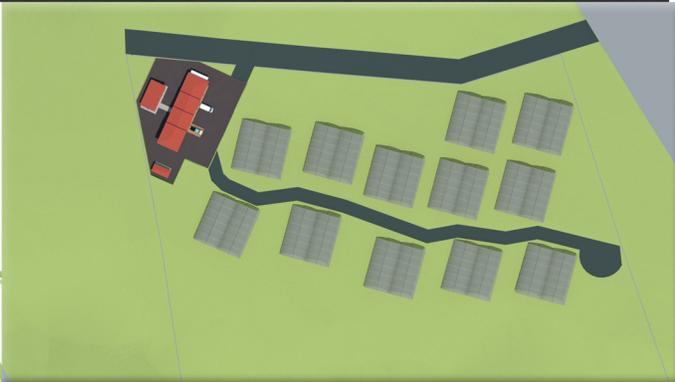


GOVERNMENT OF ST. VINCENT AND THE GRENADINES
MINISTRY OF AGRICULTURE, INDUSTRY, FORESTRY, FISHERIES AND RURAL TRANSFORMATION



DESIGN AND SUPERVISION OF THE CONSTRUCTION OF GREENHOUSE PARK FACILITIES
FINAL EMP - SECTION 4



NOVEMBER 2015

ENVIRONMENTAL MANAGEMENT PLAN
FOR THE CONSTRUCTION OF A
GREENHOUSE PARK IN CHATEAUBELAIR – FITZ HUGHES
(RICHMOND)
ST VINCENT AND THE GRENADINES

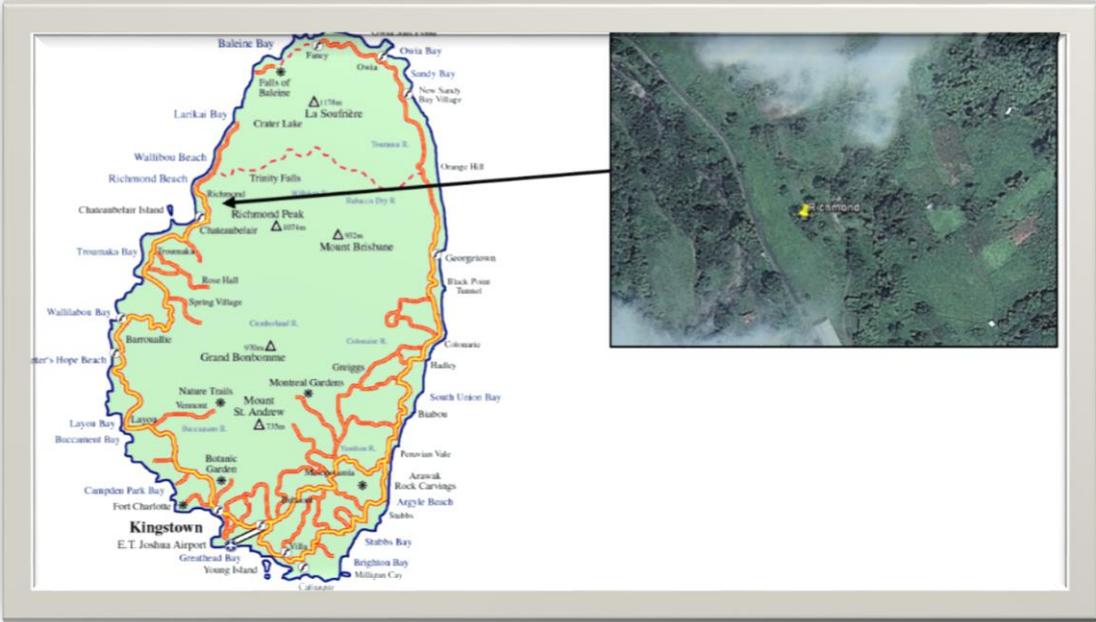


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ENVIRONMENTAL MANAGEMENT PLAN
FOR THE CONSTRUCTION OF A
GREENHOUSE PARK in CHATEAUBELAIR – FITZ HUGHES
(RICHMOND)
ST VINCENT AND THE GRENADINES

Background

The Government of St. Vincent and the Grenadines has selected Chateaubelair – Fitz Hughes in Richmond as one of 3 sites for the establishment of a greenhouse park. This is being undertaken under the Fruit and Vegetable component of the Banana Accompanying Measures (BAM), a European Union funded programme to modernize and develop the agricultural sector in St. Vincent and the Grenadines.

The Ministry of Agriculture *et al.* will lead the process by establishing a pilot park with 15 greenhouses. Farmers, through cooperatives, will then develop and operate parks with up to 25 greenhouses, all at high altitudes for natural cooling, equipped with solar and irrigation facilities. Ministry of Agriculture officials have been holding consultations in the selected site to update residents, and solicit feedback and advice on the parks project.

The Greenhouse Parks are expected to reduce the climate based seasonality of local vegetable production and supply. Farmers will be expected to supply more consistent quantity and quality, and thus secure better marketing arrangements especially with major local and overseas buyers. The project will also reduce imports, estimated at about EC\$16.86 million between 2006 and 2010. Farmers, through a hybrid cooperative structure which can incorporate business interests, will establish and operate the park which will comprise a total of 17 greenhouses that will be situated in three sets of fives and one pair parallel to the proposed road. Each set of five will measure 20mx48m while that of the pair is 20mx19.2m with a 8m spacing (Size of greenhouse: 20x9.6m). A 4.5m road will provide access to greenhouses and buildings which will conjoin with main road. Please refer to Figure 1 below.

Introduction

The terms of reference require the Consultant to undertake an Environmental Impact Assessment (EIA) and to prepare an Environmental Management Plan (EMP). Following an Environmental Screening (ES) of the site it was determined that the level of impact on the environment would not be significant to require an EIA.

Environmental screening is undertaken to determine whether a proposed project falls into one of



EMP FOR CONSTRUCTION OF A GREENHOUSE PARK IN CHATEAUBELAIR (RICHMOND)

two groups:

- i. Those with potentially significant environmental effects (if unmitigated) or are located in an area with complex environmental conditions and which therefore require more cautious planning efforts; or,
- ii. Those comprising uncomplicated works where the impacts are minimal (e.g., effects during construction of repairs and retrofitting) and which can be addressed through standardized or generic mitigation measures.

The completed checklist for the site is provided in Annex 1.

The objectives of this Environmental Management Plan (EMP) are to:

- i. ensure the safety of persons living, working and in school close to the construction site;
- ii. ensure the safety of the workers and the public;
- iii. protect the environment;
- iv. minimize inconveniences to the public during the execution of the works; and
- v. ensure compliance with legal requirements.

The Project Management team will be responsible for the implementation of this Environmental Management Plan. The Project Management team will also remain responsive in the event of changes occurring to the site conditions. The Contractor will adhere to the policies and principles which are set out in accordance to the Conditions of the Contract.

Implementation of this Environmental Management Plan involves:

- i. Identification of critical work activities, the safety and environmental implications of these activities and ways to mitigate any negative impact which they may have;
- ii. Regular collaboration with the Contractor; and
- iii. Continuous review of the Environmental Management Plan to adjust to changes in the site conditions.

The impact on the environment due to the implementation of this project, will be continually assessed and feedback will be provided, to the client, throughout.

For ease of reference this EMP is presented in a matrix and as a Checklist comprising of the following sections:

- Part 1 Institutional and Administrative Information
 - Site Description
 - Topographic description
 - Legislation
 - Public consultation
 - Institutional capacity building
- Part 2 Personnel
- Materials
- Part 3 Environmental/Social screening
- Part 4 Mitigation measures



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Part 5 Environmental Monitoring Plan

Part 6 Monitoring Plan during the different phases of construction

The reference document for this EMP is the EIB Environmental and Social handbook:
(http://www.eib.org/attachments/strategies/environmental_and_social_practices_handbook_en.pdf)

Figure 1: Image showing general site layout





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EMP FOR THE CONSTRUCTION OF A GREENHOUSE PARK IN CHATEAUBELAIR – FITZ HUGHES (RICHMOND) ST VINCENT AND THE GRENADINES

PART 1: INSTITUTIONAL AND ADMINISTRATIVE

Location	Chateaubelair – Fitz Hughes (Richmond)		
Name of Project	Construction of Greenhouse Parks in St. Vincent		
Scope of Project & Activity	Poverty Reduction, Agriculture, Food Security & Reduction of Non-Communicable Diseases (NCDs)		
	Project Management		
Institutional arrangements (Name and contacts)		Ministry of Agriculture, Rural Transformation, Forestry, Fisheries and Industry Contractor EMP Supervision	National Authorising Officer for EDF Operations Central Planning Division Ministry of Finance and Economic Planning
	Supervision		
Implementation arrangements (Name and contacts)		Project Implementation Management Team (PIMT) Ministry of Agriculture, Rural Transformation, Forestry, Fisheries and Industry Banana Accompanying Measures' (BAM) Fruit and Vegetable Component leader	National Authorising Office for EDF Operations
SITE DESCRIPTION			
Name of Site	CHATEAUBELAIR – FITZ HUGHES (RICHMOND)		
Describe site location	<p>The property covers an area of 32,779.54 sq. m. The Leeward Highway borders the western boundary and a 30 ft. road reserve runs along the eastern boundary. The property slopes in a south west direction.</p> <p>This site is located north west of the island in a valley between Chateaubelair and Fitz-Hughes. It is 41m above sea level and is the site of an old banana plantation and boxing plant. The topography of the site is steep and slopes downwards from east to west. The vegetation is</p>		Annex 2: Site Layout Model

	<p>primarily secondary forest and grass. Close to the site and running parallel to the road is the Richmond River. A section of the road close to the site shows signs of subsidence because its foundation has been undercut by the river. The site itself is on a higher elevation than the river and will not be flooded even if the river breaks its banks.</p> <p>The site is surrounded by forested hills. The forest is predominantly montane forest and elfin forest on the upper slopes, and secondary and dry scrub forests at lower elevations, closer to the site. Loose volcanic material is washed towards the coast by the Richmond River.</p> <p>Livestock – small and large ruminant - are found grazing in the lower elevation. Fruits trees such as coconut, mango, plum along with breadfruit and avocado trees are also found in this elevation, growing at the foothills.</p> <p>The banks of the Richmond River are covered with grass, vines and tree shrubs growing at the water’s edge.</p> <p>Hurricane Tomas on October 29th and 30th, 2011 severely affected Chateaubelair and Fitz Hughes and the areas was declared a disaster area.</p>	
Who owns the land?	The lands belong to the Crown (State)	
Geographic description	<p>The property covers an area of 32,779.54 sq. m. The Leeward Highway borders the western boundary and a 30 ft. road reserve runs along the eastern boundary. The property slopes in a south west direction.</p> <p>On the way to Richmond is the historic village of Fitz Hughes where there are remnants of past plantations infrastructure constructed in Colonial times. The most famous is the Arch at Fitz Hughes which brought water to the factory nearby. Also can be seen are old plantation houses and a sugar mill at Richmond.</p> <p>Photographs are provided in Annex 3.</p>	
Topographic description	<p>The site has a very distinct topography with two different levels: The lower section is gently sloping but narrow; the higher section is also generally gently sloping and narrow but restrictive due to two major drops in the landscape. The difference in elevation between these two major drops is approximately fifteen (15) meters at the highest point.</p>	

LEGISLATION

Identify national & local legislation & permits that apply to project activity	<ul style="list-style-type: none"> • <i>Forest Resource Conservation Act</i> (No.47, 1992) • <i>Natural Forest Resource Act</i> (1947) • <i>Town and Country Planning Act</i> (No.45, 1992)
PUBLIC CONSULTATION	
Identify when / where the public consultation process took place	The Ministry of Agriculture, <i>et al.</i> has been holding discussions with representatives of farmer organizations in the site and surrounding environs as part of the Greenhouse sensitization campaign. Officials in the Ministry of Agriculture say that interest in greenhouse parks for vegetable production continues to grow among farmers in Richmond.
INSTITUTIONAL CAPACITY BUILDING	
Will there be any capacity building?	No [] Yes[x] As part of the larger project
PART 2: (a) PERSONNEL	
<p>Safety on the site will be a collective responsibility of all parties – management, employees and the public.</p> <ul style="list-style-type: none"> i. Personal safety equipment must be worn as prescribed for each job, such as: safety glasses for eye protection, hard hats, respiratory masks, gloves and safety shoes. ii. The unlawful manufacture, distribution dispensing, possession, or use of an illegal or controlled substance, and abuse of prescribed drugs, is prohibited in the workplace. All employees shall abide by the rules of this policy, and should notify the employer in writing of his/her conviction for a violation within 5 days after such conviction. iii. Employees shall inform the supervisor if he/she is taking strong prescription drugs that make them drowsy and/or warn against driving or using machinery. iv. Employees shall maintain a clean job site, and their working area free from rubbish, debris and clutter. v. Employers shall appoint within the rank of employees trained site safety representative(s). The Safety Representative shall assume responsibility and ensure that the guidelines/checklists are adhered to for the safeguard of all personnel and the environment. vi. Employees shall participate in safety and evacuation drills, activities or meetings organized for employees. 	
In the event of Emergencies: Fire, Medical, Environmental	<ul style="list-style-type: none"> i. The Safety Representative shall assume responsibility and ensure that all guidelines/checklists provided are adhered to for the safety of all personnel and the environment. ii. The Safety Representative shall designate a safe assembly point for workers in the event of a hazard occurring. iii. The Safety Representative shall maintain a First Aid Kit on site in order to provide First Aid and medical attention. iv. The Safety Representative shall immediately report all illnesses and injuries to the Contractor’s emergency personnel and where necessary to the nearest emergency and/or medical centre. Notification of the injury shall also be made to the Project Manager. v. Only qualified personnel shall provide emergency services and medical transportation.
Fire Protection and prevention	<p>Fire protection shall be provided during any construction activity that may pose a fire hazard, i.e. welding, flame cutting etc., and there shall be one fire extinguisher for each operation.</p> <ul style="list-style-type: none"> i. The Contractor shall provide the necessary quantity and type of fire protection equipment.



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	<ul style="list-style-type: none"> ii. All necessary permits i.e. welding, cutting etc., shall be obtained and a fire watch program shall be in effect as needed. iii. There shall be one fire watch with no other duties assigned per open flame operation. iv. In the case of any fire, the Project Manager shall be notified. v. Within 72 hours of an emergency incident, the Safety Representative shall submit a written report to the Project Manager which includes the following information: <ul style="list-style-type: none"> • Type of fire • Cause of fire • Planned remedial action to prevent any future occurrences • Nature and outcome if any, all consequences not only to personnel but also to equipment and the project itself
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 conditions, 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 waste (construction and sanitary), additional strengthening of erosion control and soil stabilization systems and other conditions resulting from Contractor activities which may increase the potential for damages.
Worker Sanitation	Sanitation facilities shall be provided to site workers. All sanitary waste generated as a result of project activities shall be managed in a manner approved by the Project Manager. The Contractor shall provide a site sanitation plan for approval and implementation prior to the commencement of site activities.
PART 2: (b) Materials	
	<ul style="list-style-type: none"> i. Materials shall be stored, handled, transported and used in accordance with manufacturer’s guidelines and established industry standards (occupational health and safety). ii. The Contractor shall provide complete Material Data Safety Sheets for all materials used on the project. iii. Any unused chemicals shall be removed from the Site. iv. The use of containment for spill intervention shall be implemented when applicable



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ANNEX 1-Environmental Checklist

PART 3: ENVIRONMENTAL/SOCIAL SCREENING			
	Activity	Status	Additional References
Will the site activity include/involve any of the following	A. Building rehabilitation	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	B. New construction	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	O. General Conditions
	C. Historic building(s) and districts	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	D. Acquisition of land ¹	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	E. Hazardous or toxic materials ²	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Hazardous waste from the use of chemicals in the greenhouses
	F. Impacts on forests and/or protected areas	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	All the sites are surrounded by hills under forest cover.
	G. Handling and management of waste	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	A. Construction Activities
	H. Pedestrian and traffic safety	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	D. Traffic and Pedestrian Safety
	I. Vulnerability to sea level rise	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	J. Coastal erosion	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	K. Loss of agricultural land	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	L. Diversion of water courses	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	M. Historic/cultural artifacts	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	N. Loss of flora	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	G.H. crops grown on the site will be destroyed
	O. Loss of fauna	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
	P. Landslides/subsidence	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	There are signs of subsidence of the road running parallel to the river close to the Richmond Site. The site itself is on a higher elevation than the river.
	Q. Strom surge	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	R. Flooding	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	S. High winds	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	T. Seismic activity	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	E. Seismic Activity
U. Fisheries resources in the area	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		

¹ Land acquisitions includes displacement of people, change of livelihood, encroachment on private property, land that is purchased/transferred and affects people who are living and/or squatters and/or operate a business (kiosks) on land that is being acquired

² Toxic / hazardous material includes and is not limited to toxic paints, removal of lead paint, animal carcasses, tissue pathogen etc.



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	V. Tourism resources in the area	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	X. Agriculture/farming	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
	Y. Soil erosion and Slippage	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	F. Soil Erosion and Slippage
	Z. Surface Water	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	B. Water Quality

PART 4: MITIGATION MEASURES

ACTIVITY	PARAMETER	MITIGATION MEASURES CHECKLIST
0. General Conditions	Occupational Health and Safety Issues	(a) The contractor must ensure that an Occupational Health and Safety Plan is in place to guide work activities, and provide a safe environment for workers. (b) The contractor must ensure that all workers operate within a safe environment. (c) All relevant Labour and Occupational Health and Safety regulations must be adhered to ensure worker safety. (d) Workers must be provided with necessary equipment as well as protective gear as per their specific tasks such as hard hats, overalls, gloves, goggles, boots, etc. (e) Sanitary facilities must be provided for all workers on site. (f) The contractor must ensure that there are basic medical facilities on site and that there are staff trained in basic first aid. (g) Appropriate posting of information within the site must be done to inform workers of key rules and regulations to follow.
A. General Rehabilitation and /or Construction Activities	Air Quality	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. (d) Unpaved, dusty construction roads should compacted and then wet periodically. (e) During interior demolition debris-chutes shall be used above the first floor. (f) Demolition debris shall be kept in controlled area and sprayed with water mist to reduce debris dust.



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PART 4: MITIGATION MEASURES		
ACTIVITY	PARAMETER	MITIGATION MEASURES CHECKLIST
		<ul style="list-style-type: none"> (g) During pneumatic drilling/wall destruction dust shall be suppressed by ongoing water spraying and/or installing dust screen enclosures at site (h) The surrounding environment (sidewalks, roads) shall be kept free of debris to minimize dust. (i) There will be no open burning of construction / waste material at the site. (j) There will be no excessive idling of construction vehicles at sites. (k) The bins of all haulage vehicles transporting aggregate or building materials must be covered on all public roads.
	Noise	<ul style="list-style-type: none"> (a) Construction / work activities will occur within specified daylight hours e.g. 8:00 am to 4:00pm. (b) Community / public to be informed in advance of any work activities to occur outside of normal working hours or on weekends. (c) Sites should be hoarded wherever possible. (d) During operations, the engine covers of generators, air compressors and other powered mechanical equipment shall be closed, and equipment placed as far away from residential areas as possible. (e) There will be no excessive idling of construction vehicles at sites. (f) Noise suppression equipment or systems supplied by manufacture will be utilized. (g) Ensure all vehicles and equipment are properly serviced. (h) The contractor must develop and implement a public notification and noise management plan.
	Solid Waste Management (General)	<ul style="list-style-type: none"> (a) Contractor to develop and implement waste management plan. (b) Contractor to abide by all pertinent waste management and public health laws. (c) Waste collection and disposal pathways and sites will be identified for all major waste types expected from demolition and construction activities; and wastes generated during operations of the packing facilities. (d) Construction and demolition wastes will be stored in appropriate bins. (e) Liquid and chemical wastes will be stored in appropriate containers separated from the general refuse.



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ANNEX 1-Environmental Checklist

PART 4: MITIGATION MEASURES		
ACTIVITY	PARAMETER	MITIGATION MEASURES CHECKLIST
		<p>(f) All waste will be collected and disposed of properly in approved landfills by licensed collectors.</p> <p>(g) The records of waste disposal will be maintained as proof for proper management as designed.</p> <p>(h) Whenever feasible the contractor will reuse and recycle appropriate and viable materials.</p> <p>(i) 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>Solid Waste Management (Hazardous)</p>	<p>(a) 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.</p> <p>(b) The containers of hazardous substances shall be placed in a leak-proof container to prevent spillage, leaching, or the escape of fumes.</p> <p>(c) The wastes shall be transported by specially licensed carriers and disposed in a licensed facility.</p> <p>(d) Paints with toxic ingredients or solvents or lead-based paints will not be used.</p> <p>(e) Banned chemicals will not be used on any project.</p> <p>(f) If termite 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.</p>
<p>B. Individual Wastewater Treatment System</p>	<p>Water Quality</p>	<p>a. The approach to handling sanitary wastes and wastewater from building site (installation or reconstruction) must be approved by the local authorities</p> <p>b. Before being discharged into receiving waters, effluents from individual wastewater systems must be treated in order to meet the minimal quality criteria set out by national guidelines on effluent quality and wastewater treatment</p> <p>c. Monitoring of new wastewater systems (before/after) will be carried out</p> <p>d. Construction vehicles and machinery will be washed only in designated areas where runoff will not pollute natural surface water bodies.</p>

PART 4: MITIGATION MEASURES		
ACTIVITY	PARAMETER	MITIGATION MEASURES CHECKLIST
Surface Water		e. Ensure the construction materials do not get into any nearby river
C. Toxic Material	Toxic / hazardous waste management	<ul style="list-style-type: none"> a. Temporarily storage on site of all hazardous or toxic substances will be in safe containers labeled with details of composition, properties and handling information b. The containers of hazardous substances shall be placed in an leak-proof container to prevent spillage and leaching c. The wastes shall be transported by specially licensed carriers and disposed in a licensed facility. d. Paints with toxic ingredients or solvents or lead-based paints will not be used
D. Traffic and Pedestrian Safety	Direct or indirect hazards to public traffic and pedestrians by construction activities	<ul style="list-style-type: none"> (a) A traffic management plan to be developed and implemented by contractor. (b) Alternative routes to be identified in the instance of extended road works or road blockages. (c) The public to be notified of all disturbance to their normal routes. (d) Signposting, warning signs, barriers and traffic diversions must be clearly visible and the public warned of all potential hazards. (e) Provision must be made for the safe passages and crossings for all pedestrians where construction traffic interferes with their normal route. (f) 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. (g) Adjustment of working hours to local traffic patterns, e.g. avoiding major transport activities during rush hours or times of livestock movement.
E. Seismic Activity	Direct or indirect hazards as a result of seismic forces during earth tremors	<ul style="list-style-type: none"> a. The contractor will closely adhere to all standards and building codes (ACI and IBC) established in the design. b. The contractor will have in place an alert system to notify workers on site of seismic activity and to signal assembly at the designated point.

PART 4: MITIGATION MEASURES		
ACTIVITY	PARAMETER	MITIGATION MEASURES CHECKLIST
F. Soil Erosion and Slippage	Direct or indirect hazards as a result of excavation	<p>(a) The contractor must ensure that appropriate erosion control measures such as silt fences are installed.</p> <p>(b) Proper site drainage must be implemented.</p> <p>(c) Ensure that the removal of soil is minimized and that any soils removed should be trucked to adequate location</p> <p>(d) Any drain clogged by construction material or sediment must be unclogged as soon as possible to prevent overflow and flooding.</p> <p>(e) The use of retaining structures and planting with deep rooted grasses to retain soil during and after works must be considered.</p> <p>(f) The use of bio-engineering methods must be considered as a measure to reduce erosion and land slippage.</p> <p>(g) Keep angle of slopes within limits of soil type.</p> <p>(h) Balance cut and fill to limit steepness of slopes.</p> <p>(i) All slopes and excavated areas must be monitored for movement.</p>
G. Loss of Livelihoods	Direct results as a result of crops being removed from site	<p>a. The contractor must ensure that the farmers who will lose their livelihoods because of the loss of land – even if they were squatting – are compensated appropriately.</p> <p>b. At least three months’ advance notice for crop harvest</p> <p>c. In absence of advance notice, cash compensation based on annual value of the produce and calculated according to the Department of Agriculture norms (crop compensation) Cash compensation based on annual value of the produce and calculated according to the Department of Forestry (for trees compensation)</p>
H. Loss of common property resources	Direct results as a result of grazing grounds for ruminants being lost to construction	Any CPR impacted will be replaced by the project



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ANNEX 1-Environmental Checklist

Part 5: ENVIRONMENTAL MONITORING PLAN to MITIGATE IMPACTS FROM PROJECT ACTIVITIES					
Category of Project	Impact Area	Mitigative Measures	Mitigation Responsibility	Monitoring	Frequency of Monitoring
New building and general construction	Occupational Health and Safety Issues	As per mitigative measures (a) to (g)	Contractor	Min of Agri., NAO	weekly
	Air Quality	As per mitigative measures (a) to (k)	Contractor	Min Agri., MOH, NAO	weekly
	Traffic Impacts	As per mitigative measures (a) to (g)	contractor	Min Agri., NAO	weekly
	Noise	As per mitigative measures (a) to (h)	Contractor	Min Agri., MOH, NAO	weekly
	Solid and Liquid Waste Management (general)	As per mitigative measures (a) to (i)	Contractor	Min Agri., NAO	weekly
	Solid and Liquid Waste Management (hazardous)	As per mitigative measures (a) to (f)	Contractor	Min Agri., NAO	weekly
	Water quality	As per mitigative measure (e)	Contractor	Min of Agri., NAO	weekly
	Soil Erosion and Slippage	As per mitigative measures (a) to (h)	Contractor	Min Agri., NAO	weekly

Part 6: Monitoring Plan during the Different Phases of Construction

Phase	What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)	When (Define the frequency / or continuous?)	Why (Is the parameter being monitored?)	Cost (if not included in project budget)	Who (Is responsible for monitoring?)
During activity preparation	Access road to site Hoarding of site	Yes Yes	Observation and supervision Certification of payments	During construction	Reduce level of pollution from dust	Cost will be encompassed in Works Contract	FDL
During activity implementation	Noise and dust created during: Demolition Construction Management of demolition and construction waste	Yes Yes	Observation and supervision Certification of payments Building codes and standards will be incorporated into design and monitored during site supervision Contractor and engineer will agree on disposal site	On site supervision during demolition and construction	Safety of working population Proper waste disposal as enshrined in the St. Vincent and the Grenadines Waste Management Act and Regulations, Act No.31 of 2000	Cost will be encompassed in Works Contract	FDL



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ANNEX 1-Environmental Checklist

Part 6: Monitoring Plan during the Different Phases of Construction

Phase	What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)	When (Define the frequency / or continuous?)	Why (Is the parameter being monitored?)	Cost (if not included in project budget)	Who (Is responsible for monitoring?)
			Periodic checks by site supervisor				
During activity supervision	Verification of the works	Yes	Site visit by representation from the National Authorising Office and Ministry of Agriculture <i>et al.</i>	Periodic	To ensure compliance with contractual agreements		Ministry of Agriculture <i>et al.</i>



ANNEX 1: Environmental Checklist for Chateaubelair (Richmond) Greenhouse Park Site

DESCRIPTION OF ENVIRONMENTAL SETTING

1. PHYSICAL ENVIRONMENT

- a. Description of terrain (%slope):
Flat or Level (0-3)
Level of Undulating (3-8)
Undulating to Rolling (8-18)
Rolling of moderately steep (18-30)
Moderately steep to steeply Mountainous (30-50)
Very Steeply Mountainous (above 50)
- b. Is the area erosion prone? No
If so, what is the status: Slight Moderate Severe
- c. Are there existing natural hazards in the area, e.g., landslides, gulying? etc.?
No
- d. Is the site situated along a flood prone/storm surge area?
No
- e. Is the project beside or near the shoreline? No
If yes, How far? _____ Meters
- f. Are there water bodies found inside or near the project site? Yes
If yes please enumerate them: 1 No. River
- g. What is the Quality of water? Fresh Brackish Saline/Sally
- h. What is the quality of air? Poor Fair Good

2. Ecosystem Description

- a. Is the project immediately adjacent to a natural ecosystem? √ Yes; _____ No
If yes, please check on the appropriate box:
Forest Coastal/Marine Marshland



EMP FOR CONSTRUCTION OF A GREENHOUSE PARK IN CHATEAUBELAIR (RICHMOND) –

ANNEX 1-Environmental Checklist

Grassland Mangrove Wetland

Others, please specify _____

b. Is there any wild life in the area? No
If yes, please identify and enumerate: _____

c. Are there trees within the Project site? Yes
If yes, please identify and enumerate:
> 20; fruit trees: mango, plum, coconut

d. Is there other vegetation within the project site? No
If yes, please identify and enumerate:

3. Socio-Economical Environment

a. What is the total human population where the project is located?
_____ ; State source of information _____

b. Are there existing settlements that the proposed project would displace?
 Yes; √ No

If yes, indicate the number of:
_____ households/families
_____ legitimate landowners
_____ tenants
_____ informal dwellers

c. What will be the livelihood of the displaced families?

d. Are there existing social infrastructure within 200 metre radius from the project area?

Social Infrastructure	Yes/No	Type & No.
Schools	No	
Communications	Yes	1 Utility poles (telephone)
Health Centres/Clinics/ Hospitals	No	
Churches	No	
Transportation	No	
Roads	No	
Others (specify)	Yes	

Impact of proposed project on the environment

Characteristics of Project Activities:	Y/N	Observations/Specifics
1. Does the project involve construction or major rehabilitation of roads?	Y	Temporary bypass encroaches on site property
2. Does the project involve dam construction, reconstruction, rehabilitation, or strengthening?	N	
3. Does the project envisage hazardous materials management and disposal (e.g. asbestos, medical or infectious waste, solvents or gasoline) except small amounts normally encountered during construction?	N	
4. Will the project modify any coastal zone features, including reefs and/or marine life?	N	
5. Could the project activities impact any natural or protected areas or Forest Reserves located within 1 km of the Project?	N	
6. Are there any endangered plant or animal species in the site of the proposed construction?	N	<i>Identify the species</i>
7. Could the project impact or affect the habitat of endangered species of plants or animals?	N	
8. Would the project activities disrupt, trade and commerce or major economic activities of the communities close to the project site?	N	
9. Is the project within proximity of noise sensitive receptors like hospitals or schools?	N	<i>State how close</i>

Characteristics of Project Activities:	Y/N	Observations/Specifics
10. Could the project adversely affect critical resources such as drinking water?	N	<i>Will there be any diversions of drinking water?</i>
11. Could the project adversely affect natural waterways (streams, rivers, or wetlands) by sedimentation, pollution, flooding, draining, or filling)?	N	<i>State the nature of the impact</i>
12. Would the works adversely affect cultural property, including archeological and historical sites?	N	<i>Are there any archaeological/historical sites within 1 km radius of the project site</i>
13. 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)?	N	<i>Explain the nature of the proposed earth works</i>
14. Does the project involve the use of introduced, non-native species?	N	<i>State the species to be introduced and why</i>
15. Does the project involve the use of pesticides, herbicides, or other agents to destroy pests?	Y	These chemicals will be used during the operational phase in the greenhouses
16. Does the project pose a high risk of causing landslides, slips, slumps, rock-falls, debris-flows, or excessive erosion?	N	
17. Will the project result in the violation of national laws, international treaties and conventions, or the specific donor policy?	N	<i>Identify the laws, treaty or policy as applicable?</i>

Prepared by: D. Monrose

Date: 16/09/2015

Checked by: Vasantha Chase

Date: 20/10/2015

Annex 2: Design Model of the Chateaubelair (Richmond) Greenhouse Park



Annex 3: Site Photographs – Proposed Chateaubelair (Richmond) Greenhouse Park Site



Photo 1: View of 30ft wide access road adjacent to the site



Photo 2: View from southern boundary of the site



Photo 3: View of site and existing boxing plant



Photo 4: View of Richmond River



Photo 5: Erosion of access road due to Hurricane Tomas

**ENVIRONMENTAL MANAGEMENT PLAN
FOR THE CONSTRUCTION OF A
GREENHOUSE PARK IN MC MILLAN, MONTREAL
ST VINCENT AND THE GRENADINES**

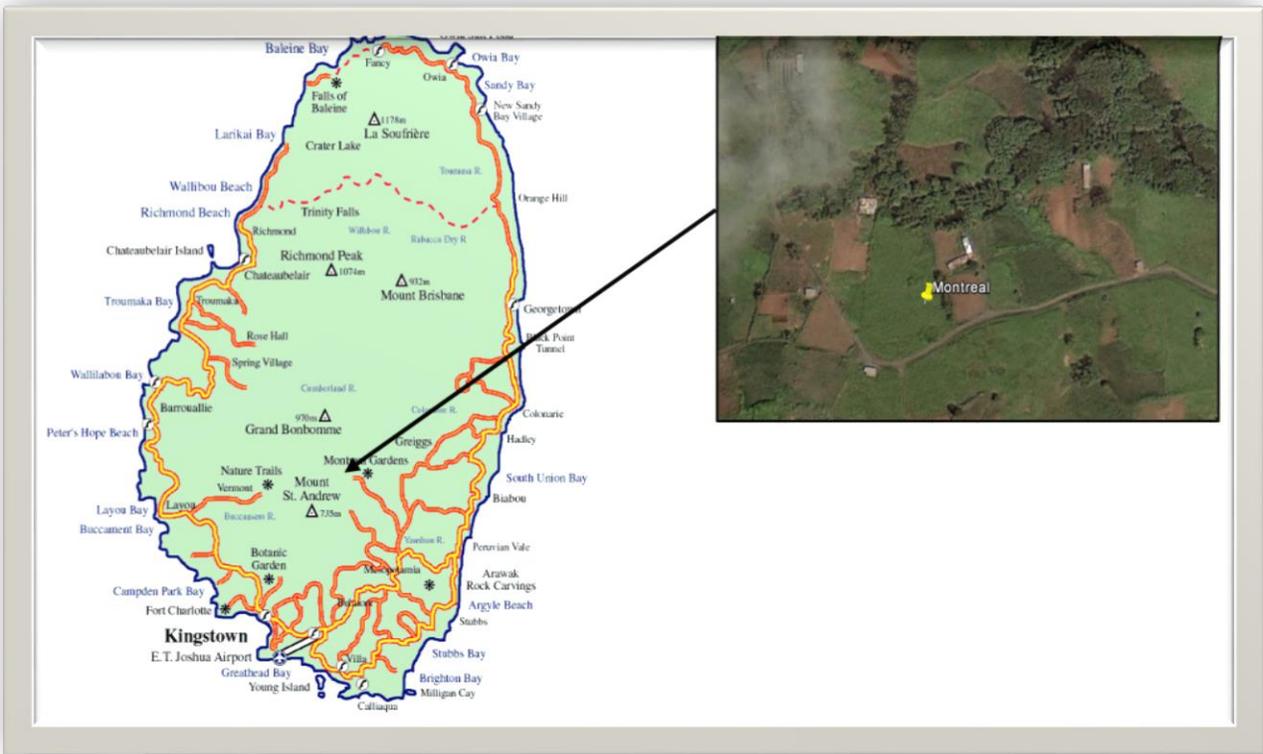


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ENVIRONMENTAL MANAGEMENT PLAN FOR THE CONSTRUCTION OF A GREENHOUSE PARK IN MC MILLAN, MONTREAL ST VINCENT AND THE GRENADINES

Background

The Government of St. Vincent and the Grenadines has selected Mc Millan in the Montreal area, as one of 3 sites to establish a greenhouse park. This is being undertaken under the Fruit and Vegetable component of the Banana Accompanying Measures BAM, a European Union funded programme to modernize and develop the agricultural sector in St. Vincent and the Grenadines.

The Ministry of Agriculture *et al.* will lead the process by establishing a pilot park with 15 greenhouses. Farmers, through cooperatives, will then develop and operate parks with up to 25 greenhouses, all at high altitudes for natural cooling, and equipped with solar and irrigation facilities. Ministry of Agriculture officials have been holding consultations in the selected site to update residents, and solicit feedback and advice on the parks project.

The Greenhouse Parks are expected to reduce the climate based seasonality of local vegetable production and supply. Farmers will be expected to supply more consistent quantity and quality, and thus secure better marketing arrangements especially with major local and overseas buyers. The project will also reduce imports, estimated at about EC\$16.86 million between 2006 and 2010. Farmers, through a hybrid cooperative structure which can incorporate business interests, will establish and operate the park which will comprise a total of 16 greenhouses that will be situated in pairs on the site with 4 pairs on either side of the proposed road. Each pair will measure 20mx19.2m with a 9m spacing (Size of greenhouse: 20x9.6m). A 4.5m road will provide access to greenhouses and buildings which will conjoin with main road. Please refer to Figure 1 below.

Introduction

The terms of reference require the Consultant to undertake an Environmental Impact Assessment (EIA) and to prepare an Environmental Management Plan (EMP). Following an Environmental Screening (ES) of the site it was determined that the level of impact on the environment would not be significant to require an EIA.

Environmental screening is undertaken to determine whether a proposed project falls into one of two groups:

- i. Those which will potentially significant environmental effects (if unmitigated) or are located in an area with complex environmental conditions and which therefore require more cautious planning efforts; or,
- ii. Those comprising uncomplicated works where the impacts are minimal (e.g., effects during



EMP FOR CONSTRUCTION OF A GREENHOUSE PARK IN MC MILLAN (MONTREAL)

construction of repairs and retrofitting) and which can be addressed through standardized or generic mitigation measures.

The completed checklist for the site is provided in Annex 1.

The objectives of this Environmental Management Plan (EMP) are to:

- i. ensure the safety of persons living, working and in school close to the construction site;
- ii. ensure the safety of the workers and the public;
- iii. protect the environment;
- iv. minimize inconveniences to the public during the execution of the works; and
- v. ensure compliance with legal requirements.

The Project Management team will be responsible for the implementation of this Environmental Management Plan. The Project Management team will also remain responsive in the event of changes occurring to the site conditions. The Contractor will adhere to the policies and principles which are set out in accordance to the Conditions of the Contract.

Implementation of this Environmental Management Plan involves:

- i. Identification of critical work activities, the safety and environmental implications of these activities and ways to mitigate any negative impact which they may have;
- ii. Regular collaboration with the Contractor; and
- iii. Continuous review of the Environmental Management Plan to adjust to changes in the site conditions.

The impact on the environment due to the implementation of this project, will be continually assessed and feedback will be provided, to the client, throughout.

For ease of reference this EMP is presented in a matrix and as a Checklist comprising of the following sections:

- Part 1 Institutional and Administrative Information
 - Site Description
 - Topographic description
 - Legislation
 - Public consultation
 - Institutional capacity building
- Part 2 Personnel
- Materials
- Part 3 Environmental/Social screening
- Part 4 Mitigation measures
- Part 5 Environmental Monitoring Plan
- Part 6 Monitoring Plan during the different phases of construction

The reference document for this EMP is the EIB Environmental and Social handbook:
(http://www.eib.org/attachments/strategies/environmental_and_social_practices_handbook_en.pdf)

Figure 1: Image showing general site layout



**EMP FOR THE CONSTRUCTION OF A GREENHOUSE PARK IN MC
MILLAN, MONTREAL
ST VINCENT AND THE GRENADINES**

PART 1: INSTITUTIONAL AND ADMINISTRATIVE

Location	Mc Millan – Montreal in the Marriagua Valley		
Name of Project	Construction of Greenhouse Parks in St. Vincent		
Scope of Project & Activity	Poverty Reduction, Agriculture, Food Security & Reduction of Non-Communicable Diseases (NCDs)		
	Project Management		
Institutional arrangements (Name and contacts)		Ministry of Agriculture, Rural Transformation, Forestry, Fisheries and Industry Contractor EMP Supervision	National Authorising Officer for EDF Operations Central Planning Division Ministry of Finance and Economic Planning
	Supervision		
Implementation arrangements (Name and contacts)		Project Implementation Management Team (PIMT) Ministry of Agriculture, Rural Transformation, Forestry, Fisheries and Industry Banana Accompanying Measures' (BAM) Fruit and Vegetable Component leader	National Authorising Office for EDF Operations
SITE DESCRIPTION			
Name of Site	MC MILLAN – MONTREAL, RICHMOND AND DANDRADE – ORANGE HILL		
Describe site location	<p>The property covers an area of 16.551.64 sq. m. It is bounded along the southern and western boundaries by an existing road and is bordered to the north by the Yambou River. Crown lands bound the eastern boundary. The property slopes gently northwards with a downward gradient of 4.5%.</p> <p>The vegetation on the surrounding hills is primarily elfin woodland and montane forest (above 500 m). The vegetation tends to be stunted because of the constant winds and moist climate in this elevation.</p>		

	<p>There are a number of agricultural plots, most of which are separated from one another by grass barriers. The crops grown are primarily dasheen and eddoes. Most of these crops will be displaced by the construction of the greenhouse park.</p> <p>Please refer to Annex 2 for a model of the Park.</p>
Who owns the land?	The lands belong to the Crown (State)
Geographic description	<p>The Mc Millan site is 446m above sea level. It is located in the Marriaquia Valley in Richmond Park along the south-east.</p> <p>Photographs are provided as Annex 3.</p>
Topographic description	<p>The topography is gently sloping from north to south; and is bounded by a river along the north-east The site is surrounded by secondary shrub and grasslands; and agricultural crops. There are some scattered coconut palms.</p>
LEGISLATION	
Identify national & local legislation & permits that apply to project activity	<ul style="list-style-type: none"> • <i>Forest Resource Conservation Act</i> (No.47, 1992) • <i>Natural Forest Resource Act</i> (1947) • <i>Town and Country Planning Act</i> (No.45, 1992)
PUBLIC CONSULTATION	
Identify when / where the public consultation process took place	<p>Since January 2015, representatives of farmers' groups in the Marriaquia community have come together for meetings as part of the current Greenhouse sensitization campaign, spearheaded by the Ministry of Agriculture, Further sensitisation consultations have been held for a wider representation of the farmers' groups.</p> <p>Additional consultations need to be held with farmers who will be losing some of their crops to the construction of the greenhouse park.</p>
INSTITUTIONAL CAPACITY BUILDING	
Will there be any capacity building?	<p>No []</p> <p>Yes[x] As part of the larger project</p>
PART 2: (a) PERSONNEL	
<p>Safety on the site will be a collective responsibility of all parties – management, employees and the public.</p> <ol style="list-style-type: none"> i. Personal safety equipment must be worn as prescribed for each job, such as: safety glasses for eye protection, hard hats, respiratory masks, gloves and safety shoes. ii. The unlawful manufacture, distribution dispensing, possession, or use of an illegal or controlled substance, and abuse of prescribed drugs, is prohibited in the workplace. All employees shall abide by the rules of this policy, and should notify the employer in writing of his/her conviction for a violation within 5 days after such conviction. iii. Employees shall inform the supervisor if he/she is taking strong prescription drugs that make them drowsy and/or warn against driving or using machinery. iv. Employees shall maintain a clean job site, and their working area free from rubbish, debris and clutter. v. Employers shall appoint within the rank of employees trained site safety representative(s). The Safety Representative shall assume responsibility and ensure that the guidelines/checklists are adhered to for the safeguard of all personnel and the environment. vi. Employees shall participate in safety and evacuation drills, activities or meetings organized for employees. 	

<p>In the event of Emergencies: Fire, Medical, Environmental</p>	<ol style="list-style-type: none"> i. The Safety Representative shall assume responsibility and ensure that all guidelines/checklists provided are adhered to for the safety of all personnel and the environment. ii. The Safety Representative shall designate a safe assembly point for workers in the event of a hazard occurring. iii. The Safety Representative shall maintain a First Aid Kit on site in order to provide First Aid and medical attention. iv. The Safety Representative shall immediately report all illnesses and injuries to the Contractor's emergency personnel and where necessary to the nearest emergency and/or medical centre. Notification of the injury shall also be made to the Project Manager. v. Only qualified personnel shall provide emergency services and medical transportation.
<p>Fire protection and prevention</p>	<p>Fire protection shall be provided during any construction activity that may pose a fire hazard, i.e. welding, flame cutting etc., and there shall be one fire extinguisher for each operation.</p> <ol style="list-style-type: none"> i. The Contractor shall provide the necessary quantity and type of fire protection equipment. ii. All necessary permits i.e. welding, cutting etc., shall be obtained and a fire watch program shall be in effect as needed. iii. There shall be one fire watch with no other duties assigned per open flame operation. iv. In the case of any fire, the Project Manager shall be notified. v. Within 72 hours of an emergency incident, the Safety Representative shall submit a written report to the Project Manager which includes the following information. <ul style="list-style-type: none"> • Type of fire • Cause of fire • Planned remedial action to prevent any future occurrences • Nature and outcome if any, all consequences not only to personnel but also to equipment and the project itself
<p>Site Security</p>	<p>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 conditions, 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 waste (construction and sanitary), 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>Worker Sanitation</p>	<p>Sanitation facilities shall be provided to site workers. All sanitary waste generated as a result of project activities shall be managed in a manner approved by the Project Manager. The Contractor shall provide a site sanitation plan for approval and implementation prior to the commencement of site activities.</p>
<p>PART 2: (b) Materials</p>	
<ol style="list-style-type: none"> i. 	<p>Materials shall be stored, handled, transported and used in accordance with manufacturer's guidelines and established industry standards (occupational health and safety).</p>



**EMP FOR CONSTRUCTION OF A GREENHOUSE PARK IN MC MILLAN
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- ii. The Contractor shall provide complete Material Data Safety Sheets for all materials used on the project.
- iii. Any unused chemicals shall be removed from the Site.
- iv. The use of containment for spill intervention shall be implemented when applicable



**EMP FOR CONSTRUCTION OF A GREENHOUSE PARK IN MC MILLAN
(MONTREAL)**

ANNEX 1-Environmental Checklist

PART 3: ENVIRONMENTAL/SOCIAL SCREENING			
	Activity	Status	Additional References
Will the site activity include/involve any of the following	A. Building rehabilitation	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	B. New construction	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	O. General Conditions
	C. Historic building(s) and districts	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	D. Acquisition of land ¹	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	E. Hazardous or toxic materials ²	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Hazardous waste from the use of chemicals in the greenhouses
	F. Impacts on forests and/or protected areas	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	All the sites are surrounded by hills under forest cover.
	G. Handling and management of waste	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	A. Construction Activities
	H. Pedestrian and traffic safety	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	D. Traffic and Pedestrian Safety
	I. Vulnerability to sea level rise	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	J. Coastal erosion	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	K. Loss of agricultural land	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	L. Diversion of water courses	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	M. Historic/cultural artifacts	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	N. Loss of flora	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	G, H. Farmers' crops will be destroyed by the construction
	O. Loss of fauna	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
	P. Landslides/subsidence	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	Q. Strom surge	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
R. Flooding	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
S. High winds	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
T. Seismic activity	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	E. Seismic Activity	

¹ Land acquisitions includes displacement of people, change of livelihood, encroachment on private property, land that is purchased/transferred and affects people who are living and/or squatters and/or operate a business (kiosks) on land that is being acquired

² Toxic / hazardous material includes and is not limited to toxic paints, removal of lead paint, animal carcasses, tissue pathogen etc.



**EMP FOR CONSTRUCTION OF A GREENHOUSE PARK IN MC MILLAN
(MONTREAL)**

ANNEX 1-Environmental Checklist

	U. Fisheries resources in the area	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	V. Tourism resources in the area	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
	X. Agriculture/farming	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
	Y. Soil erosion and Slippage	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
	Z. Surface Water (Rivers, included)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	B. Water Quality

PART 4: MITIGATION MEASURES

ACTIVITY	PARAMETER	MITIGATION MEASURES CHECKLIST
0. General Conditions	Occupation Health and Safety Issues	(a) The contractor must ensure that an Occupational Health and Safety Plan is in place to guide work activities, and provide a safe environment for workers. (b) The contractor must ensure that all workers operate within a safe environment. (c) All relevant Labour and Occupational Health and Safety regulations must be adhered to ensure worker safety. (d) Workers must be provided with necessary equipment as well as protective gear as per their specific tasks such as hard hats, overalls, gloves, goggles, boots, etc. (e) Sanitary facilities must be provided for all workers on site. (f) The contractor must ensure that there are basic medical facilities on site and that there are staff trained in basic first aid. (g) Appropriate posting of information within the site must be done to inform workers of key rules and regulations to follow.
A. General Rehabilitation and /or Construction Activities	Air Quality	(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. (d) Unpaved, dusty construction roads should be compacted and then wet periodically. (e) During interior demolition debris-chutes shall be used above the first floor. (f) Demolition debris shall be kept in controlled area and sprayed with water mist to reduce debris dust.

PART 4: MITIGATION MEASURES		
ACTIVITY	PARAMETER	MITIGATION MEASURES CHECKLIST
		<ul style="list-style-type: none"> (g) During pneumatic drilling/wall destruction dust shall be suppressed by ongoing water spraying and/or installing dust screen enclosures at site (h) The surrounding environment (sidewalks, roads) shall be kept free of debris to minimize dust. (i) There will be no open burning of construction / waste material at the site. (j) There will be no excessive idling of construction vehicles at sites. (k) The bins of all haulage vehicles transporting aggregate or building materials must be covered on all public roads.
	Noise	<ul style="list-style-type: none"> (a) Construction / work activities will occur within specified daylight hours e.g. 8:00 am to 4:00pm. (b) Community / public to be informed in advance of any work activities to occur outside of normal working hours or on weekends. (c) Sites should be hoarded wherever possible. (d) During operations, the engine covers of generators, air compressors and other powered mechanical equipment shall be closed, and equipment placed as far away from residential areas as possible. (e) There will be no excessive idling of construction vehicles at sites. (f) Noise suppression equipment or systems supplied by manufacture will be utilized. (g) Ensure all vehicles and equipment are properly serviced. (h) The contractor must develop and implement a public notification and noise management plan.
	Solid Waste Management (General)	<ul style="list-style-type: none"> (a) Contractor to develop and implement waste management plan. (b) Contractor to abide by all pertinent waste management and public health laws. (c) Waste collection and disposal pathways and sites will be identified for all major waste types expected from demolition and construction activities; and wastes generated during operations of the packing facilities. (d) Construction and demolition wastes will be stored in appropriate bins. (e) Liquid and chemical wastes will be stored in appropriate containers separated from the general refuse. (f) All waste will be collected and disposed of properly in approved landfills by licensed collectors. (g) The records of waste disposal will be maintained as proof for proper management as designed. (h) Whenever feasible the contractor will reuse and recycle appropriate and viable materials.



PART 4: MITIGATION MEASURES		
ACTIVITY	PARAMETER	MITIGATION MEASURES CHECKLIST
		(i) 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.
	Solid Waste Management (Hazardous)	(a) 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. (b) The containers of hazardous substances shall be placed in a leak-proof container to prevent spillage, leaching, or the escape of fumes. (c) The wastes shall be transported by specially licensed carriers and disposed in a licensed facility. (d) Paints with toxic ingredients or solvents or lead-based paints will not be used. (e) Banned chemicals will not be used on any project. (f) If termite 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.
B. Individual Wastewater Treatment System	Water Quality	(a) The approach to handling sanitary wastes and wastewater from building site (installation or reconstruction) must be approved by the local authorities (b) Before being discharged into receiving waters, effluents from individual wastewater systems must be treated in order to meet the minimal quality criteria set out by national guidelines on effluent quality and wastewater treatment (c) Monitoring of new wastewater systems (before/after) will be carried out (d) Construction vehicles and machinery will be washed only in designated areas where runoff will not pollute natural surface water bodies. (e) Ensure the construction materials do not get into any nearby river
Surface water		
C. Toxic Material	Toxic / hazardous waste management	(a) Temporarily storage on site of all hazardous or toxic substances will be in safe containers labeled with details of composition, properties and handling information (b) The containers of hazardous substances shall be placed in a leak-proof container to prevent spillage and leaching (c) The wastes shall be transported by specially licensed carriers and disposed in a licensed facility.

PART 4: MITIGATION MEASURES		
ACTIVITY	PARAMETER	MITIGATION MEASURES CHECKLIST
		(d) Paints with toxic ingredients or solvents or lead-based paints will not be used
D. Traffic and Pedestrian Safety	Direct or indirect hazards to public traffic and pedestrians by construction activities	(a) A traffic management plan to be developed and implemented by contractor. (b) Alternative routes to be identified in the instance of extended road works or road blockages. (c) The public to be notified of all disturbance to their normal routes. (d) Signposting, warning signs, barriers and traffic diversions must be clearly visible and the public warned of all potential hazards. (e) Provision must be made for the safe passages and crossings for all pedestrians where construction traffic interferes with their normal route. (f) 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. (g) Adjustment of working hours to local traffic patterns, e.g. avoiding major transport activities during rush hours or times of livestock movement.
E. Seismic Activity	Direct or indirect hazards as a result of seismic forces during earth tremors	(a) The contractor will closely adhere to all standards and building codes (ACI and IBC) established in the design. (b) The contractor will have in place an alert system to notify workers on site of seismic activity and to signal assembly at the designated point.
F. Soil Erosion and Slippage	Direct or indirect hazards as a result of excavation	(a) The contractor must ensure that appropriate erosion control measures such as silt fences are installed. (b) Proper site drainage must be implemented. (c) Ensure that the removal of soil is minimised and that any soils removed should be trucked to adequate location (d) Any drain clogged by construction material or sediment must be unclogged as soon as possible to prevent overflow and flooding. (e) The use of retaining structures and planting with deep rooted grasses to retain soil during and after works must be considered. (f) The use of bio-engineering methods must be considered as a measure to reduce erosion and land slippage.

PART 4: MITIGATION MEASURES		
ACTIVITY	PARAMETER	MITIGATION MEASURES CHECKLIST
		(g) Keep angle of slopes within limits of soil type. (h) Balance cut and fill to limit steepness of slopes. (i) All slopes and excavated areas must be monitored for movement.
G. Loss of Livelihoods	Direct results as a result of crops being removed from site	(a) The contractor must ensure that the farmers who will lose their livelihoods because of the loss of land – even if they were squatting – are compensated appropriately. (b) At least three months’ advance notice for crop harvest (c) In absence of advance notice, cash compensation based on annual value of the produce and calculated according to the Department of Agriculture norms (crop compensation) Cash compensation based on annual value of the produce and calculated according to the Department of Forestry (for trees compensation)
H. Loss of common property resources	Direct results as a result of grazing grounds for ruminants	Any CPR impacted will be replaced by the project



**EMP FOR CONSTRUCTION OF A GREENHOUSE PARK IN MC MILLAN
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ANNEX 1-Environmental Checklist

PART 4: MITIGATION MEASURES

ACTIVITY	PARAMETER	MITIGATION MEASURES CHECKLIST
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Part 5: ENVIRONMENTAL MONITORING PLAN to MITIGATE impacts from project activities

Category of Project	Impact Area	Mitigative Measures	Mitigation Responsibility	Monitoring	Frequency of Monitoring
New building and general construction	Occupational Health and Safety Issues	As per mitigative measures (a) to (g)	Contractor	Min of Agri., NAO	weekly
	Air Quality	As per mitigative measures (a) to (d) and (h) to (j)	Contractor	Min Agri., MOH, NAO	weekly
	Traffic Impacts	As per mitigative measures (b) to (e) and (g)	contractor	Min Agri., NAO	weekly
	Noise	As per mitigative measures (a) to (g)	Contractor	Min Agri., MOH, NAO	weekly
	Solid and Liquid Waste Management (general)	As per mitigative measures (a) to (i)	Contractor	Min Agri., NAO	weekly
	Solid and Liquid Waste Management (hazardous)	As per mitigative measures (a) to (f)	Contractor	Min Agri., NAO	weekly



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	Soil Erosion and Slippage	As per mitigative measures (a) to (i)	Contractor	Min of Agri., NAO	weekly
	Water quality	As per mitigative measure (e)	Contractor	Min of Agri., NAO	weekly



**EMP FOR CONSTRUCTION OF A GREENHOUSE PARK IN MC MILLAN
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ANNEX 1-Environmental Checklist

Part 6: Monitoring Plan during the Different Phases of Construction							
Phase	What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)	When (Define the frequency / or continuous?)	Why (Is the parameter being monitored?)	Cost (if not included in project budget)	Who (Is responsible for monitoring?)
During activity preparation	Access road to site	Yes	Observation and supervision Certification of payments	During construction	Reduce level of pollution from dust	Cost will be encompassed in Works Contract	FDL
During activity implementation	Noise and dust created during: Construction Management of construction waste	Yes Yes	Observation and supervision Certification of payments Building codes and standards will be incorporated into design and monitored during site supervision Contractor and engineer will agree on disposal site	On site supervision during demolition and construction	Safety of working population Proper waste disposal as enshrined in the St. Vincent and the Grenadines Waste Management Act and Regulations,	Cost will be encompassed in Works Contract	FDL



**EMP FOR CONSTRUCTION OF A GREENHOUSE PARK IN MC MILLAN
(MONTREAL)**

ANNEX 1-Environmental Checklist

Part 6: Monitoring Plan during the Different Phases of Construction

Phase	What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)	When (Define the frequency / or continuous?)	Why (Is the parameter being monitored?)	Cost (if not included in project budget)	Who (Is responsible for monitoring?)
			Periodic checks by site supervisor		Act No.31 of 2000		
During activity supervision	Verification of the works	Yes	Site visit by representation from the National Authorising Office and Ministry of Agriculture <i>et al.</i>	Periodic	To ensure compliance with contractual agreements		Ministry of Agriculture <i>et al.</i>



EMP FOR CONSTRUCTION OF A GREENHOUSE PARK IN MC MILLAN (MONTREAL)

ANNEX 1-Environmental Checklist

Others, please specify _____

b) Is there any wild life in the area? No
 If yes, please identify and enumerate: _____

c) Are there trees within the Project site? 5-10
 If yes, please identify and enumerate:
 coconut trees, bread fruit trees

d) Is there other vegetation within the project site? Yes
 If yes, please identify and enumerate:
 Cultivated root crops: dasheen, edoes

3. SOCIO-ECONOMICAL ENVIRONMENT

a) What is the total human population where the project is located?
 there is no human habitation in or around the site ; State source of information observation

b) Are there existing settlements that the proposed project would displace?
 Yes; √ No

If yes, indicate the number of:
 households/families
 legitimate landowners
 tenants
 informal dwellers

c) What will be the livelihood of the displaced families?
 The construction of the greenhouse park will displace farmers who now have short term root crops growing on the site. These farmers will be compensated for their crops.

d) Are there existing social infrastructure within 200 metre radius from the project area?

Social Infrastructure	Yes/No	Type & No.
Schools	NO	
Communications	NO	
Health Centres/Clinics/ Hospitals	NO	
Churches	NO	



EMP FOR CONSTRUCTION OF A GREENHOUSE PARK IN MC MILLAN (MONTREAL)

ANNEX 1-Environmental Checklist

Social Infrastructure	Yes/No	Type & No.
Transportation	NO	
Roads	YES	A secondary road leading to the site.
Others (specify)	NO	

Impact of proposed project on the environment		
Characteristics of Project Activities:	Y/N	Observations/Specifics
1) Does the project involve construction or major rehabilitation of roads?	Y	Rehabilitation (surfacing; new drains) of existing surfaced dressed road Access road on the site itself will not be repaired.
2) Does the project involve dam construction, reconstruction, rehabilitation, or strengthening?	N	
3) Does the project envisage hazardous materials management and disposal (e.g. asbestos, medical or infectious waste, solvents or gasoline) except small amounts normally encountered during construction?	N	
4) Will the project modify any coastal zone features, including reefs and/or marine life?	N	
5) Could the project activities impact any natural or protected areas or Forest Reserves located within 1 km of the Project?	N	
6) Are there any endangered plant or animal species in the site of the proposed construction?	N	<i>Identify the species</i>
7) Could the project impact or affect the habitat of endangered species of plants or animals?	N	
8) Would the project activities disrupt, trade and commerce or major economic activities of the communities close to the project site?	N	
9) Is the project within proximity of noise sensitive receptors like hospitals or schools?	N	<i>State how close</i>
10) Could the project adversely affect critical resources such as drinking water?	N	<i>Will there be any diversions of drinking water?</i>



EMP FOR CONSTRUCTION OF A GREENHOUSE PARK IN MC MILLAN (MONTREAL)

ANNEX 1-Environmental Checklist

11) Could the project adversely affect natural waterways (streams, rivers, or wetlands) by sedimentation, pollution, flooding, draining, or filling)?	N	<i>State the nature of the impact</i>
12) Would the works adversely affect cultural property, including archeological and historical sites?	N	<i>Are there any archaeological/historical sites within 1 km radius of the project site</i>
13) 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)?	N	<i>Explain the nature of the proposed earth works</i>
14) Does the project involve the use of introduced, non- native species?	N	<i>State the species to be introduced and why</i>
15) Does the project involve the use of pesticides, herbicides, or other agents to destroy pests?	Y	Crop production in greenhouses
16) Does the project pose a high risk of causing landslides, slips, slumps, rock-falls, debris-flows, or excessive erosion?	N	
17) Will the project result in the violation of national laws, international treaties and conventions, or the specific donor policy?	N	<i>Identify the laws, treaty or policy as applicable?</i>

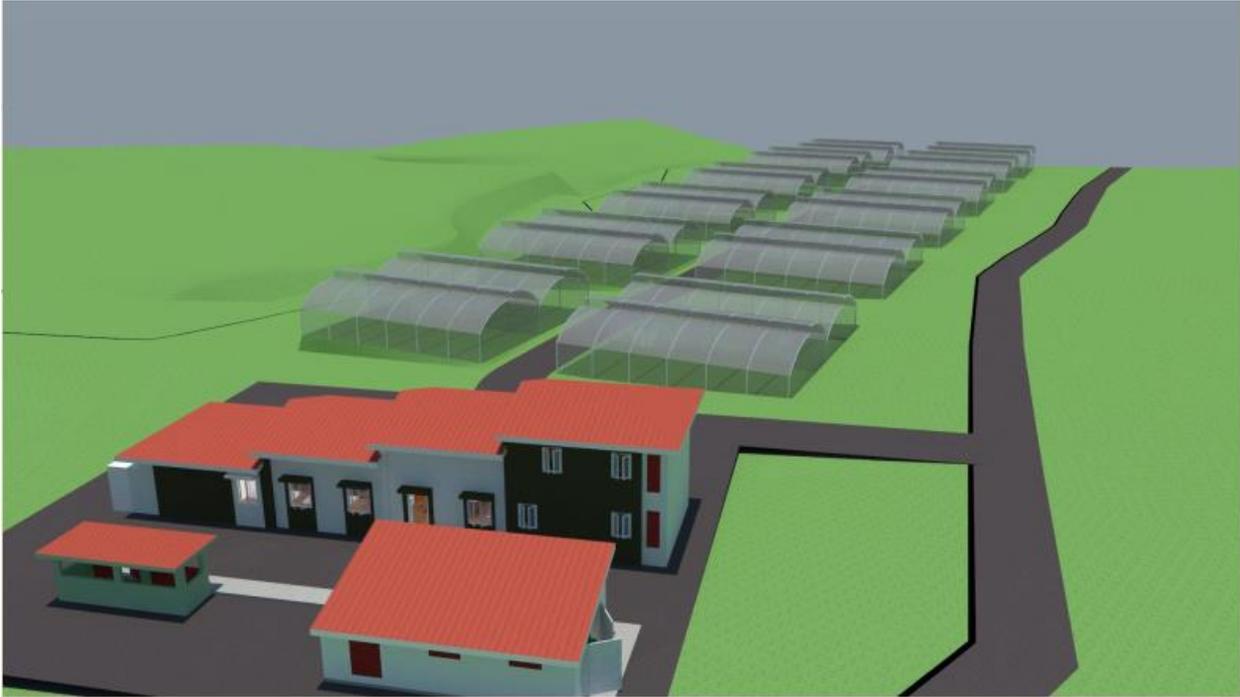
Prepared by: D. Monroe

Checked by: Vasantha Chase

Date: 16/09/2015

Date: 20/10/2015

Annex 2: Design Model of the Proposed Mc Millan Park



Annex 3: Site Photographs – Proposed Mac Millan Greenhouse Park Site



Photo 1: View of site from southern boundary



Photo 1: Fruit trees cultivated on the proposed site



Photo 3: View of site taken from the western approach



Photo 4: Root crops (dasheen) cultivated on the proposed site



Photo 5: View of access road from the eastern approach

ENVIRONMENTAL MANAGEMENT PLAN
FOR THE CONSTRUCTION OF A
GREENHOUSE PARK IN DANDRADE – ORANGE HILL
ST VINCENT AND THE GRENADINES

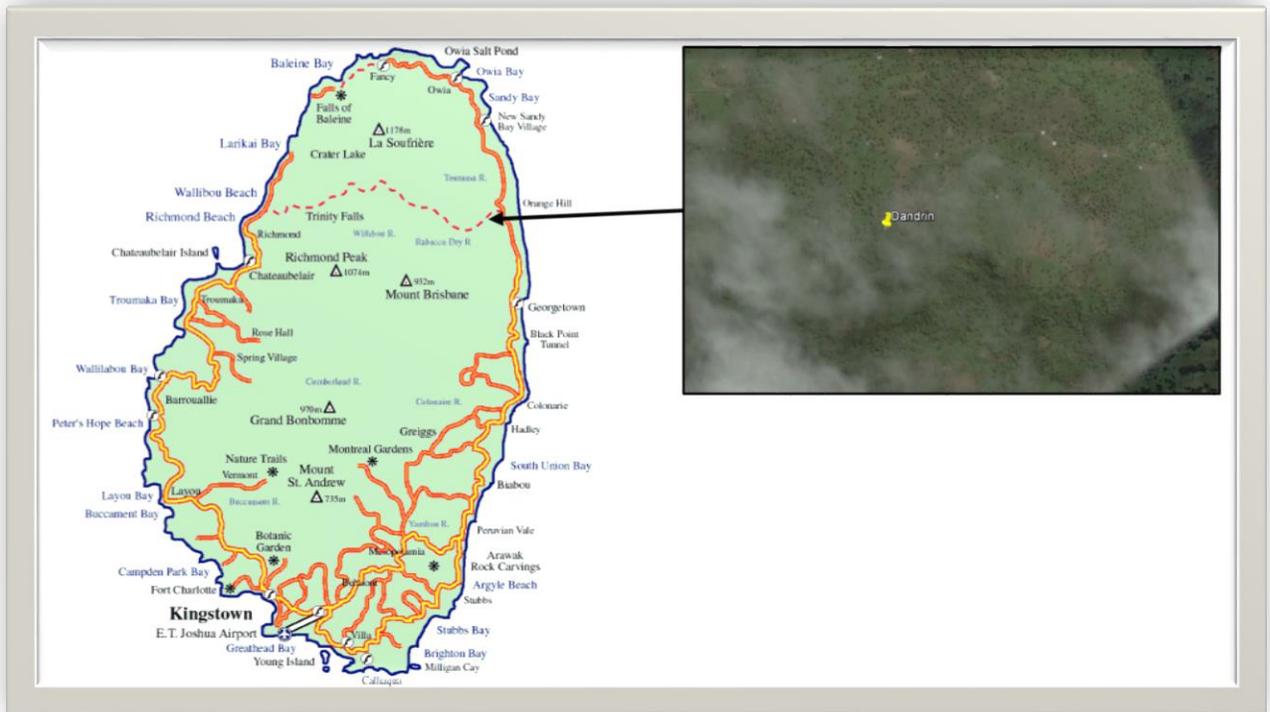


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ENVIRONMENTAL MANAGEMENT PLAN FOR THE CONSTRUCTION OF A GREENHOUSE PARK IN DANDRADE – ORANGE HILL ST VINCENT AND THE GRENADINES

Background

The Government of St. Vincent and the Grenadines has selected Dandre in Orange Hill, as one of 3 sites to establish a greenhouse park. This is being undertaken under the Fruit and Vegetable component of the Banana Accompanying Measures BAM, a European Union funded programme to modernize and develop the agricultural sector in St. Vincent and the Grenadines.

The Ministry of Agriculture *et al.* will lead the process by establishing a pilot park with 15 greenhouses. Farmers, through cooperatives, will then develop and operate parks with up to 25 greenhouses, all at high altitudes for natural cooling, and equipped with solar and irrigation facilities. Ministry of Agriculture officials have been holding consultations in the selected site to update residents, and solicit feedback and advice on the parks project.

The Greenhouse Parks are expected to reduce the climate based seasonality of local vegetable production and supply. Farmers will be expected to supply more consistent quantity and quality, and thus secure better marketing arrangements especially with major local and overseas buyers. The project will also reduce imports, estimated at about EC\$16.86 million between 2006 and 2010. Farmers, through a hybrid cooperative structure which can incorporate business interests, will establish and operate the park which will comprise a total of 16 greenhouses that will be situated in pairs on the site with 2 quadruples on either side of the proposed road. Each quadruple will measure 20m x 38.4m with a 14m spacing (Size of greenhouse: 20 x 9.6m). A 4.5m road will provide access to greenhouses and buildings which will conjoin with main road. Please refer to Figure 1 below.

Introduction

The terms of reference require the Consultant to undertake an Environmental Impact Assessment (EIA) and to prepare an Environmental Management Plan (EMP). Following an Environmental Screening (ES) of the site it was determined that the level of impact on the environment would not be significant to require an EIA.

Environmental screening is undertaken to determine whether a proposed project falls into one of two groups:

- i. Those which will potentially significant environmental effects (if unmitigated) or are located in an area with complex environmental conditions and which therefore require more cautious

- planning efforts; or,
- ii. Those comprising uncomplicated works where the impacts are minimal (e.g., effects during construction of repairs and retrofitting) and which can be addressed through standardized or generic mitigation measures.

The completed checklist for the site is provided in Annex 1.

The objectives of this Environmental Management Plan (EMP) are to:

- i. ensure the safety of persons living, working and in school close to the construction site;
- ii. ensure the safety of the workers and the public;
- iii. protect the environment;
- iv. minimise inconveniences to the public during the execution of the works; and
- v. ensure compliance with legal requirements.

The Project Management team will be responsible for the implementation of this Environmental Management Plan. The Project Management team will also remain responsive in the event of changes occurring to the site conditions. The Contractor will adhere to the policies and principles which are set out in accordance to the Conditions of the Contract.

Implementation of this Environmental Management Plan involves:

- i. Identification of critical work activities, the safety and environmental implications of these activities and ways to mitigate any negative impact which they may have;
- ii. Regular collaboration with the Contractor; and
- iii. Continuous review of the Environmental Management Plan to adjust to changes in the site conditions.

The impact on the environment due to the implementation of this project, will be continually assessed and feedback will be provided, to the client, throughout.

For ease of reference this EMP is presented in a matrix and as a Checklist comprising of the following sections:

- Part 1 Institutional and Administrative Information
 - Site Description
 - Topographic description
 - Legislation
 - Public consultation
 - Institutional capacity building
- Part 2 Personnel
- Materials
- Part 3 Environmental/Social screening
- Part 4 Mitigation measures
- Part 5 Environmental Monitoring Plan
- Part 6 Monitoring Plan during the different phases of construction



**EMP FOR CONSTRUCTION OF A GREENHOUSE PARK IN DANDRADE
(ORANGE HILL)**

The reference document for this EMP is the EIB Environmental and Social handbook:
(http://www.eib.org/attachments/strategies/environmental_and_social_practices_handbook_en.pdf)

Figure 1: Image showing general site layout



**EMP FOR THE CONSTRUCTION OF A GREENHOUSE PARK IN
DANDRADE – ORANGE HILL
ST VINCENT AND THE GRENADINES**

PART 1: INSTITUTIONAL AND ADMINISTRATIVE

Location	DANDRADE – ORANGE HILL		
Name of Project	Construction of Greenhouse Parks in St. Vincent		
Scope of Project & Activity	Poverty Reduction, Agriculture, Food Security & Reduction of Non-Communicable Diseases (NCDs)		
	Project Management		
Institutional arrangements (Name and contacts)		Ministry of Agriculture, Rural Transformation, Forestry, Fisheries and Industry Contractor EMP Supervision	National Authorising Officer for EDF Operations Central Planning Division Ministry of Finance and Economic Planning
	Supervision		
Implementation arrangements (Name and contacts)		Project Implementation Management Team (PIMT) Ministry of Agriculture, Rural Transformation, Forestry, Fisheries and Industry Banana Accompanying Measures' (BAM) Fruit and Vegetable Component leader	National Authorising Office for EDF Operations
SITE DESCRIPTION			
Name of Site	DANDRADE – ORANGE HILL		
Describe site location	It covers an area of 23,188.49 sq. m with a 9-meter road bordering the northern boundary. It slopes downward in a south easterly direction with a gradient of approximately 9.5%. A seasonal river runs along the southern boundary. The site is surrounded primarily by undeveloped land and secondary brush. Root crops, such as dasheen and eddoes are cultivated on the site itself. The farmers growing these crops are actually squatting on Crown lands. Be that as it may they should be compensated for the loss of their livelihoods.		Annex 2: Site Layout Model

Who owns the land?	The lands belong to the Crown (State)
Geographic description	The Dandrade site is 168m above sea level. It is located in the North east of the island along the Atlantic coast. Photographs are provided in Annex 3.
Topographic description	The topography is gently sloping from north to south, and is bounded by a seasonal river which runs along the southern boundary of the site approx. 0.3 km away. The site drains naturally and is therefore not prone to flooding. The site is surrounded by secondary shrub and grasslands, with some scattered coconut palms.
LEGISLATION	
Identify national & local legislation & permits that apply to project activity	<ul style="list-style-type: none"> • <i>Forest Resource Conservation Act (No.47, 1992)</i> • <i>Natural Forest Resource Act (1947)</i> • <i>Town and Country Planning Act (No.45, 1992)</i>
PUBLIC CONSULTATION	
Identify when / where the public consultation process took place	Meetings and consultations with farmer organisations have been spearheaded by the Ministry of Agriculture, under the Greenhouse Sensitisation Campaign. Further sensitisation consultations have been held for a wider representation of the farmers' groups.
INSTITUTIONAL CAPACITY BUILDING	
Will there be any capacity building?	No [] Yes[x] As part of the larger project
PART 2: (a) PERSONNEL	
<p>Safety on the site will be a collective responsibility of all parties – management, employees and the public.</p> <ol style="list-style-type: none"> i. Personal safety equipment must be worn as prescribed for each job, such as: safety glasses for eye protection, hard hats, respiratory masks, gloves and safety shoes. ii. The unlawful manufacture, distribution dispensing, possession, or use of an illegal or controlled substance, and abuse of prescribed drugs, is prohibited in the workplace. All employees shall abide by the rules of this policy, and should notify the employer in writing of his/her conviction for a violation within 5 days after such conviction. iii. Employees shall inform the supervisor if he/she is taking strong prescription drugs that make them drowsy and/or warn against driving or using machinery. iv. Employees shall maintain a clean job site, and their working area free from rubbish, debris and clutter. v. Employers shall appoint within the rank of employees trained site safety representative(s). The Safety Representative shall assume responsibility and ensure that the guidelines/checklists are adhered to for the safeguard of all personnel and the environment. vi. Employees shall participate in safety and evacuation drills, activities or meetings organised for employees. 	
In the event of Emergencies: Fire, Medical, Environmental	<ol style="list-style-type: none"> i. The Safety Representative shall assume responsibility and ensure that all guidelines/checklists provided are adhered to for the safety of all personnel and the environment. ii. The Safety Representative shall designate a safe assembly point for workers in the event of a hazard occurring. iii. The Safety Representative shall maintain a First Aid Kit on site in order to provide First Aid and medical attention. iv. The Safety Representative shall immediately report all illnesses and injuries to the Contractor's emergency personnel and where necessary

	<p>to the nearest emergency and/or medical centre. Notification of the injury shall also be made to the Project Manager.</p> <p>v. Only qualified personnel shall provide emergency services and medical transportation.</p>
Fire Protection and prevention	<p>Fire protection shall be provided during any construction activity that may pose a fire hazard, i.e. welding, flame cutting etc., and there shall be one fire extinguisher for each operation.</p> <p>i. The Contractor shall provide the necessary quantity and type of fire protection equipment.</p> <p>ii. All necessary permits i.e. welding, cutting etc., shall be obtained and a fire watch program shall be in effect as needed.</p> <p>iii. There shall be one fire watch with no other duties assigned per open flame operation.</p> <p>iv. In the case of any fire, the Project Manager shall be notified.</p> <p>v. Within 72 hours of an emergency incident, the Safety Representative shall submit a written report to the Project Manager which includes the following information:</p> <ul style="list-style-type: none"> • Type of fire • Cause of fire • Planned remedial action to prevent any future occurrences • Nature and outcome if any, all consequences not only to personnel but also to equipment and the project itself
Site Security	<p>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 conditions, 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 waste (construction and sanitary), additional strengthening of erosion control and soil stabilisation systems and other conditions resulting from Contractor activities which may increase the potential for damages.</p>
Worker Sanitation	<p>Sanitation facilities shall be provided to site workers. All sanitary waste generated as a result of project activities shall be managed in a manner approved by the Project Manager. The Contractor shall provide a site sanitation plan for approval and implementation prior to the commencement of site activities.</p>
PART 2: (b) Materials	
	<p>i. Materials shall be stored, handled, transported and used in accordance with manufacturer's guidelines and established industry standards (occupational health and safety).</p> <p>ii. The Contractor shall provide complete Material Data Safety Sheets for all materials used on the project.</p> <p>iii. Any unused chemicals shall be removed from the Site.</p> <p>iv. The use of containment for spill intervention shall be implemented when applicable</p>



**EMP FOR CONSTRUCTION OF A GREENHOUSE PARK IN DANDRADE
(ORANGE HILL)**

PART 3: ENVIRONMENTAL/SOCIAL SCREENING			
	Activity	Status	Additional References
Will the site activity include/involve any of the following?	A. Building rehabilitation	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	B. New construction	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	O. General Conditions
	C. Historic building(s) and districts	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	D. Acquisition of land ¹	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	E. Hazardous or toxic materials ²	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Hazardous waste from the use of chemicals in the greenhouses
	F. Impacts on forests and/or protected areas	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	The site is surrounded grasslands
	G. Handling and management of waste	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	A. Construction Activities
	H. Pedestrian and traffic safety	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	D. Traffic and Pedestrian Safety
	I. Vulnerability to sea level rise	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	J. Coastal erosion	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	K. Loss of agricultural land	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	L. Diversion of water courses	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	M. Historic/cultural artifacts	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	N. Loss of flora	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	G. Agricultural crops are presently grown on the site. No of affected farmers, type and quantity of crops to be determined
	O. Loss of fauna	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
	P. Landslides/subsidence	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	Q. Storm surge	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	R. Flooding	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	S. High winds	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	T. Seismic activity	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	E. Seismic Activity
	U. Fisheries resources in the area	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
V. Tourism resources in the area	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
X. Agriculture/farming	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
	Y. Soil erosion and Slippage	<input type="checkbox"/> Yes <input type="checkbox"/> No	F. Soil Erosion and Slippage
	Z. Surface Water (Rivers, included)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	B. Water Quality

¹ Land acquisitions includes displacement of people, change of livelihood, encroachment on private property- this is to land that is purchased/transferred and affects people who are living and/or squatters and/or operate a business (kiosks) on land that is being acquired

² Toxic / hazardous material includes and is not limited to toxic paints, removal of lead paint, animal carcasses, tissue pathogen etc.



**EMP FOR CONSTRUCTION OF A GREENHOUSE PARK IN DANDRADE
(ORANGE HILL)**

PART 4: MITIGATION MEASURES

ACTIVITY	PARAMETER	MITIGATION MEASURES CHECKLIST
0. General Conditions	Occupation Health and Safety Issues	<ul style="list-style-type: none"> (a) The contractor must ensure that an Occupational Health and Safety Plan is in place to guide work activities, and provide a safe environment for workers. (b) The contractor must ensure that all workers operate within a safe environment. (c) All relevant Labour and Occupational Health and Safety regulations must be adhered to ensure worker safety. (d) Workers must be provided with necessary equipment as well as protective gear as per their specific tasks such as hard hats, overalls, gloves, goggles, boots, etc. (e) Sanitary facilities must be provided for all workers on site. (f) The contractor must ensure that there are basic medical facilities on site and that there are staff trained in basic first aid. (g) Appropriate posting of information within the site must be done to inform workers of key rules and regulations to follow.
A. General Rehabilitation and /or Construction Activities	Air Quality	<ul style="list-style-type: none"> (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. (d) Unpaved, dusty construction roads should be compacted and then wet periodically. (e) During interior demolition debris-chutes shall be used above the first floor. (f) Demolition debris shall be kept in controlled area and sprayed with water mist to reduce debris dust. (g) During pneumatic drilling/wall destruction dust shall be suppressed by ongoing water spraying and/or installing dust screen enclosures at site (h) The surrounding environment (sidewalks, roads) shall be kept free of debris to minimize dust. (i) There will be no open burning of construction / waste material at the site. (j) There will be no excessive idling of construction vehicles at sites. (k) The bins of all haulage vehicles transporting aggregate or building materials must be covered on all public roads.

PART 4: MITIGATION MEASURES

ACTIVITY	PARAMETER	MITIGATION MEASURES CHECKLIST
	Noise	<ul style="list-style-type: none"> (a) Construction / work activities will occur within specified daylight hours e.g. 8:00 am to 4:00pm. (b) Community / public to be informed in advance of any work activities to occur outside of normal working hours or on weekends. (c) Sites should be hoarded wherever possible. (d) During operations, the engine covers of generators, air compressors and other powered mechanical equipment shall be closed, and equipment placed as far away from residential areas as possible. (e) There will be no excessive idling of construction vehicles at sites. (f) Noise suppression equipment or systems supplied by manufacture will be utilized. (g) Ensure all vehicles and equipment are properly serviced. (h) The contractor must develop and implement a public notification and noise management plan.
	Solid Waste Management (General)	<ul style="list-style-type: none"> (a) Contractor to develop and implement waste management plan. (b) Contractor to abide by all pertinent waste management and public health laws. (c) Waste collection and disposal pathways and sites will be identified for all major waste types expected from demolition and construction activities; and wastes generated during operations of the packing facilities. (d) Construction and demolition wastes will be stored in appropriate bins. (e) Liquid and chemical wastes will be stored in appropriate containers separated from the general refuse. (f) All waste will be collected and disposed of properly in approved landfills by licensed collectors. (g) The records of waste disposal will be maintained as proof for proper management as designed. (h) Whenever feasible the contractor will reuse and recycle appropriate and viable materials. (i) 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.

PART 4: MITIGATION MEASURES

ACTIVITY	PARAMETER	MITIGATION MEASURES CHECKLIST
	Solid Waste Management (Hazardous)	(a) 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. (b) The containers of hazardous substances shall be placed in a leak-proof container to prevent spillage, leaching, or the escape of fumes. (c) The wastes shall be transported by specially licensed carriers and disposed in a licensed facility. (d) Paints with toxic ingredients or solvents or lead-based paints will not be used. (e) Banned chemicals will not be used on any project. (f) If termite 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.
B. Individual Wastewater Treatment System	Water Quality	(a) The approach to handling sanitary wastes and wastewater from building site (installation or reconstruction) must be approved by the local authorities (b) Before being discharged into receiving waters, effluents from individual wastewater systems must be treated in order to meet the minimal quality criteria set out by national guidelines on effluent quality and wastewater treatment (c) Monitoring of new wastewater systems (before/after) will be carried out (d) Construction vehicles and machinery will be washed only in designated areas where runoff will not pollute natural surface water bodies. (e) Ensure the construction materials do not get into any nearby river
Surface water		
C. Toxic Material	Toxic / hazardous waste management	(a) Temporarily storage on site of all hazardous or toxic substances will be in safe containers labeled with details of composition, properties and handling information (b) The containers of hazardous substances shall be placed in a leak-proof container to prevent spillage and leaching (c) The wastes shall be transported by specially licensed carriers and disposed in a licensed facility. (d) Paints with toxic ingredients or solvents or lead-based paints will not be used

PART 4: MITIGATION MEASURES

ACTIVITY	PARAMETER	MITIGATION MEASURES CHECKLIST
<p>D. Traffic and Pedestrian Safety</p>	<p>Direct or indirect hazards to public traffic and pedestrians by construction activities</p>	<p>(a) A traffic management plan to be developed and implemented by contractor. (b) Alternative routes to be identified in the instance of extended road works or road blockages. (c) The public to be notified of all disturbance to their normal routes. (d) Signposting, warning signs, barriers and traffic diversions must be clearly visible and the public warned of all potential hazards. (e) Provision must be made for the safe passages and crossings for all pedestrians where construction traffic interferes with their normal route. (f) 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. (g) Adjustment of working hours to local traffic patterns, e.g. avoiding major transport activities during rush hours or times of livestock movement.</p>
<p>E. Seismic Activity</p>	<p>Direct or indirect hazards as a result of seismic forces during earth tremors</p>	<p>(a) The contractor will closely adhere to all standards and building codes (ACI and IBC) established in the design. (b) The contractor will have in place an alert system to notify workers on site of seismic activity and to signal assembly at the designated point.</p>
<p>F. Soil Erosion and Slippage</p>	<p>Direct or indirect hazards as a result of excavation</p>	<p>(a) The contractor must ensure that appropriate erosion control measures such as silt fences are installed. (b) Proper site drainage must be implemented. (c) Any drain clogged by construction material or sediment must be unclogged as soon as possible to prevent overflow and flooding. (d) The use of retaining structures and planting with deep rooted grasses to retain soil during and after works must be considered. (e) The use of bio-engineering methods must be considered as a measure to reduce erosion and land slippage. (f) Keep angle of slopes within limits of soil type.</p>

PART 4: MITIGATION MEASURES

ACTIVITY	PARAMETER	MITIGATION MEASURES CHECKLIST
		(g) Balance cut and fill to limit steepness of slopes. (h) All slopes and excavated areas must be monitored for movement.
G. Loss of Livelihoods	Direct results as a result of crops being removed from site	(a) The contractor must ensure that the farmers who will lose their livelihoods because of the loss of land – even if they were squatting – are compensated appropriately (in accordance with the Laws of St. Vincent and the Grenadines) (b) At least three months’ advance notice for crop harvest (c) In absence of advance notice, cash compensation based on annual value of the produce and calculated according to the Department of Agriculture norms (crop compensation) (d) Cash compensation based on annual value of the produce and calculated according to the Department of Forestry (for trees compensation)
H. Loss of common property resources	Direct results as a result of grazing grounds for ruminants	(a) Any CPR impacted will be replaced by the project

Part 5: ENVIRONMENTAL MONITORING PLAN to MITIGATE impacts from project activities

Category of Project	Impact Area	Mitigative Measures	Mitigation Responsibility	Monitoring	Frequency of Monitoring
New building and general construction	Occupational Health and Safety Issues	As per mitigative measures (a) to (g)	Contractor	Min of Agri., NAO	weekly
	Air Quality	As per mitigative measures (a) to (k)	Contractor	Min Agri., MOH, NAO	weekly
	Traffic Impacts	As per mitigative measures (a) to (g)	contractor	Min Agri., NAO	weekly
	Noise	As per mitigative measures (a) to (h)	Contractor	Min Agri., MOH, NAO	weekly
	Solid and Liquid Waste Management (general)	As per mitigative measures (a) to (i)	Contractor	Min Agri., NAO	weekly
	Solid and Liquid Waste Management (hazardous)	As per mitigative measures (a) to (f)	Contractor	Min Agri., NAO	weekly
	Soil Erosion and Slippage	As per mitigative measures (a) to (h)	Contractor	Min Agri., NAO	weekly
	Water quality	As per mitigative measure (e)	Contractor	Min of Agri., NAO	weekly

Part 6: Monitoring Plan during the Different Phases of Construction

Phase	What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)	When (Define the frequency / or continuous?)	Why (Is the parameter being monitored?)	Cost (if not included in project budget)	Who (Is responsible for monitoring?)
During activity preparation	Access road to site	Yes	Observation and supervision Certification of payments	During construction	Reduce level of pollution from dust	Cost will be encompassed in Works Contract	FDL
During activity implementation	Noise and dust created during: Construction Management of construction waste	Yes Yes	Observation and supervision Certification of payments Building codes and standards will be incorporated into design and monitored during site supervision Contractor and engineer will agree on disposal site	On site supervision during demolition and construction	Safety of working population Proper waste disposal as enshrined in the St. Vincent and the Grenadines Waste Management Act and Regulations, Act No.31 of 2000	Cost will be encompassed in Works Contract	FDL

Part 6: Monitoring Plan during the Different Phases of Construction

Phase	What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)	When (Define the frequency / or continuous?)	Why (Is the parameter being monitored?)	Cost (if not included in project budget)	Who (Is responsible for monitoring?)
			Periodic checks by site supervisor				
During activity supervision	Verification of the works	Yes	Site visit by representation from the National Authorising Office and Ministry of Agriculture <i>et al.</i>	Periodic	To ensure compliance with contractual agreements		Ministry of Agriculture <i>et al.</i>



EMP FOR CONSTRUCTION OF A GREENHOUSE PARK IN DANDRADE (ORANGE HILL) –

Annex 1 – Environmental Screening Checklist

b) Is there any wild life in the area? No
 If yes, please identify and enumerate: _____

c) Are there trees within the Project site? 5-10
 If yes, please identify and enumerate:
 coconut trees, bread fruit trees

d) Is there other vegetation within the project site? No
 If yes, please identify and enumerate:

3. SOCIO-ECONOMICAL ENVIRONMENT

a) What is the total human population where the project is located?
 _____; State source of information _____

b) Are there existing settlements that the proposed project would displace?
 Yes; √ No

If yes, indicate the number of:
 _____ households/families
 _____ legitimate landowners
 _____ tenants
 _____ informal dwellers

c) What will be the livelihood of the displaced families?

d) Are there existing social infrastructure within 200 metre radius from the project area?

Social Infrastructure	Yes/No	Type & No.
Schools	NO	
Communications	NO	
Health Centres/Clinics/ Hospitals	NO	
Churches	NO	
Transportation	NO	
Roads	YES	A secondary road leading to the site.
Others (specify)	NO	

Impact of proposed project on the environment		
Characteristics of Project Activities:	Y/N	Observations/Specifics
1) Does the project involve construction or major rehabilitation of roads?	Y	Rehabilitation (surfacing; new drains) of existing surfaced dressed road
2) Does the project involve dam construction, reconstruction, rehabilitation, or strengthening?	N	
3) Does the project envisage hazardous materials management and disposal (e.g. asbestos, medical or infectious waste, solvents or gasoline) except small amounts normally encountered during construction?	N	
4) Will the project modify any coastal zone features, including reefs and/or marine life?	N	
5) Could the project activities impact any natural or protected areas or Forest Reserves located within 1 km of the Project?	N	
6) Are there any endangered plant or animal species in the site of the proposed construction?	N	<i>Identify the species</i>
7) Could the project impact or affect the habitat of endangered species of plants or animals?	N	
8) Would the project activities disrupt, trade and commerce or major economic activities of the communities close to the project site?	N	
9) Is the project within proximity of noise sensitive receptors like hospitals or schools?	N	<i>State how close</i>
10) Could the project adversely affect critical resources such as drinking water?	N	<i>Will there be any diversions of drinking water?</i>
11) Could the project adversely affect natural waterways (streams, rivers, or wetlands) by sedimentation, pollution, flooding, draining, or filling)?	N	<i>State the nature of the impact</i>
12) Would the works adversely affect cultural property, including archeological and historical sites?	N	<i>Are there any archaeological/historical sites within 1 km radius of the project site</i>



EMP FOR CONSTRUCTION OF A GREENHOUSE PARK IN DANDRADE (ORANGE HILL) –

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13) 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)?	N	<i>Explain the nature of the proposed earth works</i>
14) Does the project involve the use of introduced, non- native species?	N	<i>State the species to be introduced and why</i>
15) Does the project involve the use of pesticides, herbicides, or other agents to destroy pests?	Y	Crop production in greenhouses
16) Does the project pose a high risk of causing landslides, slips, slumps, rock-falls, debris-flows, or excessive erosion?	N	
17) Will the project result in the violation of national laws, international treaties and conventions, or the specific donor policy?	N	<i>Identify the laws, treaty or policy as applicable?</i>

Prepared by: D. Monroe

Checked by: Vasantha Chase

Date: 16/09/2015

Date: 20/10/2015

Annex 2: Design Model of the Proposed Dandrade Greenhouse Park



Annex 3: Site Photographs – Proposed Dandrade Site



Photo 1: View of proposed site taken along northern boundary



Photo 2: Access road adjacent to northern boundary



Photo 3: View of existing irrigation lines along northern section of the site



Photo 4: View of structure housing an existing irrigation system