purposes but has capacity to continue activities in another place;
- Use the property but not economically dependent on it;
- Has other significant sources of income;
- Does not reside, work, or produce in the affected property;
- Schooling and capacity/skills sufficient to defend own interests;
- Compensation fully reflects replacement value.

Utilizing the above or similar criteria, the baseline data are then disaggregated into categories of vulnerability as in the following matrix:

		High Vulnerability	Medium Vulnerability	Not Vulnerable
Owners				
	Residence			
	Business			
	Both			
Renters				
	Residence			
	Business			
	Both			
Occupants				

4. Restitution of Livelihoods

The RAP presents “packages” or groups of actions for the reconstruction of socioeconomic productivity and restoration of incomes for the affected people. These should be designed to meet the needs of the affected population, which vary with the degree and kind of vulnerability facing the displaced people, so that they can participate in the decision about the alternative that will be provided by the project in the end.

➤ High Vulnerability

- Project provides replacement land and/or house equivalent to that lost
- Project issues a letter of credit to purchase land and/or house in the market
- Installation of public services and connections to homes
- Free legal assistance with paperwork to regularize tenure
- Technical assistance to improve productive activities
- Social assistance with the transition to the new conditions
- Transfer of persons and belongings to new sites

➤ Medium Vulnerability

- Project pays difference between compensation and replacement value
- Assistance to locate and purchase replacement land and/or house
- Technical assistance to intensify production
- Free legal assistance
- Transfer of persons and belongings to new site

- Capacity building for starting a business or trade or securing employment
- **Not Vulnerable**
 - Compensation at replacement value

Each “package or cluster of actions to be offered by the project to different categories of displaced people so that they can re-establish their socioeconomic productivity should be presented in the RAP. Each of the packages should be presented in the following terms:

- Income Restoration Package Number 1
 - Technical description
 - Eligibility requirements
 - Institutional responsibility
 - Cost and financing plan
 - Number of beneficiaries expected
 - Delivery schedule
- Income Restoration Package Number 2
 - Technical description
 - Eligibility requirements
 - Institutional responsibility
 - Cost and financing plan
 - Number of beneficiaries expected
 - Delivery schedule
- Etc.

Compensation exclusively in money is acceptable only for affected people who are not vulnerable to impoverishment, when land and/or housing markets function adequately, and when compensation values assigned are at replacement levels. Compensation in money is not advisable for those vulnerable to impoverishment because cash is quickly stripped from them by money lenders and other creditors, because men who receive money may abandon their women and children, and because if the amount is less than replacement value – which is too often the case – the affected people may be forced into unsustainable and involuntary debt in order to auto-finance their own displacement and resettlement.

In lieu of handing out cash, actions should be design to provide development resources in kind. Some essential, core activities to be provided by the RAP are the measures designed to restore levels of livelihood to similar or, if possible, better levels than those

enjoyed prior to resettlement. These measures constitute investments in re-establishing or improving productivity and living conditions of the affected people. Livelihood restoration options may include:

- Assistance in finding job similar to that lost
- Training to learn a new trade or job skills
- Capacity building and credit to start a new business
- Establish kitchen gardens
- Seed capital for small livestock production

While the project can offer opportunities for restitution of livelihood, it cannot guarantee success. For this reason it is very important that the project offer a menu of options to affected people and require them to choose. This is for several reasons. First, it expresses the right and obligation of affected people to take their own decisions regarding their future. Second, it provides concrete evidence that the project will not force one solution upon everyone. Third, it is the affected people who must live with the consequences of the choice among alternatives. Four, if the people choose the alternative they prefer it lessens complaints and the tendency to blame the project for unfortunate outcomes.

5. Social Assistance Programs

To support and facilitate the implementation of income restoration “packages,” the Project should include social assistance programs such as:

- ✓ Legal assistance with using the letter of credit
- ✓ Technical assistance to re-establish production
- ✓ Training for a new job
- ✓ Social workers to accompany and advise single mothers, the aged
- ✓ Provide transport of people and their belongings
- ✓ Give food allowances if there are delays in income restoration
- ✓ Provision of temporary schooling, health services, transport, etc. if there are delays in permanent replacement of such services.

If the DD proposes to utilize the contributions of other entities (governmental, civil society, private sector firms, etc.) the RAP should provide explanation as follows:

- ✓ Number of displaced people to be attended or served
- ✓ Office and Management entity responsible
- ✓ Human resources (professional, technical, support) to be assigned
- ✓ Location where service or attention will be given
- ✓ Implementation timetable

- ✓ Cost estimate and financing plan

6. Consultation and Participation Strategy

The RAP will include the results of consultations carried out with a representative cross section of the displaced people and host communities. Consultations begin during the design or planning phase and continue throughout the execution and monitoring of the RAP. The objectives of the consultation are to foment the active participation of the affected people, both displaced and host communities, in the resettlement operation, to minimize rumors and insecurity stemming from lack of information, and to ensure the most vulnerable are fully informed and involved.

This will require that project staff who will have contact with the affected people are well trained in the provisions of the RAP and their numbers are kept to a minimum so that the project speaks with one voice. It also requires that all project staff including management and professional, technical, and support staff be trained and become knowledgeable in the provisions of the RAP so as not to inadvertently disseminate incorrect information to the general public, the media, and/or the affected people.

The DD will convene meetings with the displaced and host communities to:

- Disseminate information about the project
- Consult regarding site selection of host areas and communities
- Consult regarding alternative options for restitution of livelihoods
- Learn preferences of affected people
- Formalize decisions (in writing) of affected people
- Propose and agree a timetable for implementation
- Present the complete draft RAP and invite comments and suggestions
- Obtain signed agreement with the draft RAP.

In consultation with the displaced and host communities the DD will establish:

- Cut-off date after which no further names will be added to the census of displaced people
- Cut-off date for agreement by the displaced people on the site selection of host areas will not be changed
- Cut-off date after which no change in the decision of the displaced people regarding their preference for income restitution “package” will be accepted.
-

7. Institutional Responsibilities for Management of Implementation

The Director of the Project Execution Unit (PEU) of the DD of MEWR will be responsible for the execution of the RAP, including administration, supervision, and quality control of all works, goods, and services to be provided in the context of the RAP. The PEU Director will keep the upper management of MEWR and the Country Office of the IDB informed regarding progress in implementation of the RAP through progress reports every three months. The objective of such progress reports is to document advances and achievements as well difficulties being encountered that might require upper level management intervention to resolve.

The PEU will be responsible for putting in place the administrative measures and legal Instruments to ensure the cooperation and contribution of the Commissioner of State Lands, the Land Settlement Agency, the Housing Development Corporation, the Port Authority of Port of Spain, the Town and Country Planning Division, the Municipal Corporation and all other governmental entities to be involved in the resettlement operation. The final RAP should present an organizational chart displaying the government entities that will be counted upon to execute, collaborate, approve, or otherwise participate in parts of the RAP.

At the operational level the PEU will require strengthening depending upon the magnitude and nature of physical and/or economic displacement and resettlement operations, if any, once these are identified and the planning process begun. Such strengthening may include contracting a *project resettlement team* composed of an experienced Senior Social Scientist or Social Worker for socioeconomic field studies, execution of income restoration packages, and social and technical assistance; a Senior Architect or Civil Engineer to plan new settlement sites development; and perhaps a Senior Environmental Specialist to carryout impact studies of new settlements on host areas. Such specialized skills can well be obtained through consultancy contracts with local private contractors or universities and technical institutes.

8. Grievance Mechanism

The PEU needs to establish a mechanism for attention to complaints or grievances on the part of the displaced people and the host community. Such a mechanism consists in

- Structure
 - Instrument or form for registering a complaint in writing, including name of complainant, date, description of complaint, actions taken, and outcome.

- Office where complainant can register their grievance, including address and office hours
- Profile of the professional personal to be assigned to the office.
- Procedures
 - What are the steps to file and resolve a complaint
 - How will displaced people and host community be informed about the grievance mechanism
 - Elapse time between initiation of a grievance and its resolution (no more than 6 weeks)
 - Periodicity of reports to MEWR management and IDB regarding outcomes of grievance process.
- Documentation
 - It is important that the PEU maintain an archive recording each case, the action taken, and the outcome achieved.

9. Monitoring and Evaluation Systems

Monitoring is an element of the internal management system of the project designed to provide the Director of the PEU with empirical data regarding the progress of works, goods, and services to be provided by the RAP. It entails field inspection by PEU staff of the activities of contractors and the results obtained. The objective is to document achievement and to detect problems in the execution of the components of the RAP. The Monitoring System should be focused upon tracking a few key sensitive indicators. These should include not only physical indicators or works progress but also social and economic indicators that will reflect the well-being of the displaced and host populations. The Monitoring System should produce Progress Reports submitted to the upper level management of MEWR and the IDB Country Office.

Evaluation refers to the results or outcomes of the RAP and is carried out once at the end of the project. The focus of evaluation is on the achievement of the objectives of the resettlement operation: whether or not the project has achieved the objective of resettling affected people in a manner that restores their prior standard of living or, if possible, improves that standard of living. It must be based upon field studies of the outcomes for the affected families. Evaluation is best contracted with an external, independent entity such as a university or technical institute and is carried out at the conclusion of the execution of the RAP. The resulting evaluation report is to be shared with the management of MEWR and the IDB.

10. Implementation Timetable

	Action/Activity	Start Date	Completion Date
1	Socioeconomic Baseline Studies, Impact Identification		
2	Vulnerability Analysis		
3	Identification of Resettlement Site Alternatives		
4	Consultations with Displaced and Host Communities on Site Choice		
5	Layouts for New Site Development, Infrastructure, etc. Prepared		
6	Design Studies for Income Restoration Options		
7	Consultations with Displaced on Income Restoration Options		
8	Elaboration of draft RAP		
9	Consultation with Displaced and Hosts on draft RAP		
10	Finalization of RAP		
11	Approval of RAP by Cabinet of Ministers		
12	Approval of RAP by IDB		
13	Begin Execution of RAP		
14	Site Preparation, Installation of Infrastructure		
15	House Construction		
16	Income Restoration Programs		
17	Social, Technical, Legal Assistance Programs		
18	Evacuation of Old Area, Transfer to New Site		
19	Demolition of Old Structures		
20	Contractor Begins Works Causing Displacement/Resettlement		

11. Budget

[illegible]

