



**COMMONWEALTH OF DOMINICA**

## **DISASTER VULNERABILITY REDUCTION PROJECT**

# **ENVIRONMENTAL ASSESSMENT AND ENVIRONMENTAL MANAGEMENT FRAMEWORK**



## TABLE OF CONTENTS

<b>ACRONYMS</b> .....	<b>iii</b>
<b>LISTS OF TABLES AND FIGURES</b> .....	<b>iv</b>
<b>PREAMBLE</b> .....	<b>1</b>
<b>1.0 INTRODUCTION AND PROJECT DESCRIPTION</b> .....	<b>1</b>
1.1 <i>Introduction and Background</i> .....	1
1.2 <i>Project Description</i> .....	2
1.2.1 Component 1: Prevention and Adaptation Investments .....	3
1.2.2 Component 2: Capacity Building and Data Development, Hazard Risk Management and Evaluation .....	3
1.2.3 Component 3: Natural Disaster Response Investments .....	3
1.2.4 Component 4: Project Management and Implementation Support .....	3
1.3 <i>Description of Sub-projects under the Components</i> .....	3
1.3.1 Component 1: Prevention and Adaptation Investments.....	4
1.3.2 Component 2: Capacity Building and Data Development, Hazard Risk Management and Evaluation	4
1.3.3 Component 3: Natural Disaster Response Investments .....	4
1.3.4 Component 4: Project Management and Implementation Support .....	4
1.4 Changes from the Parent Project with the Additional Financing: .....	5
1.5 Project Status.....	6
<b>2.0 LEGAL AND REGULATORY FRAMEWORK</b> .....	<b>7</b>
2.1 <i>General Context</i> .....	7
2.2 <i>World Bank Safeguards and Policies</i> .....	9
2.2.1 OP/BP 4.01 - Environmental Assessment .....	10
2.2.2 OP/BP 4.04 - Natural Habitats .....	10
2.2.3 OP/BP 4.09 - Pest Management .....	10
2.2.4 OP/BP 4.11 - Physical Cultural Resources .....	11
2.2.5 OP/BP 4.36 - Forests .....	11
2.2.6 Environmental and Social Framework.....	11
2.2.7 Environmental, Social, Health and Safety Enhancements for Procurement .....	13
2.3 Update on Project Environment Safeguards .....	15
2.4 <i>Review of Relevant Legislation</i> .....	15
2.5 <i>National Environmental Management</i> .....	16
<b>3.0 DESCRIPTION OF EXISTING ENVIRONMENT</b> .....	<b>17</b>
3.1 <i>Dominica General Context</i> .....	17
3.2 <i>Geology</i> .....	18
3.4 <i>Climate</i> .....	20
3.5 <i>Human Settlements</i> .....	21
3.6 <i>Infrastructure</i> .....	21
3.7 <i>Socioeconomic</i> .....	22
3.8 <i>Geohazards</i> .....	22
3.9 <i>Biological Resources</i> .....	23
4.1 <i>Analysis of the Project</i> .....	25
4.1.1 Updated Analysis based on Additional Financing and upcoming sub-projects.....	25
4.2 <i>Impacts</i> .....	28
4.2.1 Positive Impacts.....	28
4.2.2 Negative Impacts .....	29

<b>5.0</b>	<b>MITIGATION MEASURES.....</b>	<b>31</b>
5.1	<i>Construction Management Plan.....</i>	<i>31</i>
5.2	<i>Construction Contract Clauses.....</i>	<i>31</i>
5.3	<i>Additional Considerations .....</i>	<i>37</i>
<b>6.0</b>	<b>ENVIRONMENTAL SCREENING PROCEDURES.....</b>	<b>38</b>
6.1	<i>Introduction.....</i>	<i>38</i>
6.2	<i>National Permitting.....</i>	<i>38</i>
6.3	<i>World Bank Environmental Safeguards.....</i>	<i>38</i>
6.4	<i>Screening Criteria and Checklists.....</i>	<i>39</i>
6.5	<i>Emergency Procedures .....</i>	<i>41</i>
<b>7.0</b>	<b>PLANNING AND EXECUTION .....</b>	<b>42</b>
7.1	<i>Project Management.....</i>	<i>42</i>
7.2	<i>Supervision and Review .....</i>	<i>43</i>
7.3	<i>Communication and Grievance Resolution .....</i>	<i>43</i>
7.4	<i>Public Consultation and Dissemination of Information.....</i>	<i>44</i>
7.5	<i>Incorporation of Environmental Contract Clauses.....</i>	<i>44</i>
<b>8.0</b>	<b>TECHNICAL ANNEXES .....</b>	<b>45</b>
8.1	<i>ANNEX 1 - RECORDS OF CONSULTATIONS.....</i>	<i>45</i>
8.2	<i>ANNEX 2 - RECORD OF DISCLOSURE FOR REVISED EA/EMF .....</i>	<i>49</i>
8.3	<i>ANNEX 3 - SCHEDULE II OF THE PHYSICAL PLANNING ACT.....</i>	<i>49</i>
8.3	<i>ANNEX 4 - PEST MANAGEMENT INFORMATION .....</i>	<i>50</i>

**ACRONYMS**

AF	Additional Financing
DOWASCO	Dominica Water and Sewerage Company
DVRP	Disaster Vulnerability Reduction Project
EA	Environmental Assessment
EIA	Environmental Impact Assessment
EMF	Environmental Management Framework
EMP	Environmental Management Plan
ESHS	Environment, Social, Health and Safety
ESS	Environment and Social Standards
GSPS	Growth and Social Protection Strategy
GoCD	Government of the Commonwealth of Dominica
ICB	International Competitive Bidding
IDA	International Development Association
IMF	International Monetary Fund
IPM	Integrated Pest Management
IPP	Indigenous Peoples Plan
IST	International Support Team
MoE	Ministry of Environment, Climate Resilience, Disaster Management and Urban Renewal
NCB	National Competitive Bidding
OP/BP	Operational Policy/Bank Policy
PCU	Project Coordination Unit
PIU	Project Implementation Unit
PMH	Princess Margaret Hospital
RPF	Resettlement Policy Framework
SBD	Standard Bidding Document
SPD	Standard Procurement Document
TOR	Terms of Reference
WHO	World Health Organisation

## **LISTS OF TABLES AND FIGURES**

### **TABLES**

- Table 1 - Key National Documents related to Climate Change and the Environment
- Table 2 - Agencies with responsibility for Project Approval and/or Implementation and Environmental Management
- Table 3 - Standard Mitigation Measures for All Construction Sites
- Table 4 - Specialized Mitigation Measures for Selected Environmental Aspects
- Table 5 - Identification of Complex/Sensitive Sub-Projects or Activities
- Table 6 - List of Persons at the Consultation
- Table 7 - List of Persons who received the document via email for Consultation

### **FIGURES**

- Figure 1 - Organisational Structure of the PCU for the DVRP
- Figure 2 - Location Map for Dominica
- Figure 3 - Geographic Features of Dominica
- Figure 4 - Geologic Map of Dominica
- Figure 5 - Topography of Dominica
- Figure 6 - Average Annual Rainfall
- Figure 7 - Land Use in Dominica
- Figure 8 - Volcanic Geohazard Map
- Figure 9 - Vegetation Types in Dominica
- Figure 10 - Protected Areas of Dominica
- Figure 11 - Land Use Map of Dominica
- Figure 12 - Sign in Sheet for Consultation
- Figure 13 - Image of Government of Dominica Web Portal showing Document Disclosure
- Figure 14 - Image of Email Message sent inviting comments on the draft EA/EMF
- Figure 15 - Image of Email Message sent re: Disclosure of revised EA/EMF

## **PREAMBLE**

This Environmental Management Framework/ Environmental Assessment for the Disaster Vulnerability Reduction Project was first developed in March 2014 for project effectiveness in September 2014. The document has now been revised, updated and finalized as of December 2018 to include activities associated with the Additional Financing approved for the project in light of impacts from Hurricane Maria.

### **1.0 INTRODUCTION AND PROJECT DESCRIPTION**

#### **1.1 Introduction and Background**

The Commonwealth of Dominica in partnership with the World Bank has embarked on a project to reduce the impacts of climate change disasters in Dominica and build resilience to adapt to such impacts. Dominica's Disaster Vulnerability Reduction Project (DVRP) provides an overview of the country circumstances, the development context and identifies climate change vulnerabilities in key sectors, for specifically vulnerable groups, for the private sector, important eco-systems and natural resources. It also provides an overview of linkages to existing development plans and programs, most importantly Dominica's Growth and Social Protection Strategy (GSPS) and Dominica's National Climate Change Adaptation Policy, as well as Dominica's Low Carbon Climate Resilient Development Strategy.

Dominica is exposed to a high level of risk to meteorological (high wind/excess rainfall/hurricanes and drought) and geophysical (seismic/volcanic/tsunami) hazards, which have significant negative impacts to its economic stability. These hazards often result in significant and recurrent damages to national infrastructure including housing, transportation networks, schools, hospitals and health centres as well as communications networks, water and electrical services. As is the case with most island states, a single hazard event can impact the entire population and economy of Dominica due to its' small population and limited geographical area. Additionally, Dominica's mountainous, rugged landscape presents significant engineering challenges to reducing infrastructure vulnerability to natural disasters and climate change.

Disasters in Dominica have had deleterious impacts on livelihoods, destroyed infrastructure and disrupted the provision of essential services and have absorbed a growing share of the national budget to cover recovery and reconstruction efforts. In 2011, for example, record level flooding and landslides associated with heavy rain caused in excess of US\$100 million in damage. In April 2013, heavy rains caused landslides, flooding and a 40-foot deep split in a section of the East Coast main road resulting in two deaths. In December 2013, heavy rainfall caused extensive landslides, rockfalls and flooding with restoration and rehabilitation works estimated at US\$18,022,000. With climate change threatening to heighten the impacts of hydro-meteorological hazards, the result in the decades to come may be an increase in the burden of weather-related disasters that can threaten the sustainability of Dominica's development processes.

More recent events such as Tropical Storm Erika in August 2015 and Hurricane Maria in September 2017 have indeed clearly demonstrated the burden of weather/climate-related disasters on the sustainability of Dominica's development process. As a result, a project restructuring and scale-up was deemed necessary. The parent DVRP financing of US\$38 million was approved by the World Bank Board on May 1, 2014 and became effective on September 8, 2014. The Additional Financing (AF) of US\$31 million was approved by the World Bank Board in September 2018 and will become effective on February 2019.

This Environmental Management Framework (EMF) was revised, updated and finalized in December 2018 to address the project restructuring and scale-up through the inclusion of additional financing from IDA credit of US\$31 million to the Disaster Vulnerability Reduction Project (DVRP, P129992). This Additional Financing will scale up activities initiated under the parent project following Tropical Storm Erika in August 2015 and Hurricane Maria in September 2017. Concurrently, it is also proposed to restructure DVRP to support activities prioritized by the Government of the Commonwealth of Dominica (GoCD) as part of its recovery and reconstruction strategy and to extend the closing date of the DVRP IDA Credit and IDA Grant by three (3) years from July 1, 2020 to June 30, 2023, which is the proposed closing date of the AF Credit and Grant (Source: AF Project Document).

In light of the project restructuring, this Environmental Management Framework and Environmental Assessment (EMF-EA) from the parent project has been updated to include the following additional finance activities:

1. Full rehabilitation of the entire 43.3 km of the East Coast road rather than spot improvements on weak or constricted sections as originally intended
2. Strengthening of water pipes and access roads for the West Coast Water Storage Tanks

As part of the revision and updating process the draft revised document was disclosed publicly for stakeholder review and feedback.

## **1.2 Project Description**

The objective of the DVRP is to measurably reduce vulnerability to natural hazards and climate change impacts in Dominica. This would be achieved through investment in climate resilient infrastructure, as well as improved hazard data collection and monitoring systems to better inform future investment decisions. The objective focuses on building resilience to increase capacity to manage risks from natural hazards and climate change. The project will contribute to Outcome 9 (Increased capacity to manage natural hazards) of the resilience area of engagement under the OECS Regional Partnership Strategy, which seeks to increase country capacity to manage natural hazards. Specifically, the project will contribute to risk reduction efforts through a combination of resilience investments and institutional capacity building in the infrastructure sector. The project will also contribute to the World Bank's twin goals of ending extreme poverty and boosting shared prosperity. The project will contribute to the GoCD's aim of Dominica becoming the first climate resilient country in the world.

The DVRP consists of four components:

1. Prevention and Adaptation Investments
2. Capacity Building and Data Development, Hazard Risk Management and Evaluation
3. Natural Disaster Response Investments
4. Project Management and Implementation Support

The original sum budgeted under the overall project was US\$38 million. The additional financing is now increasing that amount by US\$31 million to a total of US\$69 million due to the increased scope of works.

### **1.2.1 Component 1: Prevention and Adaptation Investments**

This component would be designed to reduce physical vulnerability and pilot adaptive measures to build resilience to current and future hydro-meteorological shocks. US\$28 million was originally designated to the various subprojects under this component. However, following a reassessment of this subproject both post Tropical Storm Erika and Hurricane Maria, it was agreed to do full road rehabilitation for the East Coast Roads subproject and improve access roads for the eight (8) water storage tanks, hence the need to increase the budget through the additional financing. This was increased by US\$28.1 million to a total of US\$56.1 million. Activities under this component include a suite of civil works to improve infrastructure resilience to disaster events and climate change adaptation measures.

### **1.2.2 Component 2: Capacity Building and Data Development, Hazard Risk Management and Evaluation**

This component includes support for capacity building for analysis and assessment of risks from natural hazards and climate change including the integration of this analysis in the development decision making process. Component 2 will support the creation of relevant core data and data collection systems as well as the integration analytical tools to permit improved decision making and engineering design for risk reduction and climate change adaptation. US\$7 million has been designated to this component.

### **1.2.3 Component 3: Natural Disaster Response Investments**

Under the parent project a provisional component (US\$1 million) was designated to finance emergency recovery and reconstruction activities under an agreed action plan of activities in order to support rapid response in the event of an emergency. Post Hurricane Maria it was topped up and an additional US\$10 million was made available from Component 1. This was utilized as part of an Agriculture Emergency Response Grant post Hurricane Maria.

### **1.2.4 Component 4: Project Management and Implementation Support**

Under the parent project US\$2 million was made available for activities which supported strengthening and developing the institutional capacity for Project management primarily within the Ministries of Environment and Finance. Given that the timeline of the project has now been extended, an additional US\$2.9 million has been designated to this component.

## **1.3 Description of Sub-projects under the Components**

The devastating losses and damages in the infrastructure and road sectors following Tropical Storm Erika in 2015 and Hurricane Maria in 2017 highlighted the critical need to upgrade the rehabilitation of the East Coast Road (instead of spot improvements) and strengthen the water distribution system and access roads for the West Coast Water Storage Tanks to a standard that will ensure long-term vulnerability reduction to natural hazards and climate change impacts. These activities are in line with the DVRP PDO of the project and are within the scope of Component 1 of DVRP. Further, an additional US\$10 million from the AF will be provided to Component 1 to make up for the amount transferred to Component 3 (see above). Some of the AF will also be assigned to Component 4 to continue project management and implementation support for an additional period of three (3) years, i.e., until the closing date of the AF. Also, the Dubique Cliff Stabilisation and the storm drains sub-projects have been removed to consolidate activities and improve project impact.



### 1.3.1 Component 1: Prevention and Adaptation Investments

Activities under this component would include a suite of civil works to improve infrastructure resilience to disaster events and climate change adaptation measures. Sub-projects to be financed under this component, through the provision of works, technical advisory services, operating costs, and acquisition of goods, originally included:

- Construction of water storage and distribution infrastructure
- Slope stabilization interventions
- Climate resilient rehabilitation of primary and secondary roads and bridges along the East Coast and in the South<sup>1</sup>
- Improved climate resilient drainage systems, including maintenance of storm water drainage systems<sup>2</sup>

### 1.3.2 Component 2: Capacity Building and Data Development, Hazard Risk Management and Evaluation

Core data systems to be developed under this component include:

- Creation of a high resolution digital topographic and bathymetric model through LiDAR for Dominica
- Creation of a high resolution soils survey map including chemical and physical characteristics for each soil unit
- Design and deployment of a robust hydrometeorological network to provide high resolution hydrological data for use in a wide range of activities to support, for example, engineering design, national land use and coastal zone planning, disaster management, roads construction practices and design, agricultural development and others

### 1.3.3 Component 3: Natural Disaster Response Investments

This provisional component under this Project would allow for rapid reallocation of International Development Association (IDA) funds during an emergency, under streamlined procurement and disbursement procedures. The emergency mechanism component would be triggered, following an adverse natural event, by an official Government of the Commonwealth of Dominica declaration of a national emergency. Under this component, expenditures on critical imports (imported or locally manufactured) required by the public/private sectors, and reconstruction/rehabilitation (civil works, goods, and services) of damaged infrastructure may be financed as per (OP/BP 10.00).

### 1.3.4 Component 4: Project Management and Implementation Support

Activities under this component would support strengthening and developing the institutional capacity for Project management, including:

- a) Financing the establishment of a new Project Coordination Unit (PCU) within the Ministry of Environment, including staffing, training, and operating costs;
- b) Preparation for designs and tender documents;
- c) Preparation of project reports;
- d) Processing of contracts and tender evaluation;
- e) Coordination of participating line Ministries;
- f) Supervision of the quality of works;

---

<sup>1</sup> South is now removed post Tropical Storm Erika in 2015

<sup>2</sup> Storm drains will be concentrated on the East Coast Roads sub-project only

- g) Training of staff in project management and implementation support;
- h) Monitoring and evaluation of project progress and results; and
- i) Related activities to support efficient project management and implementation, through the provision of technical advisory services, training, operating costs, and acquisition of goods.

#### **1.4 Changes from the Parent Project with the Additional Financing:**

The Additional Financing (AF) and Restructuring will scale up activities initiated under Component 1 of the parent project and extend the project by three (3) years. Specifically, the AF will:

- Finance full rehabilitation of the entire 43.3 km of the East Coast Roads rather than spot improvements on weak or constricted sections as originally intended;
- Replenish US\$10 million of funds under Component 1 which were redirected to Component 3 to support the agriculture sector through the Contingent Emergency Response Component (CERC), following Hurricane Maria;
- Strengthen water pipes installation and improve access roads for the West Coast Water Storage Tanks
- Remove the Dubique Cliff Stabilization and the national storm drains works from Component 1 (due to re-allocation of funds); and
- Allocate additional funds to Project Management and Implementation Support to address the increased scope of works.

*Component 1: Prevention and Adaptation Investments* (increase of US\$28.1 million, includes replenished US\$10 M). As noted earlier in this document the expanded scope of the East Coast Road works would fully rehabilitate, widen and resurface the entire 43.3 km of the road to resilient standards, instead of only strengthening works at selected sites. Works will include substantial slope and landslide stabilisation, flood mitigation activities along the entire corridor including storm drains, bridge protection and replacement, expansion of road width and mitigation of river erosion along the road embankments. Following Hurricane Maria there was the need for strengthening of the water distribution systems and access roads for the West Coast Water Storage Tanks. As such, the AF earmarked for the ongoing construction of the eight (8) DOWASCO North/West Coast Water Storage Tanks will include improvement of construction techniques and materials to ensure that water pipes installation are resilient to similar events of recurrent natural disasters. Works are expected to include reinstatement/rehabilitation of tank access roads and improve construction in pipe trenching.

AF funds would also replenish funds originally allocated to Component 1 that had been redirected post Hurricane Maria to Component 3 under the Contingent Emergency Response (CERC) to support the agriculture sector.

As part of this project restructuring the Dubique Cliff Stabilisation which was planned under the parent project has been removed. Following the damage from Tropical Storm Erika in August 2015, the GoCD decided that investments in the village of Dubique at the south-east side of the island were no longer cost-effective or suitable for further development due to the severe landslide risk and consequent relocation of the community. In addition, the national storm drains sub-project has also been removed from the project as the Government has decided to consolidate resources on DVRP investments on the East Coast Roads.

*Component 4: Project Management and Implementation Support* (increase of US\$2.9 million). The proposed AF would provide funds for Component 4: Project Management and Implementation Support for the three-year extension that would be required to complete the project and to provide

further support strengthening and developing institutional capacity through technical advisory services, training, operating costs and acquisition of goods.

In addition, this component will finance the establishment and operation of an Implementation Support Team (IST), which will serve as a shared resource for all World Bank-funded projects in Dominica to provide specialist procurement, safeguards and fiduciary support to their respective Project Implementation Units (PIUs). The IST will be staffed with two (2) International Procurement Specialists, a Financial Management (FM) manager, safeguards specialists and a portfolio manager. The international procurement staff within the IST will manage and be responsible for the procurement processes related to all works, goods, and consulting and non-consulting services under the Project, with support from the PIU staff. The portfolio manager will be responsible for providing policy guidance, coordination, and oversight of project activities as well as broader functions in overseeing the reconstruction process, beyond this project.

### **1.5 Project Status**

The status of implementation of each component (as of November 2018) is summarized below:

*Component 1: Prevention and Adaptation Investments* - This component comprises the rehabilitation of the East Coast Roads and construction of West Coast Water Storage Tanks. Both Tropical Storm Erika and Hurricane Maria caused some delays in implementation of these sub-projects. The preliminary engineering and design services for rehabilitation and improvement of the East Coast Roads are currently underway. According to the revised work plan, detailed design and bidding documents would be available by November 2018. In the interim, however, following Tropical Storm Erika several critical spot interventions along the project route were approved for immediate works. Works at most of these spot interventions sites are now completed. However, post Hurricane Maria there was the need to increase the scope at three (3) of these sites. Work is currently underway at one (1) of these sites with the other two (2) pending a new procurement process.

Contracts for the West Coast Water Storage Tanks have all been signed and six (6) of the eight (8) water tanks have been constructed. No tanks were damaged by Hurricane Maria, but some access roads were eroded and some pipes were exposed. It is expected that these six (6) completed tanks will be hooked up to the main distribution system and be providing water to communities by end November 2018.

*Component 2: Capacity Building and Data Development, Hazard Risk Management and Evaluation* - This component focuses on the development of data and information to better manage disaster risks and climate change in Dominica. The bathymetric component of the LiDAR survey was completed in July 2017. The LiDAR Topographic survey is currently underway. However, only 60% of the island was covered due to unfavourable weather. The team recommenced flying in November 2018 and it is expected that acquisition of the remaining 40% will be completed by December 2018 pending clear skies. The hydro-meteorological network analysis and necessary specifications are completed. The installation of the network is expected to be completed by end of 2019. Design of the meteorological office building is completed and construction is expected to begin in first quarter of 2019. Other related activities such as soil survey mapping and Geo-spatial management platform are all progressing satisfactorily and is anticipated to be advanced in the coming months.

*Component 3: Natural Disaster Response Investments.* Following Hurricane Maria in September 2017, the Contingent Emergency Response Component (CERC) was triggered. In line with the Government request to provide urgent assistance to farmers and small business owners, two cash

transfer programs were developed. A total of \$US 10 million was reallocated from Component 1 to Component 3 of the project to support these activities and the total amount was disbursed in December 2017 and January 2018.

*Component 4: Project Management and Implementation Support.* The Project Implementation Unit (PIU) is staffed with a Project Coordinator, Financial Management Specialist, Procurement Officer, Environmental Safeguards Specialist, Social Safeguards Specialist, Project Engineer, Monitoring and Evaluation/Communications Specialist and an Administrative Assistant. The PCU is performing satisfactorily given the fact that this was a newly established PIU. However, it would benefit from additional support in key functions such as procurement, especially after Hurricane Maria, to accelerate implementation.

## 2.0 LEGAL AND REGULATORY FRAMEWORK

### 2.1 General Context

In Dominica, responsibility for environment and resource management falls under the mandate of various Government Agencies and Statutory Organisations, governed by about 105 pieces of legislation. Reviews of this legislation have all concluded that comprehensive environmental and natural resource management legislation is an urgent priority in order to prevent irreversible environmental damage to the natural resources upon which Dominica relies for sustained economic and social development. This is now in draft form.

However, in the absence of comprehensive legislation, environmental management continues through the legislation that presently exists. Additionally, Dominica is party to several international conventions/protocols and there are several environmental policies and plans (refer to Table 1) which have been developed and/or approved by the Cabinet of Ministers that serve to guide environmental management in Dominica through the development of strategies and plans that aim at mainstreaming climate change into national development. Table 2 shows the Ministries/ Agencies involved in various aspects of environmental management and execution of development works.

Recently, post Hurricane Maria the GoCD declared a policy to become the first climate resilient country in the world. In keeping with this a new Ministry was established to focus on climate resilient efforts. This ministry incorporates several existing departments and is called the Ministry of Environment, Climate Resilience, Disaster Management and Urban Renewal. Almost all of the government departments concerned with the DVRP is now located under this Ministry.

The main pieces of existing legislation of relevance to the DVRP are highlighted in section 2.3 below.

**Table 1 - Key National Documents related to Climate Change and the Environment**

YEAR	POLICY DOCUMENT
2014 - 2018	Growth and Social Protection Strategy
2010	Montreal Protocol (Substances that Deplete the Ozone Layer) Regulations, 2010
2010	National Strategy for Health
2010	Sector Strategy, Natural Resources and Energy Sector Plan
2010	Tourism 2010 Policy
2010	Draft Environmental & Planning Regulations for Renewable Energy
2010	Draft Geothermal Development Bill
2010	National Energy Policy (Draft)

2010	National Integration Water Resources Management Policy (Draft)
2009	Dominica Forestry Policy
2009	Disaster Management Plan
2009	National Emergency Management Policy
2009	National Shelter Policy
2007	National Policy for the Agriculture - Environment (Agri - Eco) System, 2007 - 2025, Submitted for Cabinet's approval
2006	Growth and Social Protection Strategy
2006	St. George's Declaration
2005	National Biosafety Framework
2005	Draft National Implementation Plan on Persistent Organic Pollutants
2004	National Environment Policy/National Environment Management Strategy
2002	Dominica's Policy on Planning for Adaptation to Climate Change
2002	National Biodiversity Strategy and Action Plan
2002	Physical Planning Act
1998	Plan to reduce the vulnerability of school buildings to Natural Disasters

**Table 2 - Agencies with responsibility for Project Approval and/or Implementation\* and Environmental Management**

DEPARTMENT/MINISTRY/ORGANISATION	MANDATE/RESPONSIBILITY
<b>Physical Planning Department</b> - Ministry of Planning and Economic Development	Coordinates development planning and land use, approval of projects, EIAs reviews and requests
<b>Environmental Coordinating Unit</b> - Ministry of Environment, Climate Resilience, Disaster Management and Urban Renewal.	Focal Point - Implementation/ Coordination and development of environmental policy
<b>Fisheries Division</b> - Ministry of Agriculture, Food and Fisheries.	Sustainable management and development of the fisheries resource by creating an enabling environment for enhanced food security and poverty reduction
<b>Forestry, Parks and Wildlife Division</b> - Ministry of Environment, Climate Resilience, Disaster Management and Urban Renewal.	Mandate for protection of the forest resources
<b>Division of Agriculture</b> - Ministry of Agriculture, Food and Fisheries	Agriculture and climate change, food security and poverty reduction
<b>Dominica Meteorological Services</b> - Ministry of Environment, Climate Resilience, Disaster Management and Urban Renewal.	Collects climatological data for analysis, educational support to schools and community groups
<b>Office of Disaster Management</b> - Ministry of Environment, Climate Resilience, Disaster Management and Urban Renewal.	Coordinates the overall Disaster Management programme based upon the principles of prevention, mitigation, preparedness, response and recovery
<b>Dominica Solid Waste Management Cooperation</b> (Statutory Body) under the Ministry of Environment, Climate Resilience, Disaster Management and Urban Renewal	Responsible for solid waste management
<b>Environmental Health Department</b> - Ministry of Health and Social Services	Protect the health of the public through monitoring of the environment and instituting intervention measures to prevent negative impacts on health
<b>*Dominica Water and Sewage Corporation</b> (DOWASCO) (Statutory Body) under the Ministry of Public Works, Water Resource Management and Ports	Providing quality water and sewerage services through the use of appropriate technology, sound management and environmentally sustainable practices

<p><b>Technical Services Division</b> - Ministry of Public Works, Water Resource Management and Ports</p>	<p>Responsible for the national infrastructure namely; road network management, coastal management, irrigation and drainage, energy development, maritime services and port development and services. The Ministry also performs project management functions with regard to all government and government sponsored developments island-wide.</p>
<p><b>*Public Works Corporation</b> (Statutory Body) - Ministry of Public Works, Water Resource Management and Ports</p>	<p>Implement programmes to improve the infrastructure in roads, utilities, ports and energy</p>
<p><b>Lands and Surveys Department</b> - Ministry of Housing and Lands</p>	<p>Administration/custodian of all state lands. Conduct of all public surveys and provision of land surveying and land information services for all government agencies/divisions. Responsible for updating all maps and the authentication of all survey plans and surveys</p>

## 2.2 World Bank Safeguards and Policies

During the preparation of the project, the World Bank identified five (5) Bank Environmental Safeguards and two (2) Social Safeguards to be applied during project execution. These Environmental and Social Safeguard Policies have been progressively developed and used from the 1980's through today. The policies will continue to apply with the Additional Financing. Safeguards are applied to assure that project funds are engaged in a manner consistent with Bank institutional policies with respect to social and environmental protection and management. The application of relevant Bank safeguards is required during the preparation and execution of Bank sponsored activities. Supervision for environmental compliance shall be managed through the PCU under WB supervision. In addition to WB requirements, the PCU will be responsible for ensuring the proper application of any national environmental requirements.

This Environmental Management Framework (EMF) was prepared in keeping with the Environmental Safeguards. As part of the Social Safeguards an Indigenous Peoples Plan (IPP) and a Resettlement Policy Framework (RPF), which includes a Grievance Redress Mechanism (GRM) was also prepared in parallel and is presented in a separate document. All documents are available on [www.dvrp.gov.dm](http://www.dvrp.gov.dm).

Further, as a result of approval of the AF the project has transitioned to the 2016 Procurement Regulations which includes strengthened requirements for Environmental, Social and Health and Safety (ESHS) performance in civil works (refer to section 2.2.7). As such, for ICB for civil works or supervision of civil works, the Bank mandates the use of its SPDs/SBDs which guides the incorporation of ESHS provisions required by the Bank. The same may also be applied to NCB for civil works or supervision of civil works once agreed upon by the Bank and the Borrower. The necessary provisions will be prepared by the Safeguards Specialists for inclusion in the relevant documents.

The World Bank has also updated to and approved in August 2016 a new Environmental and Social Framework (ESF), in particular the ten (10) Environmental and Social Standards (ESS) for Bank financed projects, which became effective on October 1, 2018. The ESF and Safeguard Policies will run in parallel until the last project applying current Safeguard Policies is closed (about seven years). The applicable Environmental Safeguard Policies are described below in sections 2.2.1 – 2.2.5. The ESF is also summarised for reference in section 2.2.6 below.

### **2.2.1 OP/BP 4.01 - Environmental Assessment**

This project has been classified as Category B and, as such, an environmental assessment (EA) is required. Projects are classified Category B if:

“Its potential adverse environmental impacts on human populations or environmentally important areas -including wetlands, forests, grasslands, and other natural habitats--are less adverse than those of Category A projects. These impacts are site-specific; few if any of them are irreversible; and in most cases mitigation measures can be designed more readily than for Category A projects. The scope of EA for a Category B project may vary from project to project, but it is narrower than that of Category A EA. Like Category A EA, it examines the project's potential negative and positive environmental impacts and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance.”

The EA (Environmental Assessment) for the Dominica DVRP consists of a preliminary assessment of the potential impacts of the various components, activities and elements of the DVRP, and is included within this EMF-EA document.

It should be noted that Social Safeguards policies were also triggered for this project: OP/BP4.12 (Involuntary Resettlement) and OP4.10 (Indigenous Peoples). Those aspects are addressed in separate documents prepared specifically for that purpose.

### **2.2.2 OP/BP 4.04 - Natural Habitats**

This safeguard seeks to support the protection and rehabilitation of natural habitats associated with sponsored projects. This safeguard applies when activities are identified that may significantly affect the quality of natural habitats, which are defined as land or water areas where the biological communities are formed largely by native plant and animal species where human activity has not essentially or heavily modified the area's primary ecological functions. Particular attention is applied to critical habitats where impacts may result in ecological modifications that affect core survival requirements for resident species particularly where Endangered Species are involved. It is the Banks' Policy that any effects to critical natural habitat would be excluded from the Project.

This safeguard is triggered based on the possibility that some construction activities may relate to issues affecting natural habitats. In addition, Dominica is fortunate to have forest covering across about 60 percent of the island, for which reason any major civil works that involve clearing lands (for example laying of pipeline or construction of new roads) may also affect natural habitats, as well as works along sensitive coastline or riverside areas.

### **2.2.3 OP/BP 4.09 - Pest Management**

Activities involving the use of pesticides or pest control measures are subject to the application of this safeguard. As a matter of policy, the safeguard promotes the use of appropriate biological or environmental pest control measures such as Integrated Pest Management and seeks to minimize the potential health risks associated with pest management activities. Additionally, the safeguard prohibits the use of internationally banned pesticides and promotes the safe application and applicator training when pesticides are employed. This safeguard is triggered owing to the possibility that agricultural activities may involve the use of pesticides, as well as possible pesticide use for emergency vector control and building treatments.

#### **2.2.4 OP/BP 4.11 - Physical Cultural Resources**

This safeguard is designed to avoid/ mitigate adverse impacts on cultural resources from development projects that the World Bank finances. Cultural resources are defined as objects, sites, structures, natural features or landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance. They are important as sources of valuable historical and scientific information, as assets for economic and social development, and as integral parts of a people's cultural identity and practices. The loss of such resources is irreversible, but fortunately, it is often avoidable.

Under this project, no known cultural sites would be impacted; however, this safeguard provides a mechanism for ensuring that in the event of 'chance findings', such resources are protected. For the Dominica DVRP, it also provides that community input be included in the design or removal of any historic buildings or sites of religious or cultural importance. This safeguard was triggered as a precaution since excavation or earthmoving may uncover such resources. ,

#### **2.2.5 OP/BP 4.36 - Forests**

The forest safeguard is designed to guide Bank sponsored projects when activities may potentially affect forest resources. The safeguard seeks to enhance the use of forest management practices that promote resource conservation, renewable resource uses and inclusion of considerations for ecological services offered by forest resources. Any effect on primary forest, that is forests which are in good state of conservation and have not been logged/ harvested previously, would be excluded from the Project.

Due to the scaled up works under the additional financing which includes widening of roads in some areas on the East Coast this safeguard is critical. It is also important as it relates to the forestry and forest management sub-projects which will be reviewed for compliance with this safeguard.

#### **2.2.6 Environmental and Social Framework**

The World Bank Environmental and Social Framework (2016) sets out the World Bank's commitment to sustainable development through a Bank Policy and a set of Environmental and Social Standards that are designed to support Borrowers' projects, with the aim of ending extreme poverty and promoting shared prosperity. The ESF enables the World Bank and Borrowers to better manage environmental and social risks of projects and to improve development outcomes. It makes important advances in areas such as transparency, non-discrimination, public participation and accountability including expanded roles for grievance mechanisms. As of October 2018, the ESF will apply to all new projects while existing projects will continue with the safeguard policies.

The ESF consists of:

- The World Bank's Vision for Sustainable Development
- The World Bank's Environmental and Social Policy for Investment Project Financing (IPF), which sets out the requirements that apply to the Bank
- The ten (10) Environmental and Social Standards, which set out the requirements that apply to Borrowers
- Bank Directive on Addressing Risks and Impacts on Disadvantaged or Vulnerable Individuals or Groups



**Environmental and Social Standards:**

- **ESS1 - Assessment and Management of Environmental and Social Risks and Impacts** sets out the Borrower's responsibilities for assessing, managing and monitoring environmental and social risks and impacts associated with each stage of a project supported by the Bank through Investment Project Financing (IPF), in order to achieve environmental and social outcomes consistent with the Environmental and Social Standards.
- **ESS2 - Labour and Working Conditions** recognizes the importance of employment creation and income generation in the pursuit of poverty reduction and inclusive economic growth. Borrowers can promote sound worker-management relationships and enhance the development benefits of a project by treating workers in the project fairly and providing safe and healthy working conditions.
- **ESS3 - Resource Efficiency and Pollution Prevention and Management** recognizes that economic activity and urbanization often generate pollution to air, water, and land, and consume finite resources that may threaten people, ecosystem services and the environment at the local, regional, and global levels. This ESS sets out the requirements to address resource efficiency and pollution prevention and management throughout the project life-cycle.
- **ESS4 - Community Health and Safety** addresses the health, safety, and security risks and impacts on project-affected communities and the corresponding responsibility of Borrowers to avoid or minimize such risks and impacts, with particular attention to people who, because of their particular circumstances, may be vulnerable.
- **ESS5 - Land Acquisition, Restrictions on Land Use and Involuntary Resettlement** - involuntary resettlement should be avoided. Where involuntary resettlement is unavoidable, it will be minimized and appropriate measures to mitigate adverse impacts on displaced persons (and on host communities receiving displaced persons) will be carefully planned and implemented.
- **ESS6 - Biodiversity Conservation and Sustainable Management of Living Natural Resources** recognizes that protecting and conserving biodiversity and sustainably managing living natural resources are fundamental to sustainable development and it recognizes the importance of maintaining core ecological functions of habitats, including forests, and the biodiversity they support. ESS6 also addresses sustainable management of primary production and harvesting of living natural resources, and recognizes the need to consider the livelihood of project-affected parties, including Indigenous Peoples whose access to, or use of, biodiversity or living natural resources may be affected by a project.
- **ESS7 - Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities** ensures that the development process fosters full respect for the human rights, dignity, aspirations, identity, culture, and natural resource-based livelihoods of Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities. ESS7 is also meant to avoid adverse impacts of projects on Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities, or when avoidance is not possible, to minimize, mitigate and/or compensate for such impacts.
- **ESS8 - Cultural Heritage** - recognizes that cultural heritage provides continuity in tangible and intangible forms between the past, present and future. People identify with cultural heritage as a reflection and expression of their constantly evolving values, beliefs, knowledge and traditions. Cultural heritage, in its many manifestations, is important as a source of valuable scientific and historical information, as an economic and social asset for development, and as an integral part of people's cultural identity and practice. ESS8 sets out measures designed to protect cultural heritage throughout the project life cycle.
- **ESS9 - Financial Intermediaries** - recognizes that strong domestic capital and financial markets and access to finance are important for economic development, growth and

poverty reduction. The Bank is committed to supporting sustainable financial sector development and enhancing the role of domestic capital and financial markets.

- **ESS10 - Stakeholder Engagement and Information Disclosure** - recognizes the importance of open and transparent engagement between the Borrower and project stakeholders as an essential element of good international practice. Effective stakeholder engagement can improve the environmental and social sustainability of projects, enhance project acceptance, and make a significant contribution to successful project design and implementation.

***Even though the new framework is not applicable to the DVRP as an existing project, best efforts will be used to apply the ESF, in particular the ten (10) ESSs as good guidance and best practice during project implementation where practical.***

### 2.2.7 Environmental, Social, Health and Safety Enhancements for Procurement

Table - Summary of Key Environmental, Social, Health and Safety (ESHS) Enhancements for Standard Procurement and Bidding Documents (source: pubdocs.worldbank.org)

#	Subject	Enhancement/s
1	<b>Declaration of contract suspension or termination</b>	<ul style="list-style-type: none"> <li>• Applicants/Bidders/Proposers are now required to make a declaration listing any civil works contracts that have been suspended or terminated by an employer and/or performance security called by an employer, for ESHS reason/s. This information will be used to inform enhanced due diligence.</li> </ul>
2	<b>Strengthened specifications/ employer's requirements</b>	<ul style="list-style-type: none"> <li>• The Employer is required to set out clearly the minimum expectations of ESHS performance from the outset, to ensure that all Bidders/Proposers are aware of the ESHS requirements.</li> </ul>
3	<b>Workers' ESHS Code of Conduct</b>	<ul style="list-style-type: none"> <li>• Bidders/Proposers are now required to submit, as part of their Bid/Proposal, an ESHS Code of Conduct that will apply to their employees and sub-contractors, and details of how it will be enforced.</li> <li>• The suitability of the Code of Conduct can be assessed and discussed as part of the Bid/Proposal evaluation and negotiations.</li> <li>• The successful Bidder/Proposer is required to implement the agreed Code of Conduct upon contract award.</li> </ul>
4	<b>Contractor's ESHS Management Strategy and Implementation Plans</b>	<ul style="list-style-type: none"> <li>• Bidders/Proposers are now required to submit, as part of their Bid/Proposal, ESHS Management Strategies and Implementation Plans required to manage the key ESHS risks of the project.</li> <li>• The suitability of these strategies and plans can be assessed as part of the Bid/Proposal evaluation, and discussed during pre-contract discussions, as appropriate.</li> <li>• These strategies and plans will become part of the Contractor's Environmental and Social Management Plan (C-ESMP).</li> <li>• Particular Conditions of Contract now include provisions relating to the (C-ESMP), e.g.: <ul style="list-style-type: none"> <li>- a requirement that the Contractor shall not commence any Works unless the Engineer is satisfied that appropriate measures are in place to address ESHS risks and impacts;</li> </ul> </li> </ul>

#	Subject	Enhancement/s
		<ul style="list-style-type: none"> <li>- at a minimum, the Contractor shall apply the plans and ESHS Code of Conduct, submitted as part of the Bid/Proposal, from contract award onwards.</li> </ul>
5	<b>ESHS Performance Security</b>	<ul style="list-style-type: none"> <li>• The successful Bidder/Proposer is now required to provide, in addition to the standard Performance Security, an ESHS Performance Security (the sum of the two “demand” bank guarantees, normally not to exceed 10% of the contract price).</li> <li>• The ESHS performance security is in the form of a “demand” bank guarantee.”</li> <li>• The application of this provision is at the Borrower’s discretion. It is recommended for contracts where there is significant ESHS risks as advised by Social/Environmental specialist/s.</li> </ul>
6	<b>ESHS Provisional Sum</b>	<ul style="list-style-type: none"> <li>• An additional provisional sum, specifically for ESHS outcomes, may be included in the Request for Bids/Proposals documents, and eventual contract. Normally, the payment for the delivery of ESHS requirements shall be a subsidiary obligation of the Contractor covered under the prices quoted for other Bill of Quantity/price items.</li> </ul>
7	<b>Key ESHS Personnel</b>	<ul style="list-style-type: none"> <li>• Bidders/Proposers are now required to demonstrate that they have suitably qualified ESHS specialists among their Key Personnel.</li> <li>• Key Personnel must be named in the Bid/Proposal, and in the contract.</li> <li>• The quality of the proposed Key Personnel (including ESHS specialists) will be assessed during the evaluation of Bids/Proposals.</li> <li>• The Contractor shall require the Employer’s consent to substitute or replace any Key Personnel.</li> <li>• The Engineer may require the removal of Personnel if they undertake behaviour which breaches the ESHS Code of Conduct, e.g. spreading communicable diseases, sexual harassment, gender-based violence, illicit activity, or crime.</li> </ul>
8	<b>ESHS Reporting</b>	<ul style="list-style-type: none"> <li>• Contracts now contain specific ESHS reporting requirements. These relate to: <ul style="list-style-type: none"> <li>- ESHS incidents requiring immediate notification</li> <li>- ESHS metrics in regular progress reports.</li> </ul> </li> </ul>
9	<b>ESHS considerations during contract variation</b>	<ul style="list-style-type: none"> <li>• As part of variation procedures, the Contractor shall provide relevant ESHS information to enable the Engineer to evaluate the ESHS risks and impacts.</li> </ul>
10	<b>Ability to withhold interim payment</b>	<ul style="list-style-type: none"> <li>• Contracts now contain provisions allowing interim payments to be withheld where there is a failure to perform an ESHS obligation.</li> </ul>
11	<b>ESHS considerations included in civil works Consulting Services</b>	<ul style="list-style-type: none"> <li>• The standard Request for Proposals for consulting services now include ESHS considerations to apply to the supervision of civil works.</li> </ul>

### 2.3 Update on Project Environment Safeguards

As is noted above the DVRP triggered the following Bank environmental safeguard policies: Environmental Assessment (OP 4.01); Natural Habitats (OP 4.04); Forests Policy (OP/BP 4.36); Physical Cultural Resources Policy (OP/BP 4.11); and Pest Management Policy (OP/BP 4.09) and these will continue to be triggered under the AF. An Environmental Management Framework and Environmental Assessment (EMF-EA), acceptable to the Bank was prepared and disclosed prior to the commencement of the project. The Mid Term Review of DVRP in December 2017 rated the implementation of safeguards relating to OP 4.01 to be highly satisfactory, and rated implementation of safeguards relating to OP 4.04 and OP 4.36, OP 4.09, and OP 4.11 to be satisfactory.

The type and location of investments proposed under the AF are similar to the parent project. Works on the East Coast roads are already included under DVRP. The nature of potential environmental impacts has not changed significantly and include those typically associated with road rehabilitation or major maintenance already identified in this EMF. Such as, landslides, soil stabilisation, erosion control, debris management, soil disposal, health and safety for workers and the public and traffic management. The existing East Coast road network is already paved, but it passes through forest areas and rough terrain, so the sub-project is considered complex from the environmental standpoint. However, no change to the Environmental Assessment Category (B) is proposed.

The parent project EMF-EA provides for the additional assessment of sub-projects that are complex or sensitive, such as major road works. Accordingly, an ESIA has been included in the scope of work for the 43.3 km East Coast road and will provide an Environmental and Social Management Plan (ESMP) to minimize and mitigate the impacts of works. The ESIA will pay special attention to sensitive areas bordering the Central Forest Reserve, drainage near the Emerald Pool (a UNESCO World Heritage site), the quarry where material will be sourced and the Kalinago Territory. Bioengineering has excellent potential in Dominica given the steep slopes and abundant vegetation, so the ESIA will evaluate bioengineering methods for slope stabilization. In addition, it is expected that specific controlled areas will be identified for disposal of cut-and-fill material and for products for earth moving operations, as well as to reduce erosion and sediment input to rivers and streams. A first draft of the ESIA will be developed based on the preliminary design, and will be finalized along with design completion and disclosed for public review and consultation before it is finalized.

### 2.4 Review of Relevant Legislation

In regards to the types of projects proposed under the DVRP and the associated environmental safeguards, the relevant legislations are as follows.

**Physical Planning Act (2002)** provides inter alia for the orderly and progressive development of land and for the grant of permissions to develop land and for other powers of control over the use of land. This Act details the application and approval process which is executed through the Physical Planning Division of the Physical Planning and Development Authority. The Act states that 'No person shall carry out any development of land except under and in accordance with the terms of a development permission granted in that behalf prior to the commencement of such development.'

It makes provision for the Authority to consult with local authorities where such consultation is desirable in the interests of good planning. Further, 'Unless the Authority otherwise determines, environmental impact assessment shall be required in respect of any application for development permission to which the Second Schedule (Refer to Appendix 2) applies.'

**Forestry Act (1959), Forest and Wildlife Act (1976), National Parks and Protected Areas Act** - provides for the protection of Dominica's biodiversity, National Parks and protected areas system. The act authorizes the Minister to designate Government lands as protected areas for the preservation of natural features and for the conservation of historic sites and landmarks.

**Water and Sewerage Act (1989)** - the water management authority is vested in DOWASO which includes among its functions water conservation and the preservation and protection of catchment areas. Responsibility for catchment areas is shared with the Forestry and Wildlife Division.

**Water and Sewerage (Catchment Area) Regulations (1995)** - These rules were made under section 5 of the Act. The rules prohibit certain acts in water catchment areas including washing equipment used for applying pesticides and containers which contain or have contained pesticides in any river or stream in the area. Of note is the requirement that there must be no direct discharge of household or industrial waste, sewerage or sludge into any stream or river.

**Fisheries Act (1987), Marine Pollution Management Bill (1999)** - Relating to Coastal Areas Management - the Fisheries Act specifically prohibit a person from disposing of or dumping litter, soil, debris or pollutant in the marine environment or causing a pollutant to enter the marine reserve. It specifically protects the Marine Environment from Land Base Pollution.

## 2.5 National Environmental Management

The Physical Planning Department has the primary responsibility to issue environmental permits for development or construction. Activities or projects that require an EIA (Environmental Impact Assessment) are listed in Annex 2. In practice an EIA is created only in private sector developments, and the relevant Line Ministries are consulted to provide input into the evaluation of the EIA.

While Dominica does not currently have comprehensive environmental management legislation in place, some level of environmental management occurs nonetheless. Although it would be preferable that this is covered by existing legislation, adherence to environmental guidelines during project implementation would ensure that environmental management is factored into all activities and by all individuals. In fact, this stipulation should be built into all contractual arrangements.

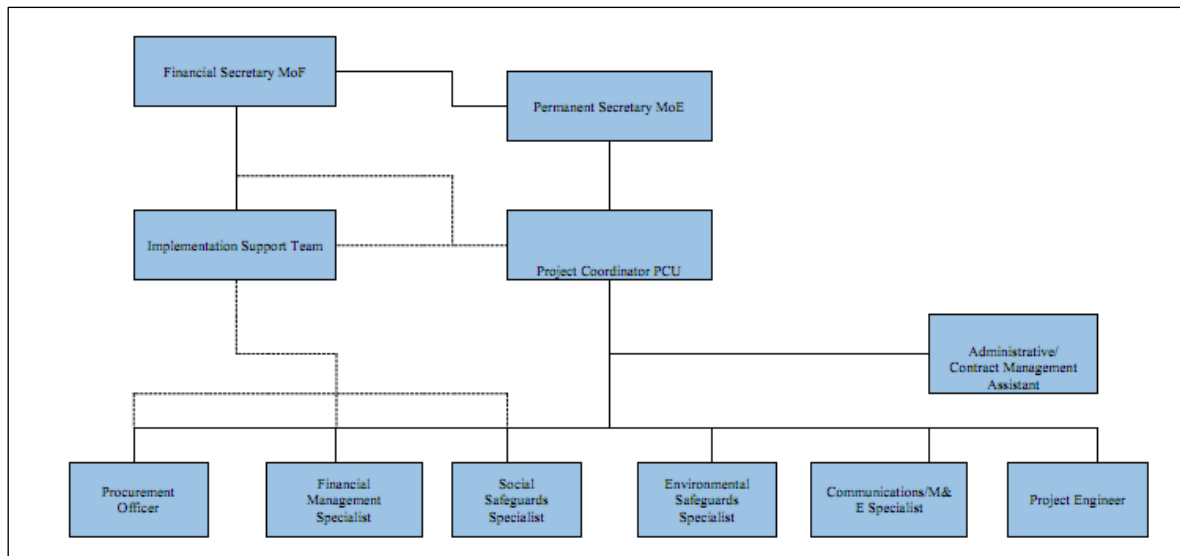
Overall, environmental management in Dominica is hampered by inadequate institutional capacity, overlap/lack of clarity of responsibilities for relevant initiatives, insufficient technical and financial resources and inadequate/outdated /legislation for enforcement. Post Hurricane Maria, however, the GoCD announced that Dominica will be seeking to become the first climate resilient country in the world. As a first step a Ministry for Environment, Climate Resilience, Disaster Management and Urban Renewal was established with the mandate to ensure that this policy objective is achieved. The GoCD has also committed to establishing an executive agency to spearhead this effort, the Climate Resilience Execution Agency of Dominica (CREAD). The proposed mission of this agency is to coordinate all reconstruction work to avoid duplication, maximize economies of scale, spot and fill critical gaps and ensure all reconstruction activities are focused on a single Climate Resilient Recovery Plan developed by Dominica and its partners.

To ensure that environmental guidelines are adhered to, the proposed projects should be examined by the agency responsible for approval of development projects in Dominica, the Planning Department, as well as the Project Steering Committee of the PCU, prior to implementation to identify proposed environmental issues and put in place mitigation measures. Other responsible agencies should also be consulted as necessary. Since project implementation began in September

2014, this has been occurring and is expected to continue with the AF. Under relevant sub-projects environmental assessments will be done and environmental management plans developed.

Within the organisational structure of the DVRP the Ministry of Environment is the technical lead for coordination amongst agencies in the project through the PCU. The PCU is responsible for overseeing the day-to-day execution of activities and project development, including environmental management through the Project Coordinator and Environmental Specialist (Safeguards Expert). The various line Ministries/Agencies would also assist with project environmental management as needed.

**Figure 1 - Organisational Structure of the PCU for the DVRP**



### 3.0 DESCRIPTION OF EXISTING ENVIRONMENT

#### 3.1 Dominica General Context

Dominica is located at 15 degrees North and 61 degrees west, occupying a central position in the eastern Caribbean archipelago. The country is bordered by the French territories of Guadeloupe and Martinique to the north and south respectively. The island is approximately 750.6 square kilometers and is the largest in the Windward and Leeward groups of the Eastern Caribbean.

The islands volcanic natural history remains evident in continuing seismic activity and in scenic attractions such as the Valley of Desolation and the Boiling Lake, which together with dense forests populated with an abundance of natural lakes and waterfalls, provide the basis for a growing eco-tourism industry. Dominica has a forest area of 45 000 hectares, more than half of the island's 75 000 hectare over all land area.

Dominica has rich volcanic soil and is well served by over 365 streams and rivers. The high mountains and deep ravines are covered in rich tropical forests. Since 1975, an extensive system of national protected areas constitutes a significant carbon sink and provides protection for approximately 20% of the national territory. Protected areas include one marine park, two large forest reserves (Central and Northern), and the Morne Trois Pitons National Park, a UNESCO World Heritage Site.

Figures 2 and 3: Location Map and Geographical Features of Dominica



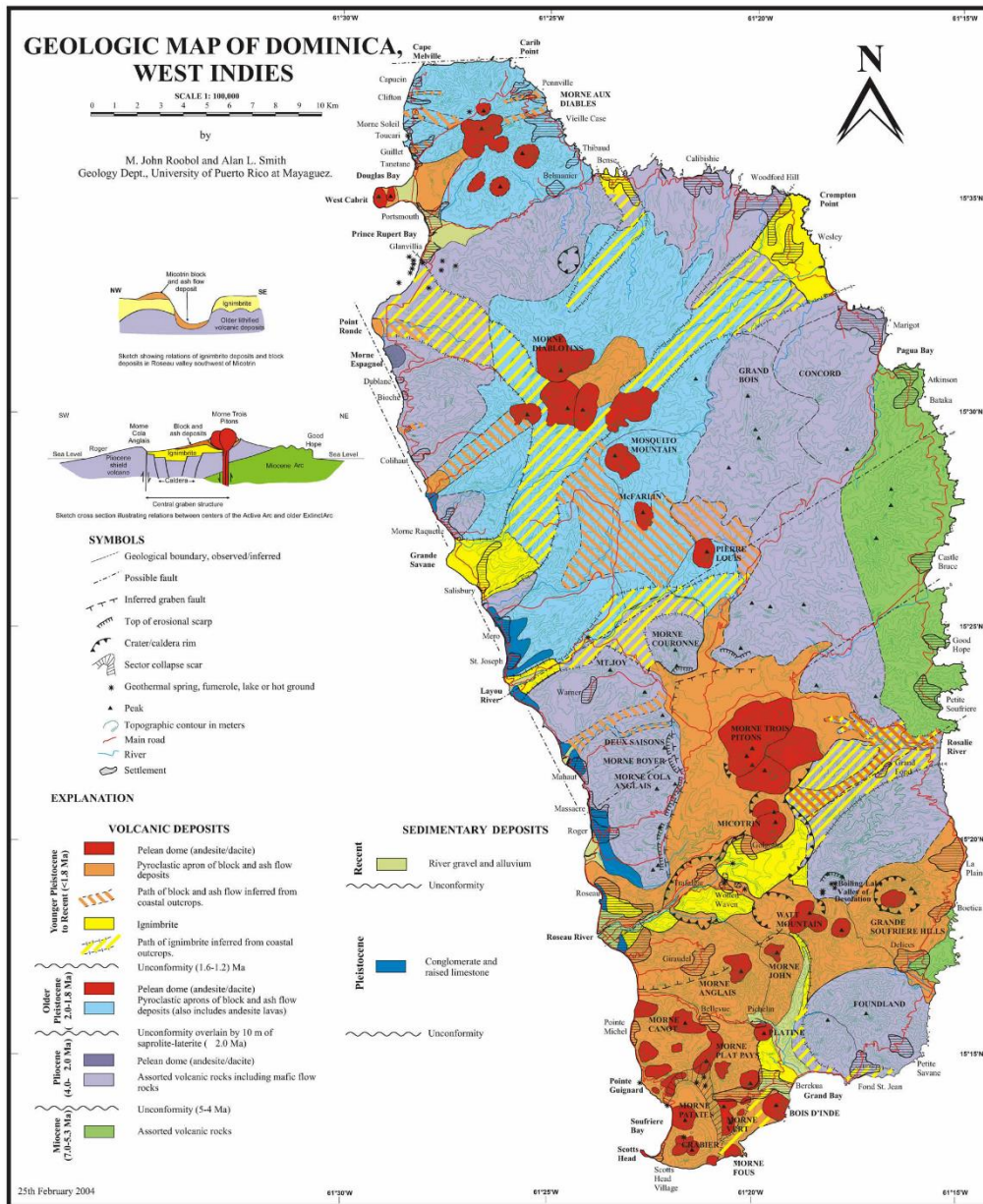
### 3.2 Geology

Dominica is part of the wider Antillean Arc of islands that are geologically quite young. While the active tectonic processes may not appear evident every day, the region is still active as evidenced by earthquakes such as the swarm which occurred from 1998 to 2000. There are fault zones cross the island, and to the east lies a deep ocean trench where active plate tectonics drive the geologic processes that have shaped the island.

There are nine active volcanoes on Dominica, giving the island its characteristic rugged topography. The rocks of Dominica are almost entirely of volcanic origin, other than recent alluvium along river valleys and reworked beach deposits along some coastlines. The youngest volcanic centres are of late Pleistocene age (less than 1 million years old) and have formed the south part of the island (Morne Trois Pitons, Wotten Waven/ Micotrin, Morne Watt, Grand Soufrière Hills, Morne Anglais and the Plat Pays volcanic complex). The most recent eruption was from the Plat Pays area about 450 years ago; and, all six volcanic centers are considered active today. Older Pleistocene volcanoes (up to 2 million years) formed the north part of Dominica, including Morne Diablotins and Morne aux Diables.

A third set of volcanic rocks (Pliocene age, 3 to 4 million years old) underlies most of the island, while the oldest rocks are between 5 and 7 million years old (Miocene age) and outcrop in a crescent-shaped zone across a swath of the East Coast. These oldest rocks consist of reworked and weathered debris derived from the oldest volcanic materials, and pose unique characteristics and challenges for the stability of slopes and hillsides because of their high clay content and easily erodible nature.

Figure 4 - Geologic Map of Dominica



Present Affiliations: MJR, Saudi Geological Survey, P.O.Box 54141, Jeddah 21514, Saudi Arabia; ALS, Dept. of Geological Sciences, California State University, 5500 University Parkway, San Bernardino, California 92407, USA. Fieldwork supported by NSF grants EAR 7717064, EAR 9527273, OEDG 01119934 and NASA NCC W-0088. Note: To print this map at the correct scale of 1:100,000, the 10 kilometer bar scale has to be 10 cm long.

### 3.3 Topography

Dominica is volcanic in origin and is characterized by very rugged and steep terrain with approximately ninety miles of coastline. The northern half of the island is dominated by the country's highest summit, Morne Diablotin, which is the highest and largest volcano in Dominica, and the second highest mountain in the Eastern Caribbean, measuring 22 km x 18 km at its base and towering to a height of 1447 meters. A chain of mountains extends from the islands center to the south and the topography is characterized by a number of ridges and steep river valleys with gently sloping lands being restricted to narrow coastal strips, particularly in the center and northeast of the island as illustrated Figure 5.



**Figure 5 - Topography of Dominica**



### **3.4 Climate**

Dominica's climate is characterized as tropical maritime with dominant influences being the Atlantic Ocean, the Caribbean Sea, and the northeasterly trade winds. As a result of its mountainous terrain the island possesses a number of micro-climates. Rainfall is distributed between a dry season from December to May and a rainy season from June to November. The western Caribbean coast is in the rain shadow of the various mountain ranges and average rainfall along that coast is significantly less than in interior locations. Limitations in measuring equipment have restricted the ability to maintain meteorological records of interior areas. High rainfall makes the island susceptible to landslides particularly in mountainous areas. Dominica's rugged topography results in considerable amount of orographic rainfall.

The island's climate is characterized by consistently warm year-round temperatures with a daytime average of 26 - 27 degrees Celsius in coastal areas decreasing to 19 - 21 Celsius degrees in mountainous areas, while night-time temperatures vary from 18 - 22 Celsius on the coast and 10 - 12 Celsius at higher elevations.

Rainfall patterns display considerable variability both on annual and locational basis. Nevertheless, Dominica's mountainous terrain makes it the wettest island in the eastern Caribbean with annual rainfall totals exceeding 10,000mm (400 inches) in some of the higher elevations. The island experiences a dry season between the months of February to June, with November being statistically the wettest month. Relative humidity remains high throughout the year consistently averaging above 85% in mountainous interior areas. Generally rainfall is less on the island's western Leeward coast which, based on the prevailing winds, is within a rain-shadow of the mountainous interior.

Figure 6 - Annual Rainfall (in inches)

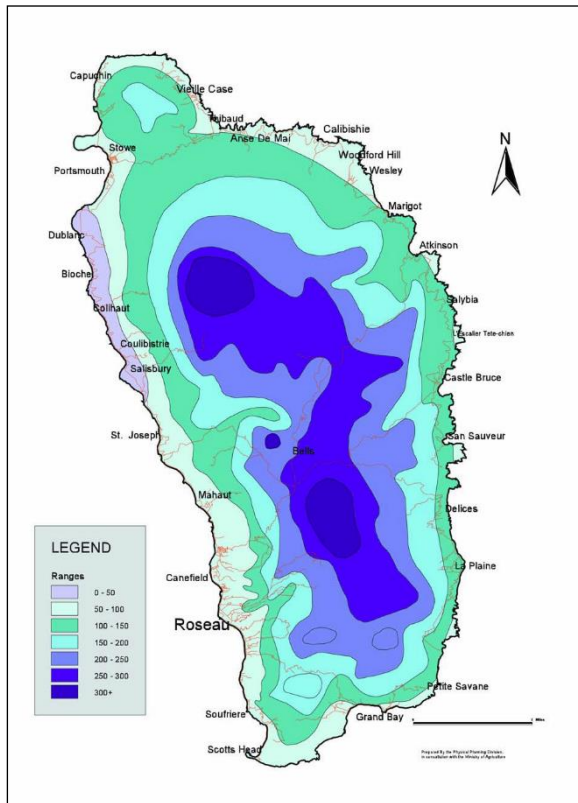
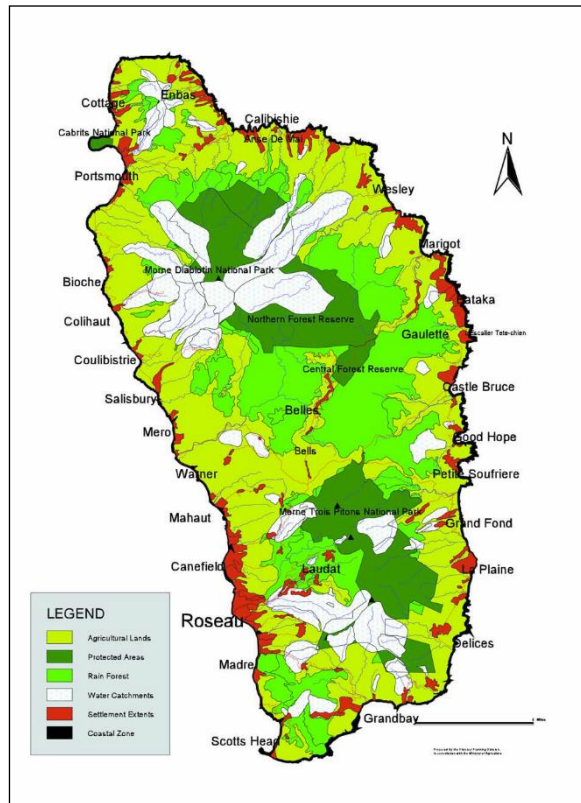


Figure 7 - Land Use



### 3.5 Human Settlements

Dominica was originally populated by Amerindian peoples, known as Kalinago and is the only island in the Caribbean still to possess distinct communities of these indigenous people of the Caribbean. Population estimates for 2001 indicate that Dominica had a population of approximately 71,000 persons (a decline from 74,750 in 1994), including two thousand Kalinagos, the remaining survivors of the first inhabitants of the island. 27.0% of the Dominican households live below the poverty line (based on the latest available figures), Topographic conditions have forced human settlements onto narrow coastal areas particularly in the south and west with approximately 44,000 persons (62%) living along the coast. The largest community is Roseau (the capital city) and its environs with 14,847 persons representing almost 21% of the total population.

The rich culture and history of Dominica has created physical cultural resources, which are features or objects of interest and value to nation’s people because of their archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance. These may include Amerindian sites, relicts of forts or plantations, shipwrecks, or historic buildings which may have great local or international value, thus meriting attention and preservation.

### 3.6 Infrastructure

Problems associated with inadequate solid and liquid waste management present threats to coastal resource health, while increasing urbanization is resulting in traffic congestion and associated public transportation concerns. Energy issues are also of concern to human settlement



Major landslide on Imperial Highway

planners since relatively long distances, rugged terrain and high costs of fuel make local transportation costs high. Vulnerability to disaster risks, both natural and man-made, are also increasing with urbanization. Underlying many of these problems are significant challenges deriving from the lack of available financing for human settlements.

Vulnerability of human settlements in Dominica to existing weather and climate change can be viewed in terms of risks from coastal processes, inland flooding, and landslides. A consistent feature of human settlements in Dominica is the vulnerability of roads and buildings to storm surge, flooding and landslides. Inadequate planning controls are apparent in the continuing construction of buildings, critical infrastructure and other facilities in active wave inundation, flood- and landslide-prone areas.

### **3.7 Socioeconomic**

The Dominica economy reflects many of the traditional features of a small open economy. This includes a high level of dependence on external trade as a proportion of gross domestic product (GDP), dependence on single sector export products (in this case agriculture) and tourism revenue, high levels of underemployment and unemployment, and dependence on foreign capital (both public and private sector) for investment into productive sectors and for infrastructural development.

The island has always been in a vulnerable position economically, socially, culturally, and environmentally. Economic developments, in particular, are significantly affected by both natural and man-made external factors as is increasingly evidenced by the negative impact on the local economy of changes associated with such international phenomenon as globalization and trade liberalization. The dependence of the economy on the constricting banana industry exposes its high economic vulnerability. Attempts to diversify are slow, however, recent trends indicate that the island is moving towards tourism/ecotourism, as it markets its unique environment and culture. In doing so Dominica has become more acutely aware of the need to protect the environment and of the growing threat to its vulnerable natural resources presented by climate change.

Dominica, by its very nature is vulnerable, given its susceptibility to natural disasters and its ecological and economic fragility. Vulnerability to climate change in Dominica, like many developing countries, is aggravated by external pressures affecting its resilience and adaptive capacity such as terms of trade, impacts of globalisation (both positive and negative), financial crises, international conflicts, rising external debt, and internal local conditions such as rapid population growth, rising incidence of poverty, political instability, unemployment, reduced social cohesion, and a widening gap between poor and rich, together with the interactions between them. It is widely acknowledged that climate change can exacerbate natural disasters with enormous human and economic costs.

### **3.8 Geohazards**

Dominica is vulnerable to a number of natural hazards such as hurricanes, earthquakes, volcanic activity, drought, tsunamis, flooding, and landslides. The effects of these phenomena can be exacerbated by the activities of population such as deforestation, indiscriminate garbage disposal, poor building practices, and unplanned settlements in environmentally sensitive areas.

The island lies within the Atlantic hurricane belt. Since the late 1970s the island has been affected by a number of hurricanes and tropical storms. In 1979 Hurricane David caused extensive destruction particularly in the southern parts of the island. In 1995, Hurricane Luis also caused wide-spread damage and in August 2007 Hurricane Dean struck the island causing widespread damage to

agricultural outputs as well as to road infrastructure estimated at almost 20 percent of GDP (source IMF).

Less than one (1) year after the commencement of this project Dominica was severely impacted by Tropical Storm Erika in August 2015 and two (2) years later Category 5 Hurricane Maria in September 2017. These two main climatic events resulted in extreme damage to the country which impacted infrastructure, human settlement and socioeconomic activities and increased the scope of works under the project.

Coastal zones are also vulnerable to storm surge during hurricanes, causing flooding and erosion from wave energy. Depending on the precise configuration of the local sea floor relative to an approaching wave or storm surge, the level of the sea could rise 3 to 5 meters (Caribbean Disaster Mitigation Project, 2000). The eastern side of Dominica is exposed to long-fetch waves across thousands of miles of open Atlantic Ocean, and consequently may be particularly vulnerable to the effects of wave erosion, but all coastal zones of Dominica are subject to coastal flooding and increased damage from wave energy during storms.

Tsunamis pose a hazard in the Eastern Caribbean and can be caused by earthquakes, by avalanches off the side of La Soufriere or other volcanoes (Le Friant and others, 2009), and by eruptions of volcanoes particularly those lying on the seafloor such as Kick-em Jenny near Grenada, which could result in a 2-meter tsunami arriving in Dominica within minutes of eruption (Gibbs, 2001).

The University of West Indies (UWI, 2011) has produced updated maps showing seismic hazard (earth shaking) that can be used for planning purposes in the Eastern Caribbean. These seismic hazards result from tectonic activity (the subduction of the Atlantic Plate beneath the Caribbean Plate). In St. Vincent the peak ground acceleration (expressed as a percentage (%) of g, the acceleration of gravity), is up to 15%g every 100 years, 25%g every 500 years, and 40%g every 1,000 years. The shaking is that typically expected from faults which cut across the island, and not from the explosive forces of erupting volcanoes.

The volcanoes of Dominica are active and pose a continuous hazard of eruption. By comparing the time of most recent eruption, the style of volcanic activity, and the potentially affected population, a composite volcanic hazard map of Dominica shows that the most vulnerable regions are to the south and southwest, with highly vulnerable areas near Roseau and Portsmouth. UWI's volcanic hazard atlas (2005) considers such an eruption likely within the next 100 years. In addition to eruptions which spew molten lava or ash, Dominica has an abundance of water-related eruptive features, in which water may contact hot buried lava and explode. The Valley of Desolation is one such example, and while these types of phreatic eruptions are more frequent, they affect smaller areas.

### **3.9 Biological Resources**

Dominica is host to an astonishing biodiversity, including more than 1,200 species of plants, and the most diverse assemblage of wildlife in the eastern Caribbean, including 175 species of avifauna. The Biodiversity Strategy and Action Plan (2006) provide an excellent reference document and bibliography of these resources, as well as outlining national direction for the way forward. About 60% of the island is forested, with a variety of vegetation types represented because of the island's large elevation change, rainshadow effects and rugged topography.

About one-third (about 20%) of Dominica is contained within protected areas such as designated Forest Reserves and National Parks, which are also recognized as Important Bird Areas (IBAs). Ocean and coastal resources include two protected marine areas on the north and south ends of the island.

Figure 8 - Volcanic hazard map

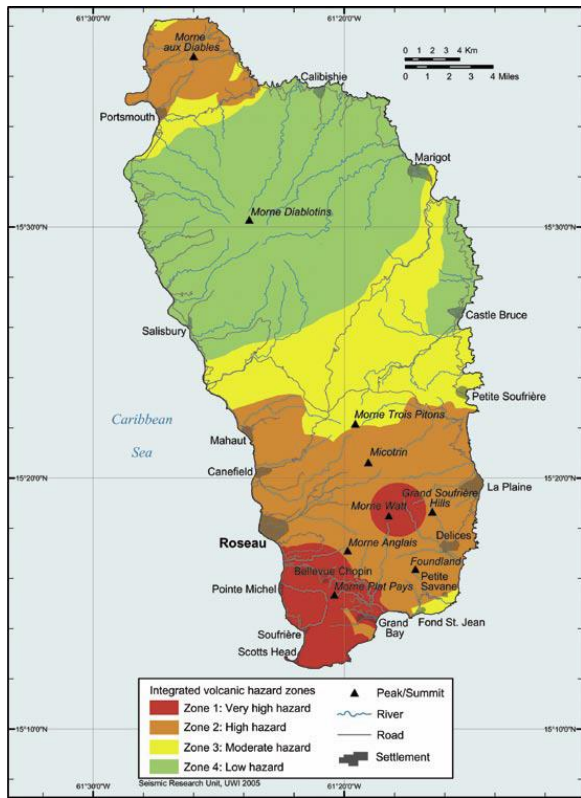


Figure 9 - Vegetation types in Dominica

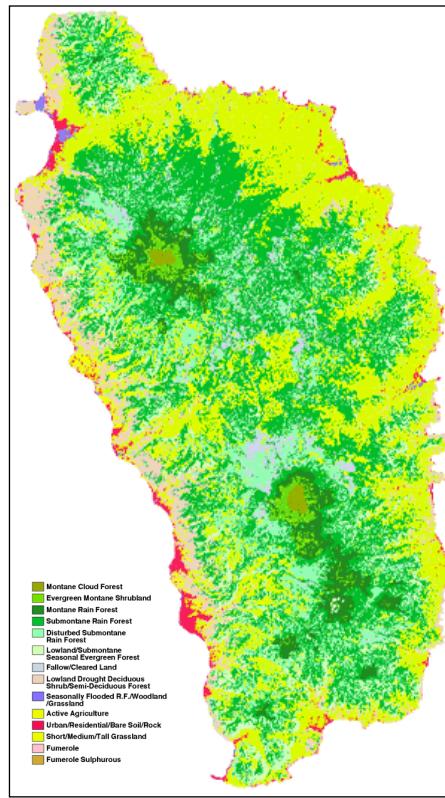


Figure 10 - Protected areas in Dominica

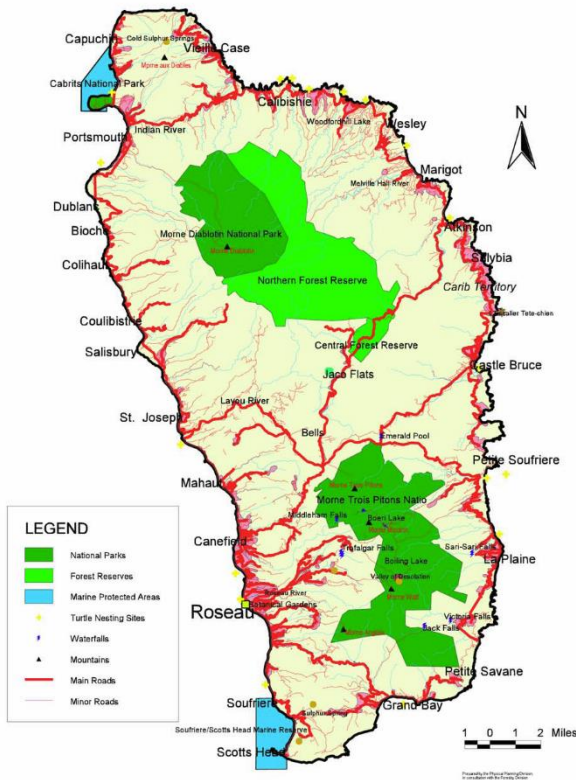
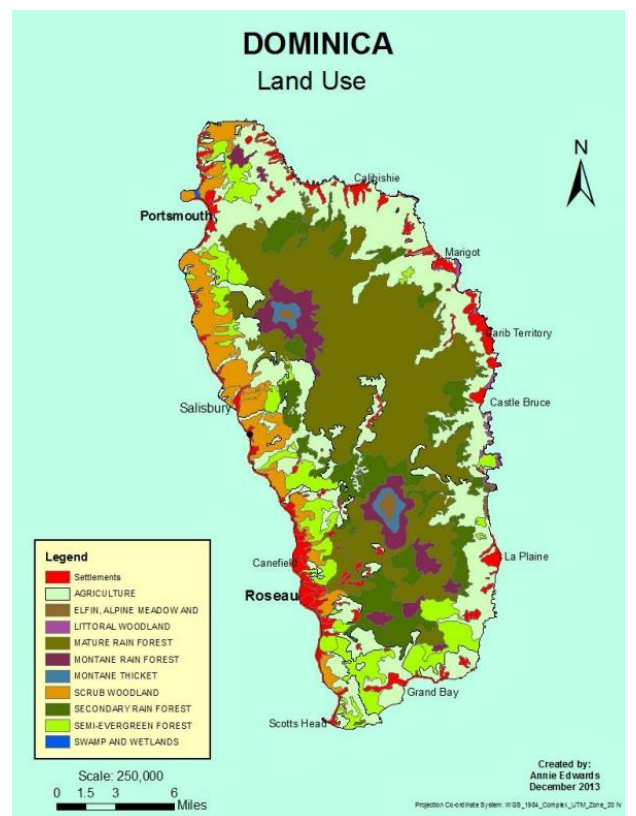


Figure 11 - Land Use Map of Dominica



## **4.0 PROJECTED IMPACTS**

### **4.1 Analysis of the Project**

The impacts highlighted in this section relate to the civil works proposed on the respective sites under consideration. The proposed civil works activities with any potential impacts are generally small to mid-sized. The expanded scope of the East Coast roads to a complete rehabilitation of the entire length of the road may result in larger impacts in certain areas, but still not as much to change the classification of the project. An environmental impact assessment was already planned under the parent project and is currently underway for the East Coast Roads sub-project. Since the Dubique slope stabilization no longer forms part of the overall DVRP the potential associated impact is no longer a consideration. None of the projects are being implemented in known historic or cultural sites. However, forested areas occur across the island, and sensitive marine and coastal environments are always downstream of any activity on land. Accordingly, care must be taken during construction and implementation activities, and pertinent environmental management measures must be implemented.

The social, cultural, historical, and socio economic impacts of these projects are being detailed in a separate social impact assessment document being prepared for this DVRP.

There are both positive and negative impacts associated with the project and its components. More positive impacts are anticipated, however. It must be noted that the projected impacts and their significance is based on currently available information. As the project components become more defined, site visits could be made and the expected impacts would become more succinct and site specific. However, if proper environmental management plans are not in place or conversely not adhered to, then the anticipated negative impacts would become more significant. Hence, the importance of proper environmental planning, project design and implementation, in particular monitoring during implementation.

The capacity building or institutional strengthening activities (Components 2 and 4) could be considered environmentally benign with no adverse impacts. However, the civil works in Component 1 (Prevention and Adaptation Investments) could have negative impacts, especially if not diligently managed. Therefore, it is critical to ensure that all mitigation measures are adhered to. Emergency measures (Component 3) would likely involve only the purchase of goods or materials; however, it is possible that some civil works could be necessary on an urgent basis.

#### **4.1.1 Updated Analysis based on Additional Financing and upcoming sub-projects**

As indicated earlier the nature of potential environmental impacts includes those typically associated with road rehabilitation or major maintenance, mainly landslides, soil stabilization, erosion control and debris management. These are also expected to be the same under the AF. Overall, since the project aims to reduce disaster risk vulnerability, there will be particular emphasis to manage these risks. Impacts associated with the civil works for the East Coast roads will be assessed under the ESIA and appropriate mitigation measures will be instituted.

The more significant environmental impacts under the DVRP are expected under component 1 and hence measures have been and are being put in place to minimize or eliminate these impacts. There are some civil works expected under a few of the Component 2 sub-projects and as such there may be a few environmental impacts. Therefore, in order to mitigate adherence to the EMF is integrated as part of the bid documents. Some stakeholder impact is also expected but will be addressed within

the ESIA. Extensive preparatory work has already commenced which include consultation with all utility companies since some of the infrastructure would require relocation.

#### 4.1.2 Road Works

The **East Coast Road Vulnerability Reduction Project** under Component 1 is expected to have some of the greatest anticipated environmental impacts. The areas proposed under this sub project are as follows:

- Link 1: Pond Casse - Bois Diable (4.5 km)
- Link 2: Boise Diable - Castle Bruce (9.5 km)
- Link 3: Castle Bruce - Petit Soufriere (8.8 km)
- Link 4: Castle Bruce - Hatton Garden through Kalinago Territory (20.5 km)

The project is expected to have high development impact as the East Coast Roads provides access to the eastern part of the country, a region that is behind in economic development and is home to the indigenous Kalinago people. In addition, the East Coast Road is an alternative road to the main airport, a critical road connecting Douglas-Charles Airport to the capital city. Investments under this project will avert future transport disruptions on the East Coast Road and ensure that it can serve as an alternative road in the event of any failure on critical sections of the Airport Road or restriction to access due to landslide.

When preparing for the parent project a site visit was conducted and the condition of the road was assessed through visual observation showing the poor drainage conditions as one of the main area of concern. While the number of culverts seems functioning with an adequate spacing, lateral ditches are obstructed at places with vegetation. It was reported that the road, which was built more than 45 years ago, has never been under any programme of periodic maintenance. The top layer of pavement does not present any camber for lateral drainage thus causing occasional potholes. However, based on visual observation the road structure appears to remain in good condition. It appears therefore that any concern related to the need for improved drainage conditions could only be addressed through the implementation of a periodical maintenance programme. Link 4 crosses through the Kalinago Territory.

The proposed project encompasses a wide range of interventions of infrastructure works for the entire 43.3 km of road such as slope stabilization, retaining walls, road realignment, pavement rehabilitation and improved drainage structures - storms drains and water storage facilities and will include associated drainage works to improve the protection of critical infrastructures structures from flood impacts. Bridge replacement and rehabilitation are also possible components of the civil works, as well as river defense structure such as retaining walls, gabions, and the like.

More related to the objective of vulnerability reduction to natural hazards, it was observed that multiple sites show the need for preventive actions of slope stabilization on the high side of the road. Slopes that are more like actual cliffs are subject to collapse under any slight pressure from water or lateral effort. Rockfalls and fallen trees are then causing road obstruction then requiring costly emergency measures.



Other lateral escarpment in potentially unstable shape



Example of lateral slope stabilization as applied on the rehabilitated road through the Central Forest Reserve

Following Tropical Storm Erika the road works for the East Coast roads were divided into two categories as a result of the need to address some key interventions before others, so it was divided into: long-term works and immediate works. The immediate works commenced in December 2017 due to several delays including the impact of Hurricane Maria. The immediate works focused on construction of several retaining walls in areas with complete or imminent failure, road realignment including cliff cutting, pavement reinstatement and expansion of some culverts.

#### 4.1.2 Water Works

In collaboration with DOWASCO, the West Coast Project is a water supply system that consists of construction of water reservoirs and related pipes works. It includes the installation of a new primary water supply network to the villages located along the 31 km stretch between Salisbury and Capuchin (northwest side of Dominica). Current conditions are that the water system on this area is divided into 9 different individual zones, each with their own individual water system. Those existing systems are inefficient as they use a lower water level source subject to seasonal drops. The project is ongoing and is based on two main intakes at higher levels (just west of Coulibistrie to the South, and at Picard, northeast of Portsmouth). The whole project is divided into three lots. Lots 1 and 2 pertaining to the intakes and associated water treatments, and main lines supply and installation towards the distribution system are currently under completion for a provisional acceptance expected by March 2014.

It is important to note that an EIA was conducted for the West Coast Water Project in September 2009, and serves as a valuable reference, as well as reassurance that the project as a whole has been adequately assessed. The only components of the project that will be financed by DVRP concerns Lot 3, which is the construction of eight storage tanks (one being already under construction) and their supply lines (typically of 200-meter length). Two tanks would have a capacity of 80K gallons, and six others with various capacities between 30K and 60K gallons. Technically, the project is very feasible under a well-controlled management structure and with well-known procedures and technologies. The type of construction with this particular technology is accessible to a large number of local contractors.

#### 4.1.3 Monitoring Stations

Monitoring stations for rainfall, stream flow, and seismic activity are being considered by DOWASCO, MET and ODM. These may use existing sites, or may require small new sites to be acquired and prepared by blading, grading or clearing. Access to sites should be carefully screened to ensure that footprints are minimal and that new access roads are not constructed unless absolutely necessary.



Standard mitigation measures will be developed for these works, which may include in-stream works for the stream flow measuring stations.

#### **4.1.4 Agroforestry**

Forestry and Agriculture have planned a broad range of interventions, which may include greenhouses, animal rearing facilities, limited forest resource harvesting, conversion of clear-cut cropland to tree crops on riverbeds and slopes, and planting of windrow trees for slope stabilization. Intercropping and "mixed farming" is practiced on steep slopes common in Dominica, in which various types of crops are planted to best accommodate variations in slope, soil, and elevation. Extensive public education and participation programs (e.g. 4-H Club and Agricultural Extension Service) are planned to support these activities. Detailed project proposals are to be developed during implementation, leaving the potential scope fairly extensive at project appraisal.

Within this Project, the term forest harvesting only refers to incidental clearing of a very limited number of trees as may be required for the agroforestry pilot plots which would also include planting of trees for slope stabilization, erosion prevention, or planting of climate resilient crops. All proposed project activities will be screened using the EMF and any negative effects on primary forest would be excluded. Effects on critical natural habitat and primary forests would also be excluded.

## **4.2 Impacts**

As noted earlier, there are both positive and negative impacts associated with this DVRP.

### **4.2.1 Positive Impacts**

The positive impacts are expected to be significant. These include:

- The provision of better water supply to communities, which would provide potable water to more households in the area. Also, the storage tanks would provide sufficient water supply to communities when water intakes are shut down during extreme climate events.
- Potential economic growth and development that is likely to occur as a result of the improvement in the road network and increased income and employment opportunities from project implementation and improvement in services. Local communities would also benefit from immediate employment and income generating opportunities created during project implementation.
- Improvement in the quality and standard of living through easier access to necessary information and resources.
- Development of a safer transport route which would open the community to more development and ease concerns of risk to life and limb.
- Improvement in development planning and decision making from the data sets expected (hydrometeorological data analysis and archiving system, soil mapping, bathymetric surveys), would help with designing and placement of appropriate sea defence, weather prediction, useful in agriculture, etc.

#### 4.2.2 Negative Impacts

The data collection, archiving and analysis is expected to have little or no environmental impacts. However, the larger infrastructure components will have some significant impacts. The Dubique component especially is one where there is the possible need for an EIA. Alternatively, an EA-environmental assessment could be done which is not as detailed as an EIA but still provides alternatives or mitigation measures for prospective environmental impacts. If they impacts are great, it leads to the development of an EIS - environmental impact statement which essentially is a documents detailing the mitigation measures to endure that the goals and policy of environmental management are met on the project.

The following impacts are anticipated at various stages of implementation of the DVRP's projects:

- **Soil erosion and land slippage** - Some erosion during construction is unavoidable and will occur temporarily as a result of runoff in areas of excavation or other areas of earth disturbances. Unplanned or indiscriminate land clearing, excavation and poor drainage can result in soil erosion and landslides within steep sloping areas which may eventually result in siltation and pollution of rivers and coastal areas. Since, this material may eventually find their way into the nearby streams and rivers causing increases in the suspended sediment concentration. This can be exacerbated by construction during the rainy season or improper construction methods, which leave soils exposed unnecessarily. Landslides at riverbanks could also occur during construction which could also lead to obstruction and siltation of rivers.
- **Soil contamination** - Fuel is expected to be stored on site and there is an increased risk of spills of hazardous material which may occur, or if oily products from engines are spilled on site or due to improper disposal of used oils and lubricants. During construction, and with heavy traffic, there are likely to be increased risks of accidental spills of oils and fuels. One component of this Project includes the use of pesticides and herbicides. Therefore, there is the risk of soil contamination from these chemicals.
- **Water pollution** - surface water (rivers) or/and groundwater and coastal/marine waters may be contaminated by improper utilisation of storage of construction materials that are toxic or hazardous, such as chemicals or petroleum products. Also, materials used during construction could be accidentally or intentionally dumped in the water. This can cause temporary or permanent loss of habitats or aquatic flora and fauna. Soil erosion could also lead to water pollution. One component of this Project includes the use of pesticides and herbicides. Therefore, there is the increased risk of water contamination from these chemicals.
- **Loss of Biodiversity** - Indiscriminate land clearing and excavation, improper disposal of waste materials (oil, grease etc.) could destroy flora and fauna and pollute the area, and quite possibly destroy some of the natural resources. Changes in forest management could have indirect effects, but could be substantial if carried out over broad areas and long time periods.
- **Loss of Physical Cultural Resources** - the unplanned or unintentional destruction of historic buildings, religious or culturally significant sites, could result in the loss of valuable physical cultural resources. Excavation could destroy artifacts of prehistoric age, and cause the loss of irrecoverable archaeological information, unless properly avoided.

- **Ponding** - Project activities may lead to creation of stagnant water in excavation pits or other areas. The resultant stagnant water bodies create suitable conditions for the breeding of mosquitoes and other disease vectors. Presently, in Dominica there is concern over the breeding of the *Aedes aegypti* mosquito since there has been an increase in the incidence of Dengue Fever and Chikungunya.
- **Noise Pollution** - Ambient noise levels in the project area have not been measured. The use of the vibration and/ or noise producing equipment that is generated from the construction site can be a potential nuisance to the local community and farmers. It may also create unacceptable disturbance to marine species.
- **Air Pollution** - The major effects on air quality during construction would be an increase in suspended particles (dust) from excavation as well as movement of heavy machinery and trucks over unpaved roads, also the dust caused when all traffic is directed to unpaved detours. This increased dust could be unfavourable to resident's health and a nuisance for their property; it could also form layers on vegetation and reduce visibility for pedestrians and motorists. Any proposed site clearing and excavation activities and use of malfunctioning equipment and machinery can emit excessive levels of dust and carbon monoxide into the air which can be harmful to people.
- **Waste Generation** - The civil works projects are expected to generate the most waste materials. This would include both construction waste and sanitary waste from workers on site. Construction waste would include material packaging as well as earth and rocks. It would be imperative to ensure that these are correctly disposed of.
- **Traffic Congestion and Inaccessibility** - There is likely to be increased traffic and/or congestion due to some road works, excavation and construction activities. Some areas may be difficult to access.
- **Health and Safety** - Potential hazards to the health and safety of workers and other persons in the area in the event of accidents or injury due to improper use, storage and disposal of hazardous materials and waste etc, can occur. There is also the possibility of injury to workers caused by falls, falling equipment or material or from machinery and vehicles.

#### 4.3 Summary of Impacts

The potential negative impacts described above would be the result of the civil works described under the road works, the water works, the monitoring stations, and the agroforestry projects. In large part the negative effects are minor and reversible, occurring mainly during construction, and can be avoided or minimized by the application of standard environmental management methods as described in the "Mitigation Measures" (Section 5) of this report. Some of the projects could have potentially significant or major negative effects, and thus require more detailed analysis and planning in the form of EIAs which would be done specifically for those projects, as described in the "Screening Procedures" (Section 6) later in this report.

## 5.0 MITIGATION MEASURES

This section highlights the appropriate measures to be taken in order to minimize or eliminate negative impacts and enhance positive impacts. However, the application of good operation and management practices is of utmost importance. Public consultation is also necessary to inform the affected Communities of the potential problems and mitigation measures. Their concerns and suggestions should also be given due consideration and if possible, employment should be provided for the local residents. This could enhance cooperation and support for the project by the affected Community. In general, impacts generated due to construction and civil works could be avoided or mitigated by the development and adherence to a Construction Management Plan.

An ESIA is currently being conducted for the East Coast Road and this is expected to determine specific environmental and social impacts and any related mitigation actions. An ESMP and Traffic Management Plan will also be prepared. Although there is no formal Road Traffic Safety Plan for Dominica, a significant positive project impact is that road safety will be improved by the expanded rehabilitation works along the 43.3 km length of the East Coast roads in Component 1. The works will improve road width and alignment, as well as road condition and skid resistance, which are expected to reduce the risk of accidents. The works will further reduce the hazard risk to road users by reducing the risk of surface flooding through drainage improvements and the risk of landslides through slope stabilization.

### 5.1 Construction Management Plan

Construction activities will occur over a period of time and as such, activities need to be designed so as to minimize the impacts to natural environment. While temporary in nature, construction impacts can be disruptive particularly with respect to noise, management of construction debris, traffic management and interruption of basic services such as drinking water, sanitary, and communication and also impacts on rivers and coastal shorelines. To manage these impacts, the PCU shall include in the construction contract the requirement to develop a construction management plan for all activities involving civil works. This plan shall at a minimum include:

- Construction Schedule
- Service interruption Schedule
- Logistics plan (for deliveries, storage and waste management)
- Communication Plan (to advise and alert commuters, pedestrians and other users and service providers to construction activities)
- Noise management
- Traffic Management
- Dust and other form of pollutants
- Required coordination activities (including regular meetings with communities and other service providers that may be impacted whether directly or indirectly)

This plan shall be submitted by the contractor(s) for approval by line Ministries and the PCU of the Ministry of Environment prior to the commencement of construction activities. To the extent possible, the contractor(s) shall schedule major disruptive activities to occur at times when commuting activities are at a minimum (e.g. between 6 am and 6 pm, or weekends and holidays).

### 5.2 Construction Contract Clauses

Guidelines for the plan appear below in Tables 3 and 4, which will be modified to create standard contracting clauses for civil works.

**Table 3 - Standard Mitigation Measures for All Construction Sites**

<p><b>Permits and Approvals.</b> The contractor shall be responsible for ensuring that he or she has all relevant legal approvals and permits required to commence works.</p>
<p><b>Site Security.</b> The contractor shall be responsible for maintaining security over the construction site including the protection of stored materials and equipment. In the event of severe weather, the contractor shall secure the construction site and associated equipment in such a manner as to protect the site and adjacent areas from consequential damages. This includes the management of onsite, construction materials, construction and sanitary wastes, additional strengthening of erosion control and soil stabilization systems, and other conditions resulting from contractor activities which may increase the potential for damages.</p>
<p><b>Noise Control.</b> The contractor(s) shall control noise emissions generated as a result of contracting activities to the extent possible. In the case of site locations where noise disturbance will be a concern, the contractor(s) shall ensure that the equipment is in good working order with manufacturer supplied noise suppression (mufflers etc.) systems functioning and in good repair. Where noise management is a concern, the contractor(s) shall make reasonable efforts to schedule activities during normal working hours (between 8 am and 5 pm). Where noise is likely to pose a risk to the surrounding community, the contractor(s) shall inform the site manager and shall develop a public notification and noise management plan for approval by the line Ministry and PCU of the Ministry of Environment, Climate Resilience, Disaster Management and Urban Renewal. Elements of the hazardous materials management shall include: contractor must provide temporary storage on site of all hazardous or toxic substances in safe containers labeled with details of composition, properties and handling information; the containers of hazardous substances shall be placed in an leak-proof container to prevent spillage and leaching; the wastes shall be transported by specially licensed carriers and disposed in a licensed facility; paints with toxic ingredients or solvents or lead-based paints will not be used; banned chemicals will not be used on any project.</p>
<p><b>Dust Control.</b> The following conditions apply to work sites for the control of air quality including dust control at construction sites: (a) construction materials such as sand, cement, or other fines should be kept properly covered, (b) cement should be kept stored within a shed or container, (c) the sand and fines can be moistened with sprays of water, and (d), unpaved, dusty construction roads should be compacted and then wet periodically. During interior demolition, debris-chutes shall be used above the first floor; and, demolition debris shall be kept in controlled area and sprayed with water mist to reduce debris dust. During pneumatic drilling/wall destruction dust shall be suppressed by ongoing water spraying and/or installing dust screen enclosures at site. At all sites, the surrounding environment (sidewalks, roads) shall be kept free of debris to minimize dust; there will be no open burning of construction / waste material at the site; there will be no excessive idling of construction vehicles at sites; and, the bins of all haulage vehicles transporting aggregate or building materials must be covered on all public roads.</p> <p><b>Mud Control</b> - Roadways should also be kept free of mud which can be tracked onto the road pavement by construction vehicles during excavation works. Scraping of the wet mud from the road pavement should occur during and at the end of the work day to ensure safe conditions for traffic.</p>
<p><b>Use and management of hazardous materials, fuels, solvents and petroleum products.</b> Any use of hazardous materials excluding pesticides, oils, fuels and petroleum products shall conform to the proper use recommendations of the product. Waste hazardous materials and their containers shall be disposed of in a manner approved by the relevant agency. A site management plan will be developed by the contractor if the operation involves the use of these materials to include estimated quantities to be consumed in the process, storage plans, spill control plans, and waste disposal practices to be followed. This plan is subject to the approval of the line Ministry and PCU of the Ministry of Environment, Climate Resilience, Disaster Management and Urban Renewal .</p>
<p><b>Use of preservatives and paint substances.</b> All paints and preservatives shall be used only with the approval of the contracting officer. Information shall be provided to the contracting officer that describes the essential components of the materials to be used so that an informed determination can be made as to the potential for environmental effects and suitability can be made. Storage, use, and disposal of excess paints and preservatives shall be managed in conformance with the manufacturers' recommendations and as approved by the contracting officer. The contractor shall provide the contracting officer with a list of materials and estimated quantities to be used, storage,</p>

<p>spill control and waste disposal plans to be observed during the execution of the contract. This plan is subject to the approval of the line Ministry and PCU of the Ministry of Environment, Climate Resilience, Disaster Management and Urban Renewal.</p>
<p><b>Site stabilization and erosion control.</b> The Contractor shall implement measures at the site of operations to manage soil erosion through minimization of excavated area, preservation of existing ground cover to the extent possible, and provision of approved ground cover. For all construction sites, standard measures such as silt fences, baffles, filters, or sedimentation basins will be used to prevent sediment from moving off site and causing excessive turbidity in nearby drains, streams, rivers, wetlands, and coastal waters. Standard erosion control measures will include (a) proper site drainage and prevention of drains being clogged by construction material or sediment to prevent overflow and flooding, (b) all construction materials, including chemicals, must be properly stored, (c) construction vehicles and machinery will be washed only in designated areas where runoff will not pollute natural surface water bodies. Where excavations are made, contractor shall implement appropriate stabilizing techniques to prevent cave-in or landslide. Where slopes are cut, (a) keep angle of slopes within limits of soil type, (b) balance cut and fill to limit steepness of slopes, (c) all slopes and excavated areas must be monitored for movement, and (d) the use of retaining structures and planting with deep rooted grasses (bio-engineering) to retain soil during and after works will be done. An erosion management plan will be required where the potential exists for significant sediment quantities to accumulate in wetlands, lakes, rivers and nearshore marine systems. This plan shall include a description of the potential threat, mitigation measures to be applied, and consideration for the effects of severe weather and an emergency response plan. If works are long coastal marine areas or near major steams and river, water quality monitoring must be done before construction, and at regular intervals to determine turbidity levels and other quality parameters. Erosion control plans shall be approved by the line Ministry and PCU of the Ministry of Environment, Climate Resilience, Disaster Management and Urban Renewal.</p>
<p><b>Traffic Management.</b> In cases where construction activities result in the disruption of area transportation services, including temporary loss of roadway, blockage due to deliveries and site related activities, the contractor(s) shall provide the line Ministry and PCU of the Ministry of Environment, Climate Resilience, Disaster Management and Urban Renewal with a traffic management plan including a description of the anticipated service disruptions, community information plan, and traffic control strategy to be implemented so as to minimize the impact to the surrounding community. This plan shall consider time of day for planned disruptions, and shall include consideration for access to essential services such as medical, disaster evacuation, and other critical services. The plan shall be approved by the line Ministry and the PCU of the Ministry of Environment, Climate Resilience, Disaster Management and Urban Renewal . Elements of the traffic management plan to be developed and implemented by contractor shall include: alternative routes to be identified in the instance of extended road works or road blockages; the public to be notified of all disturbance to their normal routes; signposting, warning signs, barriers and traffic diversions must be clearly visible and the public warned of all potential hazards; provision must be made for the safe passages and crossings for all pedestrians where construction traffic interferes with their normal route; there must be active traffic management by trained and visible staff at the site or along roadways as required to ensure safe and convenient passage for the vehicular and pedestrian public; Adjustment of working hours to local traffic patterns, e.g. avoiding major transport activities during rush hours or times of livestock movement.</p>
<p><b>Management of standing water.</b> Under no circumstances shall the contractor(s) permit the collection of standing water as a consequence of contractor(s) activities without the approval of the line Ministry and PCU of the Ministry of Environment, Climate Resilience, Disaster Management and Urban Renewal. This will require proper landscaping, filling or drainage of the work site in order to reduce disease incidence, but not in such a way as to affect surrounding areas, water bodies, streams, wetland or coastline.</p>
<p><b>Management of trash and debris.</b> The contractor(s) shall provide the contracting officer with a trash and debris management plan that conforms to the solid waste management policies and regulations of Dominica. Under no circumstances shall the contractor(s) allow construction wastes to accumulate so as to cause a nuisance or health risk due to the propagation of pests and disease vectors. The site waste management plan shall include a description of how wastes will be stored, collected and disposed of in accordance with current law. Additionally the contractor(s) shall provide</p>

<p>for the regular removal and disposal of all site wastes and provide the contracting officer with a schedule for such removal.</p>
<p><b>Management of Liquid Wastes.</b> Under no circumstances shall the contractor allow construction related liquid wastes to accumulate on or off the site, or to flow over or from the site in an uncontrolled manner or to cause a nuisance or health risk due to its content. The site waste management plan shall include a description of how these wastes will be stored, collected and disposed of in accordance with current law. Additionally the contractor shall provide for the regular removal and disposal of all site wastes and provide the contracting officer with a schedule for such removal. Liquid and chemical wastes will be stored in appropriate containers separated from the general refuse; all waste will be collected and disposed of properly in approved landfills by licensed collectors; the records of waste disposal will be maintained as proof for proper management as designed; and, construction related liquid wastes must not be allowed to accumulate on or off the site, or to flow over or from the site in an uncontrolled manner or to cause a nuisance or health risk due to its contents.</p>
<p><b>Occupational Health and Safety.</b> An Accident and Emergency Response Plan should be prepared and approved before commencement of work. This should be done in consultation with the Accident and Emergency Department of the Princess Margaret Hospital (PMH) and also Primary Health Care in the relevant District, as well as the Fire and Ambulance Service. The contractor shall ensure that all workers operate within a safe environment. The contractor shall ensure that there are basic medical facilities on site and that there are staff trained in basic first aid. Workers must be provided with the necessary protective gear as per their specific tasks such as hard hats, overalls, gloves, goggles, boots, etc. The contractor shall provide the contracting officer with an occupational health and safety plan for approval by the local health authority prior to the commencement of site activities. All relevant Labour and Occupational Health and Safety regulations must be adhered to ensure worker safety. Appropriate posting of information within the site must be done to inform workers of key rules and regulations to follow.</p>
<p><b>Worker Sanitation.</b> Sanitation facilities shall be provided to site workers. All sanitary wastes generated as a result of project activities shall be managed in a manner approved by the contracting officer and the local authority responsible for public health. The contractor(s) shall provide a site sanitation plan for approval and implementation prior to the commencement of site activities.</p>
<p><b>Community Relations.</b> Above all there must be community consultation before and during project implementation. This will allow for the development of open communication or rapport between the community and the contractor. It will allow for concerns to be addressed upfront and the affected community would have greater tolerance to the inconveniences experience. They are also the ones on the ground and their concerns and recommendations should have merit.</p>
<p><b>Closure plan.</b> A final cleanup plan must also be defined to ensure site is cleared and cleaned after project is completed.</p>

In addition to the standard measures in Table 3 above, there are also special mitigation measures that relate to World Banks safeguards policies, or to high risk, sensitive conditions, or complex situations that involve special care. These special measures are detailed in Table 4 below.

**Table 4 - Specialized Mitigation Measures for Selected Environmental Aspects**

<p><b>Discovery of Antiquities.</b> If, during the execution of the activities contained in this contract, any material is discovered onsite which may be considered of historical or cultural interest, such as evidence of prior settlements, native or historical activities, evidence of any existence on a site which may be of cultural significance, all work shall stop and the supervising contracting officer shall be notified immediately. The area in which the material was discovered shall be secured, cordoned off, marked, and the evidence preserved for examination by the local archaeological or cultural authority. No item believed to be an artifact must be removed or disturbed by any of the workers. Work may resume, without penalty of prejudice to the contractor upon permission from the contracting officer with any restrictions offered to protect the site.</p>
---

<p><b>Use and Management of Pesticides.</b> Any use of pesticides shall be approved by the contracting officer and shall conform to the manufacturers' recommendations for use and application. Any person using pesticides shall demonstrate that they have read and understood these requirements and are capable of complying with the usage recommendations to the satisfaction of the contracting officer. All pesticides to be used shall conform to the list of acceptable pesticides that are not banned by the relevant local authority. If termite treatment or vector control treatment is to be utilized, ensure appropriate chemical management measures are implemented to prevent contamination of surrounding areas, and use only licensed and registered pest control professionals with training and knowledge of proper application methods and techniques. Finally, for projects or activities that may involve significant amounts of pesticides, herbicides, or agricultural chemicals, a Pest Management Plan will be prepared, in accordance with the guidelines in Annex 3 of this EMF.</p>
<p><b>Asbestos.</b> In the event that during the course of work activities the contractor discovers asbestos as part of the existing site which requires stabilizing and/or removing it, the contractor shall contact the relevant local authorities and the contracting officer immediately. If work has already commenced, all work in the area must stop immediately. An asbestos management plan must be prepared by the contractor and approved by the relevant local health and waste management authorities and the contracting officer describing how this material will be stored, collected and disposed of in accordance with current law, and identifying the approved experienced professional who will undertake this work. The plan must include (a) description of the type and extent of asbestos, (b) site safety measures, (c) stabilization techniques to be employed, (d) storage and transport plan, (e) approved disposal procedure, and (f) worker awareness and training. In preparing the plan, the contractor should liaise with the relevant local health and waste management agencies to ensure that the adequacy of the measurements being proposed. Site management shall consist of enclosing relevant sections of the site with appropriate material by the contractor. Where possible the asbestos and its location must be appropriately contained and sealed to minimize exposure, and any asbestos shall be marked clearly as a hazardous material. Stabilizing friable asbestos will be done prior to removal (if removal is necessary) and it will be treated with a wetting agent to minimize asbestos dust. Asbestos will be handled and disposed by skilled and experienced professionals using appropriate PPE (personal protective equipment) such as respirators and tyvec suites which will be provisioned to workers to protect them and prevent contamination with asbestos fibers. Respiratory protection together with measures to prevent the contamination of clothing and inadvertent transport of asbestos fiber off-site shall be provided to all exposed workers. If asbestos material is to be stored temporarily, the wastes should be securely enclosed inside closed containments and marked appropriately. Security measures must be implemented against unauthorized removal of asbestos from the site. No removed asbestos will be reused.</p>
<p><b>Medical waste.</b> In the event that the contractor discovers medical wastes, the contractor shall provide the contracting officer with a medical waste management plan as part of a site waste management plan that conforms to the waste management policies and regulations of the relevant health and waste management authorities. The plan shall include a description of how these wastes will be stored, collected and disposed of in accordance with current law. The contractor must ensure that all persons handling medical wastes are provided with proper protective clothing. All medical wastes must be secured in specially labeled and sealed containers, and disposed of according to relevant local legislation at specified disposal sites. Medical wastes must be kept separate from the other waste streams on site. The waste management plan provided by the contractor must ensure that all persons handling medical wastes are provided with proper protective clothing. All medical wastes must be treated as hazardous. All medical wastes must be secured in specially labeled and sealed containers separate from other wastes streams. All medical wastes must be disposed of according to relevant local legislation at specified disposal sites.</p>
<p><b>Water pipelines.</b> The Contractor shall utilize the following measures to mitigate potential environmental, health and safety impacts during the construction and installation of the water pipeline:</p> <ul style="list-style-type: none"> <li>• <b>Trenching.</b> Soil stockpiling will be done in designated areas alongside the trench using piles no higher than 2 meters, convex in shape, and located so as to minimize disturbance and hazard to passersby or traffic. The contractor shall ensure that stockpiles do not cause damming of water or runoff, or that such stockpiles are themselves not washed away.</li> </ul>



- Dewatering. Removal of water from trenches shall be done in such a manner to prevent the discharge of mud or sediment into any water body, or the creation of standing water bodies on lands outside the work area.
- Dust Control. During dry periods when dust is a nuisance it shall be mitigated by spraying of water onto work surfaces along the pipeline work area. Dust shall not be allowed to travel outside of the work zone.
- Traffic Control. For all works alongside roadways, appropriate safety signage and barriers shall be used to ensure the safety of any foot traffic or vehicular traffic. If the trench is exposed to foot or vehicle traffic appropriate restrictive barriers, taping, and warning signage shall be used. Traffic shall be controlled and stopped as necessary on public thoroughfares in accordance with good safety practice and national requirements. Trenches or equipment exposed to public access must be clearly demarcated and restricted to public access. Mud and sand brought onto paved public access roads shall be washed and cleared daily.
- Safety Plan. The Contactor will prepare a Health and Safety Plan which shall include emergency response and first aid procedures, awareness training suitable to the tasks being conducted, vehicle and equipment safety provisions, and personal protective equipment information. The contractor will provide hard hats, work boots, protective eyewear and gloves to workers and will ensure that they are used by workers on the job.
- Vegetation and Topsoil Clearing. If any vegetation or brush is cleared, or topsoil removed, it shall be done in such a way as to avoid disturbance or effects outside the established work area. Herbicides or burning may not be used to dispose of any cleared vegetation, rather such vegetation must be chipped, shredded, and dispersed in approved areas or hauled to an approved landfill. Should fauna be encountered work will cease until such fauna have been safely relocated. If any agricultural land is crossed, topsoil shall be stored separately and replaced by spreading on the land surface upon completion of work.
- Access Roads. No new access roads will be opened, only existing roadways will be used for all the entry and exit of materials and equipment to and from the work zone.
- Work Areas. Contractor will delineate approved work areas for all activities including excavation, stockpiling, access, equipment placement during excavation, and materials storage. Such work areas are subject to approval by the contract manager and/or supervising engineer, and Contractor may use only those lands for which approval and access has been provided by the contracting officer and/or supervising engineer. Any rental, use or acquisition of lands from private parties is not permitted without previous notification to and express written approval by the PCU through application of relevant World Bank Policy.
- Vehicle and Equipment Fueling and Maintenance. All gasoline and diesel filling, oil changing, and maintenance of vehicles and equipment will be done outside of the project area at established facilities. If fuel trucks are used they will have adequate safety equipment and fire extinguishers, be free of leaks and be fitted with appropriate dispensers, and have spill kits and absorbent materials ready to retrieve any leaked or spilled fuels. No fuel, new oil or waste oil will be stored on the work site, and vehicles will not be washed on the work site or in adjacent areas.

**Explosives.** Use of explosives shall be at the approval of the relevant local authority and shall be supervised and undertaken by a qualified explosives technician. Blasting will be limited to between the hours of 9:00am and 4:00 pm unless specifically approved by the local authority and the contracting officer. Any use of explosives shall be permitted only after an explosives management and blasting plan has been approved by the relevant local authority and the contracting officer.

This plan shall include

- A. Description of the explosive agent, charge description, intended use.
- B. Site safety plan including:
  1. Storage of initiators, booster charges and principal blasting agents
  2. Handling precautions to be observed
  3. Transport to and from site
  4. Security of stored materials
  5. Disposal of excess or damaged explosive materials.

<p>C. Analysis of risk to surrounding area and mitigation measures to be employed including:</p> <ol style="list-style-type: none"><li>1. Over-pressure event</li><li>2. Noise</li><li>3. Flying debris</li><li>4. Seismic transmission</li><li>5. Accidental detonation</li></ol> <p>D. Name and qualifications for all persons responsible for handling explosive agents.</p>
<p><b>Works in Forest Areas.</b> For any work in a designated Forest Reserve, or in a forest area, the following will apply:</p> <ul style="list-style-type: none"><li>▪ There must be no unnecessary clearing of natural vegetation.</li><li>▪ Any negative effects on primary forest are prohibited.</li><li>▪ Avoid the use of herbicides or other chemicals.</li><li>▪ Any works to be undertaken in a protected forest area must be done under the supervision of a representative of the Forestry Department.</li><li>▪ The contractor must ensure that any work undertaken in the forest reserve must be done by manual means.</li><li>▪ There must be minimal impact to flora and fauna in the forest area.</li><li>▪ All recognized natural habitats, wetlands and protected areas in the immediate vicinity of the activity must not be damaged or exploited.</li><li>▪ The contractor must ensure that all staff will be strictly prohibited from hunting, foraging, logging or other damaging activities.</li><li>▪ A survey and an inventory shall be made of large trees in the vicinity of the construction activity, large trees shall be marked and cordoned off with fencing, their root system protected, and any damage to the trees avoided.</li><li>▪ There will be no unlicensed borrow pits, quarries or waste dumps in protected areas.</li><li>▪ Upon completion, all wastes must be immediately removed out of the forested area.</li></ul>

### 5.3 Additional Considerations

Finally, if approval from the relevant permitting Agency has been sought and granted for any particular project or activity, then the contract language should include any additional permit conditions and/or recommendations of Physical Planning as well as those of any other statutory agency who was part of the permitting. If an EIA has been conducted for a particular sub-project due to its environmentally sensitive or complex nature (see section 6 and Table 5), then the specific recommendations for mitigative measures in that EIA should also be included in the contract language, in addition to the standard minimum mitigation measures in Table 3 above and any applicable special mitigation measures in Table 4 above.

Procurement under the AF will be carried out in accordance with the Bank's "Procurement Regulations for IPF Borrowers" (July 2016, revised November 2017). DVRP will therefore migrate to the Regulations to ensure consistent implementation of procurement under the Regulations for the entire project.

## **6.0 ENVIRONMENTAL SCREENING PROCEDURES**

### **6.1 Introduction**

This section of the report provides an important element of the environmental management process, namely the screening procedure for future work activities and subprojects. At present the proposed works are known at a general level of detail and their potential impacts are also known only in a general sense, so it is impossible to generate any detailed mitigation or management plan.

The preliminary project descriptions, impact evaluations, and generalized mitigative measures given previously in this report therefore provide a good starting point, but as is often the case details and particulars may change over time. In the future as detailed actions emerge and specific activities are ready to begin physical works, the scope, scale, and design of particular activities become fully known. At that time it will be necessary to ascertain their potential environmental impacts through a screening process, identify potential environmental impacts, and provide the appropriate mitigation measures.

As part of this process it will be critical to identify those works which could have more significant impacts, or which could affect sensitive areas or involve complex conditions, and which would merit additional evaluation, assessment, and careful planning to best manage impacts during project execution. Accordingly, this part of the report contains the screening procedures, which are the guidelines, procedures and protocols that will be used for environmental management of future subprojects or activities once they are defined in sufficient detail to allow the development of detailed planning efforts. In addition, any works in primary forest or in critical natural habitat will be identified and excluded from consideration as part of the Project.

### **6.2 National Permitting**

The Physical Planning Department is the main authority with legislated responsibility for granting planning permits or approvals as highlighted earlier in this report. In doing so, this authority consults with other statutory agencies, depending on the type of project being applied for. According to Schedule II of the Physical Planning Act, there is a list of projects to determine if a proposal requires an EIA (Refer to Annex 2). For all World Bank projects, the requirements of the Physical Planning Act must be followed, as well as all laws and regulations and guidelines pertaining to environmental protection in Dominica.

The evaluation, screening and scoping of activities and projects by the Physical Planning Department may conclude that certain projects or activities require that an EIA be conducted. In such cases, then any mitigation requirements or conditions from that EIA should be included in the relevant contracting language to ensure that they are carried out. Any relevant permits or approvals that are necessary in accordance with law in Dominica must also be obtained.

### **6.3 World Bank Environmental Safeguards**

As part of the general assessment process under the World Bank's policy on Environmental Assessment (OP/BP 4.01), the Bank, as the main project sponsor with its own internal procedures, would determine whether all of the collective suite of potential sub-projects that together create a program such as the DVRP might have a significant environmental impact or not, as was the case with this project. This would be part of the initial screening, and resulted in a classification of "Category B" meaning that while there will be some negative impacts, they can be identified and managed through fairly standard means, as described within this EMF.

Four other Bank safeguards on environmental matters have been identified as applicable to the project (Refer to Section 2.2) and include:

- Natural Habitats (OP/BP 4.04)
- Pest Management (OP/BP 4.09)
- Physical Cultural Resources (OP/BP 4.11)
- Forests (OP/BP 4.36)

These policies would not apply to most of the projects being considered under the DVRP program, since they involve relatively simple civil works with only limited impacts. However, each project or activity must be screened and scoped carefully during the planning process, in order to identify any cases where specific activities or projects could affect natural habitats, physical cultural resources, the management of forests, or involve the significant use of pesticides. In these cases, the policies would apply, and care must be exercised to ensure that the provisions of the policies are followed.

These will generally be the projects for which the possible environmental effects could be significant, where issues surrounding the proper management are more complex than previously assumed, or that involve sensitive areas or natural habitats require special attention to avoid doing harm. In those cases, additional study is merited in the form of a separate EIA appropriate to the scale of the potential effects, which would have as its end product a specific tailor-made set of mitigation measures to best manage the project in question.

#### **6.4 Screening Criteria and Checklists**

The screening criteria for the DVRP projects addresses the environmental aspects and allows for flagging of the pertinent World Bank policy response if or as necessary. To begin it is necessary to determine whether a proposed project falls into one of two groups: those which involve more complex environmental conditions and/or potentially significant environmental effects (if unmitigated) and which therefore require more cautious planning efforts; or, those comprising relatively simple or uncomplicated works where the impacts are minimal (e.g., effects during construction of minor works) and which can be addressed through standardized or generic mitigation measures.

The first step of the screening procedure will be the preparation of a screening form designed to capture the necessary information about the proposed activity and its potential environmental impacts. The screening form will be completed by the PCU in coordination with the associated Line Ministry. The screening form should indicate whether a sub-project or activity is environmentally complex or may have potentially significant impacts if unmitigated. These would include the following:

- Potential impact to natural habitats: whether or not a specific activity or subproject would potentially affect land or water areas where the biological communities are formed largely by native plant and animal species where human activity has not essentially or heavily modified the area's primary ecological functions, and so trigger OP/BP 4.10.
- Potential impact to physical cultural resources: whether or not a specific subproject or activity would potentially affect objects, sites, structures, natural features or landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance, and so trigger OP/BP 4.11.

- Potential for forest effects: whether project has or may have impacts on the health and quality of forests, projects that affect the rights and welfare of people and their level of dependence upon or interaction with forests, and projects that aim to bring about changes in the management, protection, or utilization of natural forests, and so trigger OP4.36.
- Pesticide Use: whether or not the project would involve procurement of pesticides or pesticide application equipment (either directly through the project, or indirectly through on-lending, co-financing, or government counterpart funding), and whether the project may (i) lead to substantially increased pesticide use and subsequent increase in health and environmental risk, (ii) maintain or expand present pest management practices that are unsustainable, not based on an IPM approach, and /or pose significant health or environmental risks.
- Potential for Hazardous Waste: whether or not special or hazardous wastes would need to be handled, for example waste solvents, asbestos, medical waste, infectious or biohazard materials, or radioactive materials.
- Existence of extremely challenging geotechnical conditions: Would activities pose a high risk of causing landslides, slips, slumps, rockfalls, debris-flows, or excessive erosion? Is work space limited and is there a risk to workers and area residents? Are large amounts of earthwork envisaged?

To assist the PCU and proposing agencies in determining if a project is likely to have significant environmental impacts or presents complex conditions for which an environmental assessment is required, the following checklist is proposed in Table 5 below. Additional checklists and forms may be developed and used by the PCU and Line Ministries to assist with the screening process.

**Table 5 - Identification of Complex/Sensitive Sub-Projects or Activities**

Characteristic of Sub-project or Activity:	Yes/No	Comments
1. Does the project involve construction of new roads, or major rehabilitation of existing roads?		
2. Does the project involve dam construction, reconstruction, rehabilitation, or strengthening?		
3. Does the project involve hazardous materials management and disposal (e.g. asbestos, medical or infectious waste, solvents) or gasoline) excepting small amounts normal for construction?		
4. Will the project significantly modify any coastal zone features, reef or marine features?		
5. Could the project activities significantly affect any natural or protected areas or Forest Reserves located within 1 km of the Project?		
6. Could the project impact or affect primary rainforest or critical natural habitats or the habitat of endangered species of plants or animals?		
7. Could the project adversely affect critical resources such as primary rainforests, critical natural habitats or drinking water diversions?		
8. Could the project adversely affect natural waterways (streams, rivers, or wetlands) by sedimentation, pollution, flooding, draining, or filling)?		
9. Would the works adversely affect cultural property, including archeological and historical sites?		
10. Would the works require leveling and clearing of lands with natural habitat (those water or land areas where most of the original plant and animal species are still present), especially any habitat critical to ecological or preservation purposes?		

11. Does the project involve the use of introduced, non-native species?		
12. Does the project involve the use of pesticides, herbicides, or other agents to destroy pests?		
13. Does the project pose a high risk of causing landslides, slips, slumps, rockfalls, debris-flows, or excessive erosion?		
14. Will the project result in the violation of Dominican law, international treaty, or Bank policy?		

In cases where it is suspected that a specific project or activity could meet these criteria, the screening procedure would result in a positive determination and such subproject would require closer examination to determine if a separate stand-alone EIA should be done specifically for that project. For projects requiring a stand-alone EIA, the EIA will be completed prior to initiation of the works and will establish environmental requirements for the design and construction phase of the activity in the form an EMP specific to that sub-project. Draft Terms of Reference (TORs) to assist the PCU in contracting and undertaking the EIA are included in Annex 9. World Bank staff may assist in preparing the TORs and reviewing the EIAs.

Based on the discussion and analysis of the DVRP sub-projects presented in Section 4 of this report, most are fairly simple and do not involve significant impacts. There are only a few which meet the criteria presented in Table 5 above and therefore merit additional analysis. Once the details of the activities encompassed in those sub-projects are known with greater precision, the screening tools should be applied and an informed decision made with respect to the need for additional assessment and planning.

Potential project activities may occur in highland forest areas, on coastlines, in sensitive riparian areas along streams or rivers, or in other areas where the policy could be triggered owing to the richness of Dominica's natural habitat. Table 5 of the EMF considers natural habitats in screening procedures, to identify areas that may trigger this policy and require additional assessment to develop site-specific mitigation and management measures. Effects on critical natural habitat, such as primary forests, would be excluded from project financing. The Forests policy is being triggered as a precaution because limited forest resource harvesting may be done.

As noted in Section 4.1.4, the term forest harvesting only refers to incidental clearing of a very limited number of trees as may be required for the agroforestry pilot plots which would also include planting of trees for slope stabilization, erosion prevention, or planting of climate resilient crops. All proposed project activities will be screened using the EMF and any negative effects on primary forest would be excluded from consideration for financing.

If none of the criteria in Table 5 apply to a particular sub-project or activity, then it is considered to have only a limited and minor environmental impact. Based on the discussion and analysis in Section 4 of this report, most of the sub-projects with minor civil works will involve only limited or minor impact, and can be easily mitigated by using standardized generic environmental controls that represent best practice for construction of civil works. For the relatively uncomplicated environmental actions required of these activities, standardized generic construction contract clauses are sufficient, and can be applied as needed to works construction contracts. The draft language for inclusion in contracts can be found in Tables 3 and 4 of this EMF.

## 6.5 Emergency Procedures

Component 3 of the RDVP is intended to provide financing for emergency sub-projects. Because most of the elements financed under Component 3 are likely to be related to emergency provision

of critical goods, it is expected that those subprojects will fall into Category C and therefore would require no environmental screening or assessment work. However, some Component 3 activities could include demolition, removal, repair or reconstruction of damaged public infrastructure, clearing of debris, or other activities which could have potential negative impacts if not mitigated, and would therefore fall into Category B. It is even possible that there may be exceptional cases where a proposed sub-project would involve work in highly ecologically sensitive areas, potentially affect physical cultural resources, or require acquisition of substantial areas of land either temporarily or permanently for reconstruction work or relocation of a vulnerable population.

In order to ensure that Component 3 emergency subproject activities are consistent with the World Bank Safeguard Policies as outlined in this Environmental Assessment / Environmental Management Framework document, the activities identified for financing under Component 3 will be subject to an expedited review by safeguards specialists to determine if they are eligible under the safeguard policies and compliance procedures used by the PCU for all activities financed under the DVRP. This will allow the possibility to exclude certain activities if the environmental or social impacts are too great, or to include appropriate mitigation measures for a proposed activity if feasible. Having the existing safeguards screening process in place will also allow a certain degree of flexibility and efficiency in processing potential subprojects or activities.

## **7.0 PLANNING AND EXECUTION**

Within any type of project there is expected to be some level of environmental and social impacts, whether positive or negative. Therefore, the intent should be to minimise or avoid any negative impacts as far as practical. This can be done through proper environmental management. However, in order to be effective, environmental management must be fully integrated with the overall project management effort at all levels. This section of the EMF discusses the roles and responsibilities of the various parties during the project execution, in the context of planning for successful implementation of the project as regards environmental performance, and can be considered the Environmental Management Plan (EMP) for the project.

### **7.1 Project Management**

The Project Management structure of Dominica's Disaster Vulnerability Reduction Project (DVRP), includes a Project Coordinator, who would be responsible for the day-to-day management of the Project. There is also expected to be the appointment of a Project Committee comprising relevant line Ministries to oversee certain aspects of the Project. While it is expected that members would include those that have direct responsibility for the various components of the DVRP, it should also include members who have institutional and regulatory responsibility for environmental management, such as the Planning Division. The mandate of the Committee should include the responsibility to ensure a successful implementation of the mitigation measures and also to identify and address unidentified impacts of the Project.

It is evident that there is an informal working relationship between responsible agencies in Dominica. As such, every effort should be made to continue/establish acceptable working relationships between the relevant agencies/Ministries in order to achieve the desired environmental management goals for this Project.

It would be prudent, given the nature of this Project in the Dominican context, for the PCU to consider engaging an Environmental Specialist who would have the overall responsibility for ensuring the implementation of the mitigation measures and the coordination of environmental management activities (monitoring, enforcement, audits and inspection) of the Project.

Consistent with the assignment of project management responsibilities, environmental and social management responsibilities are distributed among the Project Coordination Unit (PCU) and the Ministry of Environment, Climate Resilience, Disaster Management and Urban Renewal. The PCU will have overall technical responsibility for the management of project activities and in this capacity will be the lead agency for coordinating the application of environmental and social requirements under the project.

The Project Coordination Unit (PCU) of the Ministry of Environment, Climate Resilience, Disaster Management and Urban Renewal is the Project implementing agency. Project implementation arrangements have been designed to take advantage of existing capacities and comparative advantages within Dominica. The Ministry of Finance will provide fiduciary services, whereas the PCU will contract specialists (financial management and procurement) and will be responsible for overall contracts management. The PCU would have primary responsibility for Project coordination and for the technical implementation of the Project. This would ensure that the PCU remains responsible for all technical aspects, at the same time as existing (and scarce) fiduciary management capacity within the Ministry of Finance is tapped and strengthened.

## **7.2 Supervision and Review**

Activities executed under the Project relate to primarily to building climate resilience within vulnerable sectors that are most critical to the country transformation into a more robust economy. While contracts for construction will be managed by the PCU of the Ministry of Environment, Climate Resilience, Disaster Management and Urban Renewal, the Government has a vested interest in the management of safeguard related activities both from the perspective of Project management and as an affected party. The PCU will have the ultimate responsibility for the enforcement of required safeguards under the Project. To this end, the enforcement of contract related requirements will fall to the PCU who will engage the services of an environmental specialist to provide compliance oversight.

The PCU will be responsible for the application of safeguard requirements for the evaluation, award and execution of grant related activities using screening procedures contained in this plan. At an agreed interval, the PCU will forward a report of grant activities to the Ministry of Environment, Climate Resilience, Disaster Management and Urban Renewal including safeguard screening reports for their periodic review.

With respect to construction activities, the Line Ministries will provide coordination and supervision services to ensure works activities conform to agreed procedures and policies. While not exercising direct contract supervision in the contractual sense, the line Ministries shall report, on an agreed schedule, to the PCU within the Ministry of Environment, Climate Resilience, Disaster Management and Urban Renewal noting contractor activities.

While the line Ministries will be an active participant in project implementation, ultimately, enforcement responsibility will fall to the PCU with respect to contracting obligations.

## **7.3 Communication and Grievance Resolution**

Notwithstanding contractual and other legal grievance resolution mechanisms under national and international law, the PCU shall be ultimately responsible for the management of any conflicts arising Project contract activities.



Construction management, as a contractual issue, will reside with the PCU, however, the line Ministries shall assume an active role in coordinating contractor activities. Responsibilities will be assigned as mutually agreed between the PCU and Line Ministries; however, the PCU shall have the sole authority to engage the contractor in disputes and modifications to contracts. For this reason, the PCU shall work closely with the line ministries in the preparation of construction contracts to assure that construction impacts are minimized, and are acceptable with respect to World Bank operations.

The Line Ministries and the PCU shall prepare a communication plan detailing specific responsibilities and communication requirements. This plan shall be submitted to the Bank for its No Objection.

#### **7.4 Public Consultation and Dissemination of Information**

Above all there must be community consultation before and during project implementation. This will allow for the development of open communication or rapport between the community and developer. It will allow for concerns to be addressed upfront and the affected community would have greater tolerance to the inconveniences experience. They are also the ones on the ground and their concerns and recommendations should have merit. Public Consultation is critical for this type of project - especially to gain community support and 'buy in'.

It should include Provisions for the PCU to organize public consultation forums with the affected communities, interested organizations and individuals as often as is necessary. A Public Consultation Plan should be prepared by the PCU, which among other things, identifies the target groups, schedule, information to be disseminated (safeguard instruments etc.) how and where it would be disseminated.

In accordance with World Bank's procedures, both the Project details and the draft EMF - EA safeguard instrument were publicly disclosed prior to project appraisal in 2014. Consultation on the draft EMF - EA was done with key Agencies prior to finalizing the first draft. The first draft document was then disseminated via email to several key individuals, Community Groups, Agencies and Ministries. It was also placed on the website of the Government of Dominica and the World Bank, where the public and other interested persons were invited to review and submit comments or concerns by a given date. Details of this public disclosure and consultations are summarized in Technical Annex 1.

This revised EMF - EA (November 2018) which was updated to reflect the AF activities was disclosed to the public and key stakeholders for comments and/or feedback prior to being finalized and minor comments received were included in the final version.

#### **7.5 Incorporation of Environmental Contract Clauses**

While construction activities are inherently disruptive, actions can be taken to minimize impacts to the physical and natural environment. Based on the potential impacts identified, the PCU of the Ministry of Environment, Climate Resilience, Disaster Management and Urban Renewal shall include in the construction contract specific clauses to guide contractor activities during the construction period. Tables 3 and 4 contain the draft language for environmental performance contract clauses, which shall be adjusted as needed to conform to Dominica national legal requirements, the World Bank Safeguards Policies, and any additional environmental performance clauses arising from EIAs conducted for the activity or project. The PCU will ensure that results of all these analyses and conditions are included or, are interpreted as an integral part of the Contract before signing.

8.0 TECHNICAL ANNEXES

8.1 ANNEX 1 - RECORDS OF CONSULTATIONS

In the preparation of the first draft of this EA/EMF, a consultation was held on 29<sup>th</sup> January 2014 with key individuals and Agencies (refer to Table 6, as well as Figure 12). The Local Consultant, World Bank Consultant and local counterpart from the Ministry of Environment were present to discuss the proposed projects within the DVRP, ask questions of relevant Agencies, and answer queries or concerns posed and receive feedback on what should be included in the draft document. This feedback fed into the first draft document which was then disclosed for public consultation on the Government of Dominica web portal (<http://dominica.gov.dm/notices/288-draft-environmental-assessment-and-environmental-management-framework>) (See Figure 13) on 27<sup>th</sup> February 2014 and persons were invited to submit comments no later than 14<sup>th</sup> March 2014.

The document was also disclosed on the website of the World Bank. Additionally, the draft document was emailed to several key individuals, Community Groups, Agencies and Ministries (Please see Table 7 and Figure 14 - copy of email message).

No further comments were received from any of the Agencies or individuals that the document was emailed to. Neither was any comments received from the public based on the website disclosure. However, several comments were received through the World Bank and these were incorporated into this final document, the main one being the concern for damage to the forested areas and natural habitats. The World Bank Safeguards of Natural Habitats (OP/BP 4.04) and Forests (OP/BP 4.36) are triggered by this Project; therefore, appropriate provisions have already been put in place to identify and address these issues if they should arise.

Figure 12 - Sign in Sheet for Consultation

WRAP-UP / TRAINING = 1-29-2014

NAME	Institutions	Contact
MIKE DARR	World Bank	mjdarr@wia.com
M. Ysa Oppong	Social Dept. World Bank	yoppong@worldbank.org
Andrea Marie	Private	andreamarie2@gmail.com
Kimisha Thomas	E.C.U	ecu@dominica.gov.dm
DON CORRIETTE	ODM	Corriette.d@dominica.gov.dm edm@dominica.gov.dm 1767 448 7777 1767 275 3625
Michael Fedak	World Bank	mikefedak@gmail.com
MARSHALL ALEXANDER	DOMINICA INST SERVICES	Marshall.Alexander@dominica.gov.dm TEL 225 6995
MAGNUS WILLIAMS	DO WASCO	m.williams@do-wasco.dm 275-1155
Emile Lancelot	Min. Public Works	emile.lancelot@dominica.gov.dm 275 0550
Bradley Guye	Forestry Div.	guyeb@dominica.gov.dm
Elizabeth Douglas	Ministry of the Environment	ps@dominica.gov.dm

**Table 6 - List of Persons at the Consultation**

NAME	AGENCY
Mike Darr	Environmental Specialist, World Bank
Collin Guiste	ECU, Ministry of Environment
Andrea Marie	Local Consultant
Kimisha Thomas	ECU
Don Corriette	Officer of Disaster Management
Michael Fedak	World Bank
Marshall Alexander	Dominica Meteorological Services
M. Yaa Oppong	Social Specialist, World Bank
Marcus Williams	DOWASCO
Annie Edwards	Physical Planning
Emile Lancelot	Ministry of Public Works
Bradley Guye	Forestry Division
Dr. E. Douglas	Ministry of Environment

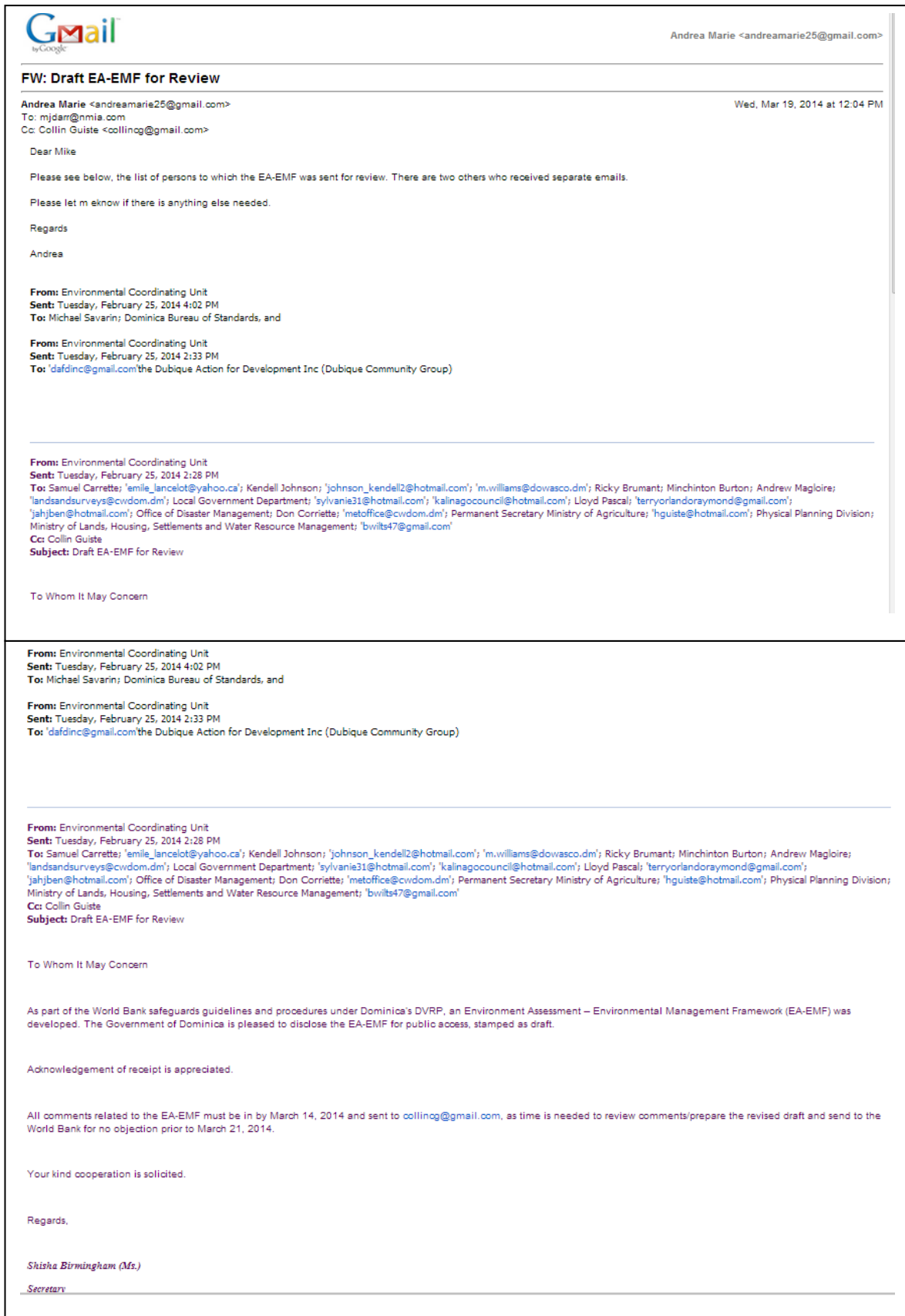
**Figure 13 - Image of Government of Dominica Web Portal where the Document was disclosed**



**Table 7 - List of Persons who received the document via email for Consultation**

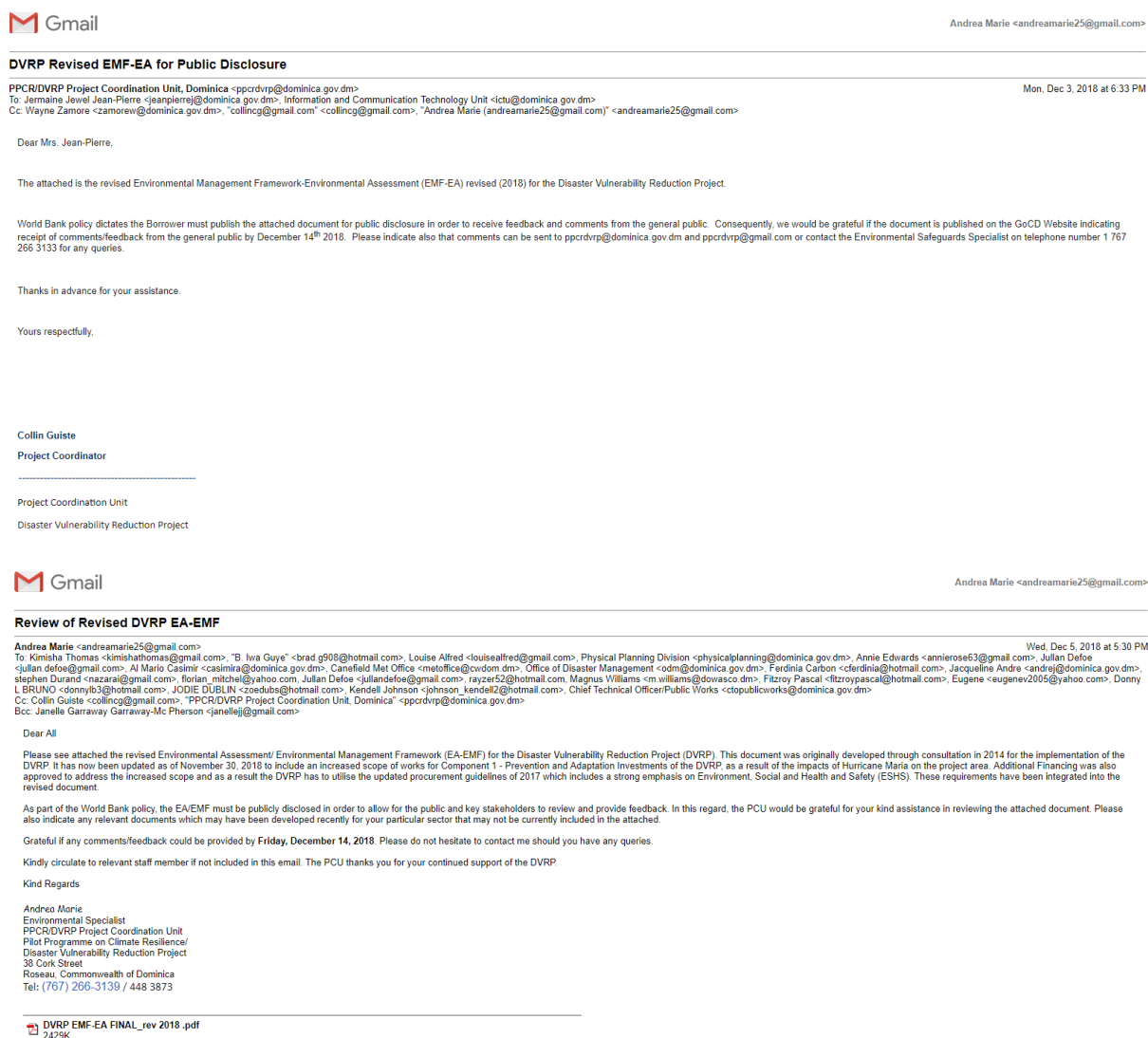
<b>NAME</b>	<b>AGENCY/MINISTRY/GROUP</b>
Mr. Samuel Carrette	Chief Development Planner, Ministry of Finance
Mr. Lloyd Pascal	Director, Environmental Coordinating Unit, Ministry of Environment
Mr. Ricky Brumant	Director, Division of Agriculture
Mr. Harold Guiste	Permanent Secretary, Minister of Environment, Natural Resources, Physical Planning and Fisheries, and Ministry of Agriculture and Forestry
Mr. Michington Burton	Director, Forestry Division
Mr. Terry Raymond	Head, Dominica Youth Environmental Organization
Ms. Sylvanie Burton	Kalinago Development Officer, Ministry of Kalinago Affairs
Ms. Annie Edwards	Physical Planner, Physical Planning Division
Mr. Michael Savarin	Director, Dominica Bureau of Standards
M. Williams	DOWASCO
	Local Government Department
	Lands and Surveys Department
Kendell Johnson	Kendell Johnson - Chief Technical Officer, Ministry of Public Works, Energy and Ports
	Kalinago Council
Mr. Jaisaiah Benoit	Head, National Youth Council
Mr. Emile Lancelot	Engineer, Ministry of Public Works, Energy and Ports
	Dubique Action for Development Inc (Dubique Community Group)
Mr. Don Corriette	Director, Office of Disaster Management
	Dominica Meteorological Services
Mr. Andrew Magloire	Head, Fisheries Division
	Ministry of Lands, Housing, Settlements and Water Resource Management

Figure 14 - Image of Email Message sent inviting comments on the draft EA/EMF



## 8.2 ANNEX 2 - RECORD OF DISCLOSURE FOR REVISED EA/EMF

### Figure 15 - Image of Email Message sent re: Disclosure of revised EA/EMF



## 8.3 ANNEX 3 - SCHEDULE II OF THE PHYSICAL PLANNING ACT

### Matters for which Environmental Impact Assessment shall be required:

1. Hotels of More Than Twelve Rooms;
2. Sub-Divisions Of More Than Six Plots;
3. Residential Development Of More Than Six Units;
4. Any Industrial Plant Which In The Opinion Of The Authority Is Likely To Cause Significant Adverse Environmental Impact;
5. Quarrying And Other Mining Activities; (Section 18(3) And 23). 2002 Physical Planning Act 5 218
6. Marinas;
7. Land Reclamation, Dredging And Filling Of Ponds;
8. Airports, Ports And Harbours;

9. Dams And Reservoirs;
10. Hydro-Electric Projects And Power Plants;
11. Desalination Plants;
12. Water Purification Plants;
13. Sanitary Land Fill Operations, Solid Waste Disposal Sites And Other Similar Sites;
14. Gas Pipeline Installations;
15. Any Development Projects Generating Or Potentially Generating Emissions, Aqueous Effluent, Solid Waste, Noise/Vibration Or Radioactive Discharges;
16. Any Development Involving The Storage And Use Of Hazardous Materials;
17. Coastal Zone Developments;
18. Development In Wet Lands, Marine Parks, National Parks, Conservation Areas, Environmental Protection Areas Or
19. Other Sensitive Environmental Areas

### **8.3 ANNEX 4 - PEST MANAGEMENT INFORMATION**

Operational Policy 4.09 on Pest Management seeks to ensure that projects avoid using harmful pesticides. A preferred solution is to use Integrated Pest Management (IPM) techniques and encourage their use in the whole of the sectors concerned. The Bank requires that any pesticides it finances be manufactured, packaged, labelled, handled, stored, disposed of, and applied according to standards acceptable to the Bank. The Bank does not finance formulated products that fall in WHO classes IA and IB, or formulations of products in Class II, if (a) the country lacks restrictions on their distribution and use; or (b) they are likely to be used by, or be accessible to, lay personnel, farmers, or others without training, equipment, and facilities to handle, store, and apply these products properly.

For the majority of projects considered in the DVRP, pesticides will not be used, or only small amounts may be used for such activities as building extermination or termite foundation treatments. For these routine activities, the following procedures apply:

- Any use of pesticides shall be approved by the contracting officer and shall conform to the manufacturers' recommendations for use and application.
- Any person using pesticides shall demonstrate that they have read and understood these requirements and are capable of complying with the usage recommendations to the satisfaction of the contracting officer.
- All pesticides to be used shall conform to the list of acceptable pesticides that are not banned by the relevant local authority.
- If termite treatment or vector control treatment is to be utilized, ensure appropriate chemical management measures are implemented to prevent contamination of surrounding areas, and use only licensed and registered pest control professionals with training and knowledge of proper application methods and techniques.

However, for projects or activities that may involve more significant amounts of pesticides, herbicides, or agricultural chemicals, a Pest Management Plan will be prepared. The determination of whether or not a Pest Management Plan should be prepared is whether or not the project would involve procurement of pesticides or pesticide application equipment (either directly through the project, or indirectly through on-lending, co-financing, or government counterpart funding), and whether the project may (i) lead to substantially increased pesticide use and subsequent increase in

health and environmental risk, (ii) maintain or expand present pest management practices that are unsustainable, not based on an IPM approach, and /or pose significant health or environmental risks.

A pest management plan is a comprehensive plan, developed when there are significant pest management issues such as:

1. New land-use development or changed cultivation practices in an area;
2. Significant expansion into new areas;
3. Diversification into new crops in agriculture, particularly if these tend to receive high usage of pesticide, like cotton, vegetables, rice, etc.;
4. Intensification of existing low-technology systems;
5. Proposed procurement of relatively hazardous pest control products or methods;
6. Specific environmental or health concerns (e.g., proximity of protected areas or important aquatic resources; worker safety).

A pest management plan is also developed when proposed financing of pest control products represents a large component of the project. The plan is designed to minimize potential adverse impacts on human health and the environment and to advance ecologically based IPM. The plan is based on on-site evaluations of local conditions conducted by appropriate technical specialists with experience in participatory IPM. The first phase of the plan was an initial reconnaissance to identify the main pest problems and their contexts, which for the DVRP include the possible use of pesticides and herbicides for agroforestry projects. It is not known how significant these issues may be, therefore this Annex to the EA/EMF provides guidance the second phase, which is development of specific operational plans to address the pest problems identified, as well as specific procedures for screening pest control products.

The procurement of any pesticide in a Bank-financed project is contingent on an assessment of the nature and degree of associated risks, taking into account the proposed use and the intended users. With respect to the classification of pesticides and their specific formulations, the Bank refers to the World Health Organization's Recommended Classification of Pesticides by Hazard and Guidelines to Classification (Geneva: WHO 1994-95). The following criteria apply to the selection and use of pesticides in Bank-financed projects:

- a) They must have negligible adverse human health effects.
- b) They must be shown to be effective against the target species.
- c) They must have minimal effect on nontarget species and the natural environment. The methods, timing, and frequency of pesticide application are aimed to minimize damage to natural enemies. Pesticides used in public health programs must be demonstrated to be safe for inhabitants and domestic animals in the treated areas, as well as for personnel applying them.
- d) Their use must take into account the need to prevent the development of resistance in pests.

The Bank requires that any pesticides it finances be manufactured, packaged, labelled, handled, stored, disposed of, and applied according to standards acceptable to the Bank. The Bank does not finance formulated products that fall in WHO classes IA and IB, or formulations of products in Class II, if (a) the country lacks restrictions on their distribution and use; or (b) they are likely to be used by, or be accessible to, lay personnel, farmers, or others without training, equipment, and facilities to handle, store, and apply these products properly.



As an exception, the Pest Management Plan may be limited to pest control product screening when all of the following conditions are met:

1. Expected quantities of pest control products are not significant from a health or environment standpoint (for a description of the term 'significant' see section on EA).
2. No significant environmental or health concerns related to pest control need to be addressed.
3. The project will not introduce pesticide use or other non-indigenous biological control into an area, or significantly increase the level of pesticide use.
4. Products to be financed fall in Class III or table 5 of the WHO Classification of Pesticides by Hazard. Table 5 refers to pesticides unlikely to present acute hazard in normal use.

It is considered most likely that projects within the DVRP will only use minimal amounts of pesticides, and typically for routine uses, such that the standard mitigation measures described previously are necessary. However, if a project proposed for financing is identified during the screening procedures as meeting the criteria to trigger the Pest Management Policy as described in this Annex, then such project would require an EIA with specific mitigation and management measures for the pesticide use envisaged. The EIA would include a Pesticide Management Plan as described in this Annex, and would be forwarded to the Bank for no-objection.