

# **AIRPORT GATEWAY PROJECT**

## **SEGMENT 1**

### **ENVIRONMENTAL MANAGEMENT PLAN**

**JOHN F. KENNEDY DRIVE FROM WINDSOR FIELD ROAD TO BETHEL AVENUE**  
**NEW PROVIDENCE, BAHAMAS**

**14 March 2011**



**TABLE OF CONTENT**

1.0 Introduction

2.0 Project Overview

3.0 Applicable Environmental Regulations

4.0 Description of Existing Natural Communities, Environmental Impacts and Mitigation Measures

5.0 Project Planning

6.0 Construction and Operation Management Activities

7.0 Hazard and Emergency Management, Storage of Materials

8.0 Landscape Management

9.0 Environmental Monitoring

10.0 Work Plan

Appendix A Emergency Plans

Appendix B Method Statements

Appendix C Monitoring Forms



## 1.0 INTRODUCTION: PURPOSE, SCOPE AND CONTENT

This Environmental Management Plan (EMP) is produced specifically for the Airport Gateway Project. It will provide information with regards to legal and contract requirements, information and guidelines for the environmental management of the project. The EMP is a site document designed to be accessed and understood by construction staff and project managers to enable them to achieve the projects environmental requirements through reference and appropriate training. The EMP should indicate responsibility, requirements and directions to ensure that environmental risk is properly managed..

The EMP is an active site document, it should be reviewed on a regular basis and where necessary amendments and updates made as the projects develops.

The EMP is developed from information published in the Environmental Impact Assessment (EIA), Contract Documents (Conditions of Contract) and Best Management Practices. The EMP explains how project activities can be undertaken, or mitigated minimizing the impact on natural environments and receptors identified in the EIA. The EMP will be subject to approval by the Bahamas Environment Science and Technology Commission (BEST Commission).

The EMP, if properly implemented and managed, aims to ensure that:

- Negative environmental impacts caused by the project are minimized and that environmental mitigation measures are correctly installed and used.
- That the project is compliant with applicable legislation.
- Site staff are well informed and managed as to their responsibility of environmental protection.
- Site activities are well planned and managed to prevent or minimize environmental impact.

### 1.1 CCACBL Environmental Policy Statement

As a responsible Contractor CCACBL will:

- Conform to, and where appropriate exceed, the requirements of all relevant legislation and regulations.
- Comply with all relevant environmental commitment as a criterion for the selection of supplier and subcontractors.
- Promote reduction in the quantity of waste materials generated on site whilst encouraging reuse and recycling wherever possible.
- Continually strive to prevent pollution and minimize waste at all times.



- Try to use business suppliers who minimize the impact of their activities on the environment, and work with the supplier to achieve that aim.
- Promote environmental awareness, and responsibilities with all CCACBL Contractors employees and ensure those issues are included in training programmes throughout the company.
- Operate its facilities in a responsible manner in the communities in which they reside.

**CCACBL will endeavor to meet all the criteria above and continually seek methods to improve its work procedures enhancing the environment.**



## 2.0 PROJECT OVERVIEW

### 2.1 Project Description, Project Objectives, Route Plan

Segment 1 of the Airport Gateway Project generally follows the existing route of JFK Drive from Windsor Field Road to Bethel Avenue covering approximately 6.2 miles (See Figure 1.0). The project involves upgrading the existing two lane road to a four lane dual carriageway, with re-alignment to comply with standards for the designated design speed (55mph), junction provisions and landscaping requirements. Design of storm drainage on the new alignment together with the relocation and /or restoration and/or upgrading of the existing utility provisions, such as overhead high voltage electrical lines, water mains and communication cables will also be required.

The project aims to improve traffic flow, traffic capacity and safety and reduce the congestion presently experienced by users of the JFK Drive. The re-alignment of the route will comply with design speed requirements and reduce the potential of traffic accidents. The completion of the project should synchronize with the ongoing Airport Expansion Project to facilitate and improve transportation between the Airport and downtown Nassau, for tourism growth. The project will improve the beautification and landscaping of the Airport Gateway to enhance The Bahamas as one of the best tourist destinations.

During the project construction it is the aim of the project team to ensure that the works are carried out to the highest standards. All construction staff and sub-contractors should be aware of the governing legislation, their legal responsibilities, potential environmental impacts and their responsibilities for implementing and maintaining mitigation measures.



Figure 1.0 Location of Segment 1 Airport Gateway Project



## 2.2 Expected or Potential Impacts, Accidents or Malfunctions

The foreseen environmental impacts from road construction have been identified and discussed in the published Airport Gateway Project EIA (September 2010). These identified environmental impacts are reviewed under section 4.0 of this EMP, together with planned mitigation measures and their implementation.

It must be recognized that within a construction project that Accidents, Incidents and Malfunctions can also have a significant Environmental Impact. The Environmental aspect of fires, storms or hurricanes and chemical spillages should be considered, outline Emergency Plans of this nature are considered under section 7.0 of this EMP.

## 2.3 Goals for Safe Construction and Schedule of Activities

A detailed and phased construction schedule will be submitted by CCACBL for approval. The Right of Way (ROW) boundary will be established by surveyors, clearly marked and maintained to ensure construction activity does not occur outside the ROW. Site clearance and the underground relocation and installation of utility equipment are likely to be programmed as the first phase of construction, starting at the western (Windsor Field Road) end of the project and progressing east. Subgrade works will follow on or be in conjunction with the underground utilities. Pavement and junction construction will be undertaken as subgrade sections are completed and landscaping and street furniture will be installed in stages as civil construction is completed.

Traffic management and communication with the travelling public is an essential part of keeping the traffic flow moving safely during construction and ensuring public awareness of alternative routes, diversions and potential delays to their journeys. Traffic management is to be addressed via a separate document for the project.

CCACBL shall ensure environmental information is included and identified in site inductions and working method statements.

## 2.4 Organization Charts

The projected Airport Gateway Project organizational chart is shown below listing the key personnel that will be affected by the EMP.



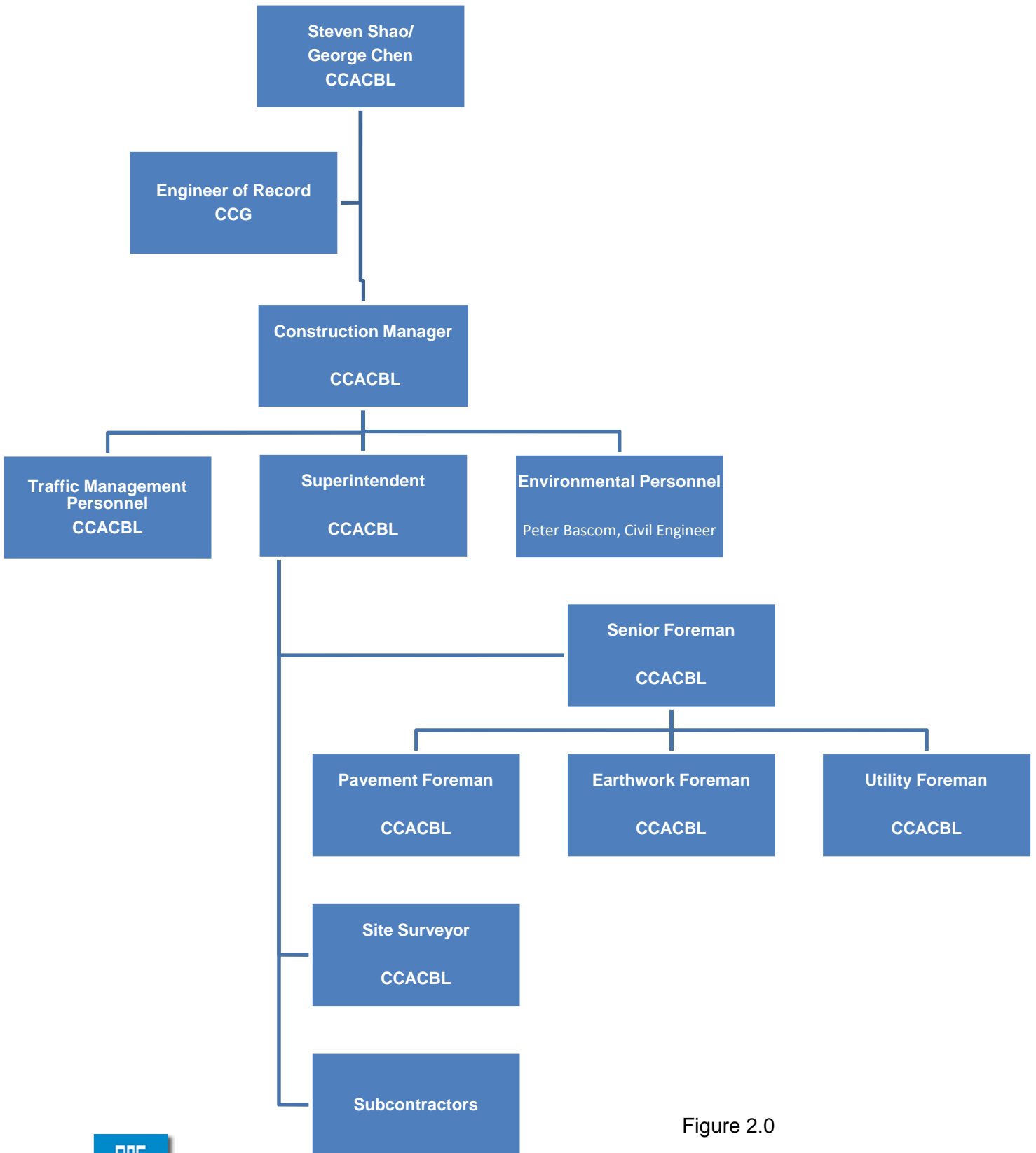
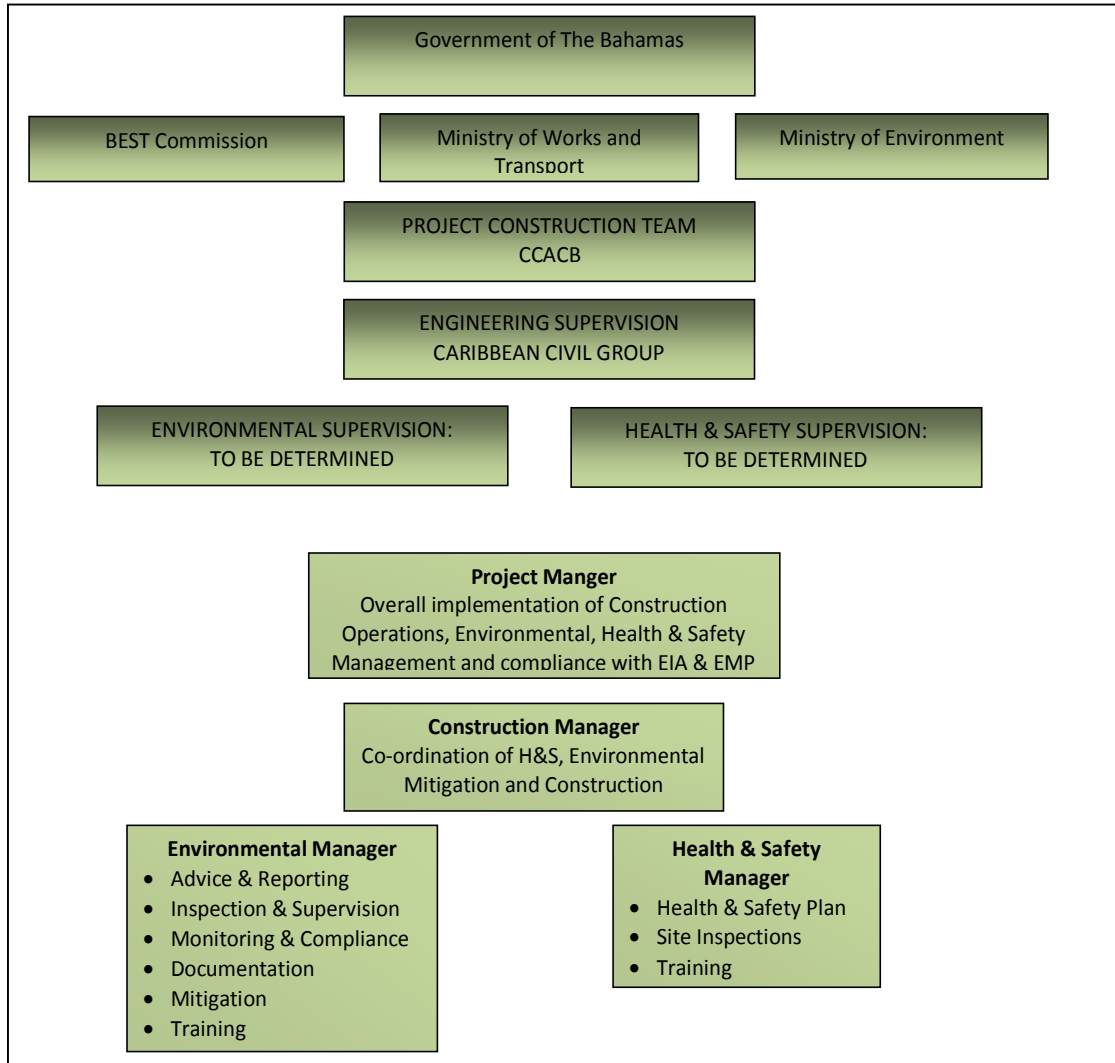


Figure 2.0



**2.4.1 Organization Hierarchy**



The day to day responsibilities of following and implementing the EMP will be delegated to Mr. Peter Bascom, Civil Engineer (Environmental Personnel). As staff are appointed and staff lists are available detailed supervisory and line staff charts will be completed.



## 2.4.2 Emergency Response

Please refer to Section 7.0 of this plan



### 3.0 Applicable Environmental Regulations

#### 3.1 National Legislation and Regulations

The project will be constructed, operated and maintained in accordance with applicable Bahamian environmental laws and regulations. A description of some of the applicable Legislative items listed below is contained within the EIA completed for the project. The list below is not exhaustive.

- The Town Planning Act (1961)
- The Water and Sewerage Act
- Environmental Health Services Act, 1987
- The Conservation and Protection of the Physical Environment of the Bahamas Act, 1997
- The Antiquities, Monuments and Museums Act, 1998 and Regulations 1999
- The Public Works Act
- The Local Government Act 1996
- The Wild Birds Protection Act, 1987
- The Plant Protection Act, 1987
- The Wild Birds and Animals and Plants Protection Act, 1952
- The Bahamas National Trust Act (1959)
- The Fisheries Resources Act
- Declaration of Protected Trees Order, 1997
- The Bahamas National Wetlands Policy, 2007
- The National Invasive Species Strategy for the Bahamas.
- For Contaminated site related standards, the State of Florida regulations will apply

The project manager and construction manager will ensure that sufficient time is incorporated into the construction programme for any permitting and approvals to be granted by GOB. Relevant agencies/departments include:

- The BEST (Bahamas Environment Science Technology) Commission
- Ministry of Works and Transport
- Water and Sewerage Corporation
- Antiquities, Monuments, and Museum Corporation
- Environmental Health Services
- The Bahamas Electricity Corporation
- The Bahamas Telecommunication Company
- The Royal Bahamas Police Force
- Cable Bahamas Ltd.



### 3.2 International Legislation and Regulations

The Bahamas is a signatory to a number of international environmental conventions. A description of the applicable Regulations listed below is contained within the EIA completed for the project. They include:

- The Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES Convention)
- The Convention on Wetlands of International Importance especially as Wildfowl Habitat (Ramsar Convention)
- The United Nations Convention on Biological Diversity (Biodiversity Convention)
- United Nations Framework Convention on Climate Change
- United Nations Convention to combat Desertification
- Vienna Protocol for the Protection of the Ozone Layer
- Montreal Protocol on substances that Deplete the Ozone Layer
- Basel Convention on the Control Transboundary Movement s of Hazardous Waste and their Disposal.
- International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC)



## 4.0 Description of Existing Natural Communities, Environmental Impacts and Mitigation Measures

### 4.1 Habitat Communities

Six habitat types were identified during the terrestrial habitat survey undertaken for the EIA. Full Terrestrial Habitat descriptions are contained within the EIA. The identified divisions of habitat types affected by the project area are described below, they are often very linear and some are fragmented in nature rather than expansive due to localized clearance and development. For continuity between project documents and ease of reference the divisions of the Project Area and Habitat map produced for the EIA are followed in this document. The areas described follow the route from west to east.

#### **Area A: West of Airport to Coral Harbour Road; Pine Forest**

(Project Start LPIA Adjacent to Esso Headquarters to Roundabout 3)

This area is dominated by Pine Forest. The Pine Forest is described as relatively healthy, including species such as Five Finger (*Tabebuia bahamensis*), Wild Guava (*Tetrazygia bicolor*), Purple Bletia Orchid (*Bletia purpurea*), Star Sedge (*Dichromena floridensis*), Poison Wood (*Metopium toxiferum*), and Gum Elemi (*Bursera simaruba*). Some ornamental species such as Wild Tamarind (*Lysiloma bahamensis*), and Pink Poui (non-native) are noted particularly at the edges of the forest. An area of pine forest on the opposite western corner to the police station has been recently cleared and developed to accommodate a new Gas Station.

#### **Area B: East of Police Station to Blake Road (North Boundary); Pine Forest**

(Roundabout 3 to Roundabout 4)

Pine forest habitat, dominated by the Bahamian Pine (*Pinus caribea var. bahamensis*), Five Finger (*Tabebuia bahamensis*), Wild Guava (*Tetrazygia bicolor*), Purple Bletia Orchid (*Bletia purpurea*), Star Sedge (*Dichromena floridensis*), Poison Wood (*Metopium toxiferum*), and Gum Elemi (*Bursera simaruba*). This area of Pine Forest is described as relatively healthy with an occasional Casuarina (*Casuarina equisetifolia*) recorded.

#### **Area C: East of Police Station to Blake Road (South Boundary); Mixed Pine Forest and Wetland**

Roundabout 3 to Roundabout 4)

This area is a transitional Pine Forest/Wetland area, as the area is represented by plant species associated with both habitats. It forms part of the northern most extremities of Lake Kilarney. Species recorded include Bahamian Pine (*Pinus caribea var. bahamensis*), Gum Elemi (*Bursera simaruba*), Saw Grass (*Cladium jamaicense*), Red Mangrove (*Rhizophora mangle*), Leather Fern (*Acrostichum aureum*), Mangrove Vine (*Rhabdadenia biflora*), Cocoplum (*Chrysobalanus icaco*), Wild Tamarind (*Lysiloma bahamensis*) and the invasive non-native Casuarina (*Casuarina equisetifolia*). It is recorded that at the western end of this area there is an increase in the occurrence of Yellow Poui, ornamental specimens.

#### **Area D: East of Blake Road to West Ridge (North Boundary); Broad-leaved Coppice Forest**



(Roundabout 4 to Roundabout 5)

This area is broad leafed coppice forest. Flora species recorded included Five Finger (*Tabebuia bahamensis*), Poison Wood (*Metopium toxiferum*), Gum Elemi (*Bursera simaruba*), Mahogany (*Swietenia mahogani*), Satin Leaf (*Chrysophyllum oliviforme*), Featherbed (*Diospyros crassenevis*), Pigeon plum (*Coccoloba diversifolia*), Bahama Buttercup (*Turnera ulmifolia*), Willow Busic (*Sideroxylon salicifolia*), Cinnecord (*Acacia choriophylla*) and Strong Back (*Bourreria ovata*). This area of forest is described as relatively healthy with occasional specimens of Silk Cotton Tree (*Ceiba pentandra*).

**Area E: East of Blake Road to West Ridge (Southern Boundary); Coppice Forest**

(Roundabout 4 to Roundabout 5)

This area is dominated by coppice forest. Flora species recorded include Joewood (*Jacquinia keyensis*), Wild Tamarind (*Lysiloma bahamensis*), Poison Wood (*Metopium toxiferum*), Satin Leaf (*Chrysophyllum oliviforme*), Pigeon plum (*Coccoloba diversifolia*), Willow Busic (*Sideroxylon salicifolia*). However it is mixed with species associated with other habitats: Bahamian Pine (*Pinus caribea* var. *bahamensis*), Five Finger (*Tabebuia bahamensis*), Purple Bletia Orchid (*Bletia purpurea*), Star Sedge (*Dichromena floridensis*), are all associated with Pine Forest matrix and wetland species such as Saw Grass (*Cladium jamaicense*) are also present. Invasive non-native Casuarina (*Casuarina equisetifolia*) is also recorded.

**Area F: East of West Ridge to Western End of Lake Cunningham; Broad-leafed Coppice Forest**

(Roundabout 5 to Roundabout 6)

This area is identified as broad-leafed coppice forest, in relatively healthy condition. Species include Five Finger (*Tabebuia bahamensis*), Gum Elemi (*Bursera simaruba*), Mahogany (*Swietenia mahogani*), Satin Leaf (*Chrysophyllum oliviforme*), Featherbed (*Diospyros crassenevis*), Pigeon plum (*Coccoloba diversifolia*), Bahama Buttercup (*Turnera ulmifolia*), Willow Busic (*Sideroxylon salicifolia*), Cinnecord (*Acacia choriophylla*) and Strong Back (*Bourreria ovata*), Paradise Tree (*Simarouba glauca*) and the Thatch Palm (*Thrinax morrisii*).

**Area G: Southern Project Boundary opposite Lake Cunningham to Gladstone Road. Coppice Forest**

(Roundabout 5 to Roundabout 6)

The Coppice Forest area opposite Lake Cunningham is reported as very healthy and diverse. Species include Five Finger (*Tabebuia bahamensis*), Gum Elemi (*Bursera simaruba*), Mahogany (*Swietenia mahogani*), Satin Leaf (*Chrysophyllum oliviforme*), Featherbed (*Diospyros crassenevis*), Pigeon plum (*Coccoloba diversifolia*), Bahama Buttercup (*Turnera ulmifolia*), Willow Busic (*Sideroxylon salicifolia*), Cinnecord (*Acacia choriophylla*), Strong Back (*Bourreria ovata*), Paradise Tree (*Simarouba glauca*), Wild Coffee (*Psychotria nervosa*), Snake Bark (*Colubrina arborescens*), Lancewood (*Nectandra coriacea*), and Wild Mamee (*Clusia rosea*). Many bromeliads (*Tillandsia* sp.) and Orchids (*Encyclia* sp.) were noted in this area also. This area held a good number of avian species, recorded during the walk through were Red-legged thrush, American Mockingbird and Bahama Woodstar.



**Area H: Eastern End of Lake Cunningham; Wetland**

(Roundabout 6 to Roundabout 7)

The Far eastern boundary of the lake is formed by a fill area constructed in 2000 as part of the 'Corridor 7' New Providence Road Improvement Project. The filled embankment area appears to have been colonized with successional / invasive vegetation such as Casuarina (*Casuarina equisetifolia*), Brazilian Pepper (*Schinus terebinthifolius*) and Jumbey (*Leucaea glauca*). The lake edge demonstrates typical wetland plant species such as Saw Grass (*Cladium jamaicense*), Buttonwood (*Conocarpus erectus*), Seagrape (*Coccoloba uvifera*), Cocoplum (*Chrysobalanus icaco*) but is dominated by Red Mangrove (*Rhizophora mangle*).

Birds noted during the survey were Least Grebe (*Tachybaptus domesticus*) and Little Blue Heron (*Egretta caerulea*).

A snorkel investigation of the lake was carried out for the EIA. This investigation showed the lake is populated mostly by Guppies (*Poecilia reticulata*). This species was introduced as a mosquito control tool. The Bahama Pup Fish (*Cyprinodon laciniatus*) (Hubbs & Miller 1942), a very rare and endemic species was noted and the Sheepshead minnow (*Cyprindon variegatus*).

**Area I: East of Lake Cunningham to Prospect Ridge (Wetland)**

(Roundabout 6 to Roundabout 7)

This area forms the extremities of Lake Cunningham, but is severed from the main Lake body by the proposed road embankment. The area demonstrates typical wetland plant species such as Saw Grass (*Cladium jamaicense*), Cattail (*Typha domingensis*), Leather Fern (*Acrostichum aureum*), Buttonwood (*Conocarpus erectus*), Seagrape (*Coccoloba uvifera*), Coco plum (*Chrysobalanus icaco*), Red Mangrove (*Rhizophora mangle*) and Wild Tamarind (*Lysiloma bahamensis*). Invasive / successional species such as Casuarina (*Casuarina equisetifolia*), Brazilian Pepper (*Schinus terebinthifolius*) and Jumbey (*Leucaea glauca*) are also present.

Common Moorhen (*Gallinula chloropus*) were observed in the area, with males demonstrating territorial display, indicating that the area is a nesting area for the species.

**Area J: Tonique Williams Darling Highway and Prospect Ridge Junction North End Strip; Coppice Forest**

Roundabout 7

This area is already being impacted by development further up the ridge. Remnant broad-leaved coppice forest which is relatively diverse is interspersed with the Bahamian Pine (*Pinus caribea* var. *bahamensis*). Other species include Five Finger (*Tabebuia bahamensis*), Gum Elemi (*Bursera simaruba*), Mahogany (*Swietenia mahogani*), Satin Leaf (*Chrysophyllum oliviforme*), Featherbed (*Diospyros crassenevis*), Pigeon plum (*Coccoloba diversifolia*), Bahama Buttercup (*Turnera ulmifolia*), Willow Busic (*Sideroxylon salicifolia*), Cinnecord (*Acacia choriophylla*) and Strong Back (*Bourreria ovata*), Paradise Tree (*Simarouba glauca*) and the Thatch Palm (*Thrinax morrisii*). In more disturbed areas the habitat has become dominated by Casuarina (*Casuarina equisetifolia*) and Seagrape (*Coccoloba uvifera*).



**Area K: Tonique Williams Darling Highway and Prospect Ridge Junction South End Strip; (Mixed Disturbed Area)**

Roundabout 7

This area is dominated by large non-native plants interspersed with some typical broad-leafed coppice. There is evidence of disturbance and recolonisation of non-native and invasive species. Plants recorded in the area include Poinciana (*Delonix regia*), West Indian Almond (*Terminalia catappa*), Womans Tongue (*Albizia lebbek*), Mother-in-Laws Tongue (*Sanseveria trifasciata*), Wild Coffee (*Psychotria nervosa*), Satin Leaf (*Chrysophyllum oliviforme*), Pigeon plum (*Coccoloba diversifolia*), Wild Tamarind (*Lysiloma bahamensis*), Willow Busic (*Sideroxylon salicifolia*), Wild Guava (*Tetrazygia bicolor*). The occasional Bahamian Pine (*Pinus caribea var. bahamensis*) is interspersed throughout the non native landscape plants.

**Area L: East of Prospect Ridge; (North and South Boundaries) Coppice Forest**

Roundabout 7 to Roundabout 8

Healthy linear coppice forest interspersed with Bahamian Pine (*Pinus caribea var. bahamensis*). Other species include Gum Elemi (*Bursera simaruba*), Satin Leaf (*Chrysophyllum oliviforme*), Pigeon plum (*Coccoloba diversifolia*), Willow Busic (*Sideroxylon salicifolia*), Cinnecord (*Acacia choriophylla*), Strong Back (*Bouyeria ovata*), Wild Coffee (*Psychotria nervosa*), Wild Tamarind (*Lysiloma bahamensis*), Rams Horn (*Pithecellobium keyense*)

**Area M: East of Prospect Ridge to Bethel Avenue (Developed area)**

Roundabout 8 to Roundabout 9

This area is heavily urbanized and developed. A few native trees are used as Ornamentals such as Wild Tamarind (*Lysiloma bahamensis*) and Mahogany (*Swietenia mahogani*) along with non-natives such as Pink Poui and Weeping Fig.



#### 4.1.1 Environmental Impacts

##### 4.1.2

Environmental Impacts are discussed in full in the EIA. Those impacts are summarised in this section.

Description	Impact	Mitigation	Responsibility & Further References
Pine Forest	Habitat Fragmentation & Loss Biodiversity Loss Aesthetic Loss	Replanting of Bahamian pines in suitable areas at a ratio of 2:1 against those trees removed is preferred. Understory planting should also be undertaken to increase biodiversity. If no suitable areas are available within the ROW offsite planting could be considered	<ul style="list-style-type: none"> <li>• Environmental Personnel</li> <li>• Landscape Architect</li> <li>• Appendix G EIA</li> <li>• Planting Method Statement</li> </ul>
Coppice Forest	Habitat Fragmentation & Loss Biodiversity Loss Aesthetic Loss	Where possible coppice forest trees should be salvaged and replanted. Gum Elemi, Satin Wood and Strong Back transplant relatively easily. Five Finger, Featherbed, Cinnecord species should also be retained for mitigation planting. Many of the understory shrub species are readily available at local nurseries. Consultation with the Botanical Garden Manager would be advantageous.	<ul style="list-style-type: none"> <li>• Environmental Personnel</li> <li>• Landscape Architect</li> <li>• Appendix G EIA</li> <li>• Site Clearance Method Statement</li> </ul>
Wetland	Habitat Fragmentation & Loss Biodiversity Loss Aesthetic Loss Loss of marginal areas. Sedimentation	It is likely that marginal areas will be lost or water levels will change leaving the remaining habitat unsuitable for certain flora communities. The prevention of Sedimentation must be addressed as this is a significant impact on both flora and fauna. Suspended sediment release will have both short and long term effects and is regularly overlooked. Replanting of suitable areas should be undertaken with Saw Grass, Leather Fern, Red Mangrove, Pond Apple and in more marginal areas White Mangrove, Buttonwood.	<ul style="list-style-type: none"> <li>• Environmental Personnel</li> <li>• Construction Manager</li> <li>• Landscape Architect</li> <li>• Site Clearance Method Statement</li> <li>• Sediment and Erosion Control Method Statement</li> </ul>



Description	Impact	Mitigation	Responsibility & Further References
Mixed Pine Forest/ Wetland Habitat	Habitat Fragmentation & Loss Biodiversity Loss Aesthetic Loss Loss of marginal areas. Sedimentation	Replant Bahamian pines in suitable areas at a ratio of 2:1 against those trees removed. Understory planting should also be undertaken to increase biodiversity. If no suitable areas are available within the ROW offsite planting could be considered. It is likely that marginal areas will be lost leaving the remaining habitat unsuitable for certain flora communities. The prevention of Sedimentation must be addressed. Suspended sediment release will have both short and long term effects and is regularly overlooked. Replanting of suitable areas should be undertaken with Saw Grass, Leather Fern, Red Mangrove, Pond Apple and in more marginal areas White Mangrove, Buttonwood.	<ul style="list-style-type: none"> <li>• Environmental Personnel</li> <li>• Construction Manager</li> <li>• Landscape Architect</li> <li>• Site Clearance Method Statement</li> <li>• Sediment and Erosion Control Method Statement</li> <li>• Appendix G EIA</li> </ul>
Mixed disturbed areas	Habitat Fragmentation & Loss Biodiversity Loss Aesthetic Loss	These areas can actually result in an improvement, once exotic invasive specimens have been removed. Coppice forest species can be replanted with a native fruiting tree mix to improve diversity and habitat.	<ul style="list-style-type: none"> <li>• Environmental Personnel</li> <li>• Landscape Architect</li> <li>• Site Clearance Method Statement</li> <li>• Appendix G EIA</li> </ul>
Developed areas	Aesthetic loss	Careful consideration to replanting and landscaping could offer an improvement to existing conditions.	<ul style="list-style-type: none"> <li>• Landscape Architect</li> <li>• Site Clearance Method Statement</li> <li>• Appendix G EIA</li> </ul>



Soils	Generation of Dust from exposed soils. Sediment release from exposed soils Removal of topsoil	Application of dust control sealer if exposed surfaces are to be left for long periods of time. For short-term exposure dust control must be implemented by regular damping down with water trucks fitted with spray bars. Speed limit enforcement for vehicles traveling on untreated surfaces. Silt fencing and sediment control barrier must be used in area where sediment release to open water, wetland and drainage systems to prevent suspended sediment damage. Careful removal, screening and storage of topsoil should be undertaken. The reuse of topsoil should be made in the landscaping and replanting of woodland areas. The stripped topsoil will retain the natural seed bank for the area and assist with regeneration of planted areas.	<ul style="list-style-type: none"> <li>• Environmental Personnel</li> <li>• Construction Manager</li> <li>• Safety Manager</li> <li>• Site Clearance Method Statement</li> <li>• Sediment and Erosion Control Method Statement</li> <li>• Air Quality Method Statement</li> </ul>
Description	Impact	Mitigation	Responsibility & Further References
Air Quality	Dust, fumes and fine particle release.	The operation of heavy equipment and machinery may increase fumes and fine particle release but this will be temporary and transient in nature. Vehicles must obey reduced speed limits traveling on untreated surfaces to prevent entrained dust.	<ul style="list-style-type: none"> <li>• Environmental Personnel</li> <li>• Construction Manager</li> <li>• Safety Manager</li> <li>• Site Clearance Method Statement</li> <li>• Sediment and Erosion Control Method Statement</li> <li>• Noise, Air Quality &amp; Odour Control Method Statement</li> </ul>
Waste	Vegetation debris and inert construction waste. Liquid and hazardous waste	Vegetation debris should be considered for mulching to prevent utilizing valuable land fill space. Domestic type refuse will increase on a temporary basis during road construction from additional staff and workers. Construction waste should be recycled or re-used where possible. Oil waste is to be collected by a licenced collector Machine batteries should be recycled where possible.	<ul style="list-style-type: none"> <li>• Environmental Personnel</li> <li>• Construction Manager</li> <li>• Safety Manager</li> <li>• Site Clearance Method Statement</li> <li>• Sediment and Erosion Control Method Statement</li> <li>• Waste Control</li> </ul>



Hydrology	Potential effect on groundwater / freshwater supply for dust control & limerock compaction / flushing	Minimization of use of potable fresh water supplies. Any well dug for water supply for the project will conform to national standards and specifications and will not affect the quality of the freshwater lenses or other natural resource.	<ul style="list-style-type: none"> <li>• Environmental Personnel</li> <li>• Construction Manager</li> <li>• Safety Manager</li> <li>• Drainage/Well drilling Method Statement</li> <li>• Limerock Base/ Compaction Method Statement</li> <li>• Sediment and Erosion Control Method Statement</li> <li>• Waste Control</li> </ul>
Archaeological Resources	Damage to or loss of Archaeological resources	Consultation with AMMC, Identified resources should be preserved where possible. The discovery of any archaeological resource is to be reported to the Env. Manager and then consultation with the AMMC will be taken.	<ul style="list-style-type: none"> <li>• Environmental Personnel</li> <li>• Construction Manager</li> <li>• Site Clearance Method Statement</li> </ul>
Description	Impact	Mitigation	Responsibility & Further References
Neighboring Communities	Effects of land use change. Increased traffic during construction. Removal of memorials to traffic accident victims	<p>The land use change will likely have minimal impact on communities, some loss or change of access will occur for those who use the lake for remote controlled power boat racing etc.</p> <p>There may increased traffic on different routes during construction as diversions are put in place or people simply try and avoid using the roads during certain periods.</p> <p>The memorials and tributes to traffic accident victims should be handled with care. It is strongly recommended that that efforts should be made to trace families that maintain these memorials and advise them that the project is going to affect the location of memorial headstones and wreaths.</p>	<ul style="list-style-type: none"> <li>• Environmental Personnel</li> <li>• Construction Manager</li> <li>• Site Clearance Method Statement</li> </ul>



Visual, Aesthetic	Impact to the existing boundaries of the right of way	Potential improvement in some areas with considered landscaping. Long term maturing landscaping should result in beautification of route.	<ul style="list-style-type: none"> <li>• Landscape Architect</li> <li>• Site Clearance Method Statement</li> <li>• Appendix G EIA</li> </ul>
Noise	Increase in ambient noise emissions	Short-term increase in noise emissions due to heavy plant and equipment. Minimal long-term impact as traffic will move more freely and project follows existing route.	<ul style="list-style-type: none"> <li>• Environmental Personnel</li> <li>• Construction Manager</li> <li>• Safety Manager</li> <li>• Site Clearance Method Statement</li> <li>• Noise, Air Quality &amp; Odour Control Method Statement</li> </ul>
Land use	Change in land use	Linear loss of and further fragmentation of Pine forest, coppice and wetland. Areas of redundant road from realignment should be re-worked and planted with suitable forest or coppice species to help mitigate for lost habitat.	<ul style="list-style-type: none"> <li>• Landscape Architect</li> <li>• Site Clearance Method Statement</li> <li>• Appendix G EIA</li> </ul>

#### 4.1.2.1 Education and Socio-Economic Effort

Description	Duration	Responsibility
Retention of as much existing vegetation as possible. Translocation of selected trees & vegetation etc	During ROW establishment & throughout Construction.	Environmental Personnel Construction Manager Surveyor Landscape Architect
Preservation of water quality into Lake Kilarney Wetland	During ROW establishment & throughout Construction and ongoing.	Environmental Personnel Construction Manager Project Team
Preservation of water quality into Lake Cunningham	During ROW establishment & throughout Construction and ongoing.	Environmental Personnel Construction Manager Project Team
Preservation of Wetland East of Lake Cunningham	During ROW establishment & throughout Construction and ongoing.	Environmental Personnel Construction Manager Surveyor Landscape Architect



#### 4.1.2.2 Education and Socio-Economic Effort

Description	Duration	Responsibility
Site Induction covering environmental responsibility for all staff and site workers	Throughout construction	Environmental Personnel Construction Manager
Employment and training opportunities for local workers	Throughout construction	Project Team
Improved safety and journey time for road-users	After completion	Project Team

#### 4.1.2.3 Habitat Conservation Effort

Description	Duration	Responsibility
Retention of as much existing vegetation as possible.	During ROW establishment & throughout Construction.	Environmental Personnel Construction Manager Surveyor Landscape Architect
Replanting of native species	Landscaping phase	Environmental Personnel Landscape Architect
Planting to minimize fragmentation of habitats	Landscaping phase	Environmental Personnel Landscape Architect
Redundant areas of road to be worked and replanted as mitigation for habitat removal	Construction phase Landscaping phase	Environmental Personnel Landscape Architect Construction Manager

#### 4.1.2.4 Construction Effort

Description	Duration	Responsibility
Protection of retained vegetation against accidental damage or removal	Boundaries to be marked and in place prior to site clearance and maintained throughout the construction	Environmental Personnel Construction Manager
Correct installation of sediment fence, bunds and silt curtain	Sediment fence, curtain and bunds to be in place before construction begins, inspected daily and monitored throughout the construction. To remain in place until soils are stabilized.	Environmental Personnel Construction Manager
Correct bunding of static fuel	Tanks are to be installed on	



tanks and readily available spill kits.	impervious bases and surrounded with impervious walls to contain at least 110% of tank capacity. Valves are to be locked off to prevent vandalism and other unauthorized access.	Plant Manager Construction Manager Environmental Personnel
Revegetation and erosion protection of slopes and exposed soils.	The establishment of vegetation soon as construction starts should be carried out to prevent erosion and silt generation.	Landscape Architect Environmental Personnel Construction Manager
Fill materials, sand etc to be from licenced and approved sources only.	For the duration of construction	Project Manager Quantity Surveyor / Purchaser Environmental Personnel Construction Manager

#### 4.1.3 Areas of Special Concern

The Marginal wetlands of Lake Kilarney are particularly susceptible to sediment release and changes in water levels will affect the habitat matrix.

Lake Cunningham is designated as a Wild Bird Reserve, and also holds populations of the Bahama Pup Fish (*Cyprinodon laciniatus*).

Tree species found in the project area that are protected by law include:

- Caribbean (Bahamian) Pine (*Pinus caribea var. bahamensis*)
- Mahogany (*Swietenia mahogani*)
- Silk Cotton Tree (*Ceiba pentandra*)

Special conditions are required for the removal of specimens of these species. Many Bromeliads and orchids were noted in Area G; these are valuable species and indicators of established and stable habitat communities and a method of transplanting them implemented.



## 5.0 Project Planning

### 5.1 Pre-construction

Description	Comments	Responsibility
Approval for site office location / compound storage facilities	Compound storage areas should be located away from any water body, and away from residential areas to minimize noise and additional traffic movements	Project Manager
Land Acquisition / ROW establishment	Any land acquisition transfers are to be completed before construction on that land begins	MOWT
Public Relations	Inform major stakeholders, adjacent business owners and public that project is to begin. Keep major transport businesses (shippers, buses, taxicabs, fuel distributors etc) informed as to likely changes and traffic management layouts etc.	MOWT Traffic Management Manager Construction manager
Approval of EMP	Submission to the BEST Commission	Project Manager
Identify and approve locations for installation of sediment fence, bunds and silt curtain	Sediment fence, curtain and bunds to be in place before construction begins.	Project Manger Environmental Personnel Construction Manager
Identify ROW and plant and tree species for relocation	Trees and plants to be retained to be clearly marked. Protected areas to be clearly marked. ROW to be clearly marked.	MOWT Surveyor Landscape Architect Construction Manager Environmental Personnel
MOWT to secure permits and special conditions for tree harvesting	Submit construction drawings for all permitting and approvals to MOWT.	MOWT
Appropriate Excavation and fill permits to be obtained as necessary	Submit construction drawings for all permitting and approvals to MOWT.	MOWT
Photographic record to be undertaken of Route to ROW.	To record existing ecological features and conditions.	Environmental Personnel



## **5.2 Best Management Practices and Pollution Prevention**

See Section 6.0: Construction and Operation Management Activities.

## **5.3 Project Sequencing**

A construction programme will be produced for approval prior to works starting on site. The works will commence at the western end of the project at chainage 0+00 progressing eastward. Tree distressing and utilities relocations will be the first construction activities for the project.



## 6.0 Construction and Operation Management Activities

### 6.1 Construction Erosion and Sediment Control Plan

Exposure of underlying soils and rock will lead to sediment release in wet weather conditions or potentially when wetting down of surfaces is undertaken for dust control. Sediment release into wetland and aquatic habitats can result in the smothering and death of invertebrates, fish and plants.

Dust release on land is not only a visual and health nuisance it will coat vegetation and inhibit a plant's ability to carry out photosynthesis and gas exchange, eventually causing die-back and suffocation.

This plan explains methods and techniques designed to reduce and minimize sediment release and control the impacts of construction activity. Many methods are available and each site or problem area must be assessed and the best workable solution used. Not all methods are practical at all sites, which may increase the cost and consume time if inappropriate, expensive and badly installed solutions are utilized.

**Sediment protection MUST be installed prior to work starting (including utilities relocation) It is always possible to increase protection areas if required but it can be difficult to access and properly install measures once equipment is working in an area and a problem has become evident.**

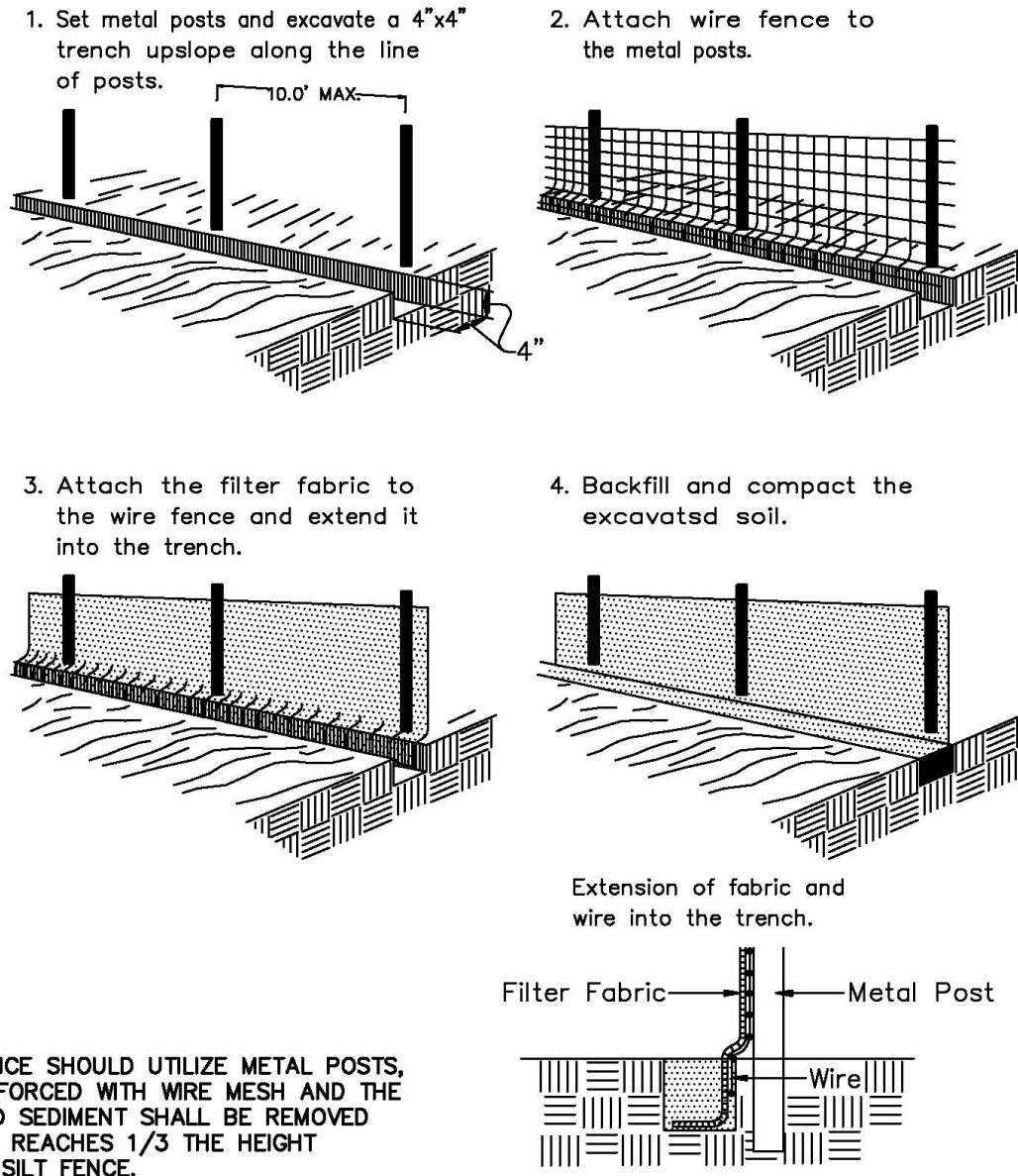
Sediment control & protection is to be inspected on a daily basis as part of the environmental checklist.

A full Construction Erosion and Sediment Control Plan can only be developed when the ROW is marked, design and construction drawings are finalized so that positioning and type of protection can be determined for suitability at appropriate locations. The construction drawings should have details of sediment fence and other controls to be utilized.

#### 6.1.1 Silt Fence

A silt fence is a sediment barrier for temporary use. It is usually widely available on island. The Environmental Personnel will identify the areas that require silt fence installation. The silt fence installation will be monitored and supervised by the Environmental Personnel to ensure that it is correctly installed. When installed correctly in low flow situations this is a very effective barrier. The fence is made from filter fabric supported by upright wooden posts. It is very important that this fence is installed with care (See Silt Fence Detail Figure 3.0) . The bottom of the fence must be buried in a shallow trench to stop sediment laden run-off flowing under the curtain. There are limits to its effectiveness, particularly when there is a heavy build up of water behind the fence which often can result in the tearing of the fence or even the breaking of the posts. The Environmental Personnel will identify areas that will not be adequately protected by silt fence alone. The use or combination of protection methods described in this section when correctly implemented will prevent sedimentation damage to existing habitats.





## SILT FENCE DETAIL

Figure 3.0

### 6.1.1.1 Turbidity Curtain

Turbidity curtain is for use in water rather than on land. It can be installed in both tidal and non – tidal situations. It is a floating plastic or canvas curtain that is weighted at the base of the



curtain. It is very effective when installed correctly at preventing the flow of sediment loaded run-off water.

Turbidity curtain will be a very useful second defense in the Lake Cunningham location due to the surrounding and existing topography. As silt plumes have been common and highly visible during heavy rainfall in the very recent past on this lake, CCACBL will monitor closely and use this methodology if required.

### **6.1.2 Berm Barriers**

Berm barriers are designed to slow down the flow of water and allow the transported sediment to settle out behind the barrier.

Berm barriers may be constructed by wrapping infill material within a geotextile fabric, straw bales, and sand bags. Hay bales can be used but their provenance should be checked as they can cause the spread of alien species and weeds as seeds can be washed out. Sand bags, if used, should not be filled with limerock as this when first soaked generates suspended particles and causes sediment release. Daily inspections will indicate whether the installation of berm barriers will be required in addition to silt fencing at sensitive locations.

### **6.1.3 Drainage Swales**

Drainage swales are temporary ditches that help move storm water flows away from working areas into a settlement area that allows the suspended solids to drop out.

Swales generally need a considerable area and can be difficult to accommodate within a linear construction area, unless they are going to be incorporated as part of the drainage design. They should have stabilized surfaces to prevent their erosion in high flow conditions and their release of sediment. The installation of swales may be applicable in certain areas to allow retain runoff, reduce flow and allow sediment to settle out.

### **6.1.4 Soil Erosion Protection**

#### **6.1.4.1 Soil Stabilizers**

Soil erosion protection is usually a polymer based liquid or powder, applied, having been mixed with water with a waterbowser. It forms a sealed but porous layer on exposed soils and can also help with vegetation establishment. The requirement for use of stabilizers will be assessed by the Environmental Personnel. Through the monitoring process he will be able to determine whether their use is appropriate for the conditions encountered.

#### **6.1.4.2 Mulches/Seeding/ Hydroseeding/Turfing**

Mulching using a protective layer of material such as straw, wooding chippings etc that is applied over the soils surface may be utilized. Hydroseeding can be included in this segment applying hydraulically with a fibre mix. The use of seeding or turfing will enable fast establishment of a grassed surface, that will prevent soil erosion and reduce sediment release.



Co-ordination between the construction programme and landscaping contractor is essential as the landscaping should be implemented as soon as works are completed in each section. Landscaping should not be left to the end of the contract.

#### **6.1.4.3 Erosion Control Blankets /Mats**

These can be used during construction to stabilize slopes but are generally a post construction option. They are appropriate for steep slopes and stream banks where establishing vegetation can be difficult. They are made from both natural and synthetic options. **6.1.4.4 Gravel /Riprap**

Gravel and /or Riprap can be used to protect drainage channels, banks and outlets from surface water flow erosion. Riprap can be incorporated into permanent drainage design.

#### **6.1.4.4 Plastic Sheeting**

Plastic sheeting may be used to assist in an immediate erosion or protection issue and with stockpile protection. It will not be a long term solution as it is easily damaged and visually intrusive.

### **6.2 Land Reclamation**

Not Applicable to this project.

### **6.3 Water Quality**

Areas of wetland and open water must be protected against sediment release and hydrocarbon pollution. No direct drainage from the project should be allowed to any waterbody or wetland during construction or on completion of the project. Oil interceptors should be used in drainage runs that would ultimately reach any of these aquatic habitats

Water features will be visually inspected at least once daily during construction to ensure no unauthorized discharges have taken place. If dewatering or over-pumping is required during the construction then pumped water must be contained in a settlement area before being allowed to drain. A method statement for the dewatering or over pumping is to be produced for those operations should they be required, the method statement will also cover environmental monitoring and conditions.

Monitoring stations are to be set up prior to construction. They should be adjacent to and remote from the construction envelope to ensure that impacts are being properly mitigated. The Environmental Personnel should identify these stations and they should be approved by the BEST commission. The Environmental Personnel will carry out photographic and species records at each station before, during and after construction. Monitoring record forms are included in Appendix B. Reports on each station should be provided in the monthly site report.



Specific chemical analysis and testing throughout the project is not thought to be necessary unless an incident affecting the water body takes place. There may be some merit in a pre-construction test and post construction test of Lake Cunningham, however this and any interim testing is a decision that must be made by the BEST Commission or the relevant agency and their direction must be followed.

No refuelling operations should be carried out within 150 feet of a wetland, open water or drainage feature. If water pumps are to be refueled and cannot be moved for the operation, they must be stood on an impervious base or tray and spill mats provided to absorb any potential spillages. Personnel operating and maintaining these pumps must have special instruction and briefings on refueling and the potential environmental implications.

## 6.4 Flora and Fauna

During construction measures to minimize disturbance and impact to wildlife must be undertaken. Birds, reptiles, fish and invertebrate species are the most likely impacted by this development. Measures that can be undertaken include, but are not restricted to:

- Careful monitoring of works with construction activities near Lake Cunningham, Lake Kilarney, their associated wetlands and Prospect Water Works area. This will be particularly important between July and September to limit the construction impact of birds using the area.
- Prevention of entry of workers and construction traffic into sensitive areas including coppice woodland, lakes and wetlands.
- Where possible the prevention of site clearance and vegetation clearance during breeding seasons.
- The minimization of vegetation clearance and maximum re-vegetation as soon as possible to provide habitat for both vertebrate and invertebrate species.
- Translocation of individuals where possible (e.g. Trees, shrubs, epiphytes, reptile species) to suitable alternative locations.
- Siltation of waterbodies, drainage and wetland during construction must be prevented.
- No Fishing, trapping or hunting will be permitted in the Lakes or Wetland area by workers.
- Minimization of the width of the working areas within the ROW.
- Temporary fencing around retained vegetation to protect from encroachment, illegal dumping and accidental damage from machinery.
- Hand excavation around the roots of retained trees and street trees.
- Pruning of trees where possible instead of removal. Severed roots and branches must be treated with an approved dressing.
- Groundcover and vegetation restoration to be implemented as soon as the earthworks and construction allow.
- No stockpiling or storage of materials, under the crown or drip-line of any tree. No fencing is to be fixed to any tree.



Dust emissions must be minimized to prevent desiccation and die-back of trees through impaired photosynthesis and gaseous exchange.

## 6.5 Noise, Air Quality and Odour Control

The following measures to minimize noise and dust shall be put in place.

- Plant and equipment used on site will have fitted and maintained exhaust/muffler systems, this will keep noise levels down and reduce the 'black smoke' emissions from plant.
- Dust control will involve the application of water or calcium chloride by water bowser with a spray bar.
- Consideration should be given to using a polymer dust suppression additive, particularly on haul roads to reduce the quantity of water used.
- Minimal vegetation stripping will help with dust control.
- Public road ways should be kept clean and free of mud and dust. Road Brushes and Vacuum Sweeper trucks are available on Island.
- Overnight running of Generators and/or pumps should be avoided, particularly in the vicinity of residences. Noise attenuation screens should be used around these items of plant.
- Residents and Businesses shall be informed of hours of working, duration of works and potential noise levels.
- Particular attention and co-ordination with the Lakeview Cemetery should be in place when works around Gladstone Road are underway.
- A specific re-assessment of impacts for Lake Cunningham should be undertaken should activities such as pile driving be required.
- Blasting is not permitted unless the required permits are in place and approval has been received from the MOWT and BEST Commission.
- There should be no works or at least restricted works on Sundays in accordance with the conditions of the contract. Recognition of when works are carried out close to or affecting access to places of Worship.
- In the absence of noise regulations in The Bahamas an average daytime noise level of 70dB(A) at the receptor is considered to be an indication of noise impact and a limit of nighttime working. Existing background levels are to be established by the Environmental Personnel at certain sensitive locations such as Lakeview Cemetery, and residential areas such as Christie Avenue, prior to works being undertaken.
- Refuse removal will be ongoing from site areas. Adequate refuse containers will be provided and No area should have a build up of garbage that would produce odour. The regular removal and proper containment of garbage will also discourage vermin.

## 6.6 Waste Management

Waste will be generated from various sources during the project. A waste record must be maintained by the Environmental Personnel, and landfill record slips retained.



Land clearing will generate vegetative waste. If possible this should be mulched and reused in landscaping either as mulch or mixed with topsoil.

Construction debris will be generated, but quantities are unknown. Where possible it should be reused or recycled. If it cannot be re-used or recycled then it should be sent to land fill. No dumping or fly tipping of materials from the project will be permitted. Millings from the existing carriageway could be used in embankment construction or for haul roads as it will reduce dust emissions rather than running on exposed soils.

Waste Oils will undoubtedly be produced during the project. They should be stored in marked drums and their removal by a licenced contractor undertaken. Under no circumstance should they be allowed to discharge to ground or water.

General domestic waste will be generated. Lidded garbage bins or skips must be provided to prevent waste being blown around the site and to prevent scavenging by animals.

### **6.7 Site Access**

Areas under construction must have restricted access. Only persons involved with the project should be permitted access to working areas. Site or works access and exit should be positioned so as to gain safe access and exit from the sites, they should be clearly marked and delineated from normal traffic flow. Site access and exit must be kept clean and free from mud and dust. Traffic control in the form of Flag persons, stop/go or temporary traffic lights should be used. If the access / exit is to be used at night it should be clearly illuminated and if closed it should be securely barriered to prevent unauthorized access.

### **6.8 Staff Training**

Before commencing work on site all staff and visitors must attend a safety and environmental briefing and orientation. A record of their attendance must be kept. The briefing will not only cover site rules, safety issues, accident prevention but must also cover environmental issues and rule, emergency response procedures, lines of communication and personal responsibility.



## 7.0 Hazard and Emergency Management, Storage of Materials

An incident that has the potential to cause or causes environmental damage is an environmental emergency.

An activity or condition that is potentially dangerous to human health or property is an Environmental hazard.

Emergency plans to cover such potentials as Fuel, Oil or Chemical Spills, Fire, Hurricane, should be put in place. Emergency plans are included in Appendix A.

The emergency plans should be briefed to all site workers and visitors at the site induction. Emergency Plans should be posted at common areas so that all employees and site workers have access to them.

Hurricanes and Storms are usually known about in advance and so there is time to re-brief staff and allocate specific duties. A meeting should be held close to the start of Hurricane season to review and update responsibilities in that particular plan and ensure that it is still relevant. See Appendix A for the Spills Emergency Plan.

Additional emergency contact details cards should be provided in all company vehicles, at communal areas and around emergency equipment such as spill kits, fire extinguishers and first aid kits. An emergency contact card should hold the following contact details as a minimum.

<b>AIRPORT GATEWAY PROJECT Emergency Contact Numbers</b>	
<b>911 / 919</b>	<b>FIRE / POLICE</b>
<b>322- 2861</b>	<b>PM Hospital</b>
<b>322- 8411</b>	<b>Doctors Hospital</b>
<b>TBD</b>	<b>CCACBL Offices</b>
<b>322 -2576</b>	<b>BEST Commission</b>
<b>322- 8073</b>	<b>Department of Environmental Health</b>
<b>302-9779</b>	<b>MOWT</b>
<b>422-6644</b>	<b>MOWT</b>

## 7.1 Personal Protective Equipment (PPE)

A minimum requirement for all workers and visitors to be worn on site at all times are:



- Hi –visibility vests, with reflective bands.
- Steel-toe safety boots or shoes
- Hard hats

Other PPE such as eye protection, hand protection ear protection may be deemed compulsory or required as specified for certain tasks or works.

## 7.2 Hazardous Material Management

Materials may be considered hazardous if it demonstrates one or more of the following properties.

- Has a flash point below 140°F (gasoline, mineral spirits etc)
- Is corrosive; has a ph of 2.0 or below (Acid) or 12.5 (alkali) and above. Batteries, cleaning solvents etc)
- Has a high reactive action with water or other compounds (bleach etc)
- Is toxic, i.e. is or contains a substance that is harmful. E.g. lead, mercury etc.

Hazardous materials commonly used during construction include paint, adhesives, pesticides, preserved woods, wood preservatives, and oils.

It is yet to be determined whether the WHMIS or COSHH will be implemented on site. They are of equal value and both demand that MSDS sheets are provided with hazardous material and that persons using or handling hazardous materials are informed of the potential hazardous and how to correctly manage and handle those substances. A register of these materials must be kept on site for ease of reference in an emergency.

If material is left over and disposal is required disposal instructions as set out on the MSDS must be followed.

### 7.2.2 Storage

- All hazardous materials must be clearly marked.
- They should be stored under cover where possible with recognition being made of their storage temperatures.
- Avoid stockpiling hazardous materials. Smaller quantities purchased more often is safer.
- Hazardous liquids should be stored on spillage trays or in bunded areas.
- Ensure containers are kept closed and weather proof to stop any contamination.
- Hazardous material should be stored in a secured locked area to prevent vandalism and accidental injury.
- Used oils should be stored in lidded secure containers and kept on an impervious base and bunded.
- Materials storage should be inspected on a daily basis to ensure the facility is safe and no leaks or spill are present.

## 7.3 Fuels

Fueling should be restricted to areas with impervious surface to prevent ground contamination.



No refuelling operations should be carried out within 150 feet of a wetland, open water or drainage feature. If water pumps are to be refueled and cannot be moved for the operation, they must be stood on an impervious base or tray and spill mats provided to absorb any potential spillages. Personnel operating and maintain these pumps must have special instruction and briefings on refueling and the potential environmental implications.

Further details on Access routes and defined fuelling areas must be developed when the construction programme is defined.

Drip trays should be used when refuelling vehicles and plant. Automatic shut off valves should be used to prevent overfilling.

Spill kits must be available at fuelling locations and on any fuel trucks.

Fuel truck operators must have specific briefing as to emergency procedures and responsibility for safe fuelling.

#### **7.4 Spills**

- Clean up leaks and spills immediately.
- Do not wash spills into drainage systems or soils, they should be cleaned up with absorbant materials.
- Vehicles including delivery trucks should be checked for leaks before entering unpaved areas.
- All contaminated cleanup materials should be disposed of as hazardous materials.
- Spills Emergency Plan is found in Appendix A.

#### **7.5 Fire Control Measures**

- No Fires are to be lit on site; incineration is banned on the project area.
- Temporary storage of cleared vegetation will be in open areas - away from retained vegetation.
- Emergency numbers must be displayed at communal areas and next to emergency equipment such as fire extinguishers.
- Fire extinguishers must be certified and checked on a weekly basis, and replaced once discharged.



## 8.0 Landscape Management

The landscaping aims of this project are to improve the beautification of the Gateway project, it aims to improve the initial impression upon arrival for tourists as well as improve the safety and journey for regular road users. A specific set of landscaping drawings will be issued for the sub-contractor to follow and ensure that appropriate planting is used in locations such as junction approaches and site lines.

The recommended planting list is included in Appendix G of the EIA. Landscaping requirements for the project are set out in Appendix G of the EIA.

Where ever possible existing vegetation is to be retained insitu, where specimen trees are suitable for transplantation they will be marked and moved prior to site clearance.

Exotic and invasive species remaining within the ROW should be marked and removed. Species recommended for removal by the BEST Commission are listed below;

- Casuarina /Australian Pine (*Casuarina glauca*)
- Paperback Tree (*Melaleuca quinquinervia*)
- Monkey Tamarind (*Mucuna pruriens*)
- Hawaiian Seagrape (*Scaevola taccada*)
- Brazilian Pepper (*Schinus terebinthifolius*)

Landscaping for this project will be undertaken by a sub-contractor, it is not anticipated that the landscape contractor will set up an equipment storage and maintenance yard specifically for the project, but that he would operate from his existing fixed base.

Pesticides shall not be stored on site, but brought in as required by the landscape contractor. The use of pesticides around wetlands and open water must be carefully monitored. No pesticides containers are to be flushed out or emptied into wetland or open water. Pesticide must only be used as per contractual requirements, in prescribed areas and as per manufacturer's instructions. Any spillage or leak of pesticide must be cleared up immediately and reported to the designated environmental personnel.



## 9.0 Environmental Monitoring

Environmental monitoring ensures that the project meets the environmental requirements of the contract documents and EIA. It also aims to ensure that sensitive and recoverable areas are identified and protected before construction begins. The implementation and success of prescribed mitigation measures is vital to environmental compliance and the ability of the Environmental Personnel to adapt and manage those measures to achieve the best possible outcome is essential. Environmental monitoring and management must be integrated into the project management and team; it should not be considered an add-on. If additional measures are required they should be implemented with approval and collaboration from BEST Commission.

Daily inspections are to be compiled into a weekly report and reviewed at progress meetings. As a minimum a monthly report should be forwarded to the BEST Commission.

If required, non-conformance reports should be completed, together with the significance of the non-compliance, specified corrective action(s) and a timeline for the implementation of corrective action(s). Non-conformances should be notified to the Project Manager and BEST Commission within 24 hours.

Non Conformance reports should be signed off by the project Environmental Personnel and BEST Commission or MOWT Engineer.

An Environmental Audit should be undertaken by the MOWT or the BEST Commission on a regular basis throughout the contract. All inspection and monitoring reports should be available for inspection at any time.

The Environmental Personnel is to liaise with the Antiquities, Monuments and Museums Corporation on any archaeological finds or questions in regards to historical resources. All tombstones and similar markers shall be handled by MOWT liaising directly with the persons whom placed the tombstones along the project route.

The Environmental Personnel, Mr. Peter Bascom will report directly to the CCACBL Project Manager. The Environmental Personnel will be the point of contact for the BEST Commission on a day to day basis.

Monitoring forms are included in Appendix C.



## **10.0 Work Plan**

### **10.1 Staff and Reporting Structure**

Names and contact details are to be included in the plan as personnel are appointed. An organization chart will be submitted to the MOWT including all pertinent information.

Key names and numbers will be posted as part of the Emergency Procedures section of the EMP.

The day to day responsibilities of following and implementing the EMP will be spread amongst various construction activities. As staff are appointed and staff lists are available the detailed chain of command charts will be completed.

### **10.1 Training**

All workers, sub-contractor and site personnel on site must have received a site induction covering Environmental issues.

Public meetings and notices must be implemented to ensure that persons affected by the works understand what works will be occurring and the long-term benefits and also who to contact should issues or complaints arise.

### **10.4 Reporting & Documentation**

Daily inspection reports will be completed and compiled into a weekly environmental report. The report will record the amount of site clearance, the number of translocated species, species removed for replanting, invasive species removed, the occurrence of any incidences and non-conformance reports. Non conformances should be reported to the BEST Commission as soon as soon possible and with in 24 hours of any incident.

Environmental issues must form a part of the agenda for the project progress meeting. Any required reviews to the EMP, mitigation implementation, non-conformances are to be discussed and it allows for construction / environmental conflicts to be raised and discussed.

From the weekly reports a monthly report is to be compiled for the BEST Commission. Wetland and aquatic habitat monitoring station observations should be included in this report. Photographic records of work, progress and mitigation should form part of the report.

### **10.5 Review, Input and Feedback**

The EMP will be reviewed and approved by The BEST Commission. It is expected to be further developed as site works progress and construction details are confirmed. All updated pages and sections should be recorded and identified with a revision date to prevent confusion as to the latest requirement or advice. Updated pages or revisions should be reviewed and approved by the BEST Commission before inclusion.



Feedback on environmental issues from public meetings, progress meeting will be documented and retained by the Environmental Personnel. This feedback will help make adjustments to the EMP and provide information for future EMPs.



## **APPENDIX A**

**Emergency Plan  
Emergency Information  
Template Hurricane Plan**

## ***Emergency Response Plan***

### **INTRODUCTION**

This Emergency Response Plan describes some general background issues of the types of emergency and actions required should an emergency occur during the construction works during the Airport Gateway Project.

### **SCOPE**

The plan is relevant for all areas of the Airport Gateway Project site and offices.

### ***DISTRIBUTION***

A copy of the plan will be held in the Site Offices.

### ***AUTHORITY OF CONTROL***

The Project Manager and Construction Manager have the authority to take control of any incident. These persons will have the authority to make the decision to close down all or any part of the site following an incident. There will always be a Project Manager or Construction Manager on site any time the site is operational.

Incident reports will be completed by either manager or by the person they designate.

**EMERGENCY CONTACT DETAILS**

**EMERGENCY NUMBERS**

POLICE	919/911	
FIRE	919/911	
AMBULANCE	322-2861	
HOSPITAL (DOCTORS HOSPITAL)		302-4747

MOWT 302-9779/422-6644

**B.E.S.T COMMISSION & DEPARTMENT OF ENVIRONMENTAL HEALTH**

B.E.S.T.	397 5508
D.E.H.S	322 8037

**UTILITIES**

Electrical Fault Services	323 5561/4
Water & Sewerage Corporation	325 0505 or 325 4504
BTC	302 7000
Cable Bahamas Ltd.	356-2200

**CCACBL CONTACTS**

**OFFICE**

Project Manager	449-8518
Construction Manager	XXX-XXXX
Traffic Management Personnel	XXX-XXXX

In the event of an incident on site the following procedure is to be carried out:-

### **Minor Accident (including basic First Aid)**

Inform Supervisor or Project Manager and First Aider who will assess the injury and either treat on site or arrange transport to medical facilities.

After treatment, complete an entry into the Accident Record book.

Report all accidents, near misses etc at Weekly Project meeting.

### **Major Accident/Incident**

#### **Call 919 or 911**

- Request services required, i.e. Ambulance, Fire Department or Police.
- Give the details of the accident, location number of persons involved and any further relevant information, State, type of injury, i.e. Broken leg, conscious or unconscious, Fire / Explosion / Spillage.
- Inform Appointed Safety Office and First Aiders.
- Contact the Project Manager / Project Office.

### ***FIRE (911) If you discover a Fire:***

- \* Immediately warn others and evacuate the building or area.
- \* Attack the fire if safe to do so, with appliances provided, but without taking personal risks.
- \* Contact the Fire Department and/or Appointed Safety Officer.
- \* Relay accurate information to the Fire Department, such as location, access route, type of fire or spillage, etc.
- \* Ensure that Safety Officer and or Environmental Officer have been notified

### ***SPILL KITS (MINOR INCIDENTS)***

#### **Spill Kits**

Spill kits for tackling minor spills will be available through out the site. The kits must remain dry to effectively absorb small spills. Apply the required amount of absorbent to the spillage, allow the spill to be soaked up by the applied material and clear away into heavy duty plastic bags for disposal. The bags must be clearly marked as contaminated material.

Notify the Environmental Coordinator and/or Safety Officer that the spill has occurred and been cleared away.

### ***Major Spillages & Fuel Spills***

In the event of a fuel spill covering more than 6 feet x 6 feet the following action must be taken.

- Stop the flow or cause if possible. Do NOT put yourself into danger.
- Notify the Appointed Safety Officer and/or Environmental Coordinator.
- Assess the situation to decide whether emergency service attendance is required.
- **In all cases requiring Emergency Services state the exact location and the nature of the incident i.e. Chemical Spillage or Fuel Spillage and approximate quantities if known.**
- Prevent the movement of people or vehicles into the immediate area.
- Ensure that all activities are restricted in the vicinity to reduce any risk of ignition.
- The spill should be treated with absorbent material such as sand or sawdust and a bund formed if possible to prevent the spill travelling and contaminating soil and ground water.
- The contaminated material should be cleared away and disposed of as advised by DEHS.

## *Examples of Possible Spill Incidents*

### **Scenario**

An operative who is filling a vehicle or tank leaves the fuel hose in an unlocked position and the operation unattended. The vehicle or tank over fills and a spillage occurs.

### **Response Procedure**

- Immediately stop the flow of diesel by releasing the lock or using the shut off valves to the tank.
- Immediately contact the Environmental Officer or Project Manager/ Construction Manager and inform them of the incident.
- The Project Manager or Environmental Officer will contact the Employer's Representative and inform him of the incident.
- If fuel is running across hard surface employ loading shovel / backhoe to form sand/earth bund to prevent runoff leaving impermeable surface.
- If any unprotected ground was to be contaminated the contaminated soil will be excavated to a clean level, where possible, and contained (e.g. tray of truck) and then disposed of as directed by the DEHS or Employer's Representative.

\*\*\*\*\*

### **Scenario**

A drum containing Lubricating oil is removed from the containment bund and then damaged resulting in a spillage.

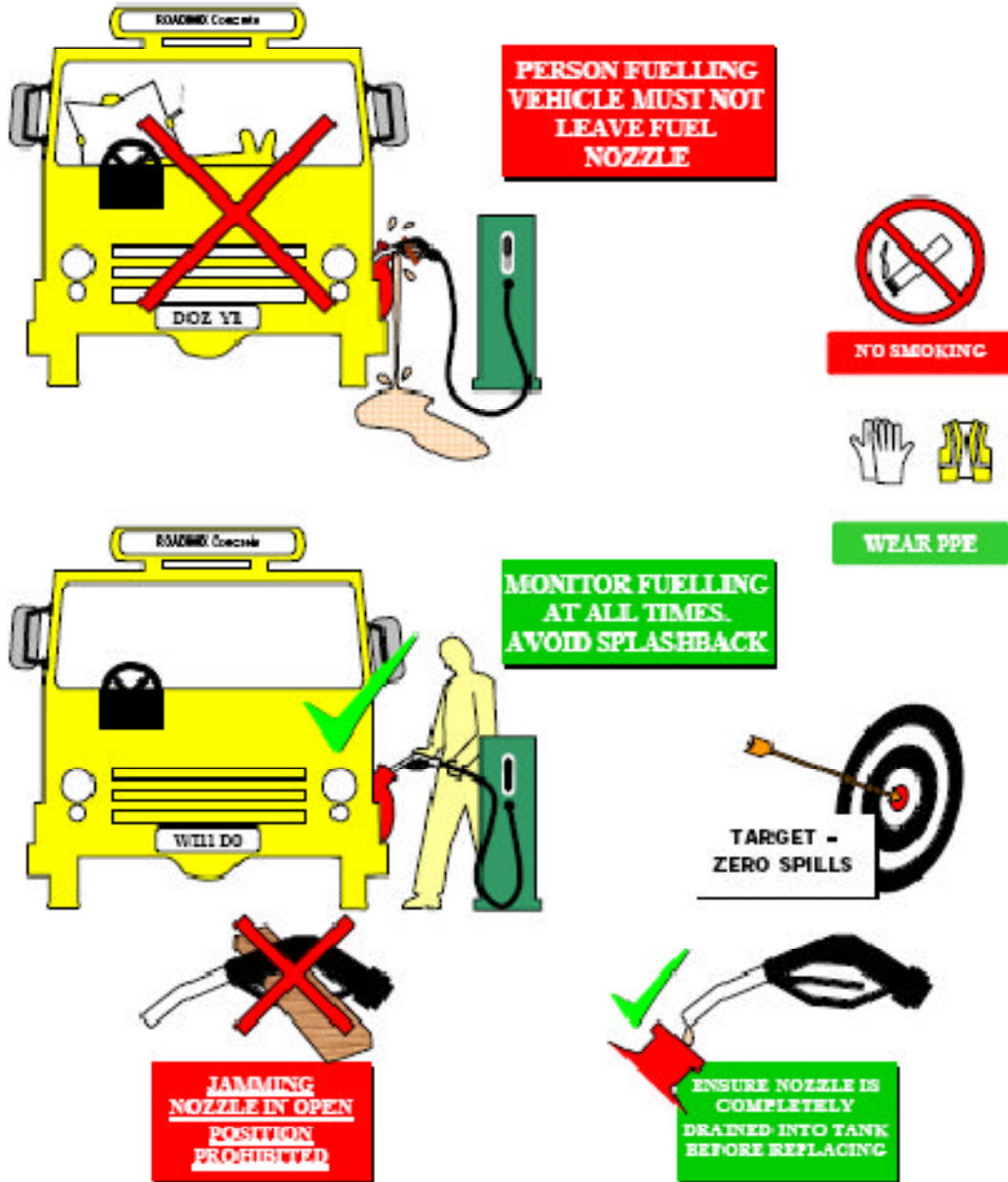
### **Response**

The oil should be prevented from spreading using sand or earth and allowed to absorb the spilled material. If possible, without spreading the spill, the damaged drum should be placed back on the containment area and placed on a sand layer. Any remaining oil will be transferred to an alternative undamaged drum.

\*\*\*\*\*

ISO 14001

## FUELLING



**IF A SPILL OCCURS IT SHOULD BE REPORTED TO THE SITE MANAGER AND ALL EMERGENCY Response INSTRUCTIONS FOLLOWED IMMEDIATELY**

ISO 14001

**ENVIRONMENTAL EMERGENCY SPILL RESPONSE  
 FUEL OILS AND CHEMICALS**



**DEALING WITH MINOR SPILLS**



Spill occurs



Absorb spill using absorbent material



Shovel up used absorbent into plastic bag



Take bag, label and place in \*designated area for special wastes at the yard for disposal



**must be put into bins provided for disposal by DEHS.**

- **In the event of a large or major spill, the flow of the material must be stopped if possible.**
  - ❖ **The movement of people or vehicles into the area should be stopped.**
  - ❖ **Ensure that all activities are restricted to reduce any risk of ignition.**
  - ❖ **The spill should be contained as far as is possible using sand / soil / to form a bund to prevent the spill travelling and contaminating a larger area.**
  - ❖ **The area should be cleared away to a holding area ready for remediation treatment.**
- **All personnel are responsible for keeping their work areas clean and tidy, ensuring that rubbish is put in skips and that clear access is maintained for Fire Fighting equipment.**
- **All personnel have a duty to report any accident, near miss, dangerous occurrence, or defects on site that may lead to any incident or accident.**

## **Outline / Template Hurricane Plan**

Hurricane “season” runs from June to November each year. This is the period that tropical storms and hurricanes generally form, although they can arise in earlier and later months. Tropical storms although not having high wind speeds can be as devastating as hurricanes because of flooding. This plan should be reviewed and amended to apply to the specific site and site team when it is formed. A preparedness meeting should be held in early May and a Hurricane “team” or committee be set up to finalise the plan and make sure necessary equipment is in place before the season starts. Regular updates should be provided on notice boards to keep staff informed of potential storms.

## **Contents**

1. Hurricane Classification
2. Hurricane tracking
3. Key Decisions
4. Preparation
5. Communications
6. Leaving shelters
7. Return to work

## **1. Hurricane Classification**

### SAFFIR SIMPSON HURRICANE INTENSITY SCALE

#### ***Category One - A Minimal Hurricane***

Winds: 74-95 mph, 64-83 kts, 119-153 km/h  
Minimum surface pressure: higher than 980 mbar  
Storm surge: 3-5 ft, 1.0-1.7 m

Damage primarily to shrubbery, trees, foliage, and unanchored homes. No real damage to other structures. Some damage to poorly constructed signs. Low-lying coastal roads inundated, minor pier damage, some small craft in exposed anchorage torn from moorings. Example: Hurricane Jerry (1989)

#### ***Category Two - A Moderate Hurricane***

Winds: 96-110 mph, 84-96 kts, 154-177 km/h  
Minimum surface pressure: 979-965 mbar  
Storm surge: 6-8 ft, 1.8-2.6 m

Considerable damage to shrubbery and tree foliage; some trees blown down. Major damage to exposed mobile homes. Extensive damage to poorly constructed signs. Some damage to roofing materials of buildings; some window and door damage. No major damage to buildings. Coast roads and low-lying escape routes inland cut by rising water 2 to 4 hours before arrival of hurricane centre. Considerable damage to piers. Marinas flooded. Small craft in unprotected anchorages torn from moorings. Evacuation of some shoreline residences and low-lying areas required. Example: Hurricane Bob (1991)

#### ***Category Three - An Extensive Hurricane***

Winds: 111-130 mph, 97-113 kts, 178-209 km/h  
Minimum surface pressure: 964-945 mbar  
Storm surge: 9-12 ft, 2.7-3.8 m

Foliage torn from trees; large trees blown down. Practically all poorly constructed signs blown down. Some damage to roofing materials of buildings; some wind and door damage. Some structural damage to small buildings. Mobile homes destroyed. Serious flooding at coast and many smaller structures near coast destroyed; larger structures near coast damaged by battering waves and floating debris. Low-lying escape routes inland cut by rising water 3 to 5 hours before hurricane centre arrives. Flat terrain 5 feet or less above sea level flooded inland 8 miles or more. Evacuation of low-lying residences within several blocks of shoreline possibly required. Example: Hurricane Gloria (1985)

#### ***Category Four - An Extreme Hurricane***

Winds 131-155 mph, 114-135 kts, 210-249 km/h  
Minimum surface pressure: 944-920 mbar

Appendix A: Emergency Information

14 March 2011

Rev 02

Storm surge: 13-18 ft, 3.9-5.6 m

Shrubs and trees blown down; all signs down. Extensive damage to roofing materials, windows and doors. Complete failures of roofs on many small residences. Complete destruction of mobile homes. Flat terrain 10 feet or less above sea level flooded inland as far as 6 miles. Major damage to lower floors of structures near shore due to flooding and battering by waves and floating debris. Low-lying escape routes inland cut by rising water 3 to 5 hours before hurricane centre arrives. Major erosion of beaches. Massive evacuation of all residences within 500 yards of shore possibly required, and of single story residences within 2 miles of shore. Example: Hurricane Andrew (1992)

### **Category Five - A Catastrophic Hurricane**

Winds: greater than 155 mph, 135 kts, 249 km/h

Minimum surface pressure: lower than 920 mbar

Storm surge: higher than 18 ft, 5.6 m

Shrubs and trees blown down; considerable damage to roofs of buildings; all signs down. Very severe and extensive damage to windows and doors. Complete failure of roofs on many residences and industrial buildings. Extensive shattering of glass in windows and doors. Some complete building failures. Small buildings overturned or blown away. Complete destruction of mobile homes. Major damage to lower floors of all structures less than 15 feet above sea level within 500 yards of shore. Low-lying escape routes inland cut by rising water 3 to 5 hours before hurricane centre arrives. Massive evacuation of residential areas on low ground within 5 to 10 miles of shore possibly required. Example: Hurricane Camille (1969)

## **2. Hurricane Tracking**

During Hurricane season tracking and checking will be carried out upon alert of a storm watch in the Caribbean Region. The checking will be via one of the sources below.

1. [www.noaa.gov](http://www.noaa.gov)
2. [www.stormpulse.com](http://www.stormpulse.com)
3. [www.caribwx.com](http://www.caribwx.com)
4. [www.kronor.com](http://www.kronor.com)
5. [www.stormcarib.com](http://www.stormcarib.com)

## **3. Key Decisions**

Once it has been ascertained that a hurricane strike is imminent the Project Manager or his assistant will make all decisions accordingly.

- Evacuation – minimum 3 days before the risk of a major hurricane strike a decision will be made whether or not to evacuate the site.

- When to shut down the site and release local staff to allow arrangements for securing personal property and ensuring safety.
- What to do with essential staff; essential staff required to ensure the safety of the plant and offices will be told what shelter accommodation has been arranged. The number of essential staff retained will be based on the likely severity of the hurricane and the safety of the employees in the aftermath.
- At what stage to go to shelters; A balance will be struck between securing the compound and the safety of the employees.

Prior to all this commencing employees will be informed of these procedures so that no time is wasted when the key decisions are implemented.

#### **4. Preparation**

The following tasks need to be carried out to the site to make it safe and secure. The task will be started a minimum 3 days before the hurricane makes landfall.

- All plant brought to a safe area (ideally the site compound or yard) that has no risk of flood and be parked together with brakes on. Trucks maybe filled with aggregate.
- All small plant such as generators and pumps to be placed inside a safe but accessible storage container making sure that fuel is available for such plant. (They will not be filled with gas when stored due to fire risk).
- Window shutters will be fitted o the site compound if they are available, if not plywood will be placed on the windows.
- Computer data will be backed up and stored in a safe secure area.
- Electric supplies will be disconnected before leaving site or compound.
- All confidential and essential records held on site will be kept in a secure and watertight place off the ground.
- All Computers and electrical goods will be stored likewise.
- Any portable offices will be tied down.
- Some ventilation will be left in offices to avoid differential pressures.
- Any loose materials in the area will be gathered up and stored.
- Any trees likely to damage offices or site will be assessed and trimming undertaken as required.
- Asphalt and concrete plants will have their bins filled and in asphalt plants the hot storage filled with dry stone. Bitumen heaters will be turned off. All gantries, masts and any loose parts will be taken down
- All plant and vehicles will be left fuelled.

## **5. Communications**

Communications will be established as quickly as possible after a hurricane. Phone lines will be affected and mobile phones may not be able to be used either. Satellite phones may be required in order to stay in contact. Home contact details for all persons remaining will be disseminated to Head Office so a track can be kept on persons remaining.

Radios will be purchased with FM AM and short-wave so that the likes of BBC world service could be accessed in the event that local broadcasting is affected.

Ideally some method of access to the internet would be useful to keep informed.

Also at all times there will be a 24 hour contact person for the project.

## **6. Leaving shelters**

Shelters will not be left until the advice has been given from the Employer's Representative.

## **7. Return to work**

Once the all clear has been given and the construction personnel are in a position to return to work the work areas will be checked to ensure they are safe. The following things will be examined and confirmed.

- Structural integrity of site offices, welfare facilities and accommodation.
- Check all services to ensure that electrical supplies are still safe.
- Check fuel stores and service areas for damage and for leaks.
- All plant will be checked to ensure that it is still in safe working order.
- Sanitation facilities will be checked.
- A roll call of all personnel conducted by Project Manager or Construction Manager.
- Check of worksite carried out with CCACBL and Employer's Representative.
- Photos taken for documentation.

## **APPENDIX B**

### **METHOD STATEMENTS**

---

## **MS E001: SITE CLEARANCE <sup>1</sup>**

- The right of way will be established and clearly marked, by the project surveyors.
- A walk through of each section of the project will be arranged and undertaken by the Environmental Personnel (EP), Mr. Peter Bascom and a representative from AMMC, to establish any areas of identification and/or concern. A record of this visit, the findings and recommended actions will be made and reported in the Environmental Report.
- The EP Consultation with the Botanical Gardens staff will be made in regards to Epiphytic species and their recommendations and findings.
- Vegetation and specimen trees for retention will be marked using highly visible coloured tapes or temporary fencing. Staff and workers involved in the site clearance operations will be instructed as to the significance and location of these markers and plants to avoid accidental removal. The EP is responsible for ensuring that workers are properly briefed.
- Plants marked for translocation will be moved by a landscape contractor.
- Plants marked for retention must be clearly identified using coloured tapes and temporary fences to prevent damage. No stockpiling of materials or excavation works may take place under the dripline of any retained specimen. If Trenching is required in such a case unless a specific method statement and preparation works are in place. BMP should be used to prepare such a method statement.
- The EP will identify where pruning of trees may be possible instead of their removal. Severed roots and branches will be treated with an approved dressing.
- Cleared vegetation, topsoil material and subsoils will be stored separately. The storage location will be considered to prevent sediment release, and/or dust emissions. Stockpiles will be monitored by the EP on a daily basis.
- Man made materials such as dumped cars, household appliances and furniture that are found during site clearance will be recorded and disposed of in accordance with the requirements of the DEHS.
- Site clearance will be undertaken by heavy equipment such as D8 Tractors, Tracked 360 excavators and dump trucks. Materials being hauled from site in dump trucks will be sheeted or covered to prevent debris falling. Machine operators and labourers will be instructed that if they disturb reptiles such as snake species they should allow the animal to leave the area. Under no circumstance should they deliberately harm or kill any animal disturbed by the site clearance operations. If nesting birds are seen operators should report this immediately to the EP and avoid further disturbance.
- Operators must be aware of the importance of the sediment or silt fence installed. They must not damage the fencing and report any damage to the silt fence to the EP. Site Trucks and vehicles, site access and egress will be kept cleaned, to prevent the build up of mud and debris. After cleaning
- Signs and traffic management equipment being kept clean and visible.

---

<sup>1</sup> Method Statement – Site Clearance

## **MS E002: NOISE, AIR QUALITY AND ODOR CONTROL<sup>2</sup>**

### **Noise**

- Existing background noise levels will be taken by the EP at the following locations as a minimum

Blake Road Community Centre  
Lake View Cemetery  
Residential Properties between roundabout 6 &7  
Christie Road

- The existing levels will be recorded and reported to the BEST commission. The levels at each location will be checked and recorded on a monthly basis
- The EP will ensure that residents and businesses are kept informed of working hours, the projected duration of the works, hours of working and potential noise increase during working hours.
- The EP will ensure that communications with Lake View Cemetery are setup and implement a system of notification of services that will be held. An agreement should be made in regards to what works can be undertaken when services are being held.
- Overnight running of Generators and/or pumps will be avoided where possible, particularly in the vicinity of residences. If this necessary noise shields will be used around the plant item to reduce emissions and noise readings will be taken at affected properties.
- Plant and equipment used on site will have fitted and maintained exhaust/muffler systems; this will reduce noise levels and reduce the 'black smoke' emissions from plant. The EP will advise on noise reducing measures and equipment.
- The EP will make weekly inspections of all plant to ensure to ensure that the machinery is properly maintained to minimize noise and air emissions.
- A specific re-assessment of impacts for Lake Cunningham will be undertaken should activities such as pile driving be required.
- Blasting will not permit unless the required permits are in place and approval has been received from the MOWT and BEST Commission
- Restrictions of Sunday works in accordance with the conditions of the contract will be in place and monitored by the EP. Particular recognition of when works are carried out close to or affecting access to places of Worship will be made.
- The EP will record and investigate any complaints in regard to noise emissions. NCRs describing the issue and remedial actions will be completed where necessary.

### **Air Quality**

- The EP will keep daily records of visual inspections carried out throughout the site.
- Dust control will be maintained by the application of water or calcium chloride by water bowser fitted with a spray bar.

---

<sup>2</sup> Method Statement – Noise, Air Quality and Odor Control

## **MS E002: Noise, Air Quality and Odor Control**

- Site Access roads will be brushed or scraped to minimize dust and mud deposits with road brushes and preferably vacuum sweeper trucks

### **Odor Control**

- The EP will ensure that adequate refuse containers are provided on the construction sites.
- There will be a regular collection programme set up through Bahamas Waste or another reputable refuse collection company.
- Adequate portable toilet facilities will be provided. The EP will ensure that a regular emptying and cleaning programme is set up and maintained.
- The EP will record and investigate any complaints in regards to odors and air quality.

## **MS E003: SEDIMENT CONTROL<sup>3</sup>**

The EP is responsible for identifying the areas that require sediment fence installation. He will ensure that the fence is correctly installed and secure. Where the EP assesses that additional protection measures are required, above that of sediment fencing, he will be responsible for recommending the most appropriate additional measures.

- The EP shall ensure that prime and subcontractor staging/lay-down areas are not situated in or adjacent to wetland areas. The staging/lay-down areas shall be staked with a double lining of sediment fencing where necessary to ensure surface runoff from staging/lay-down areas do not negatively impact the wetlands or lakes. The sediment fencing in staging/lay-down areas shall be inspected weekly or immediately after a rainfall producing 0.5 inches of rain in a 24 hour period to ensure the integrity of the system.
- Sediment fencing will be correctly installed by trained and experienced personnel. There will be no “gaping” between posts or at the base of the fence. Sections of fence will overlap to ensure its integrity.
- The EP shall arrange an inspection by BEST Commission to ensure installation meets the satisfaction of that agency.
- Sediment control measures will be checked at least once a day and their condition recorded.
- The EP is responsible for checking that any “sand” bags used for mitigation measures are filled with appropriate material (I.E. Not limerock based material which adds to sedimentation problems).
- If there are any reports of failure of the sediment control measures the EP will oversee the repair or immediate containment of an incident. He will then report the failure to BEST commission or MOWT and report the immediate measures taken. An NCR identifying the cause of the problem and remedial measures taken will be recorded.
- The EP will ensure that over clearance does not take place, he will ensure that exposed soil surfaces are stabilised and covered by permanent works at the earliest possible time.
- The EP through his daily inspection will record any area of exposed surface that is showing signs of erosion and put in place appropriate measures to prevent further erosion.
- The EP will locate and establish monitoring stations prior to construction. They will be adjacent to and remote from the construction envelope to ensure that impacts are being properly mitigated. Photographic and species records are will take of each station before the start of construction and monthly thereafter during the construction phase. These results will be compared to ensure that the environment is not being negatively impacted and that sediment control measures are effective.

---

<sup>3</sup> Method Statement – Sediment Control

## **MS E004: DUST CONTROL<sup>4</sup>**

The EP to ensure dust control measures used conform to BMPs to reduce surface activities and air movement that may cause dust to be generated from disturbed soil surfaces. The dust control BMPs shall ensure minimal dust is generated by site or carried offsite to mitigate against an inhospitable working environment.

- The EP shall ensure that dust is controlled by sprinkling/irrigation. Sprinkling the ground surface with water until it is moist at periodic frequencies as necessary.
- The EP shall ensure that any chemical dust control measures such as spray-on Chemical Soil Treatments (palliatives) such as anionic asphalt emulsion, latex emulsion, resin-water emulsions, and calcium chloride is biodegradable or water-soluble and understand the effect its application could have on the surrounding environment, including the wetland area, lake and wildlife.
- The EP shall ensure that any chemical dust control measures undertaken must adhere to supplier instructions and shall not be discharged into wetland areas, lakes or pool in vegetated areas.

---

<sup>4</sup> Method Statement – Dust Control

## **APPENDIX C**

**ENVIRONMENTAL INSPECTION & MONITORING CHECKLIST FORM**

**NON-CONFORMANCE / INCIDENT REPORT FORM**

**ENVIRONMENTAL STATION MONITORING FORM**

---

AIRPORT GATEWAY PROJECT SEGMENT 1							
ENVIRONMENTAL INSPECTION & MONITORING CHECKLIST							
DATE:				COMPLETED BY:			
Sheet #1	Description	√ / NA / Comment # for attached sheet					
		Mon	Tues	Weds	Thurs	Fri	Sat
1	Protective fencing around retained vegetation & trees, in place and maintained. Is there any evidence of damage or die-back						
2	Approval for for removal of protected species. (Record must be kept of number of each species removed, to include location, date and preferably photographic record).						
3	Site access and Haul roads clearly marked and public roads kept clean						
4	Dust control operations effective						
5	Fill source is from licenced borrow pit / approved source						
6	Sand material is from licenced source						
7	Haulage Trucks sheeted when traveling on public roads						
8	Materials stockpiles maintained to prevent cross-contamination, sediment release, dust generation etc.						
9	Fuel storage tanks correctly bunded with impervious bases and walls that will contain 110% of tank capacity. Is there any damage to bund.						
10	Fuel storage tanks labeled with contents and capacity, spill kits available						
11	Hoses stored inside bunds, nozzles /fillers auto shut off						
12	Mobile tankers/bowsers labeled with contents and capacity						
13	Hoses locked away in cabinets and valves shut off when not in use						
14	Is a spill kit available on the fuel truck. Is it checked and maintained.						
15	Has the operator of the fuel truck been specifically briefed on fuelling safely, spill clean up and emergency response. Is there a list of emergency contacts available.						
16	Are static plant items such as pumps, generators and compressors on drip trays						
17	Are oil drums and other containers correctly stored and on drip trays						

Airport Gateway Project Segment 1  
 Monitoring Forms: Appendix C

18	Are drip trays empty of rainwater						
19	Are sufficient skips / bins available across the site						
20	Do skips/ bins need emptying?						

AIRPORT GATEWAY PROJECT SEGMENT 1							
ENVIRONMENTAL INSPECTION & MONITORING CHECKLIST							
Sheet #2	Description	√ / NA / Comment # for attached sheet					
		Mon	Tues	Weds	Thurs	Fri	Sat
21	Is there any litter / garbage generated from the site not disposed of correctly						
22	Is all appropriate documentation in place? i.e. Collection records (waste collection notes, oils and battery notes must be retained to assemble waste records)						
23	Does septic tanks/ vehicle wash pits need emptying?						
24	Are silt fences in place where required and being effective?						
25	Is there evidence of sediment being released?						
26	Are turbidity curtains required and in place where required						
27	Are further measures required?						
28	Has any concrete waste or other debris been disposed of in drainage channels?						
29	Have there been any complaints from businesses / residents / public						
30	Are alternative routes or diversions properly advertised / signed and maintained?						
31	Has permission been obtained for night-time or Sunday works?						
32	Are pumps / generators etc left running at night? Are sufficient noise reduction measures in place?						

**WEEKLY ENVIRONMENTAL CHECKLIST – NOTES SHEET**

<b>Week starting :</b>				
<b>Week Ending:</b>				
Comment #	Results of inspection	Action proposed or taken	Date(d/m/y) Completed	Signed off

REFER COPIES TO:	DATE (d/m/y):	REFER COPIES TO:	DATE (d/m/y):	Inspection Completed By:
Environmental File				
Project Manager				

ISO 14001

<b>AIRPORT GATEWAY PROJECT SEGMENT 1</b>		
<b>NON-CONFORMANCE / INCIDENT REPORT FORM</b>		
<b>Date(d/m/y):</b>		<b>INCIDENT #:</b>
<b>CHAINAGE / LOCATION</b>		
<b>WORKS SUPERVISOR:</b>		
<b>REPORTED BY:</b>		
Description of Incident:		
Action to be Taken:		
BEST Commission Notified: (Time, Date, Method)		Action to be Completed by (Date):
Verified Complete for CCACB	Signed:	Date(d/m/y):
Verified Complete for BEST / MOWT/ MOE	Signed:	Date(d/m/y):
<b>Issue Assignment (Mark as appropriate)</b>		
Over /Unplanned Clearance	Loss of Protected / Rare species	Air Quality
Noise	Fuel / Oil Spillage	Hazardous Material(s)
Sediment Release	Mitigation Compromise/Failure	Archaeology/ Historical Issue
Social Issue / Public Complaint	Emergency Equipment Required	Emergency Services Required
Training	Sub-Contractor	Other
ISO 9001	ISO 14001	OHSAS 18001

<b>ENVIRONMENTAL MONITORING STATION REPORT</b>		
<b>AIRPORT GATEWAY PROJECT –SEGMENT 1</b>		
Monitoring Station #	Monitoring Frequency:	Date(d/m/y):
Weather on Inspection Date (d/m/y):	General Weather Week Preceding:	Recorded by:
Construction Stage:		
Description of Environmental Mitigation Measures in Place:		
Condition of Environmental Mitigation Measures:		
Photo 1	Photo 2	
General notes:		
Vegetation Conditions:		

<b>ENVIRONMENTAL MONITORING REPORT – Page 2</b>
Aquatic Observations (turbidity, sedimentation, etc):
Wildlife Observations:
Agency attendance (BEST, MOWT):
Recommendations:
Reported to BEST Commission: (Date, Method):
Reported By:
Implementation of recommendations:
Sketch if Required: