

**Caribbean Community Climate Change Centre (CCCCC)
SPECIAL PROGRAM FOR ADAPTATION TO CLIMATE CHANGE
Implementation of Adaptation Measures in Coastal Zones (SPACC) Project**

**Environmental Management Plan (EMP)
for the
Construction of Rainwater Harvesting and Waste Water Recycling Facility
at the Coconut Bay Beach Resort and Spa
in Vieux Fort, Saint Lucia**



**By Alison King-Joseph
July 4, 2011**

Technical Report 5C/SPACC-11-07-01

Copyright © 2012 by Caribbean Community Climate Change Centre

Contents

| | |
|---|----|
| Introduction..... | 1 |
| Description of works..... | 3 |
| Potential environmental/social risks, specific mitigation measures, and responsibility for implementation | 4 |
| Anticipated Construction Impacts and Recommended Impact Mitigation/Benefit Enhancement Measures | 5 |
| Contract technical specifications of environmental/social significance | 26 |
| Register of permissions and consents required, with responsibilities allocated | 30 |
| Identification of environmental roles to be met by contractor staff..... | 31 |
| CONTRACTOR | 31 |
| SENIOR SITE STAFF..... | 31 |
| SUPERVISORS | 32 |
| EMPLOYEES | 32 |
| Contingency plans for major incidents | 33 |
| Procedures for reporting incidents (e.g., spillages/ pollution, accidents, archaeological finds)... | 37 |
| Appendix 1: REPORTING FORMAT FOR ENVIRONMENTAL MANAGEMENT PLAN (EMP) | 39 |

Abbreviations

| | |
|---------|--|
| C&D | Construction and Demolition |
| CBBRAS | Coconut Bay Beach Resort and Spa |
| CCCCC | Caribbean Community Climate Change Centre |
| CFC | Chloro-floro carbons |
| DCA | Development Control Authority |
| EMP | Environmental Management Plan |
| GEF | Global Environment Fund |
| LIME | Landline, Internet, Mobile, Entertainment |
| LUCELEC | Saint Lucia electricity Services |
| ODS | Ozone depleting Substances |
| PPE | Personal Protective Equipment |
| SPACC | Special Programme for Adaptation to Climate Change |
| SWMA | Saint Lucia Solid Waste Management Authority |
| TOR | Terms of Reference |
| WASCO | Water and Sewerage Company Ltd |

Environmental Management Plan (EMP)
Construction of Rainwater Harvesting and Waste Water Recycling Facility
at the Coconut Bay Beach Resort and Spa
in Vieux Fort, Saint Lucia

Introduction

O. B. Sadoo Engineering Services Ltd was notified of contract award for the *Construction of Rainwater Harvesting and Waste Water Recycling Facility* at the Coconut Bay Beach Resort and Spa (CBBRAS) in Vieux Fort, on April 6, 2011. Works are expected to commence in late May 2011. Specifically, the works involve (1) the construction of two 25 thousand litre water storage tanks with complimentary pipe network to harvest rainwater from the roofs of the resort to be used for toilet flushing, pool top-up, etc., and, (2) construction of irrigation network for the recycling of sewer wastewater to be used in landscaping.

These works are co-funded under a Grant Agreement between the World Bank, acting as the implementing agency for the Global Environment Fund (GEF), and the Caribbean Community Climate Change Centre (CCCCC), acting as the executing agency, for the implementation of the Special Programme for Adaptation to Climate Change: Implementation of Adaptation Measures in Coastal Zones (SPACC) Project. The main objective of this SPACC project is to support efforts by Dominica, Saint Lucia and St. Vincent and the Grenadines to implement specific (integrated) pilot adaptation measures addressing the impacts of climate change on the natural resource base of the region, focused on biodiversity and land degradation along coastal and near-coastal areas.

In Saint Lucia, this CBBRAS project is one of the pilot adaptation measures identified to complement the national water supply programme by establishing adaptation measures that increase resilience to the impacts of climate change and variability. In this regard, the SPACC project will co-finance a pilot project with a private sector entity, Coconut Bay Beach Resort and Spa, aimed at conserving water and making available additional water from Water and Sewerage Company (WASCO) for residents of Vieux Fort.. Overall, the Project intends to:

- Reduce the consumption of WASCO-produced water by CBBRAS, thereby augmenting the water availability and supply of residents in the Vieux-Fort community and reducing investment by WASCO in infrastructure to serve the same

- Facilitate the increased resilience of adjacent marine ecosystems and the improved viability of the adjacent Pointe Sable Environmental Protection Area (PSEPA)
- Enhance the awareness of hotel owners, managers, entrepreneurs and other relevant persons to the anticipated impacts of climate change
- Demonstrate the application of climate change adaptation responses in an effort to encourage and promulgate adaptive replication by hotel owners, managers other entrepreneurs
- Inform and encourage the development of guidelines for the installation of water conservation systems, as part of the Government of Saint Lucia/Development Control Authority (GOSL/DCA) approval process for all new hotels and other commercial establishments in Saint Lucia

Alison King-Joseph was contracted by Caribbean Community Climate Change Centre (CCCCC) in October 2009, amended in February 2011 to assist the CCCCC with oversight of this process to ensure that the World Bank's guidelines are maintained in the selection and award of the contract; to monitor the progress of the works and certify eligible expenditures.

The specific tasks for which Alison King-Joseph has been contracted (as amended in February 2011) are:

Task 1. Review of the Designs and Estimates for the Works to Establish the Water Conservation Pilot

Task 2. Revision of Tendering Documents and Assist in Tendering Process

Task 3. Monitor Works, Recommend Payments and Prepare and Submit Reports

Task 4. Assist in the Preparation of Cabinet Paper for the Incorporation of Water Conservation Projects into Other Developments

Task 5. Preparation of an Environmental Management Plan (EMP)

This document is submitted in fulfilment of Task 5. TOR for Task 5 are contained in Appendix 1 attached.

Description of works

The works include all permanent and temporary works required for the proposed construction of a rain water harvesting and waste water recycling facility at the Coconut Bay Beach Resort and Spa in Vieux Fort, Saint Lucia. The worksite is within an operating resort, and will use the main access road used by all visitors and staff.

For the rainwater harvesting system, the works include the construction of two underground reinforced concrete storage tanks, and the installation of horizontal pipes along the third and fourth floors of the existing guest wing to intercept rainwater from the roof and carry it to the storage tanks via newly installed downpipes. Pipework will also be installed for the transmission of harvested rainwater to the various floors of the building blocks as necessary.

For the recycling of treated wastewater, a reinforced concrete open tank will be constructed to contain the treated waste, and a sprinkler system installed, through which the effluent shall be discharged to irrigate the premises on a daily basis. The system will be operated by CBBRAS at night to minimize human contact with the treated waste. Landscaping and planting will be reinstated as required.

Both initiatives include the installation of pumps and pipes for the transmission of rainwater and waste water as required. Two small pump houses will be built out of blockwork.

Accommodation for the Engineer, plant yard, workshops, offices for the Contractor, his staff and employees will be constructed as the Contractor considers appropriate.

There is a small ravine adjacent to the wastewater treatment plant and proposed wastewater treatment plant effluent tank, and this will receive overflow from the effluent storage tank, in the event that inflows from treatment plant exceed irrigation requirements. This ravine discharges into the adjacent coastal area.

The site will be accessed by Contractor staff via the CBBRAS main gate, and by heavy equipment and trucks via the CBBRAS back gate.

Potential environmental/social risks, specific mitigation measures, and responsibility for implementation

Table 1 provides details of potential direct and indirect, on-site and off-site impacts associated with the project according to the phase (pre-construction and construction respectively) in which they may occur. Impacts are subdivided into groups associated with component activities.

Potentially adverse impacts are denoted by a “-”, and potentially beneficial impacts by a “+”. The tables identify:

- Impacts which are unlikely to occur, or are unlikely to be significant (categorised as “non-sig.”), because the nature and scope of works and/or the operational characteristics of the project are such that the causal agents responsible for impact are either absent or are of negligible magnitude, or sensitive receptors do not exist.
- Minor beneficial and adverse impacts which are either not significant or are of low significance (categorised as “low”).
- Key beneficial and adverse impacts (categorised as “mod” or “high”), classified into those which are of moderate or high significance and are likely to have a major influence on the overall environmental performance of the project.

The significance level of potential impacts was assessed subjectively, taking into account such factors as areal extent and/or numbers of separate locations/persons which might be affected, duration, reversibility, likelihood of occurrence and severity, the latter referring to the degree of change from the baseline state and taking into account the value ascribed to the environmental component or components likely to be affected.

Evaluation of potential impact significance is based on the assumption that no specific action will be taken to prevent an impact occurring, or to minimise occurrence. In this respect, the impact assessment presents a “worst case” scenario. However, the recommended benefit enhancement and mitigation measures which have been or should be adopted are also indicated in the tables. In all instances, recommended mitigation measures are designed to adequately address impacts cited.

Anticipated Construction Impacts and Recommended Impact Mitigation/Benefit Enhancement Measures

The impacts contained in the following table are organised as follows:

- 1 Workforce Deployment.
 - 1.1 Creation of construction employment opportunities for local residents.
 - 1.2 Disturbance of hotel guests and employees by Contractor's workforce.
 - 1.3 Health and safety hazards to the workforce arising from participating in an inherently dangerous occupation.
 - 1.4 Environmental damage caused by the workforce.
- 2. Site clearance and earthworks.
 - 2.1 Increases in the silt load of drains resulting in impairment of drainage system function and adverse effects on marine and water quality.
 - 2.2 Increased erosion and sediment levels in the bay as a result of site clearance and construction activities.
 - 2.3 Smoke and odour nuisance arising from on-site burning of construction waste.
 - 2.4 Fire damage to surrounding properties.
 - 2.5 Noise, vibration & dust nuisance during earthworks.
 - 2.6 Damage to archaeological sites and protected areas.
 - 2.7 Damage to cultural heritage.
 - 2.8 Initiation of instability arising from changes in natural slope geometry, with adverse implications for workforce safety during construction.
- 3 General construction operations.
 - 3.1 Land and water pollution and public health hazards arising from inappropriate/ inadequate liquid waste disposal practices and spillages/ leakages of contaminating materials at the worksite.
 - 3.2 Land and water pollution, public health hazards and reduction in amenity value, arising from inappropriate/ inadequate sewage disposal practices.
 - 3.3 Land and water pollution, public health hazards, landscape degradation and reduction in amenity value, arising from inappropriate/ inadequate solid waste disposal practices.
 - 3.4 Hazards associated with roadside storage of construction materials and parking of plant and vehicles.
 - 3.5 Impedance of access to/from areas adjacent to the worksite.
 - 3.6 Interference with traffic due to disposal of demolition and construction wastes, and other wastes.
 - 3.7 Increased road safety hazards and inconvenience to road users and the general public caused by the construction traffic/works interfering with normal traffic flow.
 - 3.8 Damage to existing road pavements and structures caused by overloaded haulage traffic.
 - 3.9 Generation of road safety hazards on haul routes.
 - 3.10 Depletion of finite non-renewable natural resources.

- 3.11 Diminished aesthetics of the site from the adjacent resort areas.
- 3.12 Competition for scarce potable water resources with existing users.
- 3.13 Competition with existing users for power supply during construction.
- 3.14 Damage to and interference with public and privately owned services.
- 3.15 Creation of dust nuisance from construction activities on- and off- site.
- 3.16 Creation of noise nuisance and air pollution caused by haulage vehicles/ construction plant and machinery operation.
- 3.18 Contamination of adjacent grounds by wastewater plant effluent.
- 3.18 Increase in emissions of ozone-depleting substances (ODS)
- 3.19 Land sterilisation/ reduction in post-construction land use options, adverse roadside or landscape visual impact and public health and safety hazards, arising from inadequate worksite clearance on completion of construction.
- 4.0 Concrete works
- 4.1 Dust and other air pollution arising from the operation of concrete plant.
- 4.2 Pollution of waterbodies and fish kills, resulting from entry of cement dust, fresh concrete and mixer wash water.

Table 1. Anticipated Construction Impacts and Recommended Impact Mitigation/Benefit Enhancement Measures

| Actions Affecting Environmental Resources & Values | Potential Environmental Impact | Mitigation/Benefit Enhancement Measures, and Responsibility for Implementation | Non-Sig. | Low | Mod | High | Comments |
|---|--|--|-----------------|------------|------------|-------------|--|
| 1 Workforce Deployment. | 1.1 Creation of construction employment opportunities for local residents. | <p>Contractor:</p> <p>Contractor will make maximum use of local labour as a means of contributing to alleviation of local unemployment/under-employment.</p> <p>Contractor will maximise use of labour-intensive construction methods rather than plant-intensive.</p> <p>Contractor will maximise participation of local suppliers of materials, services and equipment, and sub-contractors.</p> | | | + | | <p>The timing of this work will coincide with a period of low economic activity globally and investment in resort development across Saint Lucia in particular, resulting in a relatively low competing demand for services and skills.</p> <p>Selected Contractor is locally based, and is expected to procure goods and services locally, subject to availability. Construction management will be local. There are no aspects of the work that require foreign sub Contractors. The workforce is expected to number approximately 40 persons over 3</p> |

| Actions Affecting Environmental Resources & Values | Potential Environmental Impact | Mitigation/Benefit Enhancement Measures, and Responsibility for Implementation | Non-Sig. | Low | Mod | High | Comments |
|--|--|--|----------|-----|-----|------|---|
| | | | | | | | <p>months.</p> <p>Construction will be mainly reinforced concrete, plumbing and mechanical and electrical works. Construction of these will be relatively labour intensive, using familiar technology. New employment opportunities, mainly for unskilled labourers, watchmen etc, may arise for residents in the immediate area.</p> |
| i | 1.2 Disturbance of hotel guests and employees by Contractor's workforce. | <p>Contractor:</p> <p>Contractor will establish and maintain cordial relations with the hotel management and inform them well in advance of any construction activity that may impact them adversely.</p> <p>Contractor will assign responsibility for dealing with complaints from the hotel management to the Project Manager, who shall meet daily with the hotel's Liaison Officer, before works commence for the day.</p> <p>Contractor will maintain a complaints register which sets out the relevant dates, the complainant, the nature of the complaint, action taken, and other relevant details.</p> <p>Contractor will keep the site well lit at night.</p> <p>Contractor will maintain continuous site security to discourage criminal activity in the area.</p> <p>Contractor will ensure work force remains within work site and does not harass guests or hotel staff. Contractor will take appropriate disciplinary action including dismissal if</p> | | | | - | <p>A worksite within an operating hotel has the potential to significantly disrupt hotel operations, and disturb guest enjoyment of the property. Real or perceived issues such as dust, noise, damage to and interference with services, diminished aesthetics, criminal activity, etc. may arise during the construction period. Such issues can become a major concern to hotel management and users, and in the interest of maintaining good relations with the Client, should be taken seriously by Contractor, and appropriate preventative and remedial action initiated promptly as appropriate.</p> <p>The site also interfaces with the highway and there is potential to disrupt activities of the general public there.</p> |

| Actions Affecting Environmental Resources & Values | Potential Environmental Impact | Mitigation/Benefit Enhancement Measures, and Responsibility for Implementation | Non-Sig. | Low | Mod | High | Comments |
|--|--------------------------------|--|----------|-----|-----|------|----------|
| | | <p>appropriate.</p> <p>Contractor staff will be required to enter via the main gate. Before commencement of works, police clearance for all proposed staff will be provided to CBBRAS management for vetting. Thereafter, a list of employees will be kept at the gate, and listed staff will be required to produce photo ID to enter the site.</p> <p>Persons banned from the resort will not be employed by the contractor.</p> <p>Heavy equipment will access the worksite via the back gate (road past quarry) that will be manned by hotel security during working hours. Trucks will be checked on entry and exit.</p> <p>Supporting recommendations for Government:</p> <p>Authorities should ensure that food vendors do not become established on the public roadway where they may become a traffic hazard and diminish area aesthetics.</p> <p>Hotel Management:</p> <p>To meet before start up with the work crew (in presence of Contractor, Engineer) to lay down the ground rules especially regarding interface with guests, dress code, security, smoking, eating.</p> <p>To identify a responsible member of staff to act as liaison between the management team and the Contractor. Liaison officer to meet with the Contractor's Project Manager daily, before the works commence to exchange information</p> | | | | | |

| Actions Affecting Environmental Resources & Values | Potential Environmental Impact | Mitigation/Benefit Enhancement Measures, and Responsibility for Implementation | Non-Sig. | Low | Mod | High | Comments |
|--|---|---|----------|-----|-----|------|--|
| | | <p>regarding impacts of activities of the previous day's work and how these can be mitigated going forward, and to provide information regarding the day's work programme, so that relevant members of hotel management may be informed if necessary.</p> <p>Hotel management (including Liaison Officer) to participate in site meetings with the Contractor, so that both parties are aware of all relevant issues and can make relevant inputs.</p> | | | | | |
| | <p>1.3 Health and safety hazards to the workforce arising from participating in an inherently dangerous occupation.</p> | <p>Contractor: Contractor will have full regard for the safety of all persons entitled to be on the site and manage the site and works in an orderly manner appropriate to avoidance of dangers. The standards and guidelines regarding health and safety shall be the draft Labour Code, The Factories Regulations (Cap 106 of 1948), and Employees (Occupational Health and Safety) Act (No. 10 of 1985).</p> <p>The Contractor will develop a Health and Safety Plan within 4 weeks of contract signature.</p> <p>The contractor will designate a qualified senior member of his site staff as Health and Safety Officer with the responsibility to ensure that all workforce health and safety matters are properly and fully addressed.</p> <p>Contractor will provide adequate on-site first aid facilities with qualified first-aiders, together with approved evacuation plans/procedures for</p> | | | - | | <p>The selected contractor(s) will have full responsibility for the adequacy, stability and safety of all construction operations and methods in accordance with the contract. Construction is a relatively dangerous occupation and accidents are likely to occur.</p> <p>The St Jude Hospital is a five minute drive away, and is able to deal with major cases. Emergency services are available from the Vieux Fort Fire Station, where domestic fire appliances, emergency fire appliances and ambulances are stationed. These are expected to be able to provide a sufficiently fast response in an emergency situation.</p> |

| Actions Affecting Environmental Resources & Values | Potential Environmental Impact | Mitigation/Benefit Enhancement Measures, and Responsibility for Implementation | Non-Sig. | Low | Mod | High | Comments |
|--|---|---|----------|-----|-----|------|----------|
| | | <p>seriously injured persons.</p> <p>Contractor will provide protective helmets, safety boots, protective clothing, ear mufflers, dust masks, gloves etc, appropriate to the activities being undertaken by the workforce, and make it a condition of employment that these are worn when appropriate.</p> <p>Contractor will convene monthly health and safety meetings with workforce to emphasize safe work practices and expectations.</p> <p>Contractor will provide lights, guards, fencing etc for protection of the works and for the safety and convenience of the guest, hotel staff and other members of the public.</p> <p>Contractor will identify location of nearest fire hydrant within the property, and install a fire hydrant at the entrance to the work site if deemed necessary.</p> <p>Contractor will carry the requisite insurances.</p> <p>Accidents will be promptly reported to the Labour Department and requisite procedures followed. Near misses will be recorded by the Health and Safety Officer.</p> | | | | | |
| | 1.4 Environmental damage caused by the workforce. | <p>Contractor:</p> <p>Contractor will take all reasonable steps to protect the environment on- and off-site, and to avoid damage or nuisance to persons or property arising from pollution, noise or other issues arising as a consequence of his methods of operation, including the following:</p> <ul style="list-style-type: none"> • Incorporate environmental and other issues | | | - | | |

| Actions Affecting Environmental Resources & Values | Potential Environmental Impact | Mitigation/Benefit Enhancement Measures, and Responsibility for Implementation | Non-Sig. | Low | Mod | High | Comments |
|--|--|---|----------|-----|-----|------|---|
| | | <p>into the agenda of regular meetings with workers.</p> <ul style="list-style-type: none"> • Order immediate suspension or a halt to any activity which is causing, or is likely to cause significant environmental damage, and to commit to make good any such damage at his own expense, in accordance with the instructions of the relevant authorities. • Require the immediate and permanent dismissal from site of any member of the workforce who is committing or has committed acts prejudicial to the environment including theft or interference with property and offensive behavior. • Provide and enforce worker use of appropriate, accessible toilet facilities and of appropriate, accessible solid waste disposal facilities. | | | | | |
| 2. Site clearance and earthworks. | <p>2.1 Increases in the silt load of drains resulting in impairment of drainage system function and adverse effects on marine and water quality.</p> <p>2.2 Increased erosion and sediment levels in the bay as a result of site clearance and</p> | <p>Contractor: Contractor will submit a construction drainage plan for approval by the Supervisor, in particular, proposals for trapping eroded sediment. Contractor will take all reasonable steps to minimise erosion and siltation, and protect water resources, including construction and maintenance of silt traps at strategic locations. Cleared areas will be re-vegetated as quickly as possible, using Contract-specified species. Ponding of water that may encourage mosquito breeding will be minimised. Construction drainage plan will be implemented before site earthworks</p> | | | - | | <p>The site is flat and the catchment area small, so that surface runoff will not be rapid. However, soils will be susceptible to erosion when disturbed by construction works, and rainfall intensities are high.</p> <p>There is a ravine immediately adjacent to the worksite, that runs to the sea. Effects on coastal users in terms of a reduction in water quality through increased suspended sediment content and deposition smothering adjacent marine ecosystems will be significant if controls are not adopted. There is the possibility of reduced fish yields if sedimentation is significant.</p> |

| Actions Affecting Environmental Resources & Values | Potential Environmental Impact | Mitigation/Benefit Enhancement Measures, and Responsibility for Implementation | Non-Sig. | Low | Mod | High | Comments |
|--|---|--|----------|-----|-----|------|--|
| | construction activities. | <p>commence.</p> <p>Drainage will be reinstated to minimise erosion and sedimentation by featuring the following:</p> <ul style="list-style-type: none"> • Vegetated swales will be used to slow and infiltrate water and trap pollutants in soil where they can be naturally destroyed. • Vegetated swales will direct water away from roads. • No discharges from pipes will run directly to the sea. • Directly connected impervious areas will be eliminated or minimised. <p>Supervisor: Work will be halted in the event turbidity and sediment levels in the adjacent coastal area exceed levels determined in consultation with DOF and MOH.</p> | | | | | <p>Coastal water quality in the immediate vicinity is currently good, and very important for recreational use, and should be protected.</p> <p>The area has a problem with mosquitoes. Dengue Fever, transmitted by the mosquito, is often a threat in Saint Lucia, so ponding of water is to be minimized in the interest of public health.</p> |
| | <p>2.3 Smoke and odour nuisance arising from on-site burning of construction waste.</p> <p>2.4 Fire damage to surrounding properties.</p> | <p>Contractor: There will be not burning of waste on site. All waste will be disposed at the Vieux Fort Waste Disposal Site.</p> | | | - | | <p>The possibility of causing smoke and odour nuisance to resident guests, staff, coastal users and adjacent property users is high if burning is allowed.</p> |

| Actions Affecting Environmental Resources & Values | Potential Environmental Impact | Mitigation/Benefit Enhancement Measures, and Responsibility for Implementation | Non-Sig. | Low | Mod | High | Comments |
|--|---|---|----------|-----|-----|------|---|
| | 2.5 Noise, vibration & dust nuisance during earthworks. | Contractor: Effective measures will be taken to minimise nuisance, including use of methods which minimise dust generation and a restriction on working hours of certain equipment. See Sections 3.15 and 3.16 for more information. | | | - | | The construction stage of most projects has the potential to cause localised wind-blown dust problems, either when excavation is taking place or when materials are being transported and stockpiled. The potential for dust nuisance to resident guests and staff is high as this site is within a relatively low rainfall area. |
| | 2.6 Damage to archaeological sites and protected areas. 2.7 Damage to cultural heritage. | Contractor: In the event of an archaeological discovery, Supervisor to be immediately informed. Supervisor: Supervisor to notify the Saint Lucia National Trust immediately. | | - | | | There are confirmed archaeological sites (Amerindian) in the general area, although no archaeological or cultural sites are located within this site. |
| | 2.8 Initiation of instability arising from changes in natural slope geometry, with adverse implications for workforce safety during construction. | Contractor: The contractor will accept full responsibility for the adequacy, stability and safety of all operations and methods of construction, as well as have full regard for the safety of all persons entitled to be on the site and keep the site and works in an orderly state appropriate to avoidance of dangers. All works will be carried out in accordance with the approved plans. Construction will be carried out such as not to promote instability during construction. Excavated slopes will not exceed 2:1. Excavation sides in excess of 1.5 m will be battered back or shored. | | - | | | Significant excavations will be required for underground tank construction. |

| Actions Affecting Environmental Resources & Values | Potential Environmental Impact | Mitigation/Benefit Enhancement Measures, and Responsibility for Implementation | Non-Sig. | Low | Mod | High | Comments |
|--|---|--|----------|-----|-----|------|---|
| 3 General construction operations. | 3.1 Land and water pollution and public health hazards arising from inappropriate/inadequate liquid waste disposal practices and spillages/leakages of contaminating materials at the worksite. | <p>Contractor: All necessary precautions will be taken by the Contractor to prevent land and water pollution.</p> <p>Contractor: Contractor will be responsible at his own cost for taking immediate remedial action and payment of compensation for any environmental damage resulting from his actions.</p> <p>Contractor will minimise and carefully control use of chemicals.</p> <p>Contractor will advise Supervisor of type and quantity of chemicals to be stored on site for construction purposes. Temporary storage location of permissible quantities will be approved by the relevant authorities, and appropriate precautions taken. These include:</p> <ul style="list-style-type: none"> - Construction of a dedicated chemical storage structure to be roofed with a lockable door. - The floor to be equipped with a continuous curb to retain spilled materials. - Chemicals not to be stored near burning material or hot work (welding, grinding) or in shop areas. - Adequate space and shelving to be provided to properly segregate chemicals. - Dry materials to always be placed above liquids, never vice versa. - Liquids not to be stored above eye level. - Storage for PPE to be provided where it is easily accessible in the event of emergency, but not in the chemical storage | | | ■ | | Sanitary arrangements, fuel storage/refuelling and plant/vehicle servicing areas have the greatest potential for causing land and water pollution, and site pollution controls are often extremely inadequate. The coastal/marine resources to the east of the work site are to be protected. |

| Actions Affecting Environmental Resources & Values | Potential Environmental Impact | Mitigation/Benefit Enhancement Measures, and Responsibility for Implementation | Non-Sig. | Low | Mod | High | Comments |
|--|--------------------------------|--|----------|-----|-----|------|----------|
| | | <p>area.</p> <ul style="list-style-type: none"> - Appropriate emergency wash area to be provided. - Information of chemical locations, contents, appropriate emergency response and other details to be readily accessible to site management, in the event of spill or injury. - Procedures in the handling of chemicals or other hazardous material and in event of emergency to be clearly posted on the container. <p>Contractor will install secondary containment for fuel stored on site.</p> <p>Contractor will adopt pollution prevention measures relating to fuel and oil storage/dispensing arrangements, to prohibit other than emergency maintenance of equipment and vehicles on the site, and require usage of spillage trays during on-site refuelling of minor equipment.</p> <p>Waste oils arising from emergency servicing of construction equipment will be disposed of at a licensed recycling facility.</p> <p>All washing of vehicles, plant and tools to be carried out at designated areas within the work site which are provided with oil/grease traps.</p> <p>Government:</p> <p>Development control authorities should limit storage of fuels and chemicals to quantities below stipulated values within the worksite during construction, and approve proposed storage areas.</p> | | | | | |

| Actions Affecting Environmental Resources & Values | Potential Environmental Impact | Mitigation/Benefit Enhancement Measures, and Responsibility for Implementation | Non-Sig. | Low | Mod | High | Comments |
|--|--|---|----------|-----|-----|------|---|
| | 3.2 Land and water pollution, public health hazards and reduction in amenity value, arising from inappropriate/inadequate sewage disposal practices. | <p>Contractor:</p> <p>Contractor will abide by Public Health Act of 1975 and Regulations, in the provision of sanitary facilities for workers on site.</p> <p>Requirements for provision of adequate non-polluting worksite sanitary facilities include provision of sufficient number of adequate toilet facilities on the site connected to suitable treatment, or otherwise collected and disposed of.</p> <p>Sewage will not be permitted to enter the drainage or coastal waters.</p> <p>Worksite pit latrines will not be used.</p> <p>All workers to be required to use the facilities.</p> <p>Workers who refuse are subject to dismissal.</p> | | | - | | <p>This site is on the coastline and improper sewage disposal will contaminate adjacent recreational coastal waters and fishing grounds.</p> <p>The worksite can be integrated in the existing sewage disposal system.</p> |
| | 3.3 Land and water pollution, public health hazards, landscape degradation and reduction in amenity value, arising from inappropriate/inadequate solid waste disposal practices. | <p>Contractor:</p> <p>Contractor will abide by the provisions of the Waste Management Act of 2004, the Litter Act of 1983 and its amendments (1985 and 1993), and the Public Health Act of 1975 and Regulations.</p> <p>Solid waste will not be permitted to enter drainage or coastal waters.</p> <p>Requirements for provision of adequate non-polluting worksite sanitary facilities include provision of sufficient number of adequate waste receptacles across the site (including appropriate and accessible containment for worker food waste) and regular collection services provided by a licensed collector.</p> <p>If Contractor is hauling site-generated waste,</p> | | | - | | <p>Green waste and spoil from this site will not be significant.</p> <p>Builders' waste storage and disposal arrangements are frequently inadequate. Fly tipping of construction wastes is still a problem throughout much of Saint Lucia, and on vacant properties in the vicinity of this site. Contractors often have an offhand attitude to waste disposal, with excavated material, spoil and other wastes being dumped down slopes or into watercourses, and onto unoccupied land.</p> <p>SWMA will accept construction waste at Vieux Fort Disposal Site at the commercial rate, but encourages its minimization by Contractors in the</p> |

| Actions Affecting Environmental Resources & Values | Potential Environmental Impact | Mitigation/Benefit Enhancement Measures, and Responsibility for Implementation | Non-Sig. | Low | Mod | High | Comments |
|--|--|--|----------|-----|-----|------|---|
| | | <p>legal requirements for proper containment of the waste will be observed, and disposal will be at an approved location.</p> <p>Soil/spoil will be kept separate from other construction waste and reused on site with appropriate sediment control.</p> | | | | | interest of prolonging the municipal landfill life. |
| | <p>3.4 Hazards associated with roadside storage of construction materials and parking of plant and vehicles.</p> | <p>Contractor:</p> <p>No parking or stockpiling of materials will be allowed along the public roadway.</p> <p>No materials shall be stored so that they encroach on, or in any way adversely affect operation of, sections of roadway which are in use by the resort patrons, staff, public or result in siltation or blockage of drains.</p> <p>The Contractor will plan for the temporary storage of construction materials and wastes, and the parking of construction plant within the worksite only. This will be part of the Site Management Plan.</p> <p>Parking areas for employees' private vehicles will be located within the worksite only, in approved areas.</p> | | | - | | <p>Builders commonly store construction materials temporarily at the roadside and make little or no provision for preventing encroachment on the carriageway or footpaths, causing a hazard to road users and pedestrians.</p> <p>Plant is often left overnight close to the road margins with no lighting or warning signs, and during the day, workforce vehicles and construction plant are often parked with little consideration for the safety of road users.</p> |
| | <p>3.5 Impedance of access to/from areas adjacent to the worksite.</p> | <p>Contractor:</p> <p>All operations will be carried out so as not to interfere unnecessarily or improperly with the convenience of the resort patrons or staff, or access to and use and occupation of public or private roads, footpaths, properties and public beaches, or coastal waters.</p> <p>Neighbouring users will be informed in advance of any activity that has the potential to</p> | | | - | | |

| Actions Affecting Environmental Resources & Values | Potential Environmental Impact | Mitigation/Benefit Enhancement Measures, and Responsibility for Implementation | Non-Sig. | Low | Mod | High | Comments |
|--|---|--|----------|-----|-----|------|---|
| | | impede access to their properties or other public spaces. | | | | | |
| | 3.6 Interference with traffic due to disposal of demolition and construction wastes, and other wastes. | <p>Contractor: Contractor will abide by all solid waste regulations in the disposal of demolition waste. Public roads will be kept free and clear of wastes. Contractor will erect appropriate signage in the vicinity of the site to warn other road users of construction traffic. Contractor will consult Transport Board early for approval and advice if there is likely to be any traffic disruption.</p> | | - | | | <p>It is anticipated that construction and demolition (C&D) waste will be hauled to Vieux Fort Disposal site. The public road is adequate to accommodate construction traffic from this site.</p> |
| | 3.7 Increased road safety hazards and inconvenience to road users and the general public caused by the construction traffic/works interfering with normal traffic flow. | <p>Contractor: Contractor at all times shall take care to protect the public and facilitate the uninterrupted flow of traffic during his operation and use of public roads. Contractor will erect appropriate (approved) signage on either side of the junction with the highway to alert other road users to possibility of slow construction traffic/heavy equipment crossing lanes etc. Construction vehicles will be licensed in accordance with MCW stipulations. See previous section for further recommendations.</p> | | - | | | <p>Builders generally pay little attention to the traffic disruption caused by their activities. During construction, the free passage of traffic along the highway and at the intersection is unlikely to be significantly impeded. Consequently, there is a minimal potential safety risk to vehicles, pedestrians and the workforce. Through traffic on the highway is, and will continue to be, significant.</p> |
| | 3.8 Damage to existing road pavements and structures | <p>Contractor: Contractor will adopt every reasonable means to prevent damage to roads or bridges communicating with, or en route to the site, by</p> | | - | | | <p>Significant volumes of construction materials will have to be hauled on public roads. Overloading of contractors' vehicles and heavy, tracked equipment</p> |

| Actions Affecting Environmental Resources & Values | Potential Environmental Impact | Mitigation/Benefit Enhancement Measures, and Responsibility for Implementation | Non-Sig. | Low | Mod | High | Comments |
|--|---|---|----------|-----|-----|------|--|
| | caused by overloaded haulage traffic. | <p>his or his subcontractors' traffic.</p> <p>Contractor will be responsible for the cost of reinstatement of pavement or structures which have been damaged by his or his subcontractors' haulage traffic.</p> <p>All haulage will be carried out using vehicles of types and capacities appropriate to task and to require compliance with gross vehicle weight restrictions imposed by vehicle licensing authorities and all laws and regulations pertaining to vehicle use on public roads.</p> <p>Tracked equipment will be transported to site on appropriate transporters, and will not be permitted to track directly on the road pavement.</p> | | | | | riding on pavement surfaces contributes significantly to pavement damage. |
| | 3.9 Generation of road safety hazards on haul routes. | <p>Contractor:</p> <p>Contractor will consider location in his selection of suppliers, to minimise haul distances to site.</p> <p>Contractor will ensure that all tailgates and dropsides are properly secured, there is no overloading of loose materials above truck sides, and all loads are properly secured.</p> <p>Contractor will comply with speed restrictions imposed by the relevant authorities.</p> <p>All haulage will be carried out using vehicles of types and capacities appropriate to task, in compliance with gross vehicle weight restrictions imposed by vehicle licensing authorities and all laws and regulations pertaining to vehicle use on public roads.</p> <p>Particular care will be taken to ensure that</p> | | - | | | <p>Haulage of construction materials and wastes will be on public roads and on roadways within the resort. Loaded construction traffic moves slowly and can cause congestion. Overloading constitutes a road safety hazard. Conversely, unladen traffic often travels quickly, increasing the risk of accidents involving other vehicles and pedestrians.</p> <p>Deposition of soil on roads from tracks and tyres, where plant and vehicles leave construction sites and borrow or quarry areas, can increase the risk of skidding under wet conditions and dust nuisance under dry conditions.</p> |

| Actions Affecting Environmental Resources & Values | Potential Environmental Impact | Mitigation/Benefit Enhancement Measures, and Responsibility for Implementation | Non-Sig. | Low | Mod | High | Comments |
|--|--|---|----------|-----|-----|------|---|
| | | <p>concrete mix trucks and fuel tankers¹ are loaded and driven in a manner which does not result in spillage.</p> <p>The Contractor will be responsible, at his own cost, for cleaning up spillages or shed loads without undue delay.</p> <p>Contractor will minimize quantities of mud tracked onto the public roadways, and conduct haulage preferably during dry periods.</p> <p>Contractor will construct site roads in a manner to minimize mud generation.</p> <p>Public roads which have material deposited on them as a result of the Contractor's activities will be cleaned and kept free of mud, soil and other materials.</p> | | | | | |
| | 3.10 Depletion of finite non-renewable natural resources. | <p>Contractor:</p> <p>Contractor will minimise wastage.</p> <p>Contractor will maximise re-use of waste materials.</p> | - | | | | This is a small-medium sized project, likely to occur during a period of relatively low construction activity. Project requirements for coarse and fine aggregates for road and building construction will be easily met. |
| | 3.11 Diminished aesthetics of the site from the adjacent resort areas. | <p>Contractor:</p> <p>Hoarding will be erected to conceal construction activity from persons in close proximity to the site.</p> <p>Hoarding in the vicinity of the building blocks will be as aesthetically pleasing as possible. Green plastic lattice is suggested.</p> <p>All electrical and telecommunications cables</p> | | | - | | |

¹ Subject to restrictions on quantity of fuel allowed to be stored on site

| Actions Affecting Environmental Resources & Values | Potential Environmental Impact | Mitigation/Benefit Enhancement Measures, and Responsibility for Implementation | Non-Sig. | Low | Mod | High | Comments |
|--|--|---|----------|-----|-----|------|---|
| | | will be underground. | | | | | |
| | 3.12 Competition for scarce potable water resources with existing users. | Contractor: Contractor will conserve water. Contractor will have water storage for construction purposes. | | | - | | Builders generally use WASCO piped supplies for construction purposes. WASCO supplies in this area are inadequate, one of the reasons for implementation of this project. |
| | 3.13 Competition with existing users for power supply during construction. | Contractor: Contractor will have back up power generation capacity. | - | | | | Power requirements for construction and operation are within the capacity of LUCELEC's existing system. |
| | 3.14 Damage to and interference with public and privately owned services. | Contractor: Contractor will identify and locate existing services on the worksite boundaries, will take all reasonable precautions to protect services during construction and will repair and reinstate forthwith any damage arising from the works, at his expense, in consultation with/under the supervision of, the relevant authorities. | | - | | | |
| | 3.15 Creation of dust nuisance from construction activities on- and off- site. | Contractor: Contractor will take all reasonable steps to protect the environment on- and off-site, and to avoid damage or nuisance to persons or property arising from pollution, noise or other causes arising as a consequence of his methods of operation. Contractor will take appropriate measures to minimise dust generation including regular | | - | | | Dust caused by the operation of builders' equipment and construction activity, and transfer of soil from the site to the road surface on the wheels/tracks of equipment, can be a source of annoyance to nearby guests, residents and other road users. |

| Actions Affecting Environmental Resources & Values | Potential Environmental Impact | Mitigation/Benefit Enhancement Measures, and Responsibility for Implementation | Non-Sig. | Low | Mod | High | Comments |
|--|--|--|----------|-----|-----|------|--|
| | | <p>watering of works sections, aggregate, and soil stockpiles where dust is likely to cause nuisance.</p> <p>All material to be stockpiled within the worksite will be kept clean and free of mud, soil and other materials.</p> <p>Access roads will be regularly swept.</p> <p>Contractor will minimise quantum of mud and dust tracked onto public roadways from the site.</p> <p>Selection of aggregate sources will minimize haul distances to site, and disruption to other road users.</p> <p>All construction waste taken off site and aggregate brought onto the site will be covered by a tarpaulin to minimize dust emissions.</p> <p>Contractor will not stockpile material along the roadway.</p> | | | | | |
| | <p>3.16 Creation of noise nuisance and air pollution caused by haulage vehicles/ construction plant and machinery operation.</p> | <p>Contractor:</p> <p>Contractor will take all reasonable steps to protect the environment on- and off-site, and to avoid damage or nuisance to persons or property arising from pollution, noise or other causes arising as a consequence of his methods of operation.</p> <p>Contractor activities will be conducted in a manner which minimises nuisance to the resort users and general public. No night or weekend work will be conducted.</p> <p>Work adjacent to the building blocks (rainwater harvesting and distribution system) will be</p> | | | - | | <p>Air pollution is not expected to be a major problem in view of the relatively constant wind speeds experienced in the project area.</p> <p>Plant noise does not usually give rise to significant nuisance, except in the case of pile driving. However, this site is located within an operating resort.</p> <p>Construction haulage vehicles often emit undue smoke and noise, and may be a nuisance to those who live and work close to the road/highway along haul routes.</p> |

| Actions Affecting Environmental Resources & Values | Potential Environmental Impact | Mitigation/Benefit Enhancement Measures, and Responsibility for Implementation | Non-Sig. | Low | Mod | High | Comments |
|--|--|--|----------|-----|-----|------|--|
| | | <p>conducted between the hours of 9 am and 4 pm daily.</p> <p>Operations will be carefully designed, including selection of haulage routes within the site and location of stockpiles.</p> <p>All vehicles will be maintained in accordance with manufacturer's specifications and any vehicles/ plant /machinery which emit undue smoke or noise to be immediately removed from site for repair or maintenance.</p> <p>Noise specifications for construction equipment will be stipulated in accordance with Labour Department standards for the occupational environment.</p> <p>Internal combustion engines will be fitted with silencers.</p> <p>Records of complaints will be kept.</p> | | | | | |
| | 3.18 Contamination of adjacent grounds by wastewater plant effluent. | <p>Contractor:</p> <p>Contractor to ensure that there are sufficient valves on the various pipelines to ensure that flow can be stopped while new connections are made, between plant, storage tank, pump and irrigation system.</p> <p>Contractor to ensure that overflow and low level outlet pipe work to the watercourse are completed before connections to the new storage tank are made.</p> | | | ■ | | <p>Wastewater plant effluent is currently discharged into the adjacent watercourse. The works require that the effluent be diverted from the plant discharge to the newly constructed effluent storage tank.</p> <p>The area surrounding the plant and proposed tank are poorly drained, and quite frequently, there is standing water/effluent in the vicinity of the wastewater treatment plant.</p> |
| | 3.18 Increase in emissions of ozone-depleting substances | <p>Contractor:</p> <p>Contractor will select alternative materials and/or technologies to minimise the use of</p> | | | ■ | | <p>Saint Lucia is party to the Climate Change Convention, the Montreal Protocol and the Kyoto Protocol and is committed to phasing out of ODS. CFCs</p> |

| Actions Affecting Environmental Resources & Values | Potential Environmental Impact | Mitigation/Benefit Enhancement Measures, and Responsibility for Implementation | Non-Sig. | Low | Mod | High | Comments |
|--|---|--|----------|-----|-----|------|---|
| | (ODS) | ODS within the property. | | | | | used in aerosol sprays, refrigeration, insulation, air conditioning, fire extinction and pest control/soil fumigation contribute to the accumulation of ODS in the atmosphere. Alternatives are available for many ODS. |
| | 3.19 Land sterilisation/ reduction in post-construction land use options, adverse roadside or landscape visual impact and public health and safety hazards, arising from inadequate worksite clearance on completion of construction. | Contractor: The Contractor shall clear away and remove from the site all equipment, surplus material, rubbish and temporary works, and shall leave the site in a clean and workmanlike condition. Lands beyond the boundaries of the worksite will not be used by the Contractor for any purpose, unless he has the pre-approval of the Client. Any such site shall also be properly cleared and remediated upon works completion. | | | - | | |
| 4 Concrete works | 4.1 Dust and other air pollution arising from the operation of concrete plant. | Contractor: The amount of concrete to be mixed on site will be minimised. Concrete requirements will be met primarily by use of pre-mixed concrete. Concrete mixed on site will be done within specially constructed mixing bays designed to | | - | | | |

| Actions Affecting Environmental Resources & Values | Potential Environmental Impact | Mitigation/Benefit Enhancement Measures, and Responsibility for Implementation | Non-Sig. | Low | Mod | High | Comments |
|--|---|---|----------|-----|-----|------|---|
| | | <p>contain fugitive emissions.</p> <p>All moveable plant will be fitted with effective dust suppression equipment and operated and maintained in accordance with the manufacturer's manuals.</p> | | | | | |
| | <p>4.2 Pollution of waterbodies and fish kills, resulting from entry of cement dust, fresh concrete and mixer wash water.</p> | <p>Contractor:</p> <p>The amount of concrete to be mixed on site will be minimised. Concrete requirements will be met by pre-mixed concrete.</p> <p>A concrete mixing bay will be constructed to minimize concrete losses.</p> <p>Particular care will be taken when construction activities are carried out in or in the vicinity of drainage systems and over water bodies to ensure that pollution does not occur.</p> <p>Concrete will not be poured in exposed areas during rains.</p> <p>Although quantities of concrete mixed on site are anticipated to be small as premix will be preferentially used, special precautions will be taken to ensure that materials such as cement dust, fresh concrete and lime do not pollute water bodies.</p> <p>Washing of readymix equipment or dumping of excess concrete on site will be prohibited.</p> | | | - | | <p>Cement dust, fresh concrete and mixer wash water can give rise to significant pollution of water bodies and major fish kills. The marine environment in close proximity to the site must be protected.</p> |

Contract technical specifications of environmental/social significance

The Contract signed between CBBRAS and the Contractor, particularly the Technical Specifications, stipulate a number of requirements of the Contractor. These existing contractual provisions enable the Client and the Consultant to ensure that environmental and social mitigation measures identified above are suitably implemented by the Contractor.

Contractual provisions include preparation of the following plans, policies, written statements and notifications:

- Programme and Method Statement, with list of equipment and support facilities.
- Where it is anticipated that aggregates will be stockpiled in advance of the Works, the Contractor will indicate such operations and rates of production in his works programme and indicate the location of stockpiles.
- Environmental Management Plan detailing suitable procedures to be employed during the Works so that the Works will be undertaken in a manner that minimises unfavourable impacts on the environment and ecological systems of the area.
- Disaster Response Plan detailing the procedures to be employed in case of emergency (natural or otherwise) so as to minimise damage and loss to equipment and the Works.
- Safety Policy, to be submitted not later than two weeks before work is due to start on the Site, prepared under International Standards and relating to the execution of the Works at the Site.
- Health and Safety Plan covering all aspects of the Works, submitted to the Engineer within 4 weeks of the award of Contract, and to be regularly reviewed and updated.
- Contractor's Quality Plan describing the quality system to be implemented, and detailing the quality management policies, organisation, responsibilities and procedures to be applied, identifying the applicable requirements of **BS 5750**. The Contractor's Quality Plan shall be prepared and issued within 4 weeks of award of Contract.

- Management and technical procedures supporting or implementing the Contractor's Quality Plan, covering such activities as required by **BS 5750**.
- Written details of any control measures to be instituted in compliance with the control of substances hazardous to health. Furthermore, notwithstanding his general duties under health and safety legislation and regulations, the Contractor shall advise the Engineer in writing of any substances which he proposes to bring onto the Site or incorporate into or use about the Works, or which he discovers existing on the Site, which fall within Substances Hazardous to Health or otherwise require special precautions to be taken.

The Technical Specifications require that the Contractor appoint, in writing, the following staff, within two weeks of award of Contract:

- a Quality Manager with the responsibility for and the authority to resolve quality matters;
- a Safety Officer.

The Contractor shall arrange and chair a monthly Site Safety meeting, to which the Engineer or his nominated representative shall be invited.

The Technical Specifications further require that the Contractor consult authorities as follows:

- The Contractor shall consult all relevant authorities and services owners before commencing any excavations and shall satisfy himself as to the exact position of existing services which affect or may be affected by the Works. The Contractor shall record the position of all located existing services on the horizontal alignment drawings a copy of which shall be made available by the Contractor to the Engineer.
- Prior to commencing any work in or which may affect the use of any highway, the Contractor shall obtain the written approval of his proposed methods of working from the Engineer and the Highway and the Police Authorities. Throughout the duration of the Contract, the Contractor shall co-operate with the Highway and Police Authorities concerning works in, or access to, the highway. Any requirements of such Authorities shall be notified in writing by the Contractor to the Engineer.

The Technical Specifications also require the following of the Contractor:

- The Contractor shall execute the works in a manner that will avoid the pollution or siltation of rivers, streams or the sea. If in the opinion of the Engineer the Contractor is taking insufficient precautions to avoid such pollution or siltation the Engineer may issue a written warning under the provision of the appropriate clause of the Contract and in the event of subsequent damage, pollution or siltation the Contractor will be subject to liquidated damages in accordance with the appropriate clause of the Contract.
- The Contractor shall adopt such measures as the Engineer may consider reasonable and necessary to minimise nuisance from dust, noise, or other cause. During periods of dry weather, roads in frequent use with heavy traffic shall be watered a minimum of 3 times a day at appropriate times to be agreed with the Engineer. Other roads within the Site shall be watered at least once each day. The Contractor is to take such measures as may be necessary to prevent crop damage by dust arising from the execution of the Contract.
- The Contractor shall be responsible for health and safety on the Site. He shall co-ordinate his own activities and those of his sub-contractors and suppliers to achieve safe and healthy working environments. The Contractor shall ensure that safety procedures are enforced.
- Sanitary conveniences for the use of persons employed on the Works shall be provided and maintained by the Contractor in accordance with the appropriate regulations. All persons engaged upon the Works shall be required to use them. The Contractor shall provide and maintain temporary arrangements for the proper discharge of sewage, waste and drainage from or in connection with the Works.
- The Contractor shall take steps to ensure that existing vegetation is disturbed as little as possible in the execution of the Works. Flagrant breaches of this clause will be treated as damage to property and dealt with by the provisions of the appropriate clause of the Contract.
- Where required, the Contractor shall provide and maintain all necessary temporary diversions which shall be operational before interference with existing carriageways,

footways or public right of way. Reasonable access shall be maintained to properties adjacent to the Works. The Contractor shall provide traffic lights, flagmen and signaling equipment as may be necessary to control the traffic to the satisfaction of the Engineer. Roadways closed to traffic shall be protected by effective barricades on which shall be placed acceptable warning and directional signs. All temporary detour routes shall be indicated clearly throughout their entire length. All barricades and obstructions shall be illuminated at night and all lights shall be lit from sunset to sunrise.

- The Contractor shall ensure that damage to any public or private roads, footpaths and tracks used by any vehicles or plant proceeding to or from the Site is kept to a minimum and he shall be responsible for the cost of all repairs necessary to restore such roads, tracks or footpaths to the satisfaction of the Engineer and/or controlling authorities.
- All necessary facilities will be given by the Employer for the access of the Contractor's employees to the Works and the Contractor shall be responsible for seeing that such employees obey all regulations made by the Employer in regard to the conditions of access to and over his or the property of others.
- The Contractor shall take all reasonable steps to maintain the free movement of traffic on any permanent roads used by him to gain access to the Works. All permanent and site access roads are to be maintained free of any spillage from the Contractor's vehicles.
- The Contractor shall erect and maintain at his own expense suitable and approved temporary fencing.

Register of permissions and consents required, with responsibilities allocated

| Permission required | Agency from which permission is required | Responsibility for obtaining permission | Timing |
|--|--|---|--|
| <p>Written approval of proposed methods of working for any work which may affect the use of any highway.</p> <p>Throughout the duration of the Contract, the Contractor shall co-operate with the Highway and Policy Authorities concerning works in, or access to, the highway.</p> | <p>Transport Board Traffic Police</p> | Contractor | <p>Prior to commencing any such work.</p> <p>For the duration of the works.</p> |
| Electrical Inspection Certificate | Electrical Department of the Ministry of Works, Transport and Public Utilities | Contractor | Prior to connecting to permanent power supply. |
| Advise utility companies in the event works are planned in the vicinity of their infrastructure, that may impact their service delivery. | Utility Companies (WASCO, LUCELEC, LIME, Karib Cable) | Contractor | Prior to commencing any work which may affect the infrastructure of utility companies. Sufficient notice should be given to allow them to arrange for supervision of such works if they deem it necessary. |
| Report of accident or near miss to be made. | Labour Department | Contractor | In the event of an accident or near miss. |

Identification of environmental roles to be met by contractor staff

Senior O. B. Sadoo Engineering staff members should be required to study the Contractor's Environmental Management Plan and the Health and Safety Plan, and to participate in monthly Site Safety meetings. Environment, Health and Safety is to be on the agenda of progress meetings. Senior staff members should be responsible for conveying the information contained in these plans, and relevant decisions taken at Progress meetings, to all personnel under their direct supervision. The Contractor is to make environment, health and safety a matter of continuing concern, equal in importance to all other operational considerations, and to develop and administer an active environment, health and safety programme through the designated Environment, Health and Safety Officer.

All employees are charged with the responsibility for cooperating with, and supporting, the objectives of the Environmental Management Plan and the Health and Safety Plan. Every employee is expected, as a condition of employment, to be concerned with environmental protection, personal safety, safety of fellow workers, and safety of the general public.

Accidents do not just happen. They are caused because someone acted inappropriately and unsafely, or failed to act in a responsible, safe manner. Human failures can be controlled through effective supervision. The contractor must be committed to providing a safe work environment free from recognized environmental and safety hazards. This can only occur if everyone cooperates and becomes environment and safety conscious.

Responsibilities for environment, health and safety are as follows:

CONTRACTOR

The Contractor is ultimately responsible for the work site environment and occupational safety of his workers. The Contractor has delegated authority and responsibility for environment and occupational safety to the senior site staff.

SENIOR SITE STAFF

The Senior Site Staff may delegate authority and assign responsibilities for environmental protection and occupational safety to the designated Environment, Health and Safety

Officer. However, the senior site staff are ultimately responsible for the environmental and safety performance of the site.

SUPERVISORS

Supervisors are at the point of implementation for most activities that have implications for the environment and safety. Therefore, supervisors will assume the responsibility of thoroughly instructing their personnel in safe and environmentally appropriate practices to be followed in their work situations. They will consistently enforce safety and environmental standards and requirements to the utmost of their ability and authority. Supervisors will act positively to eliminate any potential hazards concerning activities under their jurisdiction, and they will set an example of good environmental and safety practice.

EMPLOYEES

All employees are responsible for compliance with procedures, standards and regulations established. This is essential to prevent injury to themselves, other persons, environmental damage, or damage to equipment and property. They are also responsible for promptly reporting to their supervisor any hazardous conditions or procedures that affect themselves, their fellow workers, or the general public.

Contingency plans for major incidents

Major incidents to be planned for include the following:

- Accident on site
- Fuel or other pollutant spill
- Fire
- Flooding
- Hurricane (high winds and/or flooding)

Of these, only hurricanes are preceded by a warning.

Accident on site

Risk of accidents can be minimised if the Contractor develops and enforces an appropriate Health and Safety plan. For the proposed works, activities of potential concern are:

- Operation of heavy equipment
- Excavation for underground tanks
- Working with concrete
- Installation of pipe work at significant height (from scaffolding or mechanical equipment)
- Working with electricity

The Health and Safety Plan must specifically address these activities, as well as general rules of conduct within the work site.

In the event of an accident, it must be ensured that:

- There is always on site, at least two persons trained in first aid.
- A first aid kit is provided and maintained on the site, and readily accessible in the event of emergency.
- A vehicle is available on site during working hours, to transport the injured if necessary.
- Telephone numbers for the closest Fire and Police Stations are posted within the site office, and saved in senior site staff mobile phone contacts.
- Phone service (whether mobile or landline) is always available on site during working hours.

Fuel or other Pollutant Spill

Mitigation measures identified earlier to minimise risk of spills or other pollutant release must be implemented as part of the Contractor's Environmental Management Plan. Any hazardous material brought on site by the Contractor must be accompanied by sufficient quantities of materials recommended for cleanup of spills. Such materials must be stored where they are readily accessible during working hours. Senior site staff and the Health and Safety Officer must be familiar with the appropriate response in the event of a spill.

Fire

Mitigation measures identified earlier to minimise risk of fire must be implemented as part of the Contractor's Environmental Management Plan.

A fire hydrant should be located within 100 m of the worksite.

A fire extinguisher should be kept in the site office and senior staff trained in its proper use.

Flooding and water damage

Serious water damage can occur from a variety of sources: burst pipes, clogged drains, broken windows, heavy rains. If flooding or a serious leak occurs:

1. Remain calm.
2. Try to identify the source of the water, and take corrective measures. Consistent with your own safety; proceed cautiously.
3. Use extreme caution if there are electrical appliances or outlets near the flooded area. If there is any possible danger, evacuate the area.
4. If you cannot stop the water flow, notify the Contractor and advise him of the exact source and severity of the water flow. Indicate whether any part of the area is involved or in imminent danger. He will notify the appropriate people and take charge of damage control operations.
5. Identify objects that are in jeopardy. Cover large objects with plastic sheeting. Move small or light objects out of the emergency area.
- 6. Have the electrician check before returning to room.**

Hurricane (high winds and/ or flooding)

Storms and hurricanes can cause both wind and water damage to buildings and materials. A number of preparedness measures can be taken in advance of an approaching storm system to minimize destruction.

Upon establishment of operations:

1. Stockpile emergency disaster equipment and supplies in a safe, accessible location.
2. Periodically inventory emergency supplies, and re-supply when necessary.
3. Complete and periodically update priority list of those objects that should be removed first in time of disaster.
4. Duplicate all files, especially computer files of insurance and accession records. **DO NOT STORE ON SITE!**
5. Make sure all insurance forms have been updated and that coverage is adequate for both contents and buildings.
6. Train staff in plan.
7. Test the plan.

Before the storm (on first notice of an approaching storm):

The building and grounds:

1. Inspect the building for structural deficiencies.
2. Check grounds and remove loose-lying objects.

Inside buildings:

1. Cover filing cabinets, documents and shelves with plastic sheeting.
2. Cover computers, printer and scanner with plastic sheeting.
3. Check supplies to ensure stores include all items required for clean up, business continuity in the absence of municipal power and water supplies, demolition, repairs and rescue.

Before going home:

1. Unplug all lights and electrical appliances and turn off electricity at main switch.

2. Close and lock all windows and doors.

After the storm:

Once personal and family needs are taken care of, try to contact the Contractor for instructions. If you cannot contact him, make your way to the worksite in a manner consistent with your own safety.

Procedures for reporting incidents (e.g., spillages/pollution, accidents, archaeological finds)

Procedures for reporting spillages or pollution

The following agencies should be immediately notified in the event of a spill or other polluting event:

- National Emergency Management Organisation
- National Oil Spill Committee/SLASPA
- Saint Lucia Fire Service
- Coconut Bay management

The Sustainable Development and Environment Division and the Consultant should also be informed.

If the event potentially has an impact on a public road, the following agencies should also be immediately notified:

- Ministry of Communications, Works, Transport and Public Utilities (Transport Board)
- Traffic Police

If the event puts the coastal waters at risk, the Department of Fisheries should be informed.

The Sustainable Development and Environment Division and the Consultant should also be informed.

Procedures for reporting accidents

After the accident has been responded to, the following should be notified (within 24-48 hours):

- Labour Department
- Coconut Bay management

The Sustainable Development and Environment Division and the Consultant should also be informed.

Procedures for reporting archaeological finds

If an archaeological find is suspected, the area should be cordoned off and the Consultant notified immediately. The Consultant will then inform the Saint Lucia National Trust and Coconut Bay management. The National Trust will be requested to advise. If they fail to do so within 48 hours, the Consultant will advise the Contractor as to how to proceed.

The Sustainable Development and Environment Division should also be informed.

Appendix 1: REPORTING FORMAT FOR ENVIRONMENTAL MANAGEMENT PLAN (EMP)

1. Provide a description of environment in which the works will be undertaken, including:
 - i. Construction site boundaries and any sensitive receptors e.g. trees, watercourses, local residents etc
 - ii. Details of public right of way and access to property and recommendations as to how these may be retained and managed; and
 - iii. Recommended vehicular access routes and diversions;
2. Develop guidelines for the contractor regarding sequencing and timing of works that may be important from an environmental/social perspective as well as other relevant environmental specifications including;
3. Draft contract specifications that stipulate sequencing of works that may be important from an environmental perspective, what normal working hours are and what activities may be carried out outside of working hours, and conditions under which this may occur;
4. Draft conditions to be met by equipment and facilities to be used in the works by the Contractor (e.g. air pollution, servicing and fuelling, etc);
5. Draft conditions to be met during delivery/removal of materials and other facilities (e.g. air pollution, servicing and fuelling, etc.);
6. Draft conditions to be met (e.g. air pollution, servicing and fuelling, etc,) by proposed site accommodation;
7. Identify functions to be assigned to key contractor staff required to demonstrate the competence of designated staff to fulfil specified roles.
8. Development of a register of permissions and consents required, with responsibilities. Ultimately, under this section, the compliance of the planned works with all national regulations, and the availability of all needed approvals, has to be certified.
9. Identification of potential environmental/social risks and specific mitigation measures to address those topics that could result in environmental/social risks,

such as: Cultural Heritage, Ecology, Landscape, Lighting, Noise and Vibration, Pollution incident control, Topsoil, Traffic, Waste, (considering required by current regulation and complemented by additional activities if necessary), identification of responsible parties for implementing the activities and those monitoring the implementation.

10. Develop a contingency plans for dealing with major incidents and description of procedures for reporting any incidents to the relevant authorities when required (e.g., spillages/pollution). In particular, procedures on how to respond to unexpected findings such as archaeological sites etc.