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Government of Saint Vincent and the Grenadines

Hurricane Tomas Emergency Recovery Project Environmental Assessment

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LIST OF ACRONYMS

EA	Environmental Assessment
EMP	Environmental Management Plan
GDP	Gross Domestic Product
GoSVG	Government of St. Vincent and the Grenadines
HDI	Human Development Index
MCMH	Milton Cato Memorial Hospital
MoE	Ministry of Education
MoHILP	Ministry of Housing, Informal Human Settlement, Lands and Surveys, and Physical Planning
MTW	Ministry of Transport and Works
NEMO	National Emergency Management Organisation
SPS	Sanitary and Phyto-Sanitary
SVG	St. Vincent and the Grenadines
UNDP	United Nations Development Index
WTO	World Trade Organisation

EXECUTIVE SUMMARY

The Environmental Assessment (EA) of this project was conducted in compliance with World Bank requirements as presented in OP 4.01, *Environmental Assessments* and includes relevant considerations as presented in the World Bank Safeguards for Natural Habitats, OP/BP4.04, *Natural Habitats* and OP/BP 4.11 *Physical Cultural Resources*, for Category B projects.

The EA reflects an analysis of the general impacts and mitigations to be applied during project execution. It is forward looking with emphasis on impacts reasonably expected based on the nature of the activities and the development of an Environmental Management Plan (EMP) to be applied during project execution.

Project Activities

There are a number of small civil works activities approved for funding under the project including river defense works, the refurbishment of damaged buildings including schools and community centres and the rehabilitation of critical transport infrastructure.

Major Findings and Recommendations

From the assessment of the works approved, it is anticipated that most of the likely environmental issues will relate to construction site management and construction operations. Furthermore, the environmental impacts for the type of works approved under the project are expected to be minimal in nature and can be managed through the application of appropriate engineering and management measures. Actions for the management of these issues include noise control, debris management, site security, worker sanitation, site stabilization and erosion control, and are outlined in the Environmental Management Plan in section 7 of this document. It is recommended that the project incorporate these actions into construction contracts to strengthen compliance.

1. INTRODUCTION

1.1. Project Background

At approximately 12:00 pm local time on Saturday October 30, 2010, Hurricane Tomas, a Category 1 Hurricane passed the northern most part of St Vincent and the Grenadines. Wind speeds were estimated at 75 mph (120 km/hr) with gusts reaching up to 90 mph. The storm developed rapidly off the coast of Barbados and reached Category 1 strength within 24 hours after the first storm watch was issued. Hurricane force winds affected the northern and eastern areas of St. Vincent and the Grenadines (SVG). The southwestern parts of SVG avoided hurricane force winds due to the protective effect of the interior mountains. The Grenadines received tropical storm force winds, high in the north, minimal towards the south of the chain. Storm surge and wave action were significant, and of particular note was the high wave action on the leeward coast of SVG, which received very rare onshore westerly winds as the storm passed to the north.

Overview of Adverse Economic and Social Impacts

Hurricane Tomas caused extensive damage in St. Vincent and the Grenadines. National disaster areas were formally declared in accordance with the SVG National Emergency and Disaster Management Act, 2006, by the Government of St. Vincent and the Grenadines (GoSVG) from Park Hill to Sandy Bay on the Windward side and Belle Isle to Fitz Hughes on the north western side of the island. Over 26 percent of the population was severely impacted. Approximately 1,200 persons were displaced and took refuge in the designated shelters.

There was damage to private homes, public buildings and infrastructure, roads and power systems. Local damage to the distribution network for both power and water (transmission lines etc.) was responsible for most of the service interruptions. However, by November 2, 2010, ninety percent of the affected population had regained access to power and 70 percent of the water company clients were being served. The agriculture

sector experienced significant losses, estimated in excess of US \$25 million, with banana crops comprising most of the losses. The government-led detailed housing damage assessment concluded that over twelve hundred homes were damaged. Parts of the road network were closed in the days following the event. The primary road network experienced limited damage, while key secondary roads suffered more significantly. Government buildings suffered damages, with three schools and five community centers badly damaged.

In accordance with the National Shelter Policy, schools used as emergency shelters were closed to accommodate displaced individuals. This adversely affected families and school children and forced parents to change their work schedules where possible to accommodate displaced students. Additionally, several schools suffered ancillary damage resulting from their use as shelters.

Impacts were felt in the health sector including loss of services and some damage to infrastructure. Ambulance services were temporarily halted and as most clinics lack generator systems, many health clinics were without power. The Milton Cato Memorial Hospital (MCMH) experienced flooding.

Landslip from the storm was significant and, in some areas along roadways, created dangerous situations as slopes have destabilized. In some areas, impending landslides have placed private property at risk and conditioned crop fields in some locations have been rendered useless.

Commercial access to the island through seaports and airports was unaffected except for temporary closures during the storm event.

Government response

Immediately after the event, the Government declared natural disaster areas in the most affected parishes. Public utilities were restored to near full service in a matter of days and the primary road system was cleared within a week of the event. In accordance with the National Emergency Management Office Act (2006), the Damage and Needs Assessment Committee (15 members) began work immediately after the passage of Tomas.

On November 10, 2010, the Assessment was completed with contributions from the Ministry of Transportation and Works (MTW), Ministry of Education (MoE), Ministry of Agriculture (MoA), Ministry of Housing, Informal Human Settlement, Lands and Surveys, and Physical Planning (MoHILP), National Emergency Management Organisation (NEMO) and others.

1.2. Project Description

Project Objectives

The project aims to assist the Government in recovering from the impact of Hurricane Tomas. The development objectives are to: i) rehabilitate damaged and vulnerable infrastructure, caused by the passage of Hurricane Tomas; and, ii) advance the Government's ability to identify hazard vulnerabilities.

Project Components

The project is divided into three components. These are as follows:

Component 1 – Institutional Strengthening and Hazard Risk Analysis

Improving institutional capacity at the national level, specifically, the Ministry of Housing, Informal Human Settlements, Lands and Surveys and Physical Planning

(MoHILP) and the National Emergencies Management Organization (NEMO), to evaluate and integrate hazard and climate change risk reduction into the national development policy and decision making process, through the acquisition of goods and provision of technical advisory services.

Component 2 – Rehabilitation of Vulnerable and Damaged Infrastructure

Carrying out the rehabilitation and reconstruction of damaged infrastructure, including, inter alia, school buildings and associated school infrastructure, community centers, strengthening a river defense site, stock-piling gabion baskets, and transport infrastructure, through the provision of works, technical advisory services and goods.

Component 3 – Project Management Support

Strengthening and developing the institutional capacity of the Central Planning Division's Public Sector Investment Programme Management Unit for Project management and execution, including procurement, financial management and supervision of Project activities, through the acquisition of goods, provision of technical advisory services, training, and operating costs.

1.3. Project Location

The project has a number of activities to be implemented mostly in the northern region of St. Vincent. The sites are located in communities in the following areas:

- a) Rehabilitation and reconstruction of damaged schools, including: a) Georgetown Secondary; b) Georgetown Primary; c) Troumaca Secondary.
- b) Rehabilitation and reconstruction of damaged community centers, including: a) Rose Hall; b) Rose Bank; and c) Rillan Hill.
- c) Strengthening of the Marriaqua River Defense (Tiviot River)
- d) Stock of gabion baskets
- e) Rehabilitation of Hopewell Road and River Defense

2. ENVIRONMENTAL ASSESSEMENT

This Assessment was conducted in compliance with World Bank requirements as presented in OP 4.01, *Environmental Assessment* and includes relevant considerations as presented in the World Bank Safeguards for Natural Habitats, OP/BP 4.04, Natural Habitats and Physical Cultural Resources, OP/BP 4.11, for Category B projects.

The Assessment is a project level assessment and reflects an analysis of the general impacts and mitigations to be applied during project execution. The assessment is forward looking with emphasis on impacts reasonably expected based on the nature of the activities and the development of an Environmental Management Plan (EMP) to be applied during project execution.

3. LEGISLATIVE FRAMEWORK

St. Vincent and the Grenadines has several environmental legislation which address the protection of the physical and human environment. The following are relevant in the context of this project:

- The Town and Country Planning Act No. 45 of 1992;
- The Central Water & Sewerage Act of 1992;
- The Waste Management Act, No. 31 of 2000;
- The Litter act, No. 15 of 1991;
- The Environmental Health Services Act, No. 14 of 1991; and
- The Noise Control Act, 1988.

The Town and Country Planning Act No. 45 of 1992

Under section 3 of the Town and Country Planning Act, the Physical Planning and Development Board was established. The Act makes provisions for the orderly and

progressive development of land and the proper planning of town and country areas. Section 29 (2) of the Act specifies that the Board may by notice require an EIA to be submitted to it in such form and contain such information as may be prescribed by the notice, in instances where it is of the opinion that the activities are likely to cause or is causing pollution or is otherwise likely to have adverse effects on the environment. The Town and Country Planning Act also establishes standards for setbacks from beaches, highways, riverbanks and other sensitive areas.

The Central Water & Sewerage Act of 1992

This Act makes provision for conservation, control, apportionment and use of water resources. Under the Act the Minister with responsibility for the Environment has authority to set aside protected areas for the protection of water resource.

Waste Management Act No. 31 of 2000

The Waste Management Act No. 31 of 2000 provides for the management of solid waste in conformity with best environmental practices. It defines the roles and responsibilities of the National Solid Waste Authority and generally provides the framework for waste management planning and waste management operations in St. Vincent and the Grenadines. The Act is supported by the Solid Waste Management Regulations of 2006, which, among other things, establish the national standards for the handling of solid waste such as derelict vehicles, scrap tires, used oil and special waste, and specify the requirements for obtaining licenses and permits in connection with waste management operations.

The Litter Act No. 15 of 1991

This Act makes provisions for the control of emissions and effluent discharge into water bodies, but there are no accompanying regulations in place to support this Act. In addition, there are no programmes for water quality monitoring for natural surface waters thus analyses are only being done if a problem is suspected.

The Environmental Health Services Act, No 14, 1991

The Act makes provision for conservation and maintenance of the environment in the interest of health generally and in particular, in relation to places frequented by the public. This Act determines that the Ministry of Health and Environment has this responsibility. In this respect, the Environmental Health Unit is responsible for regulating, monitoring and controlling any present and likely environmental pollution and to investigate, prevent and remediate environmental pollution, including the management and disposal of solid, liquid and gaseous waste.

Noise Control Act, 1988.

Section 5 of the Act describes a code of practice for noise control at construction sites. The Physical Planning Board may serve a notice specifying the type of plant to be used for construction and setting limits for noise levels and working hours. Where works of the listed type specified in the Act are intended, the developer must submit an application to the Board and specify the exact nature of works, construction methods to be applied and noise control measures proposed.

4. DESCRIPTION OF THE EXISTING ENVIRONMENT

4.1. Physical attributes

Saint Vincent and the Grenadines (SVG) is a multi-island State within the archipelago of islands in the Caribbean Sea called the Antilles. The country consists of thirty-four islands, islets and cays, and is situated 13° north latitude, and 61° west longitude. It is approximately 150 kilometres west of Barbados, 40 kilometres southwest of St. Lucia, 110 kilometres north-northeast of Grenada, and 270 kilometres north of Trinidad and Tobago. The main island, St. Vincent, which lies to the extreme north, is roughly elliptical in shape, 30 kilometres long and 16 kilometres wide, with an estimated land area of 340 sq. km. The Grenadines cover a land area of approximately 50 sq. km. and stretch a distance of 72 km. to the southwest of the mainland, St. Vincent. The seven inhabited Grenadine islands are Bequia and Mustique in the Northern Grenadines; and Union, Canouan, Mayreau, Palm Island, and Petit St. Vincent in the Southern Grenadines. In addition there are a number of uninhabited islets and rocks, including the Tobago Cays, which are of environmental, historic and economic significance.

The main topographical feature of St. Vincent is the rugged, thickly forested central mountain range that runs in a north–south direction. The highest point on the island, the La Soufriere Volcano, rises to 1,234 meters. Other peaks range in height from 800 to 1,100 meters. Highly dissected ridges and valleys, which extend to the coast, characterize the topography on the leeward side. The spurs are steep and the valleys deep and narrow. The windward side is dominated by more gently undulating foothills, shallow valleys and extensive coastal plains. There are many drainage systems of small streams and rivers. As such, the mainland is divided into thirteen watershed areas. The Grenadines are low-lying, with the highest point at 330 meters, Mt. Taboi on Union Island. The second highest point, Mt. Royal, on the island of Canouan, is 290 meters high.

La Soufriere is an active volcano, which has erupted five times in recorded history: 1718, 1812, 1902, 1974, and 1979. On several of these occasions, the toll in terms of human lives, property, and disruption of agricultural activity has been significant. Settlements within the areas of extreme risk with respect to volcanic eruptions are located to the north of the Rabacca and Wallilabou Rivers, and include Sandy Bay, Point, Owia, and Fancy.

There are no major faults or folds anywhere in the country. St. Vincent and the Grenadines occasionally experience earthquakes associated with activity of the La Soufriere volcano and suffer minor effects from seismic events in the Caribbean Basin.

4.2. Climate

The country has a humid tropical climate. The temperatures range from approximately 18° C to 33° C, with an annual average of around 26°C. Temperatures tend to be cooler on the higher elevations of the mainland's interior due to the orographic influences of the central mountain range. There are two distinct seasons: a dry season from January to May, and a wet season from June to December, with the wettest period between June and September. On the mainland, the annual rainfall varies from 2,000 mm on the extreme south coast to 6,000 mm in the mountainous interior. Rainfall intensity decreases from north to south and from the windward side of the island to the leeward coast. The evapotranspiration rate averages 1,250 mm a year along the coast and decreases progressively with altitude. Precipitation is significantly lower in the Grenadines. The average annual rainfall on Bequia, Union and Canouan is about 1250 mm per year. The wettest months are June to November when the monthly average is 150 mm, while the driest period is from February to April during which the average monthly rainfall is around than 250 mm.

Although St. Vincent and the Grenadines is located south of the main Hurricane Zone, the country has suffered the impact of several severe storms in the past. The passage of Hurricane Ivan in 2004 caused extensive damage from flooding, high winds, storm

waves, and landslides, particularly on the coastline, destroying settlements and major infrastructural development.

Scientists predict that global warming and associated climate change may cause an increase in the intensity and frequency of storms and hurricanes. Poor land management and deforestation in light of climate change impacts can therefore be a formula for disaster. Effects of climate change are typically insidious and manifest in variations from historical conditions. Local and sub-regional data are presently not available to evaluate the specific effects of climate change for St. Vincent and the Grenadines, but global and coarse regional data indicate that rising sea levels and changes in storm patterns are changing the country's risk profile. As is the case with most Caribbean islands, infrastructure designs are based on historical data which do not allow for the integration of future climate change into the design process. Current trends in climate modeling suggest that while SVG will face the same suite of hazards it currently experiences, the intensity, frequency and duration appears to be changing. For example, current estimates suggest that storms are trending toward fewer in number but greater in rainfall intensity. This has the effect of increasing drought vulnerability and increased exposure to land slippage, flooding and other related phenomena.

St. Vincent and the Grenadines is exposed to a range of natural hazards. Most important are hazards stemming from weather related phenomena such as winds, rainfall, hurricane and drought. The islands experience an annual hurricane season from June to November, followed by a rainy season from November to January. The dry season extends typically from February to May.

4.3. Biological

The natural vegetation of SVG occurs in several stages of development and/or disturbance caused by human and natural (volcanic) interventions. It is therefore defined by a climax vegetation formation based on environmental gradients. The concentric

variations of rainfall with elevation give rise to concentric variations in vegetation. The slopes of the La Soufriere volcano have been subject to the frequent disturbance of vegetation by volcanic eruptions, however it shows both the success of re-vegetation along with the variation of vegetation with elevation. This concentric variation in vegetation is modified by factors of topography and geology in the Grenadines, which have lower relief, and a more semi-arid climate than the mainland. The soils of the Grenadines are shallow with a uniform vegetation distribution of scrub and cacti vegetation. The physical and environmental conditions of rainfall, soils, elevation, terrain, and exposure to the trade winds, on these small islands, result in a remarkable diversity of eco-systems and forest types.

The following is a summary of the vegetation types that exist on the island

- ***Elfin Woodland:*** Found on exposed summits above 500 metres on both sides of the central mountains. They consist of pure stands of dwarfed trees about three metres in height covered with epiphytes. This vegetation type is commonly associated with the Palm Brake vegetation type.
- ***Rain Forest:*** Confined to areas in the upper Colonaire, Cumberland and Buccament Valleys between 300 and 488 metres.
- ***Lower Mountain Forest:*** This vegetation type did not exist at the time of Beard's survey in the 1940's, the forests having been felled for construction purposes and the land cultivated in the early colonial period.
- ***Palm Brake:*** This refers to a sub-climax type typically at elevations over 500 metres arising after disturbances such as landslides or tree-falls (opening up the forest canopy). The land is covered initially by mosses, then by small tree ferns and heliconias followed by the characteristic Mountain Cabbage Palms.

- *Secondary Rain Forest:* This type describes the resultant forests arising from disturbances from volcanic eruptions, hurricanes and human activity. The largest areas lie around the Soufriere Mountains. The vegetation ranges from almost bare soil on the upper slopes of the Soufriere volcano to significant stands of new forest at lower elevations.
- *Deciduous Seasonal Forests/Cactus Scrub:* On the dry southern and south-western coasts of St. Vincent and the Grenadines where the soils are extremely thin, deciduous to semi-deciduous and xerophytic species predominate.
- *Littoral Woodland:* This type of vegetation is characterized by manchineel, button mangrove, sea grape and similar species. They exist as small narrow strips along the eastern coastline on St. Vincent and on a number of the islets and cays of the Grenadines. This type of vegetation is fast disappearing as development takes place along the coast.
- *Swamp:* Only small areas of swamp occur in St. Vincent and the Grenadines. These exist in the southern section of the main land on the coast and on a few of the Grenadine islets. The typical species found in these areas are Red Mangrove, Black Mangrove, White Mangrove and Button Mangrove.

In total, there are more than 1,150 species of flowering plants, 163 species of ferns, 4 species of amphibians, 16 species of reptiles, 111 species of birds, and 15 species of mammals have been identified on SVG. In terms of marine biodiversity, over 500 species have been identified. Among these are at least 450 species of fin-fish, 12 species of whales and dolphins, 4 species of turtles, 9 of gastropods, 11 seaweeds and 30 different coral species. Nonetheless, it must be noted that local biodiversity listings are far from complete and are in many respects outdated. Consequently, current data only partially represents the wealth of natural assets, which are at risk of being lost or severely depleted due to a multitude of threats.

4.4. Socio-economic context

The 2001 Population and Housing Census indicated that SVG has a population of 106,253 persons. Approximately 90% of the population is of African descent, while the other 10% is a combination of East Indian, European and indigenous people. St. Vincent and the Grenadines is internationally classified as a lower-middle-income country. The economic development is structured around the agriculture, tourism and international business services sectors. The Gross Domestic Product (GDP) per capita (2009) is US\$ 6,668; the literacy rate is 96% and the life expectancy at birth is 74 years. St. Vincent and the Grenadines was ranked 91 of 182 in the 2009 United Nations Development Programme (UNDP) Human Development Index (HDI).

4.5. Agriculture

The agricultural sector, in particular the banana industry, has contributed immensely to the economic development of St. Vincent and the Grenadines over the past three decades. It provides income, employment and improved welfare for the Vincentian society. However, the sector's relative contribution to GDP has declined from an average of 19% in the previous twenty years to 10-13%. This decline is directly linked to a fall-off in banana production as a result of the loss of preferential marketing arrangements to the United Kingdom and ever-changing market conditions in Europe, including more stringent quality standards, greater competition and lower prices. Additional factors include new sanitary and phyto-sanitary (SPS) requirements for export of bananas to Europe (under the EUREP-GAP standard), the escalating cost of inputs and low labour productivity relative to labour cost.

St. Vincent and the Grenadines was among the world's main exporters of arrowroot flour, however the crop is now of minor importance. Other crop commodities of significance in SVG include dasheen, eddoes, sweet potatoes and yams. Major tree crops include mango, coconut, avocado and citrus. The livestock industry is relatively small.

According to the 2000 Agriculture Census, production (in terms of number of heads) was dominated by sheep, goats and poultry.

4.6. Tourism

The tourism sector has continued to play an increasingly greater role in recent times as the agricultural sector declined. The sector is now making a greater contribution to national development with direct investment and ancillary development in support service sectors. This trend is anticipated to increase as national development policy seeks to place the hospitality sector within the main engines of economic growth.

Tourism in SVG has been focused primarily on the “sea and sand” experience especially with respect to the extensive array of water-based activities available on the Grenadine islands. The Government of St. Vincent and the Grenadines (GoSVG) has sought to diversify its tourism product with a focus on upscale and niche markets. This has attracted investors such as Mustique Company Ltd., Raffles Resorts, Donald Trump and Disney, which has led to investments including a convention centre, yacht facilities and professional golf courses. Incentives are currently being offered to hotel developers interested in properties in excess of 100 rooms.

The issue of airlift is a major constraint, as currently the island is only accessible via turbo-prop aircraft from neighbouring islands flying to the E.T Joshua Airport and Canouan Island Airport. The GoSVG is currently undertaking a multi-million dollar airport development project. The new Argyle International Airport will be the island’s first international airport and is designed to accommodate jets as large as the Boeing 747-400s. It will effectively open up the island to non-stop international flights.

The rise in eco-tourism in SVG is noteworthy in the context of land conservation. Sustainable management of land-based resources is of critical importance, not only guaranteeing quality of eco-touristic excursion experience, but also quality of marine ecosystems that have dive site potential in that sector. The Ministry of Tourism

developed a Community-Based Tourism Programme for the management of eoc-sites. The programme commenced as a collaborative effort between the Ministry and the North Leeward Tourism Association, and will ensure that communities play a more integral role in the tourism sector. This is seen as necessary if the industry is to thrive.¹

4.7. Industrial Sector

The industrial sector in SVG employs around 8% of the workforce and currently contributes about 10% to GDP. Industrial activity is focused primarily on agricultural processing of foodstuffs such as flour, rice, animal feeds, beans and other dried grain.

¹ www.gov.vc. The Official Website of Saint Vincent and the Grenadines

5. ANALYSIS OF PROJECT IMPACTS

The project is designed to address infrastructural damages resulting from the passage of Hurricane Tomas. Generally, the works approved under this project relate to the rehabilitative work to damage critical infrastructure such as roads and public buildings. As such, the project is classified as Category B under the World Bank's policy OP/BP 4.01, meaning that environmental impacts for the type of works proposed under the project are expected to be moderate in nature and can be managed through the application of appropriate engineering and management measures. Further, most of the anticipated environmental issues will relate to construction site management and construction operations.

Specifically:

- There will be no use of hazardous materials apart from fuel and paint products
- No pesticide applications will be required.
- No pollution impacts have been identified apart from those associated with site debris management.
- All activities are limited to reconstruction or rehabilitation and are limited to existing sites.

Project Activities

The following activities are anticipated to have the most significant impact²:

a) *Strengthening of river defense – Marriaqua (Tiviot River)*

This activity will provide several positive physical impacts including a reduction in the variability of channel depths, which will produce a more uniform, incised single channel pattern; reduction in both erosion and siltation and long-term protection for

² Impact refers to physical environmental impact

roadways. On the other hand, the activity may result in changes in river flow, discharge and sedimentation characteristics with possible coastal effects.

b) *Rehabilitation of Hopewell Road*

The Hopewell Road is part of the main interior road network of St. Vincent. It links Byrea, Biabou, Lowmans (windward) and Richland Park to the Vigie Highway. The project will rehabilitate a section of the Hopewell road as well as stabilize the upper embankment and improve the drainage system. Possible environmental impacts will be generally limited to the construction phase – i.e. dust and noise from construction since works will be concentrated on rehabilitating existing infrastructure. There is however the potential for marine and coastal zone impacts in relation to water quality and sedimentation, and the possibility of temporary disruption of traffic.

Other Activities

The other activities under the project are limited to rehabilitative works to damaged schools and community centres. The works to be undertaken include replacements of roofs, doors and windows, installation of gender sensitive facilities such as male and female washrooms; installation of kitchens and the general hurricane proofing of the buildings including the installation of shutters and hurricane straps. The environmental impacts of these works are limited to issues such dust and noise pollution thus mitigation activity would focus on proper construction site management. Actions and recommendation to be followed are outlined in Section 7 of this document: *Environmental Management Plan (EMP)*

6. MITIGATION ANALYSIS

Works approved under the project are largely rehabilitation and retrofitting of selected infrastructure and impacts are generally associated with the actual construction phase of the works activities.

As a category B project, the Government of SVG has undertaken an assessment examining project activities and providing an environmental framework to guide project execution. Since the works to be implemented are rehabilitative in nature, procedures will be included in the operations manual detailing requirements for a stand-alone Environmental Assessment (if necessary) and the screening of uncomplicated activities for the inclusion of environmental compliance contracting clauses to mitigate construction related impacts.

Supervision for environmental compliance will be managed through the Central Planning Division in close collaboration with the Ministry of Housing, Informal Human Settlements, Land and Surveys and Physical Planning (MoHILPP), Ministry of Transport and Works (MTW), and Government's Environmental Management Unit, under Bank Supervision. In addition to the Bank requirements, the Central Planning Division will also be responsible for ensuring the proper application of any national environmental requirements.

7. ENVIRONMENTAL MANAGEMENT PLAN (EMP)

This EMP provides guidance on actions which must be taken during the implementation phase of the project to ensure that activities are undertaken in an environmentally sustainable fashion so as to minimize the impact of the initiative on the surrounding environment, both human and natural. In order to strengthen compliance with the EMP, the actions and recommendations described below can also form clauses in contracts that govern construction and project implementation.

7.1. Site Security

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 wastes, construction and sanitary, additional strengthening of erosion control and soil stabilization systems and other conditions resulting from contractor activities that may increase the potential for damages.

7.2. Discovery of antiquities

If, during the execution of the activities contained in this project, 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 marked and the evidence preserved for examination.

Work may resume, without penalty of prejudice to the contractor upon permission from the Central Planning Division with any restrictions offered to protect the site.

7.3. Asbestos

While asbestos materials have not been identified in structures targeted for repair under this project, the following asbestos management procedures shall be implemented should they be discovered during the construction process.

1. The contractor shall contact shall develop an asbestos management plan in accordance with the guidelines of the Solid Waste Management Unit of the Central Water and Sewerage Authority. The asbestos management plan shall include as a minimum:
 - A description of the issue and extent of contamination
 - Site safety measures
 - Stabilization techniques to be employed
 - Storage and transport plan
 - Approved disposal procedure
 - Worker awareness and training

This plan shall be approved by the Solid Waste Management Unit

2. Site management shall consist of stabilizing friable asbestos and the provision of worker protection to prevent contamination with asbestos fibers.
3. Respiratory protection together with measures to prevent the contamination of clothing and inadvertent transport of asbestos fiber off-site shall be provided to exposed workers.

7.4. Worker Sanitation

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 Central Planning Division. The contractor shall provide a site sanitation plan for approval and implementation prior to the commencement of site activities.

7.5. Noise Control

The contractor 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 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 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 shall inform the site manager and shall develop a public notification and noise management plan for approval by the Central Planning Division.

7.6. Use and management of hazardous materials, fuels, solvents and petroleum products

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 Central Planning Division.

7.7. Use of preservatives and paint substances

All paints and preservatives shall be used only with the approval of the contracting officer. Information shall be provided to the Central Planning Division 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. 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 Central Planning Division with a list of materials and estimated quantities to be used, storage, spill control and waste disposal plans to be observed during the execution of the contract. This plan is subject to the approval of the Central Planning Division.

7.8. Site stabilization and erosion control

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, provision of approved ground cover.

Where excavations are made, the contractor shall implement appropriate stabilizing techniques to prevent cave-in or landslide. Erosion control measures shall be approved by the contracting officer.

An erosion management plan will be required where the potential exists for significant sediment quantities to accumulate in wetlands, lakes, rivers and near-shore 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.

7.9. Traffic Management

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 shall provide the Central Planning Division 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 Central Planning Division.

7.10. Management of standing water

Under no circumstances shall the contractor permit the collection of standing water as a consequence of contractor activities without the approval of the contracting officer and consultation with the Environmental Management Department of the Ministry of Health and the Environment.

7.11. Management of trash and debris

The contractor shall provide the contracting officer with a trash and debris management plan that conforms to the solid waste management policies and regulations of St. Vincent and the Grenadines. Under no circumstances shall the contractor 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 shall provide for the regular removal and disposal of all site wastes and provide the contracting officer with a schedule for such removal.

7.12. Schools

The project includes rehabilitative works to schools. In some cases, construction may occur while classes are being held. If this is the case, the school will use undamaged areas for classroom activities. The contractor shall seek to minimize as much as possible, the impacts to ongoing classes. In addition, the contractor shall make the site as safe as possible for the students by installing construction fences such as protective barricades as required. Contractors shall also work with the Ministry of Education's designate to manage the storage and flow of materials so as to minimize disruption to school activities. In cases where this is not an option, the Central Planning Division will

coordinate with the Ministry of Education to propose a system which will ensure that the smallest level of disruption to school activities e.g. shift system in collaboration with neighbouring schools.

7.13. Agency Responsibility for EIAs

Several government agencies have responsibility for decision making on development and resource use. As it relates to EIAs the following are the key agencies:

Agency	Responsibility
Physical Planning and Development Board	Planning permission and development control
Pesticide Control Board	Control of importation, distribution and use of pesticides
Central Water and Sewerage Authority	Conservation, control distribution and use of water resources
Public Health Department	Maintenance of the environment generally and in particular place frequented by the public

7.14. Environmental Management Responsibilities

The table below lists people/agencies with environmental management responsibilities on this project and the nature of those responsibilities. This list will be kept on the Project Environmental File and constitutes a Register of Environmental Effects:

Role	Person Nominated	Responsibilities
Contractor's nominated person	To be determined/identified by contractor on the project	<p>The contractors are responsible for:</p> <ol style="list-style-type: none"> 1. Complying with all relevant legislation and with environmental controls and mitigation measures (as specified the Environmental Management plan). 2. Community liaison with Government Departments. 3. Maintaining the project Environmental File which will contain; <ul style="list-style-type: none"> • Copies of all weekly Environmental Inspection Checklist (this ongoing record constitutes a Register of Environmental Effects). The checklist and procedure for the inspection are provided in Annex I • A log of Environmental Incidents and Complaints (which also details any correspondence received on environmental issues.). The form and procedure are provided in Annex II • Records of how all Corrective Action Requests issued have been resolved. Annex III 4. Once a month meeting with the Employer's competent person to review Project Environmental File. Please see Annex IV.
The Independent Competent Person	Ministry of Transport, Works, Urban Development and Local Government Designated person	<ul style="list-style-type: none"> ▪ Provides advice and support to the contractor on environmental issues (including reviewing and approving specific working methods/practices with potential for environmental impacts). ▪ Identifies any environmental issues arising that need corrective action, issues corrective action request to the contractor and approves when completed. Reviews the issues in the weekly Environmental inspection checklist and approves it. ▪ Keeps his own Environmental File with copies of key correspondence on it. The Designated person is authorized to revise any environmental management procedure contained in the Environmental Project File as necessary to take account of changing project circumstances.
The Employer's Competent Person	Officer from Central Planning Division	Check monthly that the Environmental Management Procedures are being implemented and the Project Environmental File is up to date.

RECORD OF CONSULTATIONS

Organisation	Representative	Position
Ministry of Transport and Works	Brent Bailey Dennisford Foster	Chief Engineer Environmental Officer
Fisheries Division – Ministry of Agriculture, Forestry and Fisheries	Lucine Edwards	Fisheries Officer
NEMO	Michelle Forbes	Director (Ag)
Physical Planning Unit	Anthony Bowman Dornet Hull Laurette Pinder	Town Planner GIS Officer Planning Technician
Ministry of Housing	Hudson Nedd	Chief Technical Officer
Environmental Management Department	Edmund Jackson Nyasha Hamilton Yasa Belmar	Director Environmental Educator Environmental Analyst
Solid Waste Management Unit	Winsbert Quow	Manager
Ministry of Education	Maurice John	Education Officer
Economic Planning Unit – Central Planning Division	Trelson Mapp	Economist

ANNEXES

ANNEX I – Contractor’s weekly environmental inspection

ANNEX II – Environmental incidents ad complaints procedure

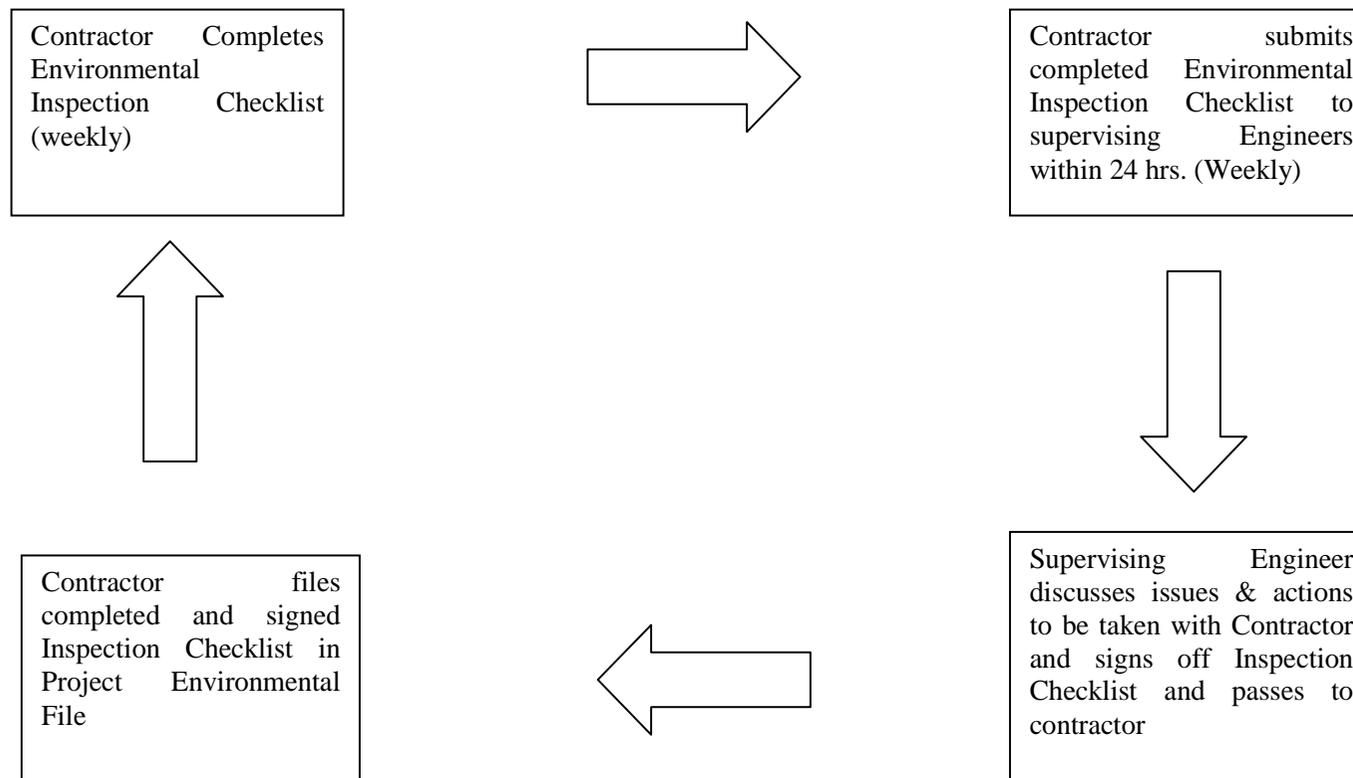
ANNEX III – Corrective action request (CAR) procedure

ANNEX IV – Employer’s monthly environmental inspection procedure

ANNEX V – Project scoping checklist/screening tool

ANNEX I: CONTRACTOR'S WEEKLY ENVIRONMENTAL INSPECTION

Section A: Procedure 1



Section B: Project Environmental Inspection Weekly Checklist

(This weekly checklist when filed in the Project Environmental File constitutes a Register of Environmental Effects).

Note: This form is to be completed by the contractor's nominated person(s) weekly from the start of major construction work on site. Completed forms are to be kept readily available in the Project Environmental file for the duration of works during which time they can be inspected by the supervising Engineer or representative of the Government of St. Vincent and the Grenadines.

Contract:

Phase:

Section:

Contractor:

Supervising Engineer:

Any environmental actions identified are to be brought to the urgent attention of the appropriate personnel as soon as possible. A copy of this completed form is to be issued to the Supervising Engineer within two days of the date of inspection.

Environmental Issue to be considered in site inspection	YES	NO	If <u>yes</u> add an explanatory comment
<p>Issue: Loss of soil through soil erosion</p> <ul style="list-style-type: none"> - Has any natural vegetation outside the working width of the road carriage way been removed? 			
Environmental Issue to be considered in site inspection	YES	NO	If <u>yes</u> add an explanatory comment
<p>Issue: <i>Prevention of negative landscape and visual impacts.</i></p> <ul style="list-style-type: none"> - Have any construction compounds, materials dumps, or waste disposal sites in use not been discussed and agreed with the Supervising Engineer (and, if necessary, appropriately licensed with the Government of St. Vincent and the Grenadines?) 			
<p>Issue: <i>Management and disposal of solid and liquid construction waste materials.</i></p> <ul style="list-style-type: none"> - Has any construction related packaging (especially cement bags) been disposed of on the site of the road or at any unofficial waste disposal site along the route? - Has any contaminated material been found during the construction? - Is any contractor's waste being disposed of along the roadside or to an unlicensed waste disposal facility along the route? - Has any construction waste of any kind been dumped by the side of the road? - Are any liquid wastes being discharged to water course? - Is water discharge/pumping in progress? - 			
<p>Issue: <i>Management of Construction noise and vibration</i></p> <ul style="list-style-type: none"> - Is any noisy stationary plant being operated adjacent to housing? (If so, are they screened to 			

reduce disturbance?) - Are any noisy activities taking place before 8:00am or after 6:00pm between Mondays to Friday (if so, has this working been discussed and agreed with the Supervising Engineer?) - Have there been any noise or vibration related complaints during the last week?			
Issue: <i>Dust nuisance prevention</i> - Are any crops adjacent to the construction works covered with dust? - Are any trucks carrying materials from quarry being arriving at the discharge site uncovered? - Is there any lack of water available to damp any dusty operations ongoing on site?			
Issue: <i>Dealing with antiquities</i> - Have any potential historic artefacts been found during construction?			
Issue: <i>Construction traffic management.</i> - Have there been any complaints about construction traffic impacts (noise, dust, congestion)?			
Issue: <i>Dealing with hazardous substances.</i> - Have any: old drums or containers, oily sheen, materials with a strong smell or unusual colouration been exposed during construction excavation?			
Issue: <i>Environmental incidents and Corrective Actions.</i> - Have any complaints been received from the public or other third party? - Has any incident leading to a threat to human health of life occurred?			

Completed by:

Signed.....

Print Name:

Action Completed:

Signed.....

Print Name:

Designation: Contractor's Representative

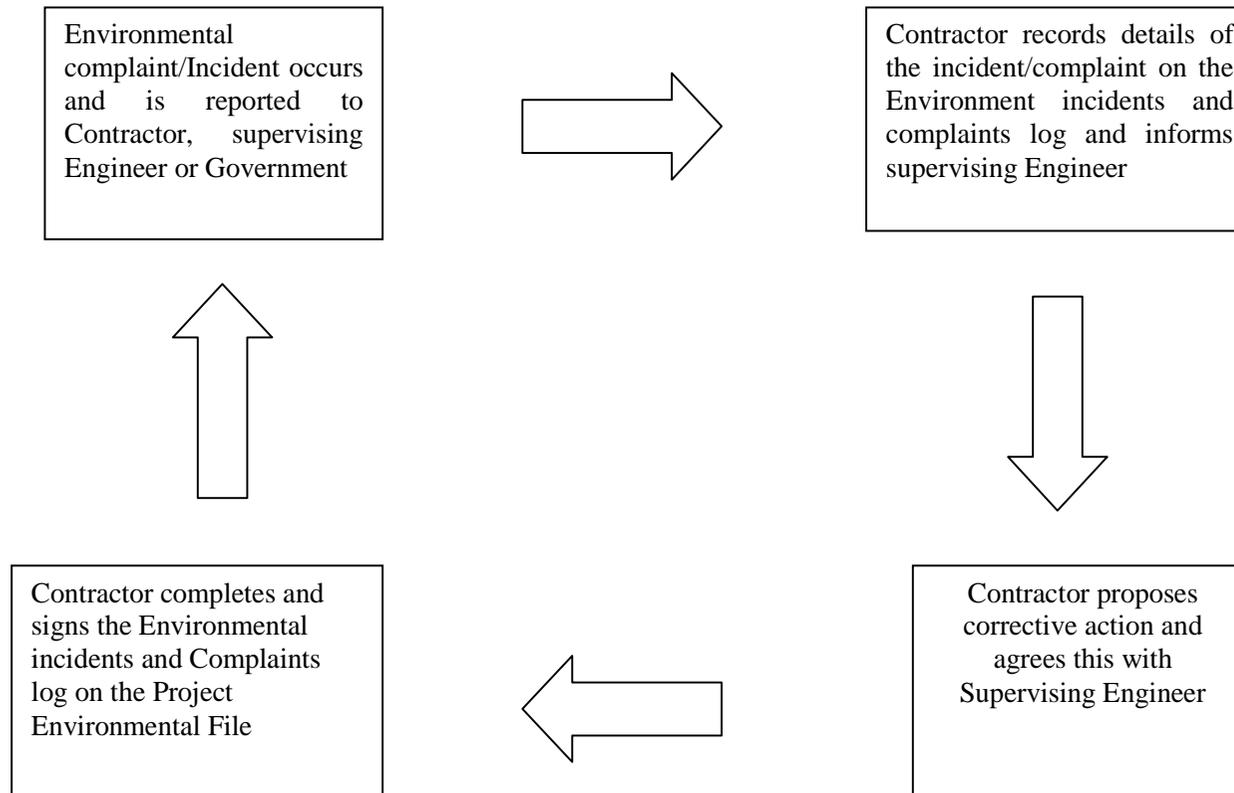
Date:

Designation: Supervising Engineer

Date:

ANNEX II: ENVIRONMENTAL INCIDENTS AND COMPLAINTS PROCEDURE

Section A: Procedure 2



Section B: Project Environmental Incidents/Complaints Log

Note: This form is to be completed and maintained by the Contractor's Nominated person(s) weekly from the start of major construction work on site. The completed log is to be kept readily available in the Project Environmental File for the duration of construction works during which time it can be inspected by the supervising Engineer or representative of the Government of St. Vincent and the Grenadines.

Contract:

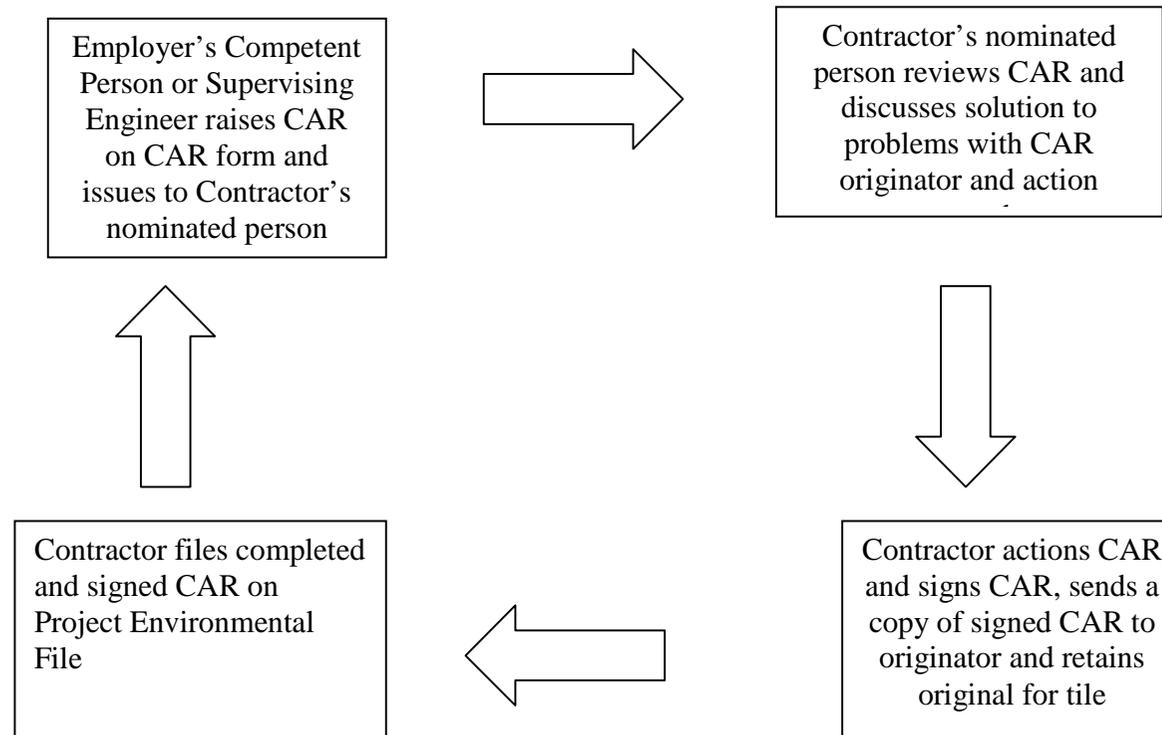
PhaseSection.....Contractor.....

Any Environmental actions identified are to be brought to the urgent attention of the appropriate personnel as soon as possible. A copy of this completed form is to be issued to the Supervising Engineer at the end of each month.

Nature of incident/complaint/ Correspondence (Inform Supervising Engineer)	Date received/ occurred	Name/address/contact details of complaint (if relevant)	How was the complaint/incident dealt with? When was action taken?	Date of any relevant correspondence	Signature of Contractor's Representative and date

ANNEX III: CORRECTIVE ACTION REQUEST (CAR) PROCEDURE

Section A: Procedure 3



Section B: Environment Corrective Action Request (CAR)
(See Procedures 3 and 4)

Date of Issue

Note: This form is to be completed by the Supervising Engineer or the Employer's nominated representative to issue a request corrective action to the construction contractor in respect of a particular environmental problem/issue that has occurred or is likely to occur. Completed forms are to be kept readily available in the Project Environmental File for the duration of construction works during which time they can be inspected by the Supervising Engineer or representative of the Government of Saint Vincent and the Grenadines.

Corrective action required and reasons	Date action to be completed by	Action taken by Contractor and date action completed

Completed by:

Signed.....

Designation:

Print Name:

Date:

Action Completed:

Signed.....

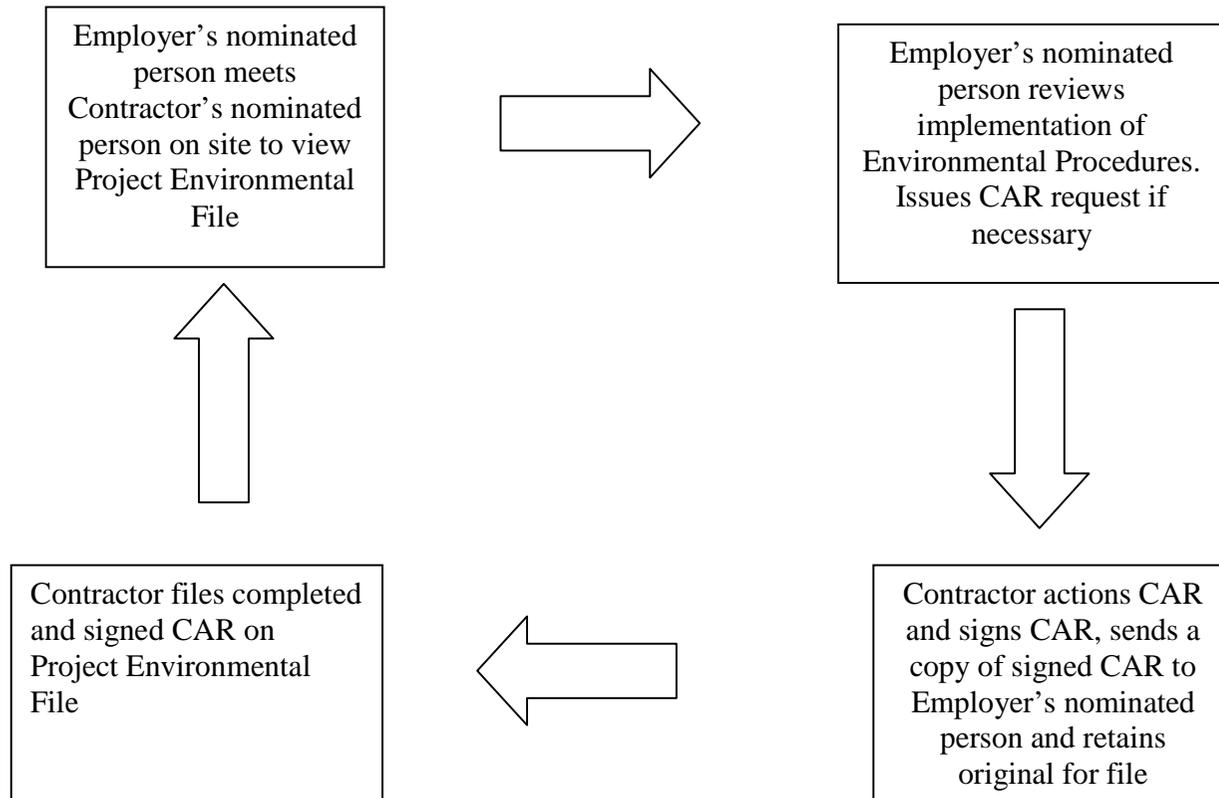
Designation: Contractor's Representative

Print Name:

Date:

ANNEX IV: EMPLOYER'S MONTHLY ENVIRONMENTAL INSPECTION PROCEDURE

Section A: Procedure 4



**Section B: Monthly Employer’s Environmental Review Checklist
(See Procedures 4)**

Note: This form is to be completed by the Employer’s nominated person(s) monthly. Completed form is to be kept on file in the Project Management Unit Offices. A copy should be passed to the Supervising Engineer for the information within 48 hours.

Contract:

Phase.....Section.....Contractor.....

The purpose of this review is to check monthly that the Project Environmental File is being kept up to date.

Issue to be considered in the review	Yes	No	Comments and detail of any corrective actions requested
Q – Looking at the file is there evidence that the Contractor is undertaking the weekly Environmental Inspection and filing the completed Inspection Checklist?			
Q – Looking at the file and the completed weekly Environmental Inspection, has the Supervising Engineer signed the completed checklist?			
Q – Looking at the file is there evidence that the Contractor is maintaining the log of environmental incidents/complaints? <u>(It is possible that there may be very few or no complaints of this project so this form may in reality not be used. If there are no complaints at the time of review write this in the comments box).</u>			
Q – Looking at the file is there evidence that any Corrective Action Requests (CAR) which have been issued have been signed off as completed by the originator of that CAR?			

Completed by:

Signed.....

Print Name:

Action Completed:

Signed.....

Print Name:

Designation:

Date:

Designation: Contractor’s Representative

Date:

ANNEX V: SCOPING CHECKLIST/SCREENING TOOL

o.	Questions to be considered in Scoping	Yes/No?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
1. Will construction, operation or decommissioning of the Project involve actions which will cause physical changes in the locality (topography, land use, changes in waterbodies, etc)?				
1.1	Permanent or temporary change in land use, land cover or topography including increases in intensity of land use?			
1.2	Clearance of existing land vegetation and buildings?			
1.3	Creation of new land uses?			
1.4	Pre-construction investigations - e.g. boreholes, soil testing?			
1.5	Construction works?			
1.6	Demolition works?			
1.7	Temporary sites used for construction works or housing of construction workers?			
1.8	Above ground buildings, structures or earthworks including linear structures, cut and fill or excavations?			
1.9	Underground works including mining or tunnelling?			
1.10	Reclamation works?			
1.11	Dredging?			
1.12	Coastal structures - e.g. seawalls, piers?			
1.13	Offshore structures?			
1.14	Production and manufacturing processes?			

o.	Questions to be considered in Scoping	Yes/No?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
1.15	Facilities for storage of goods or materials?			
1.16	Facilities for treatment or disposal of solid wastes or liquid effluents?			
1.17	Facilities for long term housing of operational workers?			
1.18	New road, rail or sea traffic during construction or operation?			
1.19	New road, rail, air, waterborne or other transport infrastructure including new or altered routes and stations, ports, airports, etc.?			
1.20	Closure or diversion of existing transport routes or infrastructure leading to changes in traffic movements?			
1.21	New or diverted transmission lines or pipelines?			
1.22	Impoundment, damming, culverting, realignment or other changes to the hydrology of watercourses or aquifers?			
1.23	Stream crossings?			
1.24	Abstraction or transfers of water from ground or surface waters?			
1.25	Changes in waterbodies or the land surface affecting drainage or run-off?			
1.26	Transport of personnel or materials for construction, operation or decommissioning?			

o.	Questions to be considered in Scoping	Yes/No?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
1.27	Long term dismantling or decommissioning or restoration works?			
1.28	Ongoing activity during decommissioning which could have an impact on the environment?			
1.29	Influx of people to an area either temporarily or permanently?			
1.30	Introduction of alien species?			
1.31	Loss of native species or genetic diversity?			
1.32	Any other actions?			
2. Will construction or operation of the Project use natural resources such as land, water, materials or energy, especially any resources which are non-renewable or in short supply?				
2.1	Land especially undeveloped or agricultural land?			
2.2	Water?			
2.3	Minerals?			
2.4	Aggregates?			
2.5	Forests and timber?			
2.6	Energy including electricity and fuels?			
2.7	Any other resources?			
3. Will the Project involve use, storage, transport, handling or production of substances or materials which could be harmful to human health or the environment or raise concerns about actual or perceived risks to human health?				

o.	Questions to be considered in Scoping	Yes/No?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
3.1	Will the project involve use of substances or materials which are hazardous or toxic to human health or the environment (flora, fauna, water supplies)?			
3.2	Will the project result in changes in occurrence of disease or affect disease vectors - e.g. insect or water borne diseases?			
3.3	Will the project affect the welfare of people - e.g. by changing living conditions?			
3.4	Are there especially vulnerable groups of people who could be affected by the project - e.g. hospital patients, the elderly?			
3.5	Any other causes?			
4. Will the Project produce solid wastes during construction or operation or decommissioning?				
4.1	Spoil, overburden or mine wastes?			
4.2	Municipal waste (household and/or commercial wastes)?			
4.3	Hazardous or toxic wastes (including radioactive wastes)?			
4.4	Other industrial process wastes?			
4.5	Surplus product?			
4.6	Sewage sludge or other sludges from effluent treatment?			

o.	Questions to be considered in Scoping	Yes/No?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
4.7	Construction or demolition wastes?			
4.8	Redundant machinery or equipment?			
4.9	Contaminated soils or other material?			
4.10	Agricultural wastes?			
4.11	Any other solid wastes?			
5. Will the Project release pollutants or any hazardous, toxic or noxious substances to air?				
5.1	Emissions from combustion of fossil fuels from stationary or mobile sources?			
5.2	Emissions from production processes?			
5.3	Emissions from materials handling including storage or transport?			
5.4	Emissions from construction activities including plant and equipment?			
5.5	Dust or odours from handling of materials including construction materials, sewage and waste?			
5.6	Emissions from incineration of waste?			
5.7	Emissions from burning of wastes in open air - e.g. slash material, construction debris?			
5.8	Emissions from any other sources?			
6. Will the Project cause noise and vibration or release of light, heat energy or electromagnetic radiation?				
6.1	From operation of equipment - e.g. engines, ventilation plant, crushers?			
6.2	From industrial or similar processes?			

o.	Questions to be considered in Scoping	Yes/No?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
6.3	From construction or demolition?			
6.4	From blasting or piling?			
6.5	From construction or operational traffic?			
6.6	From lighting or cooling systems?			
6.7	From sources of electromagnetic radiation (consider effects on nearby sensitive equipment as well as people)?			
6.8	From any other sources?			
7. Will the Project lead to risks of contamination of land or water from releases of pollutants onto the ground or into sewers, surface waters, groundwater, coastal waters or the sea?				
7.1	From handling, storage, use or spillage of hazardous or toxic materials?			
7.2	From discharge of sewage or other effluents (whether treated or untreated) to water or the land?			
7.3	By deposition of pollutants emitted to air, onto the land or into water?			
7.4	From any other sources?			
7.5	Is there a risk of long term build-up of pollutants in the environment from these sources?			
8. Will there be any risk of accidents during construction or operation of the Project which could affect human health or the environment?				
8.1	From explosions, spillages, fires, etc. from storage, handling, use or production of hazardous or toxic substances?			

o.	Questions to be considered in Scoping	Yes/No?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
8.2	From events beyond the limits of normal environmental protection - e.g. failure of pollution control systems?			
8.3	From any other causes?			
8.4	Could the project be affected by natural disasters causing environmental damage - e.g. floods, earthquakes, landslip, etc?			
9. Will the Project result in social changes, for example, in demography, traditional lifestyles, employment?				
9.1	Changes in population size, age, structure, social groups, etc.?			
9.2	By resettlement of people or demolition of homes or communities or community facilities - e.g. schools, hospitals, social facilities?			
9.3	Through in-migration of new residents or creation of new communities?			
9.4	By placing increased demands on local facilities or services - e.g. housing, education, health?			
9.5	By creating jobs during construction or operation or causing the loss of jobs with effects on unemployment and the economy?			
9.6	Any other causes?			
10. Are there any other factors which should be considered such as consequential development which could lead to environmental effects or the potential for cumulative impacts with other existing or planned activities in the locality?				

o.	Questions to be considered in Scoping	Yes/No?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
10.1	Will the project lead to pressure for consequential development which could have significant impact on the environment - e.g. more housing, new roads, new supporting industries or utilities, etc?			
10.2	Will the project lead to development of supporting facilities, ancillary development or development stimulated by the project which could have impact on the environment - e.g. supporting infrastructure (roads, power supply, waste or waste water treatment, etc.), housing development, extractive industries, supply industries, other?			
10.3	Will the project lead to after-use of the site which could have an impact on the environment?			
10.4	Will the project set a precedent for later developments?			
10.5	Will the project have cumulative effects due to proximity to other existing or planned projects with similar effects?			