

GEORGETOWN  
**Marriott**

HOTEL, CASINO & ENTERTAINMENT COMPLEX

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FINAL

ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT REPORT



SEPTEMBER 2010



ENVIRONMENTAL MANAGEMENT CONSULTANTS  
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## Acronyms

### A

ADUA	Adam Developers and Urbahn Associates
ACI	American Institute of Concrete
AHI	Atlantic Hotel Inc.

### B

BS	British Standard
BoG	Bank of Guyana

### C

CID	Criminal Investigation Department
CHPA	Central Housing and Planning Authority
CDP	Closure and Decommissioning Plan
CPTU	Central Planning and Transport Unit

### D

DTL	Demerara Timbers Limited
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### E

EAB	Environmental Assessment Board
ESIA	Environmental and Social Impact Assessment
EPA	Environmental Protection Agency
EMMP	Environmental Management and Monitoring Plan
EMC	Environmental Management Consultants
EMP	Environmental Management Plan
ERP	Emergency Response Plan
ESAL	Equivalent Single Axle Load
EDF	European Development Fund

### F

F&DAD	Food and Drug Analysis Department
FGC	Focal Group Consultations

### G

GNBS	Guyana National Bureau of Standards
GPL	Guyana Power and Light
GWI	Guyana Water Incorporated
GFC	Guyana Forestry Commission
GPF	Guyana Police Force
GD	Georgetown Datum
GCC	Guyana Council of Churches
GDF	Guyana Defence Force
GLSC	Guyana Lands and Surveys Commission
GFS	Guyana Fire Service
GBTI	Guyana Bank for Trade Industry and Commerce
GGDP	Greater Georgetown Development Plan
GTA	Guyana Tourism Authority
GBA	Guyana Bankers Association

### H

HSEC	Health, Safety, Environment and Community
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### I

IAST	Institute of Applied Sciences and Technology
IADB	Inter-American Development Bank
ICZM	Integrated Coastal Zone Management
ITCZ	Inter Tropical Convergence Zone
<b>L</b>	
LEED	Leadership in Energy & Environmental Design (LEED)
<b>M</b>	
M&CC	Mayor and City Council
MPW&C	Ministry of Public Works and Communication
MLG	Ministry of Local Government
MoH	Ministry of Health
<b>N</b>	
NCERD	National Centre for Education, Research and Development
NDC	Neighbourhood Democratic Council
NEAP	National Environmental Action Plan
NPAS	National Protected Areas System
NGO	Non-Governmental Organization
NToG	National Trust of Guyana
NREAC	Natural Resources and Environment Advisory Committee
NREAC	Natural Resources and Environment Advisory Committee
NDS	National Development Strategy
NICIL	National Industrial & Commercial Investments Limited
<b>P</b>	
PRSP	Guyana Poverty Reduction Strategy Paper
<b>S</b>	
SRDD	Sea and River Defence Division
SN	Structural Number
SDS	Sea Defence System
SDB	Sea Defence Board
<b>T</b>	
ToR	Terms of Reference
TSU	Tactical Service Unit / Traffic Safety Unit
THAG	Tourism & Hospitality Association of Guyana
TESPA	Termination and Severance Payment Act
T&HD	Transport and Harbours Department
<b>U</b>	
UNCBD	United Nation Convention on Biological Diversity
UNFCCC	United Nations Framework Convention on Climate Change
UNCCD	United Nations Convention to Combat Desertification
UNESCO	United Nations Educational Scientific and Cultural Organisation
<b>W</b>	
WSG	Works Services Group

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## **EXECUTIVE SUMMARY**

### **1.0 Background**

This report presents the findings of the Environmental and Social Impact Assessment (ESIA) Study for the proposed Georgetown Marriott Hotel, Casino and Entertainment Complex to be located at Kingston Georgetown.

### **1.1 Project Summary**

The Georgetown Marriott Hotel, Casino and Entertainment Complex project, with an investment of U.S. \$42 Million represents a flagship investment in Guyana's travel and tourism sector and seeks to establish a state-of-the-art facility with an internationally recognised brand and with an extensive, secure, facility with a wide range of accommodation, entertainment, restaurant and concession offerings, and developed according to the highest international standards.

Atlantic Hotel Inc. (AHI) will own and operate the hotel and entertainment complex. The facility will be marketed as the Georgetown Marriott Hotel, Casino and Entertainment Complex and Adam Developers and Urbahn Associates Ltd. (ADUA), a New York based company, will prepare the designs for the facility. Construction is scheduled to commence in January 2011 and is expected to be complete by the fourth quarter of 2012.

#### **1.1.1 Location**

The project site covers an area of 3.52 ha(8.69 acres) comprising tracts "P", "Rand Alpha and the road reserves, located at the North West area of Kingston contiguous to the Atlantic Ocean and the Demerara River, Kingston, Georgetown. The site is unique in that it has access to 0.97 hectares (2.39 acres) of beachfront property. Site utilization affords excellent views of the Atlantic Ocean (the property ends on the shoreline); the Demerara River (part of the property borders the river); and Georgetown.

#### **1.1.2 Components**

The facility will consist of a world-class hotel, casino, nightclub, and restaurants; all contained in a single attractively designed building. The hotel will also feature a conference centre that can be used for medium size banquets and social functions. The total building area of the hotel, casino and entertainment complex excluding parking is approximately 17,187 m<sup>2</sup> (185,000 square feet). The building complex would rise to 10 floors. The hotel portion of the complex would be approximately 12,541m<sup>2</sup> (135,000 square feet) and consist of 165 rooms, while the casino and entertainment sections would comprise approximately 4,645m<sup>2</sup> (50,000 square feet) and be located on 3 levels. The entire complex will be operated by Marriott International.

The facility will be constructed to meet the requirements Leadership in Energy & Environmental Design (LEED). LEED is an internationally recognized green building certification system which provides a third-party verification that a building or community was designed and built using strategies intended to improve performance in metrics such as energy savings, water efficiency, CO<sup>2</sup> emissions reduction, improved indoor environmental quality, and stewardship of resources and sensitivity to their impacts.

#### **1.1.3 Project Benefits**

In addition to direct employment of locals during construction (125 persons) and operation (429 persons), on a wider scale, the project is expected to bring economic and social benefits to Georgetown, the immediate and surrounding coastal communities and the national economy. It will also create downstream economic development through the goods and services it would require from local suppliers.

The project is expected to attract visitors from abroad, especially the Caribbean, North America and Brazil. The project is expected to have an average annual turnover in the first 10 years of approximately U.S. \$20,575,000 and is envisaged to service a minimum of 3,740,000 people over the first 10 years.

The table below shows the projected occupancy rate of the Hotel.

<b>Year</b>	<b>% Occupancy</b>
Year 1	60%
Year 2	65%
Year 3	67%
Year 4	68%
Year 5	68%
Year 6 and beyond	70%

## **1.2 Consideration of Alternatives**

A number of properties were considered by the proponents including the sites next to the Guyana International Convention Centre and Buddy's International Hotel. None of these sites were considered as appropriate as they were deemed to be too remote from the central Georgetown business centre, lacked sufficient utilities and did not offer the panoramic view of the preferred location.

In examining the possible sites for the project the following factors were considered by the ESIA Study:

- Land availability
- Proximity to the main tourism district in Georgetown
- Proximity to services and facilities
- Zones within the city of Georgetown for this type of development
- Existing infrastructure and utilities

While sites along Guyana's coast, and in particular the East Coast, fall within the Greater Georgetown Development Plan (GGDP) and the Seawall Development Plan for tourism and recreation development, they are limited in land area and availability and fall short of the considerations as identified above. Areas in administrative regions (2, 3, 4, 5 and 6) that have adequate land space to accommodate this development still fall short of the other criteria listed above.

Based on the GGDP, the Kingston site fall within Zone 11 Section A which has been proposed as an area to feature mainly recreational facilities. This is recognized as the most suited zone for the project.

## **2.0 Project Status**

At the time of conducting the ESIA study the project site has been cleared of derelict buildings and vegetation. No construction work has commenced and the developer has applied to the following Agencies as part of the planning permitting process:

- Central Housing and Planning Authority
- Civil Aviation Authority
- Environmental Protection Agency
- Sea and River Defence Board
- Mayor and City Council of Georgetown

### **3.0 Environmental and Social Impact Assessment (ESIA) Study**

The Guyana Environmental Protection Agency (EPA), in keeping with the provisions of the Environmental Protection Act 1996 requested that an Environmental and Social Impact Assessment (ESIA) be carried out by the developer in order to obtain an Environmental Permit to implement the project.

The principal objectives of this ESIA study are to:

1. Scope issues and concerns from stakeholders regarding the proposed project that needs to be addressed;
2. Document the ecological and socio-economic baseline of the project area;
3. Identify and assess potential environmental and social impacts associated with the proposed project;
4. Recommend mitigation measures that would reduce the significance of predicted negative impacts and enhance predicted benefits on all aspects of the surrounding environment;
5. Develop a Comprehensive Management Plan outlining actions and responsibilities for managing the predicted impacts of the project;
6. Meeting the requirements of the environmental regulator, Guyana's EPA as well as conform with international best-practice for a project of this nature
7. Inform corporate decisions about the project's planning and development; and
8. Promote development that is environmentally and socially sustainable.

The ESIA Study was conducted by Environmental Management Consultants (EMC) and was initiated with a public consultation held at the Umana Yana on May 16<sup>th</sup>, 2008 when the project proposal and a preliminary scoping of the environmental issues were presented for public comment. A sectoral agency meeting (scoping) was also held earlier on the same day of the public scoping meeting at the EPA. The EPA approved the Terms of Reference (ToR) for the EIA on June 10<sup>th</sup>, 2008. Data collection and fieldwork was carried out between May and August 2008.

### **4.0 Policy, Legal and Institutional Framework**

The project falls within Guyana's framework for environmental management which is shaped by several policy documents; strategic plan and laws and regulations and institutions. Those which are related to the project include:

#### **4.1 Plans**

##### **4.1.1 National Environmental Action Plan**

The National Environmental Action Plan (NEAP) was developed in 1994. It outlines the Government's environmental policy objectives for the sound management of the environment and natural resources. Twelve stated policy objectives were outlined. Those that are particularly applicable to this project are listed below:

- Ensure prior environmental assessments of proposed activities, which may significantly affect the environment.
- Raise consciousness of the population on the environmental implications of economic and social activities through comprehensive education and public awareness programmes.

One of the policy objectives requires the Government of Guyana to ensure environmental assessments of proposed development activities which may significantly affect the environment are undertaken.

NEAP focuses on coastal zone management, natural resources management including land resources, biodiversity, wildlife, forestry and ecotourism, waste management and pollution control, and mining. Specifically, the NEAP emphasises the critical importance of coastal zone management, and further identifies actions that should be taken at the national level to address this issue.

#### **4.1.2 Integrated Coastal Zone Management Action Plan**

The Integrated Coastal Zone Management Action Plan, prepared in 2000, recognises integrated coastal zone management as an ongoing process to promote the wise use, development and protection of coastal and marine resources; foster greater collaboration among sectoral agencies and enhance economic development. The ICZM Action Plan addresses policy development, analysis and planning, coordination, public awareness building and education, control and compliance, monitoring and measurement and information management as it regards the integrated management of Guyana's coastal zone.

#### **4.1.3 Georgetown Seawall Development Plan**

This Plan was developed by the Central Housing and Planning Authority (CHPA) through a consultative process with a range of stakeholders. The Plan covers the area from Kingston, Georgetown, to Ogle, on the East Coast of Demerara and provided a physical and ecological description of the shorezone area and Government reserve, north of the East Coast Highway, and identifies physical infrastructure works and activities for the protection, promotion and management of this zone for recreational and tourism purposes.

#### **4.1.4 Draft Greater Georgetown Development Plan**

The Draft GGDP was developed by the CHPA in March 2002. It recommends what type of development should be allowed and the respective areas/zones and the policies that CHPA and the City Council should use to assess development proposals. The plan covers the period 2001-2010 and includes the city of Georgetown and its sub-urban areas.

#### **4.1.5 Legislation**

The Environmental Protection Act, 1996, and the Environmental Protection Amendment Act 2005, establishes the basic institutional and regulatory framework within which all activities that may significantly impact on the natural, social, and cultural environments are assessed.

Regulations on Hazardous Waste Management, Water Quality, Air Quality, Noise Management and Environmental Authorization were established under the Environmental Protection Act in 2000. These pollution management regulations were developed to regulate and control the activities of developmental projects during construction and operation. Standards establishing the permissible parameters under these regulations are being developed.

### **5.0 Brief Description of the Project Environment**

#### **5.1 Study Area**

The study area of the project has been defined to encompass the overall potential area of influence of the project taking into account that each item of infrastructure may have a different zone of influence.

The environment of the study area was characterized based on review of existing information as well as specialist studies. Baseline studies carried out by the technical team included:

- Sound level Recordings

- Water Quality sampling
- Biological Assessment
- Socio-economic Assessment
- Traffic Counts

## **5.2 Physical Setting**

The project site covers an area of 2.53 ha (6.27 acres) of coastal land that previously housed the Food and Drug Analyst Department and Luckoo Pool and is contiguous to the Atlantic Ocean and the Demerara River; Neighbouring properties include the NCERD, Pegasus, Demerara Timbers Limited (DTL), Guyana Forestry Commission (GFC) and the Coast Guard.

The site is generally flat and falls within the coastal plain which is approximately 1 to 2 m below mean high tide level.

## **5.3 Topography and Drainage**

### **5.3.1 Soils**

Soils in the study area are typically frontland or marine clays. Textures are usually clay to silt loam and subsoil textures are clay, silty clay or silty clay loam. Most soils have a thin layer of organic material on the surface, grayish colour, and are deep and developed from unconsolidated and stratified deposits or marine origin. These soils are placed in land capability Class 1-11, good to moderate agricultural land (*source Seawall Feasibility and Zoning Plan November 28, 1997*).

### **5.3.2 Surface Drainage**

Within the city of Georgetown, areas are drained by small ditches along the road side which empty into alley drains crossing the centre of each block. The alley drains empty into primary drains. There is no existing drainage on the project site. The area drainage comprises drains which feed into trenches that link to the main canal which empties into the Demerara River and is regulated by a sluice and pump.

## **5.4 Climate**

Guyana's climate is influenced primarily by the seasonal shifts of the Inter Tropical Convergence Zone (ITCZ) and the seasons and climate are determined mainly by the variation in rainfall patterns.

### **5.4.1 Duration of Sunshine**

As a result of Guyana's proximity to the equator there is little variation in the hours of daylight. It varies from a minimum of 11.6 hours per day in December to a maximum of 12.5 hours per day in June.

### **5.4.2 Temperature, Relative Humidity and Wind**

On the coast, daily maximum temperatures average 29.6 °C while daily minimum temperatures average 24.0 °C. Guyana's coast is subject to the north-easterly trade winds with speeds of about 6 meters per second.

At 5 degrees latitude north of the equator, the climate of Guyana is tropical. The hot, humid conditions are moderated by the northeast trade-winds.

The coast is situated in the Tradewinds but tropical storms or cyclones do not occur along Guyana's coast. Winds and offshore wave directions are remarkably consistent with nearly sixty

percent (60%) coming from the 45° northeast sector with an average velocity at sea of 6 m/s. Wind and waves are strongest during the months December to June and weakest during the period July to November. The mean sea level in Georgetown is approximately 15.52 m above Georgetown Datum (GD).

### **5.4.3 Rainfall**

In the coastal areas, there are two rainy seasons, between May to mid-August and mid-November to mid-January. Rainfall averages one rain event in every five days. Monthly rainfall data from 2002 to 2007, measured at Georgetown by the Hydro-metrological Service of the Ministry of Agriculture, is shown in Table 2.3.3.4.

## **5.5 Coastal Features**

Guyana's coastline has a length of approximately 430km of which 70km consists of natural sandbanks and 360km is maintained with embankments and dykes. It is of varying width (between 26km-77km) and is as much as 1m below mean high tide levels in most places.

The Coastal Plain contains five biotic communities as follows:

- The Marine Ecosystem
- The Estuarine Ecosystem
- The Riverine Ecosystem
- The Palustrine Ecosystem
- The Lacustrine Ecosystem

Given the above, the project will be influenced by and will also influence the following immediate ecosystems:

- The Marine Ecosystem
- The Estuarine Ecosystem
- The Riverine Ecosystem

### **5.5.1 Tides, Waves and Currents**

The Guyana coast is subject to semi-diurnal tides - two low and two high tides per day. The tides are known as neap or spring tides. The mean high and low water spring tides at the Demerara bar are 54.64 ft GD and 46.24 ft GD respectively. The mean high and low water neap tides are 52.44 ft GD and 48.54 ft GD respectively. The spring and neap tidal ranges (the mean value of the rise and subsequent fall of a tide) are therefore 8.4 ft and 3.9 ft respectively. The mean sea level is 50.92 ft GD (1979 analysis) and the Admiralty Datum is 45.14 ft GD.

## **5.6 Riverine Features**

Guyana's major ports and wharfs are located on the banks of the Demerara River in Georgetown and surrounding areas. This results in the Demerara River experiencing the highest volume of river traffic of Guyana's main rivers, and the location of choice by many developments. With Georgetown being the capital city and business centre of Guyana, the Demerara Watershed is the major transportation hub for Guyana.

## **5.7 Groundwater**

### **5.7.1 General Description**

The hydrogeology of the coast, including Georgetown, consists of three main sand layers, typically referred to as the A, B, and C sands. Each layer is separated by clay layers. These

layers trend downwards from east to west. The A sands occur at a depth of 152 m (500 feet), the B sands at a depth of 244 m (800 feet).

The untreated water is slightly acidic with a pH range of 6.5 to 8.5. The water contains a low chloride content, low alkalinity and hardness, but high levels of iron. Water from the "B" sands has a higher temperature and chloride content, it also contains hydrogen sulphide.

There are two wells in the Kingston area, one was recently established by G.W.I and the old well is inoperable. This well taps the "A" sands aquifer. Average shallow groundwater depth is between 1 m to 2 m of the ground surface.

## **5.8 Natural Hazards**

### **5.8.1 Flooding**

The location of the project area on the coast of Guyana makes the site particularly susceptible to the effects of sea level rise in the future.

The flat low lying nature of the Georgetown area makes it susceptible to flooding after long duration of intense rainfall. However, flooding in the Kingston area is not considered a widespread threat and reports of flooding after heavy rainfall indicate that this is confined to other areas in Georgetown. Also, the flood event of 2005 is a reference point for the location since the project site and general Kingston area was not inundated.

### **5.8.2 Sea Level Rise**

In 1969 the mean sea level was recorded as 15.46m above the GD level. In 1999 the mean sea level was 15.56m above the GD level. Based on data available for the period 1951 to 1979 for Port Georgetown, mean relative sea level rise using linear extrapolation is 10.2 mm/yr-1. High tide change has been calculated to be 9.7 mm yr-1 with the low tide change being 11.1 mm yr-1.

## **6.0 Ecological Setting**

The project site is within a human disturbed area that only recently accommodated the buildings that housed the Food and Drug Analyst Department of the Ministry of Health. The existing vegetation is comprised of secondary disturbed vegetation.

The fauna identified was typical of areas where human intervention is evident. In addition, many of the avian species observed were transient and migratory. Like the flora, the fauna are very common and can be found throughout the coastal plain especially on abandoned and open lands.

### **6.1 Flora**

The vegetation in the area is very typical of coastal areas and areas that have been disturbed by humans. Except for the presence of a few cultivated trees (coconut, mango and banana) the vegetation present was primarily weeds that are found in almost all coastal areas and human disturbed areas.

### **6.2 Fauna (Terrestrial and Aquatic)**

The fauna that was observed were all highly mobile and migratory species that easily adapt to changing environments. The majority of fauna observed were avian fauna which are common to Guyana's coast. The variety of fauna on the beach was limited to a few fiddler crabs.

### **6.2.1 Birds**

The avian species observed were transient and migratory and are generally found in areas inhabited by humans.

### **6.2.2 Aquatic Environment**

There are no major aquatic systems at or on the project site. No main fish or aquatic species of significant environmental or ecological importance were identified.

## **7.0 Social Environment**

### **7.1 Land Use**

The land use in the Kingston area is mainly a function of historical factors, with much of the area retaining its traditional looks. The area is made up mainly of office buildings, though there are a few housing units around the Fort Street area. While the community has undergone some change over the past two decades, it for the most part maintains its traditional land use as an employment centre for Government ministries, semi-autonomous agencies, embassies, offices of corporations, NGO's and utility service providers.

### **7.2 Infrastructure and Social Services**

#### **7.2.1 Roads**

The infrastructural facilities of the Kingston community were observed to be in good to excellent condition. All roads within the immediate vicinity of the project, with the exception of Battery Road, were well paved. However there was a noted absence of, or poor traffic signage on some roadways within a two kilometer radius of the project site.

#### **7.2.2 Water Supply**

Pipelines for potable water supply are available to all residents within the community, with most places being serviced by GWI. Potable water is supplied through pipelines to the Kingston community on sixteen (16) hours per day schedule. A new bore hole has been commissioned and the average flow rate has increased to 90m<sup>3</sup> per hour. Further, GWI is seeking to acquire a pump which will provide the community with an average flow rate of 140m<sup>3</sup> per hour.

The project is estimated to consume approximately 90,850L (24000 gallons of water per day). Currently, the pump servicing the area cannot meet the water demands for the project. GWI, in discussion with the proponents of the project, has indicated that it would replace the existing pump with a new pump sized to meet the requirement of the area.

#### **7.2.3 Electricity and Telecommunication**

The energy and telecommunication services can be described as being between fair to good. The proposed project is projected to have an energy requirement of 2.4 megawatts. This energy requirement will be met mainly from the national grid via the Guyana Power and Light (GPL) Company. Currently GPL does not have the capacity to meet the project's requirements and has indicated that it will bring additional power to the area to meet the requirement of the facility. Additionally, the company plans to install a series of standby generators to serve as backup, or meet any additional needs.

For land line telephone service, Guyana Telephone and Telegraph Company (GT&T) has indicated that it currently does not have the capacity in the area to meet the requirements of the project, but can increase this capacity once the required demand is identified. Cellular signal to the area is excellent, from both service providers, Digicel and GT&T.

#### **7.2.4 Solid Waste Collection and Sewage**

The collection and disposal of solid waste within the Kingston community is regulated by the Georgetown Mayor and City Council (M&CC). The developer expects to engage private contractors for solid waste collection and disposal.

The project is estimated to generate approximately ten (10) cubic yards of solid waste annually or nearly 3% of the estimate waste currently generated in Georgetown. The facility is projected to generate approximately 90,850 L (24,000 US Gallons) of liquid waste per day (at 80% occupancy) during its operations. The waste water will be treated by a Waste Water Treatment Plant to be installed at the facility. This plant will treat all wastewater to meet discharge quality standards before it is pressure piped into the sewage system and flow by gravity to the Demerara River.

#### **7.2.5 Health Facilities**

The coverage by health institutions in Guyana can be described as fair, with areas closer to the city being serviced by a variety of facilities. Within the Kingston community is the St. Joseph Mercy Hospital. This is a privately owned entity, providing diagnostic and primary health care services. Additionally, the community has access to other prominent health facilities. These include the Woodlands Hospital, the Georgetown Public Hospital, Balwant Singh Hospital, the Georgetown Medical Centre, and the Cheddi Jagan Dental School, the Eureka Medical Laboratory and the Medical Arts Center. The proposed project is not anticipated to increase the pressure on the existing Government health care system in any significant way.

#### **7.2.6 Fire Services**

Georgetown has four fire stations, namely the Central/Headquarters, Campbellville, West Ruimveldt and the Alberttown Stations. These stations are equipped with six (6) specialized fire fighting vehicles (water tenders), three (3) at the Headquarters, and one each at the other branches.

The Kingston community is viewed by the Fire Service as a 'high-risk' location due to the fact that it has a high density of old traditional wooden buildings which are in some instances closely 'stacked' together. However, given the location of this facility, and the number of fire breaks between it and other public and private properties, fires in the area is not anticipated to threaten the project's infrastructure.

#### **7.2.7 Security**

The Guyana Police Force (GPF) Headquarters and its Investigative and Response Units are located within vicinity of the project. These include the Criminal Investigation Department (CID), the forensic and photographic laboratories and the Tactical Services Unit (TSU) which is the force's main rapid response Unit in the event of reported criminal activities and other emergencies. This Unit also provides Kingston and other communities within the City with day and night time patrols.

#### **7.2.8 Key Heritage and Archaeological Sites**

The Kingston community has a prominent history and significant cultural and intrinsic value to the city of Georgetown. According to the GGDP, the most prominent of these are the Umana Yana, the Cheddi Jagan Research Center (also known as the Red House and formerly Kamana Court), the lighthouse and the 1974 African Liberation Monument.

## **7.2.9 Transportation and Traffic Management**

### **7.2.9.1 Transportation**

The main transport service providers to the Kingston community are a network of privately owned minibuses and taxi services. Though Kingston is not directly serviced by a particular bus route it can be accessed from the central business district via minibuses plying the Plaisance Route (often referred to as the Kingston - Plaisance Route).

## **8.0 Environmental Impacts and Mitigation**

The specialist studies examined the baseline characteristics of the three components of the existing environment, the physical, biological, and socio-economic. The potential impact of the proposed project features and activities on the existing environment was evaluated as part of the specialist studies. A qualitative analysis was carried out utilizing the experience and expertise of the respective specialists to determine the potential negative and positive impacts related to specific aspects of the proposed project.

### **8.1 Impact Assessment Methodology**

The full range of potential impacts was examined to determine qualitatively the potential impacts based on the following criteria.

- Direction - positive or negative
- Magnitude - large or small
- Duration - long or short term
- Location - direct or indirect
- Extent - wide or local
- Significance - low or high

The impact analysis divided the proposed project activities into two categories, a construction phase and an operational phase. The potential impact criteria were applied for specific activities that will occur in each phase of the project.

### **8.2 Presentation of Impacts**

An impact matrix is presented to summarise the potential impacts of specific activities of the projects using the above criteria. Two separate matrices, Table 5.1 and 5.2 are presented for the two phases of the project. The potential impacts indicated in the impact matrix are discussed below in terms of the activity responsible for the impact for each phase of the project. Recommendations are presented for reducing and mitigating potential negative impacts as well as maximising the expected positive impacts.

**Table 1. Construction Phase of the Project**

CONSTRUCTION PHASE		Component			Criteria								
					Magnitude		Duration		Location	Extent		Significance	
		Physical	Biological	Socio-economic	Low	High	Short term	Long term	Direct	Indirect	Local	Wide	Low
<b>Activities &amp; Effects</b>													
Site clearance	Erosion												
	Vegetation removal												
	Loss of Fauna												
	Noise												
	Dust												
<b>Traffic Congestion and Disruption</b>													
<b>Impact on Existing Infrastructure</b>													
	Damage to Sea Defence structure												
	Surrounding Building												
	Damage to Road												
<b>Construction Waste</b>													
<b>Employment</b>													
	Construction workers												
	Indirect employment												

KEY	
Positive	Negative

**Table 2. Operation Phase of the Project**

OPERATION PHASE		Component			Criteria									
Activities & Effects		Physical	Biological	Socio-economic	Magnitude		Duration		Location		Extent		Significance	
					Low	High	Short term	Long term	Direct	Indirect	Local	Wide	Low	High
Modification of Surface Drainage														
Employment														
Utilities (water & electricity)														
Solid Waste Mang't & Disposal														
Sewage Disposal														
Enhancing Landscape & Aesthetics														
Traffic Congestion & Parking														
Proliferation of social ills														
Marine Navigation(obstruction of Lighthouse)														
Sea Level Rise														
Support to Tourism and Economy														
Conflicting Land Use														

## 9.0 Principal Findings of the Impact Assessment

The principal findings of the ESIA study are summarized as follows:

- The proposed project will have both negative and positive direct and indirect impacts on the socio-economic environment of Kingston, Greater Georgetown and the nation as a whole.
- Most of the negative impacts are essentially limited to the construction phase of the project. Direct adverse effects on the physical, biological and social environment are considered to be manageable through the implementation of mitigation measures and the majority of impacts associated with this project are of low significance.
- Direct impacts on the ecology due to loss of vegetation and faunal habitats are regarded as low significance, largely due to the small percentage of the total footprint of the project in relation to the distribution of these widespread flora and faunal species.
- Impacts on the visual environment, noise and traffic are expected to be limited to the construction phase of the Hotel. These impacts can thus be effectively mitigated and managed to acceptable levels.
- The incorporation of the LEED's requirements in the building design and construction will result in the collection and use of storm water which will reduce the amount of storm water discharged by the facility. This system will also ensure there is efficient energy usage and a reduction in general water use.
- While drainage is recognised as an issue, the developer has proposed a drainage network system that will assist in storm water collection, management, use and discharge and adequate drainage of the project site.
- Measures will be implemented to address solid waste by engaging a private contracted service for collection and disposal in addition to on-site best-practices for collection and recycling and sewage will be discharged first into a treatment plant for treatment and then into the existing Georgetown sewer system with contingency measures on-site to cater to emergencies.
- The positive impacts centre on the ability of the project to boost Guyana's tourism sector and the employment opportunities created during the construction and operational phases. The benefits resulting from the project will depend to a large extent on project's ability to integrate within the local tourism and services sectors.
- There is a sufficient level of confidence in the ESIA analysis and findings to enable a decision to be taken based on existing information.

## 10.0 Environmental Management and Monitoring Plan

A framework for the Environment Management and Monitoring Plan (EMMP) has been developed to address construction and subsequent operational activities of the project within the time frame identified for the project.

The primary purpose of the EMMP is to detail environmental management measures proposed for the project so that all the activities associated with construction, operation, and closure that could affect the environment can be managed, and that responsibilities and appropriate resources can be allocated to the aspects requiring management

### 10.1 Mitigation Actions

Mitigation actions are recommended to avoid and mitigate against key environmental impacts. These are discussed in detail in Section 5. Mitigation actions are presented in two (2) categories, a construction phase and an operational phase. The potential "significant impacts" that might arise from the implementation of the project on the existing natural and built environment and including socio-economic considerations are presented in the table below. Impacts are analysed during the construction and operation phases of the Hotel.

The table also presents actions recommended to avoid and mitigate against these impacts.

**Table 3. Construction Phase**

<b>ASPECT</b>	<b>MITIGATION MEASURES</b>
<b>Bio-Physical Environment</b>	
<b>Erosion of Cleared Areas</b>	<ul style="list-style-type: none"> <li>▪ Temporarily bund exposed soil and redirect flows from heavy runoff areas that threaten to erode.</li> <li>▪ Install silt fences around the property line to trap sediments contained in runoff.</li> <li>▪ Monitor areas of exposed soil during periods of heavy rainfall.</li> <li>▪ Cover large material stockpiles during periods of heavy rainfall.</li> </ul>
<b>Loss of Vegetation</b>	<ul style="list-style-type: none"> <li>▪ The vegetation removal on the shore zone should be limited to certain species.</li> <li>▪ Landscaping of the project site to restore vegetative cover to unpaved areas.</li> <li>▪ Use native flowering plants to provide habitat and host plants for some species.</li> <li>▪ A landscape maintenance programme should be established and implemented</li> <li>▪ Vegetation selected should be based on: suitability, habitat, flowering plants and shrubs</li> </ul>
<b>Loss of Fauna</b>	<ul style="list-style-type: none"> <li>▪ Landscaping component should include species of trees that will attract avian species.</li> <li>▪ Species chosen to re-vegetate the site should serve both a landscape function and a habitat function without compromising either.</li> </ul>
<b>Socio-Economic Environment</b>	
<b>Dust</b>	<ul style="list-style-type: none"> <li>▪ Access roads and exposed ground should be regularly wetted.</li> <li>▪ Stockpiles of fine materials (e.g. loam) should be wetted or covered with tarpaulin during windy conditions.</li> <li>▪ Workers on the site should be issued with dust masks.</li> <li>▪ Where possible a wall structure (probably of ply board) can be placed behind stockpiles of sand, earth and gravel to act as receptor for larger dust particles.</li> <li>▪ As much as possible maximize activities during periods when offices and neighbouring properties have a reduced occupancy (i.e. on weekends, before and after working hours).</li> <li>▪ Dust screens/blinds will be placed on the leeward side of the building.</li> </ul>
<b>Noise</b>	<ul style="list-style-type: none"> <li>▪ Construct noise barriers, such as temporary walls or piles of excavated material, between noisy activities and noise-sensitive receivers.</li> <li>▪ Site equipment on the construction lot as far away from noise-sensitive sites.</li> <li>▪ Construct walled enclosures around especially noisy activities.</li> <li>▪ Combine noisy operations to occur in the same time period.</li> <li>▪ Avoid nighttime activities.</li> <li>▪ Avoid use of an impact pile driver where possible.</li> <li>▪ Ensure noisy equipment have adequate muffler device installed.</li> </ul>
<b>Traffic and Transport</b>	<ul style="list-style-type: none"> <li>▪ Provide the MPW&amp;C with construction schedule and any required road closure at least 10 days in advance.</li> <li>▪ Provide the public with advance information on road closure.</li> <li>▪ Road closure should be posted with detour signs and the detour routes should be fully sign posted throughout to ensure the traffic follows the correct routing</li> <li>▪ An assessment of the routing of major equipment and material transfer from the Kingston wharf should be done in advance, to identify any constraints; and</li> <li>▪ Where partial or full lane closures are required, proper road signs, flags persons should be utilized to assist traffic movement.</li> <li>▪ Materials should be transported during off peak hours.</li> <li>▪ The trucks transporting fine material should be properly covered.</li> <li>▪ For movement of oversized loads, all routes should be assessed in advance to determine constraints such as overhead wires and sharp turns. The MPW&amp;C should be provided with a plan indicating the routing, need for road closure,</li> </ul>

ASPECT	MITIGATION MEASURES
	<p>date, time and duration of the movement.</p> <ul style="list-style-type: none"> <li>Adopt the recommended route for transporting materials to the site</li> </ul>
<b>Impact on Existing Infrastructure</b>	<p><i>Sea Defence System (SDS)</i></p> <ul style="list-style-type: none"> <li>The developer should establish an MoU with the SRDD regarding access, maintenance and management of the SDS bordering the project site.</li> </ul> <p><i>Surrounding Buildings</i></p> <ul style="list-style-type: none"> <li>Before the commencement of pile driving activities a structural assessment should be done of buildings including heritage sites within the immediate vicinity of the project site.</li> <li>A detailed inventory should be taken of the immediate neighbouring structures to allow the developer to adequately address any complaints of structural damage.</li> <li>A vibration monitoring program should be established.</li> <li>Local residents and businesses should be given notice of the scheduling of pile driving activities to prepare for the increased levels of noise and vibration, in an effort to mitigate some increased noise levels, acoustic barriers may be added to the pile driving equipment.</li> </ul> <p><i>Road Surface</i></p> <ul style="list-style-type: none"> <li>Given the high density and volume of vehicles which currently and is expected to traverse Battery Road, it is recommended that for its rehabilitation, extensive compacting is done to ensure the safety of the submerged water mains and rerouted sewer lines.</li> </ul>
<b>Construction Waste</b>	<ul style="list-style-type: none"> <li>Skips should be placed at strategic locations around the construction site.</li> <li>The skips should be properly designed and covered to prevent access by vermin and minimize odour and dust nuisance.</li> <li>Waste should be sorted for re-use and recycling and should be disposed on a regular basis.</li> </ul>
<b>Employment</b>	<ul style="list-style-type: none"> <li>Working with local contractors, on-the-job training and exposure to new technologies and construction approaches should be implemented</li> </ul>

**Table 4. Operation Phase**

ASPECT	MITIGATION MEASURES
<b>Bio-Physical Environment</b>	
<b>Modification of Surface Drainage</b>	<p><b>Surface Drainage Systems</b></p> <ul style="list-style-type: none"> <li>Design storm drains to permit runoff from the buildings, roads and all paved areas around the site.</li> <li>Drainage System should prevent on-site erosion.</li> <li>System should be adequately designed, stabilized, and maintained, particularly where accumulated runoff flows.</li> <li>Unpaved areas subject to sheet flow should be stabilized with vegetation or inert materials.</li> <li>As much as possible ensure areas such as the parking lot are partially pervious.</li> <li>Install a storm detention basin to collect and store water in the event of extremely heavy rainfall.</li> </ul> <p><b>Underground Drainage Systems</b></p>

ASPECT	MITIGATION MEASURES
	<ul style="list-style-type: none"> <li>▪ Underground drainage systems convey site runoff in enclosed, below-grade storm sewers. Runoff should be collected at storm drain inlets and can be released into the main installation or main sewerage system or at a surface outlet.</li> <li>▪ Runoff conveyed in sewer pipes must be released at a surface outlet, the velocity of the runoff should be reduced to non-erosive levels and the area around the outlet should be properly graded and stabilized to lessen erosion.</li> </ul>
<b>Socio-Economic Environment</b>	
<b>Employment</b>	<ul style="list-style-type: none"> <li>▪ Wider participation from the local hospitality sector should be encouraged.</li> <li>▪ On-the-job training should be done to enhance the capacity of locals to fill managerial positions.</li> </ul>
<b>Utility System and Water Management</b>	<ul style="list-style-type: none"> <li>▪ Educate, train and motivate staff to practice water conservation.</li> <li>▪ Institute a comprehensive leak detection and correction programme.</li> <li>▪ Discourage practices such as food thawing and washing vegetables under running water.</li> <li>▪ Irrigation - monitor grounds irrigation system. Irrigation should be done at nights to reduce evaporation.</li> <li>▪ Implement preventative maintenance for toilets.</li> <li>▪ Don't backwash pool filters more than necessary.</li> <li>▪ Install Low-Flush Toilets: since water-saving toilets use 50 to 75% less water.</li> <li>▪ Implement the use of electricity efficient lighting and appliances.</li> <li>▪ Encourage energy saving practices amongst staff and guests.</li> </ul>
<b>Solid Waste Management and Disposal</b>	<ul style="list-style-type: none"> <li>▪ Skips should be placed at strategic locations.</li> <li>▪ The skips should be properly designed and covered to prevent access by vermin and minimize odour,</li> <li>▪ Arrangements should be made for all solid waste to be collected by a contracted waste disposal service.</li> <li>▪ Waste should be sorted and reuse and recycling should be practiced.</li> </ul>
<b>Sewage Disposal</b>	<ul style="list-style-type: none"> <li>▪ The project should educate its occupants on the items that should not be disposed in toilets.</li> <li>▪ Grease traps should be constructed as part of the internal sewage system.</li> <li>▪ A holding tank with the capacity of two-thirds of the daily discharge should be constructed on site as emergency backup.</li> <li>▪ .Install a sewage and waste water treatment system.</li> </ul>
<b>Traffic Congestion and Parking</b>	<ul style="list-style-type: none"> <li>▪ Before construction commences, the developer should consult with the relevant traffic agencies including the GPF, Central Planning and Transportation Unit (CPTA) and TSU of the WSG to present its traffic flow arrangement for this phase of the project.</li> <li>▪ Lighting should be installed for roads immediate to the project area as installation of the appropriate signs, both warning and guidance.</li> <li>▪ The developer should construct a right turning lane for traffic going into the complex. The turning lane should have a holding capacity for five passenger cars.</li> </ul>
<b>Conflicting Land Use</b>	<ul style="list-style-type: none"> <li>▪ The seawall and beach area must remain a public good, always being accessible for public utilization but in keeping with the permission granted by Government the developer should have responsibility over the cleaning, maintaining and security of the beachfront</li> <li>▪ The SRDD should have access to the seawall and beach area for routine inspection and for emergency and maintenance works as may be required.</li> <li>▪ Neighbouring properties which will be impacted by construction works should receive prior notice and be informed of activities which may affect their staff members and the execution of their daily operations.</li> </ul>

ASPECT	MITIGATION MEASURES
	<ul style="list-style-type: none"> <li>▪ The developer should be forthright in sharing future development plans with neighbouring properties.</li> </ul>
<b>Proliferation of Social Ills</b>	<ul style="list-style-type: none"> <li>▪ Stringent measures should be taken that only individuals who are residing at the hotel be granted access to the casino as mandate by the 2007 Gambling Prevention (Amendment) Act.</li> <li>▪ Local patrons who wish to stay at the hotel as a means of acquiring the use of the casino facility must be made to pay necessary taxes on their winning which should be declared to the GRA by the management of the casino.</li> </ul>
<b>Marine Navigation</b>	<ul style="list-style-type: none"> <li>▪ The developer should work with MARAD towards placing a beacon on the highest point of the Marriott and to consider a new beacon light with a further range, greater visibility and with low maintenance.</li> </ul>
<b>Stakeholder Relations</b>	<ul style="list-style-type: none"> <li>▪ Implement a Public Awareness Programme as outlined in Section 5.</li> </ul>
Cumulative Impacts	
<b>Sea Level Rise</b>	<ul style="list-style-type: none"> <li>▪ The developer should work closely with agencies responsible for coastal zone monitoring and management, sea level rise, and sea defence.</li> </ul>
<b>Support to Guyana Tourism Sector and Economy</b>	<ul style="list-style-type: none"> <li>▪ Efforts should be made by institutions such as THAG and GTA to facilitate linkages between the project and reputable local service providers.</li> <li>▪ Local service providers who offer unique services and experiences which are not provided within the proposed project should seek to have their products showcased.</li> <li>▪ The architectural heritage of the Kingston community can be showcased to travelers staying at the facility.</li> <li>▪ The implementation of the project will enhance the landscape and aesthetics of the area.</li> </ul>

## 11.0 Monitoring Plan

The Monitoring Plan focuses on social and environmental parameters to be monitored during the operation of the project as described in Section 6.4. The Plan is based on the principal issues and impacts identified during the study, and taking into consideration the roles and responsibilities of key institutions during the operation of the project, monitoring cost and monitoring inspection forms.

## 12.0 Emergency Response Plan

The Emergency Response Plan (ERP) describes the general types of emergency and actions to be followed, should an emergency occur during the construction and operational phase of the project. The ERP includes:

- Emergency Contact Details
- Emergency Procedures
- Description of an Emergency
- Authority of Control
- Scenario Description and Response.
- Materials Inventory
- Incident Reporting

## 13.0 Stakeholder Relations Programme

A Stakeholder Relations Programme has been proposed to target in particular neighbouring stakeholders. The aim is to keep stakeholders informed of developments and to ensure that

communication has not ended once formal consultation process has been completed. The programme establishes a formal mechanism for interaction and for voicing issues and concerns throughout the project.

#### **14.0 Closure Plan**

A Closure Plan is provided. This conceptual Closure and Decommissioning Plan (CDP) details in conceptual form the measures that will be employed at the closure of the project to ensure that the site is rehabilitated to an appropriate level. The final plan will need to be developed within the first five years of the project's operation through a consultative process with relevant authorities and stakeholders.

#### **15.0 Conclusion and Recommendations**

The implementation of the Georgetown Marriott Hotel, Casino and Entertainment Complex project will not produce any significant negative environmental or social impacts either in the construction or operational phases. Potential negative impacts are all low magnitude impacts of low environmental or socio-economic significance. These negative impacts can be further minimised by applying the recommended mitigation measures where appropriate.

The project, when implemented, will have a significant positive impact on the socio-economic environment primarily through the creation of a significant number of job opportunities for a wide range of skilled and unskilled workers. The economy will also benefit from increased demand for goods and services during both the construction and operational phases of the project.

The project will therefore have a net positive impact on the larger economy of Guyana by adding to the hospitality and entertainment product of Georgetown, and creating significant job and economic opportunities.

The project is therefore considered to be environmentally acceptable, provided all mitigation measures are implemented in advance of other additional project related activities.

##### **15.1 General Recommendations**

The general recommendations are for the developer to:

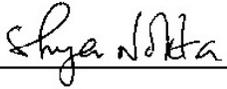
- Incorporate the findings and recommendations of the ESIA study into the detailed planning for the project and its implementation;
- Commit to effectively implement the mitigation measures listed;
- Develop an Environmental Policy and demonstrate an ongoing commitment to minimize environmental damage, at all stages of the project;
- Treat the EMMP as a living document that is regularly reviewed and updated to ensure that management measures are effective and practicable.
- Continue to liaise with stakeholders and affected parties throughout the project life cycle, by further developing and implementing the Stakeholders Relations Programme.

##### **15.2 Specific Recommendations**

It is envisaged that the proposed mitigation measures presented in the Tables 3 and 4 above will be effectively implemented and incorporated into the design and operation of the project. Any deviation from the measures described in the ESIA may therefore alter the significance rating assigned to each potential impact.

**ESIA TEAM**

Name: Shyam Nokta  
Position on Team: Project Coordinator

Signature: 

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Name: Aedan Earle  
Position on Team: Technical Team Leader

Signature: 

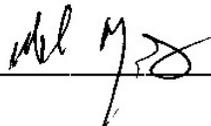
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Name: Mark Bynoe  
Position on Team: Social Economist

Signature: 

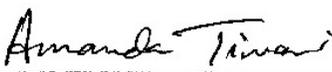
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Name: Amanda Tiwari  
Position on Team: Environmental Assistant

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Name: Khalid Alladin  
Position on Team:

Signature: 

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Name: Preeya Rampersaud  
Position on Team:

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## CHAPTER 1 INTRODUCTION

### 1.1 Background

#### 1.1.1 Location

Marriott International, in partnership with Atlantic Hotel Inc, (AHI) proposes to construct a 165 room Georgetown Marriott Hotel, Casino and Entertainment Complex in Georgetown, Guyana as depicted in Figure 1.1. The design of the hotel can accommodate an additional 35 rooms. The site for the project is located on a coastal strip of land in the Kingston area of Georgetown, east of the mouth of the Demerara River as shown in Figure1.3.



**Figure 1.1** Architect's impression of the Georgetown Marriott Hotel, Casino and Entertainment Complex



Figure 1.2 Country Location of the Project



**Figure 1.3** Location map of project site

The proposed site is a portion of State Land including tracts P, R and Alpha a total of 3.52 ha (8.69 acres) of land with rights to 0.97 (2.39 acres) of beachfront. The site is bounded on the east by the Pegasus Hotel and the west by the Guyana Coast Guard Headquarters. The seawall and associated service road forms the northern boundary while Battery Road forms the southern boundary as shown in Figure1.4.



**Figure 1.4 Project site and surrounding properties**

### 1.1.2 Project Proponents

In the Draft EIA Report, it was indicated that ADUA will design and build the hotel. However, since the draft EIA was prepared there have been some changes to the project. ADUA is still designing the project while AHI, under a management agreement, will oversee the construction and operation of the facility.

AHI is a company 100% owned by the Government of Guyana through its shareholding company called the National Industrial & Commercial Investments Limited (NICIL). AHI was incorporated in Guyana on 10<sup>th</sup> September 2009, under the Companies Act 1991 [Act No. 29 of 1991]. AHI's registered office is situated at Lot 126 Barrack Street, Kingston, Georgetown, Guyana. The sole purpose of AHI is to coordinate and oversee the construction and management of the Marriott Hotel & Entertainment Complex.

ADUA is comprised of two joint firms, Adam Developers and Urbahn Associates. Adam Developers is a development and construction company with over 50 years international experience having been involved with a number of projects for public and private sector clients globally. Adam Developers has worked on a number of prestigious projects at the US Military Academy and other major public agencies in New York City. The firm has also executed projects

such as the Delhi Airport, first US Embassy in Pakistan, the Inter Continental Hotel, Faisal Mosque, and Summit Minnar in Pakistan. Urbahn Architects is a 60 year old firm which has designed projects for public and private sector clients globally covering commercial, residential, healthcare, education and civic projects. Urbahn Architects has been ranked among the Top 15 Architectural Firms in New York City.

### 1.1.3 Project Changes

As was indicated above, since the draft EIA report was submitted, there have been some adjustments regarding the project design. These changes are minor and should not result in any additional impact on the environment. These changes are outlined below:

#### 1) Building Form

- a. The design of the 2008 project was a circular plan in the shape of a “C” that accommodated 165 rooms. The tower was positioned on the east side of the property. The first 2 floors were for public use, the 3<sup>rd</sup> floor was for public and guest use, floors 3 to 10 stepped back and were solely for guest use, and the 11<sup>th</sup> floor was designated for mechanical equipment.
- b. The current design also accommodates 165 rooms but is more spread out along the east-west access of the site and proposes to add an additional unfinished floor for future fit-out of 35 rooms bringing the room total to 200 when complete. The tower is now position more centrally on the site and does not step back. The first 2 floors are for public use, the 3<sup>rd</sup> floor will at opening be unoccupied, the 4<sup>th</sup> to 7<sup>th</sup> floor will be only for guest use, the 8<sup>th</sup> floor has a fitness center so it will be accessible for both guests and the public, the 9<sup>th</sup> floor will be only for guests, and the 10<sup>th</sup> floor was designated for mechanical equipment.

#### 2) Functional spaces

- a. Both designs have meeting spaces but the current design has a large function room capable of accommodating up to 800 persons for one event.
- b. Both designs have a casino, restaurant and night club but the current project has a smaller casino, a restaurant of approximately the same size but a much larger night club.

#### 3) Site Design

- a. The public access and service access points for both projects are the same and the size of the parking areas for the hotel and the entertainment complex are comparable in scale.
- b. Some elements that the current design has that the original project contains is a public promenade that will be available for local use and a retail arcade connecting the promenade, hotel and entertainment complex.

#### 4) Commonalities between the two projects include

- a. Both designs are design not to build any substantial or permanent structures in the seawall easement
- b. Both designs will require a remote lighthouse beacon on top of the tower roof to help guide ships into the Demerara River.

#### 5) Developer

- a) For the initial project, ADUA would have design and build the Hotel as well as oversee the operation.

- b) For this new project, ADUA will only design the Hotel while AHI will oversee the construction and operation of the Hotel.

## **1.2 Environmental and Social Impact Assessment Study**

### **1.2.1 Purpose**

The Guyana Environmental Protection Agency (EPA) has requested that an Environmental and Social Impact Assessment (ESIA) be carried out by ADUA in order to obtain an Environmental Permit to implement the project. This requirement by the EPA is in keeping with the provisions of the Environmental Protection Act 1996 and its Environmental Protection Regulations 2000.

The output of this ESIA study is a comprehensive report that will be submitted to the EPA for review and ultimately the obtaining of a permit having met the regulatory requirements. An outline of the ESIA permitting process in Guyana is presented in Section 2.

### **1.2.2 Objectives**

The general objective of the ESIA process in Guyana is to ensure that development projects are designed and implemented with due consideration for the environment including bio-physical and socio-economic issues. In general the Environmental Protection Act 1996 makes provision for the conduct of ESIA's for prescribed development projects for the purpose of ensuring that developments comply with existing environmental regulations and best practice standards.

The immediate objective of the ESIA as recognized by international conventions and best practice is to inform the process of decision-making by identifying the potentially significant environmental effects and risks of development proposals. The long term objective is to encourage and facilitate sustainable economic development. An important aspect of the ESIA study is that it provides a framework for consultations between the proponents of the project and stakeholders throughout the process of project design, permitting and implementation.

The principal objectives of this ESIA study are to:

1. Scope issues and concerns from stakeholders regarding the proposed project that needs to be addressed;
2. Document the ecological and socio-economic baseline of the project area;
3. Identify and assess potential environmental and social impacts associated with the proposed project;
4. Recommend mitigation measures that would reduce the significance of predicted negative impacts and enhance predicted benefits on all aspects of the surrounding environment;
5. Develop a Comprehensive Management Plan outlining actions and responsibilities for managing the predicted impacts of the project;
6. Meeting the requirements of the environmental regulator, Guyana's EPA as well as conform with international best-practice for a project of this nature
7. Inform corporate decisions about the project's planning and development; and
8. Promote development that is environmentally and socially sustainable.

The specific outputs required by the EPA for this ESIA is defined by the Terms of Reference for the study. The Terms of Reference approved by the EPA for this ESIA is presented in Appendix 1.

### 1.2.3 ESIA Team

Environmental Management Consultants (EMC) has been contracted by ADUA to conduct the ESIA study. EMC is a full service Guyanese environmental consulting firm that has been involved with a number of EIA studies for major projects in Guyana.

For this project, EMC has mobilized a multidisciplinary team with the expertise and experience in conducting EIA's for major hotel developments in Guyana, and the Caribbean.

The consulting team consists of:

Aedan Earle (MPhil) – Technical Team Leader  
Philip Da Silva (MPhil) – Biodiversity and Coastal Zone Specialist  
Mark Bynoe (PhD) – Social Economist  
Ray Glasgow (BSc) – Civil Engineer  
Shyam Nokta (MSc) – Project Coordinator  
Amanda Tiwari (BSc) – Environmental Assistant

For the finalization of this EIA, two (2) additional members were added to the EIA Team. These are:

Preeya Rampersaud – (MSc) - Environmental and Natural Resources Specialist  
Khalid Alladin - (BA) - Environmental Management Specialist.

The CV's of the team members and background information on EMC is provided in Appendix 6.

### 1.2.4 Methodology

The ESIA study involved the compilation of information obtained from consultations with Governmental and Non-Governmental stakeholders, and specific component investigations. Consultations involved interviews and meetings. A public scoping meeting and a stakeholders meeting were convened by the EPA at the inception of the ESIA process to finalize the Terms of Reference of the study and to highlight important issues.

The component investigations were conducted by the respective specialist on the team. The three main areas of investigation included: the physical environment, ecology (marine and terrestrial) and socio- economic context. The results of these investigations generated the information required for the determination of existing baseline conditions.

The detailed methodologies employed in conducting the component investigations are presented in the respective sections. All component investigations of this ESIA required that the following tasks be performed as required:

- Review of existing report and background documents
- Aerial photography and satellite image assessment
- Analysis of maps and plans
- Site visits and field investigations
- Data gathering and analysis
- Sample collection and laboratory analysis
- Review of results, impact analysis and mitigation recommendations

The potential impacts of the proposed project implementation were then assessed by establishing the interaction between the proposed project activities and the characteristics of the existing environment at the site and within the effective area of influence.

Team meetings were held to discuss the progress of investigations and analyses and to facilitate integration of data towards an understanding of the systems at work in both the natural and built environment. Information obtained from consultations with stakeholders and with the developer was assessed and incorporated into the ESIA process.

### **1.2.5 ESIA Report Organization**

The ESIA report consists of four main sections that outline:

1. Project Description;
2. Baseline Assessment;
3. Impact Assessment; and
4. Environmental Management.

### **1.2.6 Project Description**

The project description describes in detail the features of the proposed hotel including basic design features, utility requirements, drainage design, waste disposal and natural hazard provisions. In addition, all energy saving, waste recycling and energy efficiency and health and safety measures are outlined.

### **1.2.7 Baseline Assessment**

This section compiles all the baseline information obtained by consultations and component investigations and describes the existing baseline conditions of the site and the effective area of influence. The baseline conditions relating to the physical, biological and socio-economic characteristics are fully described.

### **1.2.8 Impact Assessment and Mitigation Measures**

The impact assessment section outlines the results of the evaluation of existing baseline conditions and how they interact with the proposed hotel design, construction and operation features. The potential negative and positive impacts on the existing natural, built and social environment are described. Recommendations are provided to reduce the potential negative impacts and to maximize the positive effects of the project.

### **1.2.9 Environmental Management Plan**

A comprehensive Environmental Management Plan is presented in this section including a Mitigation Plan and provisions for the monitoring of specific aspects of the construction and operation activities. An Emergency Response Plan describing appropriate emergency responses to natural or man-made risks is included in this section. A Closure Plan describing the measures to be undertaken to conclude operational activities and commence decommissioning in an environmentally appropriate and sustainable fashion is also presented in this section.

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## **CHAPTER TWO PROJECT DESCRIPTION**

### **2.1 Introduction**

This Chapter presents a description of the project and its details as provided by ADUA.

The Georgetown Marriott Hotel and Casino Complex represents a flagship investment in Guyana's travel and tourism sector and seeks to establish a state-of-the-art facility with an internationally recognised brand.

The intention of ADUA and AHI in the development of the Georgetown Marriott Hotel and Casino Complex is to establish a modern, iconic hotel, casino, and entertainment complex in Georgetown that would become the post-card shot and the pride of the country.

The project is expected to develop into a new hub of activity for Guyana and its tourism industry, attracting visitors from abroad, especially the Caribbean, North America and Brazil while providing an excellent accommodation alternative to vacationing persons from overseas.

The project represents an investment of U.S. \$42 Million and will establish an extensive, secure, facility with a wide range of accommodation, entertainment, restaurant and concession offerings, and developed according to the highest international standards.

Construction is scheduled to commence in 2011 and is expected to be completed by the fourth quarter of 2012 for opening in 2013.

The facility will be constructed to meet the requirements Leadership in Energy & Environmental Design (LEED). LEED is an internationally recognized green building certification system which provides a third-party verification that a building or community was designed and built using strategies intended to improve performance in metrics such as energy savings, water efficiency, CO<sup>2</sup> emissions reduction, improved indoor environmental quality, and stewardship of resources and sensitivity to their impacts. The incorporation of the LEED's requirements in the building design and construction will result in the collection and use of storm water which will reduce the amount of storm water discharged by the facility. This system will also ensure there is efficient energy usage and a reduction in general water use.

#### **2.1.1 Company Profile**

Atlantic Hotel Inc. (AHI) is a company 100% owned by the Government of Guyana through its shareholding company called the National Industrial & Commercial Investments Limited (NICIL). AHI was incorporated in Guyana on 10<sup>th</sup> September 2009, under the Companies Act 1991 [Act No. 29 of 1991]. AHI's registered office is situated at Lot 126 Barrack Street, Kingston, Georgetown, Guyana. The sole purpose of AHI is to coordinate and oversee the construction and management of the Marriott Hotel & Entertainment Complex.

#### **2.1.2 Project Rationale and Marketing Projections**

The Project is being constructed on a plot of land 2.78 ha (6.88 acres) located at the north western area of Kingston, immediately adjacent to the Pegasus Hotel and with 0.97 (2.39 acres) of beachfront property.

The main compound will consist of a world-class hotel, casino, nightclub, and restaurants; contained in two (2) attractively designed buildings. The strategic location affords excellent views of the Atlantic Ocean (the property ends on the shoreline); the Demerara River (part of the property borders the river); and Georgetown. Road links make the facility accessible to the central business district and port while the proximity to the Pegasus Hotel which is just next door, affords an alternative to what is now the main hotel in Georgetown.

The goal is to develop the complex into a new hub of activity for Guyana and its tourism industry. Importantly as well, the project will increase Guyana's accommodation capacity and assist in marketing and promotion of the country as tourist destination.

In addition to direct employment during construction and operation, on a wider scale, the project is expected to bring economic and social benefits to Georgetown, the immediate and surrounding coastal communities and the national economy. It will also create downstream economic development through the goods and services it would require from local suppliers.

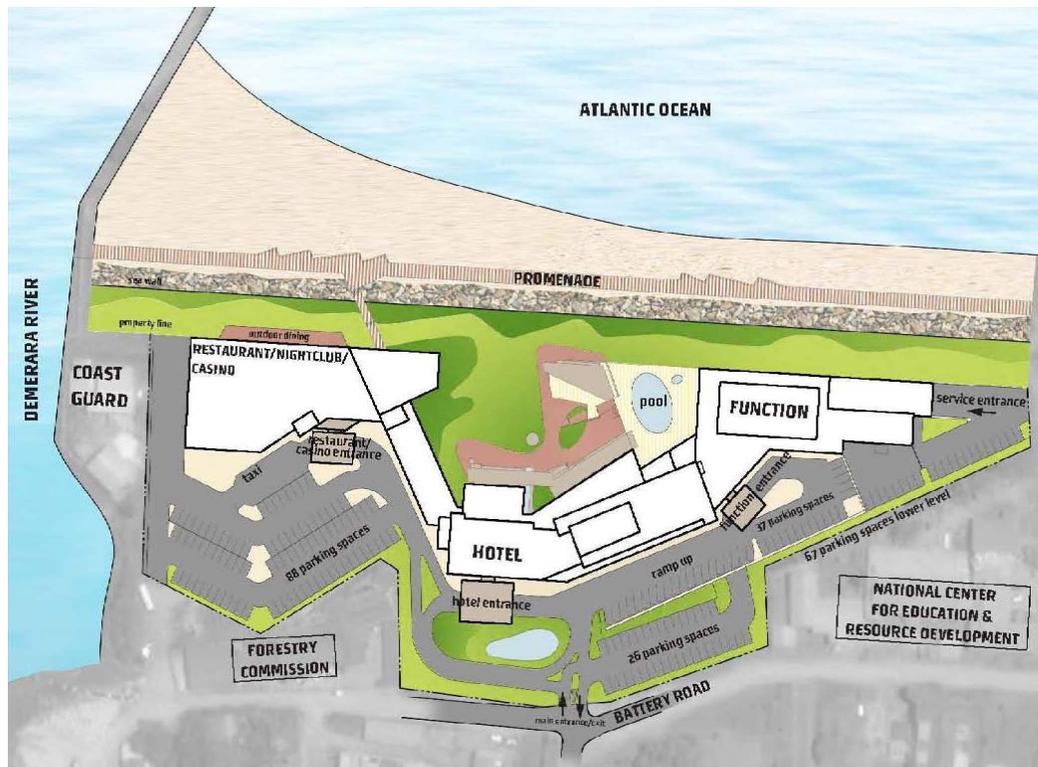
The complex is expected to attract visitors from abroad, especially the Caribbean, North America and Brazil. The project is expected to have an average annual turnover in the first 10 years of approximately U.S. \$20,757,000 and is envisaged to service a minimum of 3 740 000 people over the first 10 years.

**Table 2.1**      **Projected occupancy rate of the Hotel.**

<b>Year</b>	<b>% Occupancy</b>
Year 1	60%
Year 2	65%
Year 3	67%
Year 4	68%
Year 5	68%
Year 6 and beyond	70%

## **2.2 Project Components**

The total building area of the Hotel, Casino and Entertainment Complex, excluding parking is approximately 17,187 m<sup>2</sup> (185 000 square feet). The building complex would rise to 10 floors. The hotel portion of the Complex would be approximately 12,541m<sup>2</sup> (135 000 square feet); consist of 165 rooms and will be operated by Marriott International. The casino and entertainment portion of the Complex would comprise approximately 4,645m<sup>2</sup> (50 000 square feet) and be located on 3 levels.



**Figure 2.1 Floor Plan**

Detailed Site Plans and Floor Layout Plans are provided in Appendix 5.

### 2.2.1 Hotel

The hotel portion of the Complex would be approximately 12,541m<sup>2</sup> (135 000 square feet). The Hotel will consist of 165 rooms of which 93 are king size rooms, 68 double rooms and 4 suites and 1 governor suite and will also feature a conference centre/banquet hall. The following is a summary of the building program and amenities that will be provided when in operation.

#### 2.2.1.1 Hotel Food and Beverage Outlets

- 3 Meal Restaurant with Terrace
- Pool bar and grill
- Lounge bar

#### 2.2.1.2 Meeting Rooms

- 1 Ballroom – divisible in 3 end in 2
- Flexible meeting room – includes boardroom

#### 2.2.1.3 Recreation

- Outdoor Swimming Pool with Bar and Lounge, mini Stage
- Fitness Centre and Spa

#### 2.2.1.4 Amenities and Services

- In-Room Coffee Service

- In- Room Safe to accommodate laptop.
- Iron/Ironing Board
- HSIA – LAN and Wireless in guestrooms, wireless throughout business centre
- Business Centre
- Gift and Sundry Shop
- Parking for 93 cars and 2 buses

#### **2.2.1.5 Business Library**

- Gift / Convenience Store

#### **2.2.2 Entertainment Complex/Casino**

The entertainment complex of the project will occupy 3 floors with 2 floors of gaming, nightclub, specialty restaurant, indoor bar and parking area. The casino and entertainment complex would comprise approximately 4,645m<sup>2</sup> (50 000 square feet) and will target visitors to Guyana, and not local Guyanese. Accepted currency will be in Guyana or United States Dollars.

### **2.3 Support Services**

#### **2.3.1 Electricity Supply**

The project is expected to have an electrical demand of 2.4 MegaWatts. . The Guyana Power and Light Company (GPL) currently does not have the capacity in the area to support the entire project. However, GPL has indicated that it will bring the additional power to the area. Also, generators will be used to service the high demanding areas and serve as backups. A total of four (4) generators will be installed of capacities ranging from 500kva to 2 MW housed in sound proof enclosures with one (1) serving as back up. Power from the National Grid will be fed to a main transformer before being connected to the Complex's main control panel.

The designing and implementation of the Project to meet the requirements of LEED will result in a reduction of energy required by the facility by ensure efficient energy usage is practiced. The plan is to improve energy performance of the building by 18% to 26% over standard practices, thus reducing the cost of energy. The management will be engaging the services of a Commissioning Authority to ensure maximum performance of the selected building systems that affect energy usage.

#### **2.3.2 Potable Water Supply**

The water demand for the establishment was calculated based on 80% occupancy of the facility and hotel employees. The average daily demand was estimated to be 90, 850L (24,000 gallons).

The existing pump in the area does not have the capacity to supply the water needs of the Hotel since it was installed to meet the low demand of the area. GWI has indicated that they will install a new pump to meet the increase requirement. The current pump functions 24 hours per day. However, the new pump will function less than 24 hours. As such, the Hotel will storage enough water to cater for this cut in supply. The water will be stored in a 170, 344L (45,000 US Gallon) tank to be located on the roof of the facility. Fire service water will also be connected to the distribution system and held in an approximately 151,417L (40 000 US gallon) water storage tank. The LEED system will also contribute to a reduction in water usage at the facility. A grey water system to irrigate the landscape will be implemented while management is considering providing processed water in lieu of using GWI supplied water. It is anticipated that overall water use reduction would be in the vicinity of 30% to 40% over standards. A fully integrated rainwater collection and storage system will be installed to supplement the water provided by GWI and to reduce the demand on the system. A storage tank with a capacity of 3,625 m<sup>3</sup> (128, 000 cubic ft) will be installed to collect storm water from the roof. This water will be treated for grey water re-

use in toilets and process water. Storm water management for the site will consist of a detention basin of approximately 850 m<sup>3</sup> (30 000 cubic ft)

### **2.3.3 Sewage Treatment**

The amount of sewage that would be generated during the daily operational life of the project will depend on the type and level of occupancy.

It is anticipated that a large percentage of the persons that would be visiting the casino, clubs, restaurants, etc. would be occupants of the hotel.

The amount of sewage that would be generated during the daily operational life of the project will depend on the type and level of occupancy. The facility is projected to generate approximately 90, 850L (24,000 US gallons) of liquid waste per day (at 80 % occupancy) during its operations..

All liquid waste will be treated onsite before discharge into the receiving environment. A split sewage and waste water treatment plant will be installed to cater for both the hotel and the entertainment areas. This effluent will be treated to acceptable limits before being discharged from the facility. Currently two (2) options for disposals are being considered and were proposed to GWI. The first option, which is preferred, is to pump the treated material into the forced sewer main of the Georgetown Sewer System for discharge into the Demerara River via gravity flow. The other option is to discharge the sewage from the treatment plant to an onsite ejector pump. This ejector pump will force the sewage down either Water or Fort Street to a new pressure relief manhole which would then discharge into the gravity sewer system. This treatment facility will ensure minimum effect on the existing sewer system.

### **2.3.4 Solid Waste Disposal**

Solid waste generated by the project will primarily consist of domestic type waste including paper, plastics, packaging and food waste. It is projected that there will be 10 cubic yards per day of un-compacted solid waste generated. Waste collection and storage containers such as skips will be sited at strategic points within the project site. Waste will be separated to ensure hazardous materials are disposed of separately and in an approved manner. Waste will be collected on a weekly basis by a contracted private waste disposal service and taken to the Haags Bosch Landfill site, which should be operational by then with capacity to receive both sanitary and hazardous waste.

### **2.3.5 Telecommunications**

Telephone service will be provided by Guyana Telephone and Telegraph Company (GT&T). The Company has indicated that it currently does not have the capacity in the area to meet the requirements of the facility, but can increase this capacity once the required demand is worked out. Further, cellular signal to the area is excellent, from both service providers, Digicel and GT&T. High speed/wireless internet access will be provided in each room.

### **2.3.6 Safety Features**

The following health and safety measures will be installed.

- The buildings will be fully sprinkled and have a standpipe system in all stairways. Fire water services will be connected to the Georgetown distribution system and held in an approximately 151,417L (40 000 US) gallon water storage tank.
- There will be a complete fire alarm system with heat and smoke detectors.
- Exit signs will be placed at all stair entrances and along path of travel.
- Evacuation diagrams showing location and egress points will be placed in each sleeping room prior to occupancy and at strategic locations.

- Emergency lighting will be provided in all corridors and spaces.
- Key staff will be trained on an ongoing basis to assist customers in the event of an emergency.

### **2.3.7 Traffic Management**

#### **2.3.7.1 Construction Phase**

During the construction phase of the project there will be an increase in traffic volume in the project area and its immediate environs. As much as possible, materials including sand and piles will be barged to the Kingston wharf and transported the short distance along Battery Road to the project site. This area is currently being used by BK International to transport sand and boulders.

Concrete will be sourced from Readymix and transported by specialized trucks from the Eccles Industrial site to the project area. Readymix trucks use routes that are least congested to ensure timely delivery and the suggested route indicated for this project is via the East Bank Public Road into Lombard Street, thence to High Street into Water Street and to the project site.

#### **2.3.7.2 Operation Phase**

During the operation phase of the Complex the main route that will be used to access the site is via Main Street into Battery Road then to the site. An alternative is via Main Street into Barrack Street then onto Water Street to the site.

The road network within the Complex and to access the area for the construction and operation phases is depicted on the layout map overleaf.



2.4 Drainage

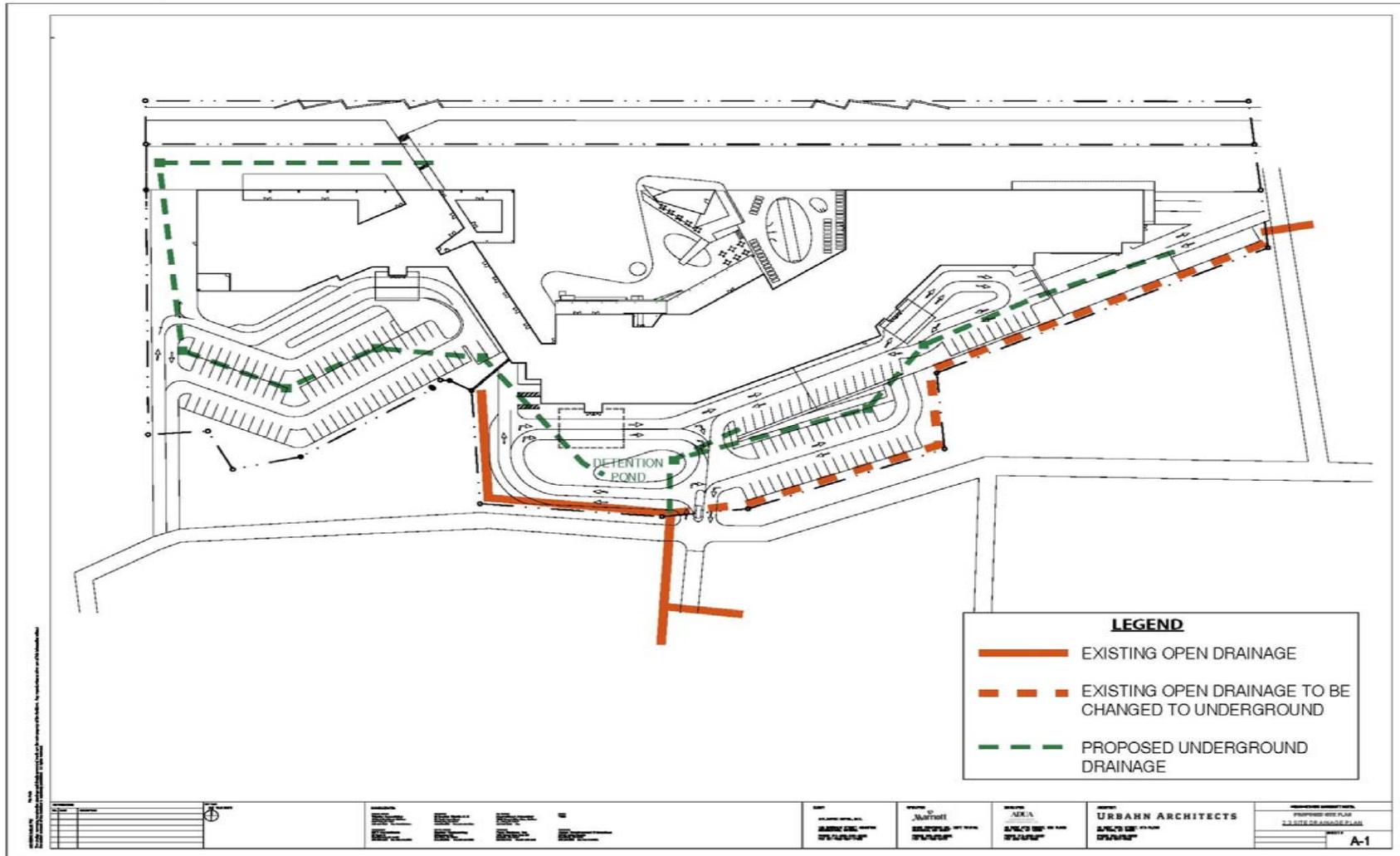


Fig 2.3 Site Drainage Plan



**Figure 2.4 Project drainage in relation to existing area drainage network**

### **2.4.1 Drainage Layout**

The site drainage plan as outlined in Figure 2.4 depicts the location of the concrete drains that will assist in storm water drainage. Storm water will be drained by a system of underground concrete drains (shown in broken red lines) around the periphery of the building. Existing open drains are shown in bold red line. These drains will ensure adequate storm water drainage and prevent flooding of nearby buildings and properties.

With the implementation of the LEED Certification, storm water management will aim at collecting and reusing some amount of that water. Consideration will also be given to the quantity and quality of discharged into the environment. A storage tank with a capacity of 3,625 m<sup>3</sup> (128, 000 cubic ft) will be installed to collect storm water from the roof. This water will be treated for grey water re-use in toilets and process water. Storm water management for the site will consist of a detention basin of approximately 850 m<sup>3</sup> (30 000 cubic ft). This will ensure the discharge of storm water into the surrounding drainage system is controlled.

The parking lot will be constructed of partially pervious material to allow for percolation into the ground thus reducing the amount of storm water to be managed. The existing drain behind NCERD will be retained for drainage purposes, a new culvert will be constructed at the exit of the eastern parking lot. The eastern portion of the hotel courtyard and roof will be drained into this collection system.

## **2.4.2 Structural Scheme and Construction Approach**

The Georgetown Marriott Hotel, Casino and Entertainment Complex is a multi-story building raised to a maximum of 10 levels and covering a 17 187 sq.m (185 000 sq.ft). The hotel section of the complex would cover approximately 12 542 sq.m (135 000sq.ft), of total floor area. The entertainment complex and casino, which would be located on the first 3 levels, would cover floor area of about 4 645 sq.m (50 000 sq.ft). The building would be designed and constructed as a concrete framed building, with a crawl through basement.

The hotel would comprise of 165 rooms, of which 93 are kings, 68 are double and 4 are suites. The rooms can be expanded to 200 if necessary. It would also enclose a breakfast lounge, restaurant, indoor and outdoor bars, meeting rooms, recreation facilities and other amenities and services.

### Project Development Phases

The development of the project can be divided into the following phases: design phase, construction phase, operational phase and closure/end-use (decommissioning) phase. At the time of preparing the ESIA report, the final structural layout for the buildings and support facilities were being developed.

### Design Phase

In the design phase a detailed survey of the proposed site would be carried out. It involves land investigations, soil testing, measurements, cadastral and topographic surveys and pre-works examination of the potential site.

### Design Code

The draft National Building Code prepared by the Guyana National Bureau of Standards (GNBS) will be used to guide the building design. In addition, the engineer will also consult with the British Standard (BS) and the American Concrete Institute (ACI) standard in case of any gaps in the local code. The building will be designed and construction will be done in accordance to the Leadership in Energy and Environmental Design Certification (LEED) from the United States Green Building Council (USGBC). The design would take into consideration all parameters available, included, but not limited to:

- Soil data,
- Close proximity to the Atlantic Ocean and the Demerara River,
- Tidal information,
- Surrounding building,
- Material that would add to global warming,
- Seismic information, and
- Material properties.

### Construction Phase

The period for construction is expected to last twenty-four months. This phase will involve the following activities:

- Clearance of the existing natural vegetation and trees;
- Removal of the top soil around the foundation area;
- Construction of access road and internal roads within the project area;
- Installation of surface water drains;
- Construction of the buildings; and
- Construction of car parks and other facilities.

The activities will be undertaken using front end loaders, excavators, pile driving equipment, wheelbarrows, shovels and picks. The soil removed from the foundation area will be stockpiled for future re-vegetation.

### General Construction

The building's structural systems include:

The building foundation system which shall consist of approximately 14" by 14" pre-cast, pre-stressed concrete piles, approximately 100' long. Pile caps shall be cast-in-place concrete.

The basement will consist of a 6 foot high crawl space under the majority of the hotel/casino complex. The center portion between elevator cores will be 10 foot high to accommodate electrical/mechanical spaces and facility movement of goods from one side of the complex to the other. Walls will be cast-in-place concrete grade beam supported on cast-in-place concrete pile caps. Slab-on-grade shall be 8" thick reinforced cast-in-place concrete. Some de-watering is anticipated. All basement construction will be waterproofed.

The hotel/casino complex which shall be constructed of reinforced concrete columns, beams, girders and slabs. The lower 3 floor of the hotel/casino complex shall be constructed of 8" reinforced concrete slabs (15' floor to floor) and the upper floors and roof shall be constructed of 6" reinforced concrete slabs (10' floor to floor). Columns spacing for the complex is based on a 4 room module containing 6 columns per bay. The average column size for the lower 3 floors will be approximately 2' x 2' by 15' high. The average column size for the upper 7 floors will be 1'-4" x 1'-4" x 10' high.

A construction schedule has been developed and is outlined in Figure 2.5 overleaf.

## 2.5 Construction Schedule

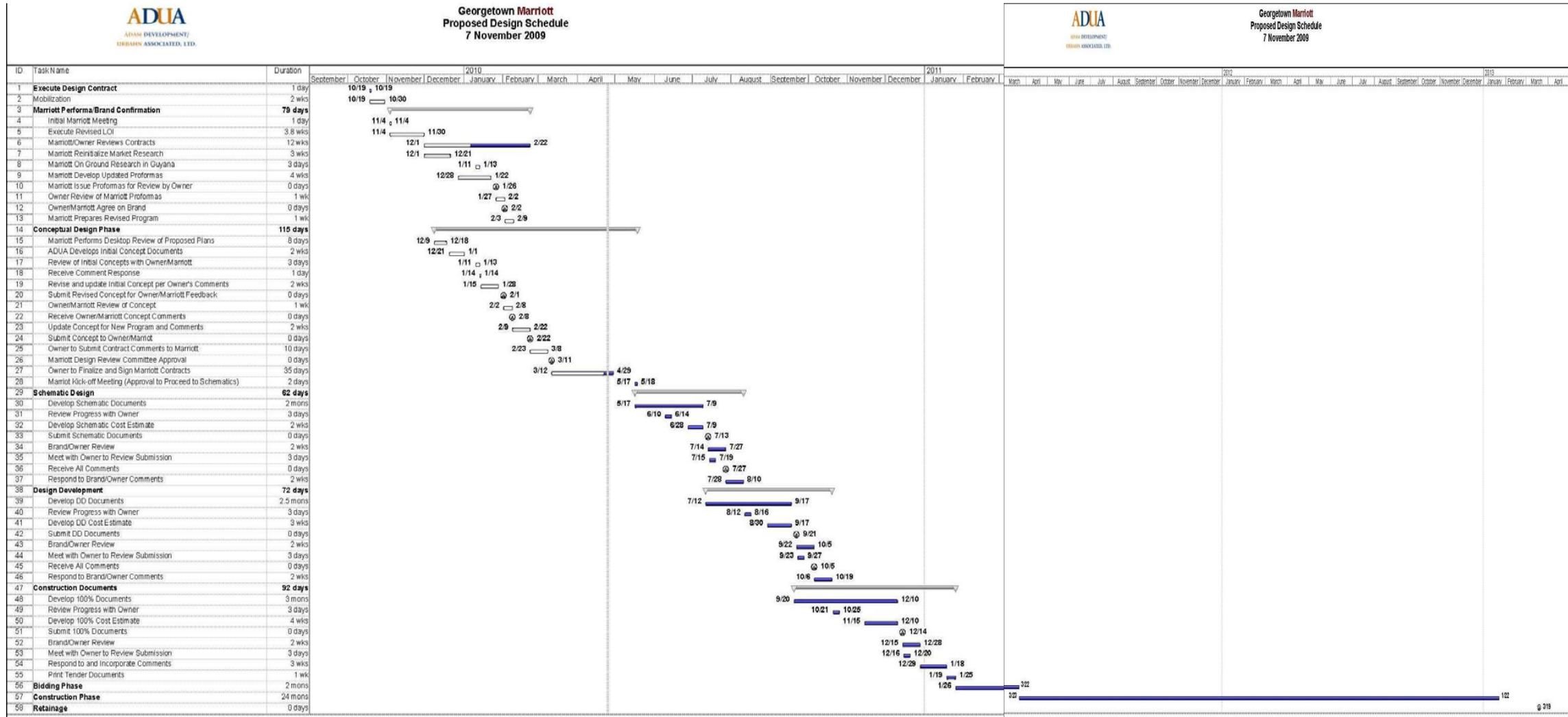


Figure 2.5 Construction Schedule

### **2.5.1 Construction Materials Sourcing**

Sand, cement, stone and lumber will be purchased from local suppliers in Georgetown and surrounding areas. Concrete will be supplied by Readymix, located at the Eccles Industrial Site. It is anticipated that a total of 50, 000 cubic yards of concrete will be required for construction.

### **2.5.2 Materials Transportation**

Sand, stone and lumber will be transported by barge to Kingston wharf and onto the project site while other materials will be brought in from local suppliers by trucks.

### **2.5.3 Materials Storage**

Materials such as coarse and fine aggregate will be stockpiled in designated areas on-site. Lumber, steel, cement and other materials will be stored in an existing bond.

#### **2.5.3.1 Fuel Storage**

A small amount of fuel (diesel and gasoline) will be stored on site for the operation of machinery and equipment that will be used for construction as well as to operate the on-site generator. For the operation phase, diesel will be stored in two (2) 37,854L (10,000 gallons) tanks on the hotel side of the site and two (2) 11,356L (3,000 gallons) tanks on the entertainment complex side of the site. It is anticipated that these tanks will be located above ground. The fuel storage area will be strategically located at least 10m from any water source and will be on an impervious base which is bermed with 110% containment. This area will have installed a perimeter fence for security and appropriate signage and personnel management and monitoring.

### **2.5.4 Health & Safety**

Prior to construction all workers will undergo a health and safety orientation programme. First Aid Kits will be present on-site and a senior member of the construction staff will be designated as the Health, Safety and Environment Officer with responsibility to ensure that all health and safety measures are implemented. All construction workers will be equipped with the necessary safety gears such as safety goggles, helmets, hearing protection, gloves, respirators, overalls and other personal protective gear. Sanitary facilities will be provided on site as well as a continuous flow of potable water. During the operational phase a health and safety programme will be implemented.

### **2.5.5 Waste Management (Solid Waste and Sewage)**

During the construction phase a significant amount of waste will be generated. This will include construction waste i.e. unused pieces of lumber, formwork, steel end pieces, cement bags, plastics, concrete waste from the site clearing activities and domestic waste generated by construction workers. This waste will be sorted accordingly and disposed by a contracted waste disposal service.

### **2.5.6 Construction Nuisance Control Measures**

#### **2.5.6.1 Noise**

During construction, ambient noise levels will be increased by operation of machinery and equipment, the increased vehicular traffic in the area and general construction activities. The use of generators on site will also increase ambient noise levels. Recognising that surrounding buildings such as the GFC, NCERD, DTL will be impacted by increased noise levels the developer intends to erect a screen at the project boundary, to ensure that the generator is housed in a sound-proof enclosure, and heavy equipment and machinery are installed with muffler devices and silencers.

### 2.5.6.2 Dust Control

The developer recognizes that surrounding buildings and occupants such as the GFC, NCERD, DTL may be impacted by increased dust levels though in the short term and limited to the construction stage of the project. Measures to be put in place include covering materials stockpiles, wetting areas of the site, especially access roads during the dry season to control dust, the use of dust screens/blinds and ensuring trucks transporting fine materials such as sand and aggregate are covered.

## 2.6 Employment

The project will provide job opportunities during the construction and operational phases in the form of direct and indirect employment. Both phases will require goods and services from local and overseas suppliers.

### 2.6.1 Construction Phase

During the construction phase both skilled and unskilled labourers will be required and it is estimated that 485 construction jobs will be created with 125 jobs representing 25 % of the work force sourced locally and the remaining sourced regionally and internationally.

The tables below present a breakdown of the workforce for the various construction activities.

**Table 2.2 Construction Work Force – 25% locals + 75% Overseas Contractors**

<b>Construction Activities</b>	<b>No of Workers</b>
Clearing, Grubbing, Temporary Utilities	25
Rough Grading and Utilities	10
Foundations	35
Concrete Superstructure	55
Carpentry Work	45
Exterior Walls, Window Walls and Storefront closures	20
Roofing	15
Building Finishes	55
Vertical Transportation	10
Plumbing and Fire Protection	65
Electrical and Communications	35
Ventilation and Air Conditioning	60
Final Grading, Landscaping and Final Utilities Connected	35
Complete Punch List Work	20
<b>Total locals employed (125 people)</b>	<b>485</b>

Areas where support services will be required include security and ground transport among others.

### 2.6.2 Operational Phase

The operation phase is expected to generate 429 permanent jobs. Support services will include food supply, ground transport, hardware for maintenance activities and specialized maintenance services such electrical, air-conditioning, plumbing etc.

**Table 2.3 Hotel Staffing**

	<u>No of Workers</u>
<u>Management:</u>	
General Manager	1
Assistant General Manager	1
Financial Controller	1
Chief Engineer	1
Sales Manager	1
Food and Beverage Controller	1
Executive Chef	1
Head of Security	1
Front Office Manager	1
Head Telephone Operator	1
Purchasing Manager	1
<b>0% Locals at inception</b>	<b>11</b>
<u>Front Office:</u>	
PBX Operators	9
Front Desk Administrators	10
Bellman	7
Front Office Supervisor	3
Reservations	4
<b>100% Locals at inception</b>	<b>33</b>
<u>Housekeeping:</u>	
Supervisor	3
Housekeeping Maids	24
Housemen	6
Laundry Manager	1
Laundry Attendants	9
<b>100% Locals at inception</b>	<b>43</b>
<u>Security:</u>	
Supervisor	2
Security Guards	8
<b>100% Locals at inception</b>	<b>10</b>
<u>Maintenance:</u>	
Electrician	2
Plumber	2
Attendants	4
<b>100% Locals at inception</b>	<b>8</b>
<u>Administrative Office:</u>	
Audit	2
Payroll	2
Secretary	2
Accounts Receivable/Payable	2
<b>100% Locals at inception</b>	<b>8</b>

<u>Grounds:</u>	
Parking Attendants	4
Pool Attendant	2
Grounds Maintenance	3
Beach Maintenance	2
<b>100% Locals at inception</b>	<b>11</b>
<u>Restaurant &amp; Bar:</u>	
Executive Housekeeper	1
Food and Beverage Manager	1
Assistant Chefs	3
Cooks	5
Wait Staff	12
Busboys	5
Bartenders	4
Cashiers	5
Hostesses	4
Kitchen Stewards	4
Scullions	6
<b>100% Locals at inception</b>	<b>50</b>
<b>Total locals employed (163 people)</b>	<b>174</b>

**Table 2.4 Night Club**

	<b>No of Workers</b>
<u>Management:</u>	
General Manager	1
Financial Controller	1
Food and Beverage Manager	1
Head of Security	1
<b>100% Locals at inception</b>	<b>4</b>
<u>General Staff:</u>	
Food and Beverage Manager	1
Security Supervisor	2
Security Guards	8
Wait Staff	12
Busboys	5
Bartenders	4
Cashiers	5
<b>100% Locals at inception</b>	<b>37</b>

**Table 2.5 Restaurant**

	<b>No of Workers</b>
<u>Management:</u>	
General Manager	1
Financial Controller	1
Executive Chef	1
<b>100% Locals at inception</b>	<b>3</b>

<u>General Staff:</u>	
Food and Beverage Manager	1
Assistant Chefs	3
Cooks	5
Wait Staff	10
Busboys	5
Bartenders	4
Cashiers	5
Hostesses	4
Kitchen Stewards	4
Scullions	6
<b>100% Locals at inception</b>	<b>47</b>

**Table 2.6 Casino Staffing**

	<u>No of Workers</u>
<u>Management:</u>	
General Manager	1
Casino Manager	1
Financial Controller	1
Security & Surveillance Manager	2
Information Technology Manager	1
Cash Cage Manager	1
Human Resources Manager	1
Casino Shift Manager	1
Slot Shift Manager	1
Marketing Manager	1
Customer Service Manager	1
Beverage Supervisor	1
<b>0% Locals at inception</b>	<b>13</b>
<u>General Staff:</u>	
Slot Machine Staff (10 locals)	20
Tables Staff (10 locals)	30
Pit Boss (0 locals)	3
Pit Boss Supervisor(0 locals)	27
Customer Service Representative (4 locals)	4
Bartenders (24 locals)	24
Waitresses (40 locals)	40
Cash Cage Supervisor (0 locals)	10
Cash Cage Staff (12 locals)	24
Cash Counters (6 locals)	12
Floor Security (20 locals)	30
Maintenance (10 locals)	10
Surveillance (5 locals)	10
Audit (4 locals)	5
Accounting (15 locals)	20

Secretary (1 local)	1
Reception/Administrative Staff (3 local)	3
<b>Total locals employed (164 people)</b>	<b>243</b>

**Table 2.7 Local Employment totals**

Short Term – Construction	125
Long Term – Permanent Staffing	429
<b>Total Local Employment</b>	<b>554</b>

### 2.6.3 Training and Recruitment

Seventy Five Percent (75%) of the employees will be recruited locally during the operational phase of the project and will receive formal training in their respective areas of work.

### 2.7 Consideration of Alternatives

A number of properties were considered by ADUA including the sites next to the Guyana International Convention Centre and Buddy’s International Hotel. None of these sites were considered as appropriate by ADUA as they were deemed to be too remote from the central Georgetown business centre, lacked sufficient utilities and did not offer the panoramic view of the preferred location.

In examining possible sites for the project the following factors were considered by the ESIA Study:

- Land availability
- Proximity to the main tourism district in Georgetown
- Proximity to services and facilities
- Zones within the city of Georgetown for this type of development
- Existing infrastructure and utilities

While sites along Guyana’s coast, and in particular the East Coast, fall within the GGDP and the Seawall Development Plan (Table 2.8) for tourism and recreation development, they are limited in land area and availability and fall short of the considerations as identified above. Areas in administrative regions (2, 3, 4, 5 and 6) that have adequate land space to accommodate this development still fall short of the other criteria listed above.

**Table 2.8 Alternative Sites for the Project**

ZONES	DESCRIPTION	PERMITTED LAND USE
<b>ZONE 1</b>		
<b>Zone I – a:</b>	This area is south of the seawall, from Pegasus in the west to the Kitty Groyne in the east. This area is indentified for pedestrian use and appropriate car parking sites will be provided for.	Permitted land uses – landscaping, mini amusement park, park furniture, mobile vending units, car parks, spots for musical entertainment. Within this any structure construction must not exceed 15 feet.
<b>Zone I – b:</b>	This area is from Pere Street, Kitty (along the Seawall) to Industry Road, further east.	
<b>ZONE II</b>		
<b>Zone II – a:</b>	The area west of Le Meridian Pegasus and east of the Demerara River estuary.	The permitted land uses in this zone include restaurants, discotheques, bars, video
<b>Zone II – b</b>	The built up area north and slightly east of	

ZONES	DESCRIPTION	PERMITTED LAND USE
	the Kitty Groyne.	centers, craft shops, sports clubs and pharmacies.
<b>Zone II – c</b>	The built up area north of the East Coast Public Road and west of the Ogle gas station.	
<b>ZONE III</b>		
<b>Zone III – a</b>	A part of the built up area 395’ east of the Kitty Groyne and extending for 640’ in an easterly direction, all north of the Seawall.	For this zone no further development activities will be permitted.
<b>Zone III – b:</b>	The area of land east of Cummings Lodge Road up to Atlantic Ville Public road further east.	

Based on the GGDP, the Kingston site fall within Zone II- a which has been proposed as an area to feature mainly recreational facilities. This is recognized as the most suited zone for the project.

## 2.7 Project Status

At the time of conducting the ESIA study the project site has been cleared of derelict buildings and vegetation. No construction work has commenced.



**Image 2.1 Present status of the project site**

The developer has applied to the following Agencies as part of the planning permitting process:

- Central Housing and Planning Authority
- Civil Aviation Authority
- Environmental Protection Agency
- Sea and River Defence Board
- Mayor and City Council of Georgetown

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## CHAPTER THREE POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

### 3.1 National Environmental Management Framework

Guyana's framework for environmental management is shaped by the Constitution and several policy documents; strategic plans and legislation and institutions. These are summarised as follows:

#### 3.1.1 Policy and Planning Framework

The foundation of Guyana's national environmental framework lies within the 1980 Constitution in Articles 2:25 and 2:36.

Article 2:25 states that *“every citizen has a duty to participate in activities to improve the environment and protect the health of the nation”*.

And Article 2:36 states that *“in the interest of the present and future generations the state will protect rational use of its flora and fauna and will take all appropriate measures to conserve and improve the environment”*.

At the national level, environmental planning and policy development are coordinated at the level of the Natural Resources and Environment Advisory Committee (NREAC) and the Natural Resources Sub-Committee of the Cabinet. A number of international conventions and treaties, relevant to this project and as listed in Table 3.1 provide guidance for development of Guyana's environmental management policy and planning framework.

**Table 3.1 International Conventions and Treaties**

Policies/Plans	Date/Status
United National Convention on Biological Diversity (UNCBD)	Signed in 1992, Ratified in 1994
United Nations Framework Convention on Climate Change (UNFCCC)	Signed in June 1992, Ratified in August 1994
Stockholm Convention on Persistent Organic Pollutants	Ratified in September 2007
United Nations Convention on the Law of the Sea	Ratified in 1993
International Convention for the Prevention of Pollution (MARPOL 73/78)	Acceded in December 1997
Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade	Acceded June 2007
Basel Convention on the Control of Trans-boundary Movement of Hazardous Wastes and their Disposal	Acceded in 2001
Convention for the Protection and Development of the Marine Environment in the Wider Caribbean Region and its Protocols (Cartagena Convention)	Acceded in June 2010
Convention concerning the Protection of the World Cultural and Natural Heritage	Acceded in 1975

In general, management and regulation of land, natural resources and environment, are shared among several institutions at the national, regional and local level. Specifically for the hotel and entertainment complex, administration is shared among the following ministries and institutions:

- Environmental Protection Agency;
- Guyana Lands and Surveys Commission;
- Central Housing and Planning Authority;
- Ministry of Public Works and Communication;

- Ministry of Tourism, Industry and Commerce
- Guyana Tourism Authority
- Georgetown Mayor and City Council
- Guyana Power and Light;
- Guyana Water Inc.
- Maritime Administration

Key policies and plans implemented by the aforementioned agencies and ministries relevant to the project are listed in Table 3.2.

**Table 3.2 Key Policies and Plans and their Status**

<b>Policies/Plans</b>	<b>Date/Status</b>
National Land Use Policy	2005; In draft, to be considered by Government
National Environmental Action Plan	2001-2005; Implementation to be reviewed
Integrated Coastal Zone Management Plan	December 2000; Currently needs revising and updating.
Integrated Mangrove Management Plan	November 2001; Currently being reviewed
Climate Change Action Plan	April 2001; Currently needs revising and updating.
National Climate Change Adaptation Policy and Implementation Plan	August 2001, Currently needs revising and updating.
National Ecotourism Development Plan	January 1999; To be formally approved by Government
5 Year Tourism Development Action Plan	January 2006; Presented to Government for consideration
National Biodiversity Action Plan II	May 2007

### 3.1.2 Legislative Framework

Guyana's framework of environmental legislation include laws such as the Environmental Protection Act 1996 and its regulations, as well as, a number of sector and institutional specific laws, listed in Table 3.3

**Table 3.3 Summary of the Principal Sector Legislation**

<b>Sector</b>	<b>Legislation</b>
<b>Maritime transport</b>	Maritime Boundaries Act (1977)
<b>Water Supply, Sewerage and Waste Disposal</b>	The Water and Sewerage Act (2002)
<b>Land Use Planning and Coastal Management</b>	Sea Defence Act (1933) Town and Country Planning Act (1948) Municipal and District Councils Act Public Health Act State Lands Act Drainage and Irrigation Act Water and Sewerage Act (2002)
<b>Environmental Management</b>	Environmental Protection Act, Act No. 11 of 1996 Environmental Protection Regulations: Water Quality, Air Quality, Hazardous Waste Management, Noise and Authorisation.
<b>Tourism</b>	Guyana Tourism Authority Act (2002)

In the following sections, the relevant policies, plans, and legislation pertinent to the construction and operational activities of the project are described.

### **3.1.3 National Environmental Action Plan**

Guyana developed its first National Environmental Action Plan (NEAP), in 1994 which outlined Government's environmental policy objectives for the sound management of the environment and natural resources. Twelve stated policy objectives were outlined. Those that are particularly applicable to this project are listed below:

- Ensure prior environmental assessments of proposed activities, which may significantly affect the environment.
- Raise consciousness of the population on the environmental implications of economic and social activities through comprehensive education and public awareness programmes.

One of the policy objectives requires the Government of Guyana to ensure environmental assessments of proposed development activities which may significantly affect the environment are undertaken. In keeping with this environmental policy objective, the Environmental Protection Act was introduced in June 1996 and the legal framework for undertaking an ESIA established. Further, the Act established the Environmental Protection Agency and outlined the legal process for undertaking sustainable and effective management of the environment and its natural resources.

The National Environmental Action Plan (NEAP 2001-2005) is a follow-on from the NEAP of 1994 and summarizes the national environment policy and brought a focus on coastal zone management, natural resources management including land resources, biodiversity, wildlife, forestry and ecotourism, waste management and pollution control, and mining. NEAP 2001-2005 identifies Guyana's commitment to sustainable development and provided a framework for integrating cross-sectoral environmental concerns into the wider context of Guyana's economic and social development programme and identifies and recognizes the roles and functions of relevant stakeholders including private sector and non-governmental organizations in environmental management. Specifically, the NEAP emphasises the critical importance of coastal zone management, and further identifies actions that should be taken at the national level to address this issue. Specific reference is made to the Integrated Coastal Zone Management Committee and the Integrated Coastal Zone Management Action Plan.

### **3.1.4 Integrated Coastal Zone Management Action Plan**

The Integrated Coastal Zone Management Action Plan, prepared in 2000, and approved by Government, recognises integrated coastal zone management as an ongoing process to promote the wise use, development and protection of coastal and marine resources; foster greater collaboration among sectoral agencies and enhance economic development. The ICZM Plan addresses policy development, analysis and planning, coordination, public awareness building and education, control and compliance, monitoring and measurement and information management as it regards the integrated management of Guyana's coastal zone. There has been progress in the implementation of the ICZM Plan with the main achievements being public awareness, promotion of research and data collection, delineation of the coastal zone, review of legislation and mangrove and shorezone management. Efforts are underway for a review of the ICZM Plan implementation.

The ICZM Plan does not offer any specific recommendations as it regards the Kingston area or the site for the project.

### **3.1.5 Georgetown Seawall Development Plan**

This Plan was developed by the Central Housing and Planning Authority (CHPA) through a consultative process with a range of stakeholders. The Plan covers the area from Kingston, Georgetown, to Ogle, on the East Coast of Demerara and provided a physical and ecological

description of the shorezone area and Government reserve, north of the East Coast Highway, and identifies physical infrastructure works and activities for the protection, promotion and management of this zone for recreational and tourism purposes. As part of the implementation of the Plan, there has been the installation of public seating in the Kingston area, near the Bandstand, as well as the placing of lighting, and improvements to the seawall road from Kingston to the Kitty Pump Station.

As it regards the Georgetown Marriott Project site the plan identified the Kingston area for development of new tourism facilities and as a zone for industries. The area between the Pegasus Hotel and west of Cummings Lodge is identified for tourism and recreation purposes. The plan has also identified similar land use in the area including the Pegasus Hotel as a landmark and emphasized the importance of any new development or activity to be congruent with the facilities that already exist.

### **3.1.6 Draft Greater Georgetown Development Plan**

The Draft GGDP was developed by the Central Housing and Planning Authority in March 2002. It recommends what type of development should be allowed and the respective areas/zones and the policies that CHPA and the City Council should use to assess development proposals. The plan covers the period 2001-2010 and includes the city of Georgetown and its sub-urban areas. A key consideration of the Plan is improving the tourist accommodation capability of the Georgetown area.

Within the plan the Kingston community is identified within the zone plan of the Georgetown seawall. The Georgetown seawall is divided into three zones which are then further subdivided in smaller geographical sections.

#### **Zone I**

**Zone I – a:** This area is south of the seawall, from Pegasus in the west to the Kitty Groyne in the east. This area is identified for pedestrian use and appropriate car parking sites will be provided for.

**Zone I – b:** This area is from Pere Street, Kitty (along the Seawall) to Industry Road, further east.

Permitted land uses – landscaping, mini amusement park, park furniture, mobile vending units, car parks, spots for musical entertainment. Within this any structure construction must not exceed 15 feet.

#### **Zone II**

**Zone II – a:** The area west of Le Meridian Pegasus and east of the Demerara River estuary.

**Zone II – b:** The built up area north and slightly east of the Kitty Groyne.

**Zone II – c:** The built up area north of the East Coast Public Road and west of the Ogle gas station.

The permitted land uses in this zone include restaurants, discotheques, bars, video centers, craft shops, sports clubs and pharmacies.

#### **Zone III**

**Zone III – a:** A part of the built up area 395' east of the Kitty Groyne and extending for 640' in an easterly direction, all north of the Seawall.

**Zone III – b:** The area of land east of Cummings Lodge Road up to Atlantic Ville Public road further east.

For this zone no further development activities will be permitted.

The project falls with Zone 11-a, an area as identified by the Plan for tourism and recreational development (in the supplementary scheme for Georgetown Seawall area). Zone 11-a is located in the area west of the Le Meriden Pegasus and east of the Demerara River and is classified as a zone designated for the development of Ocean Resorts/Entertainment.

## **3.2 The ESIA Process**

### **3.2.1 Requirements for ESIA**

The Environmental Protection Act, No. 11 of 1996, establishes the requirement for Environmental and Social Impact Assessment (ESIA). Part IV of the Act requires all developers of any listed in the Fourth Schedule or other projects that may significantly affect the environment. The project falls into this category and hence, an ESIA for an environmental permit is required before any developmental work could commence.

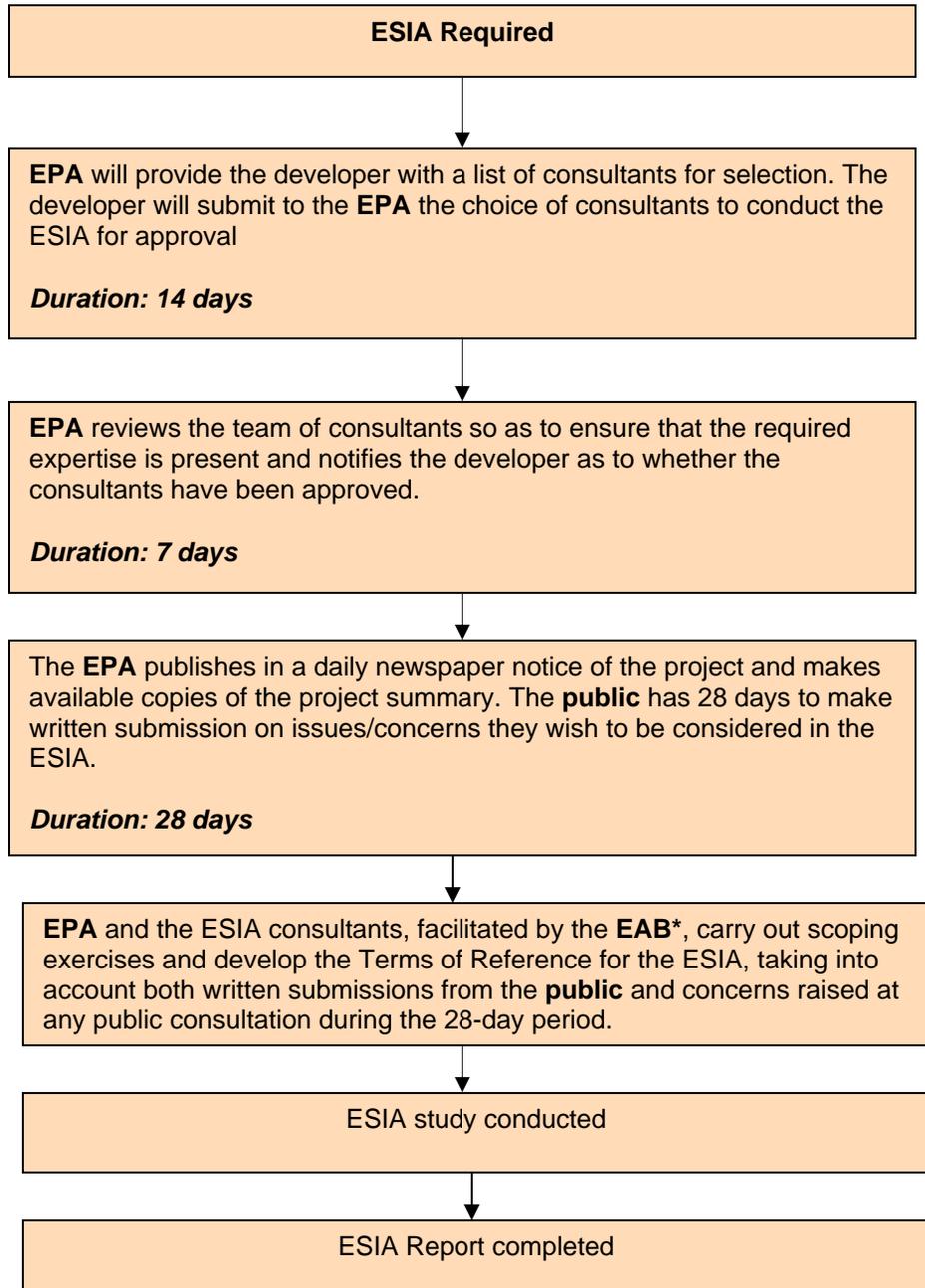
### **3.2.2 Stages in the ESIA Process**

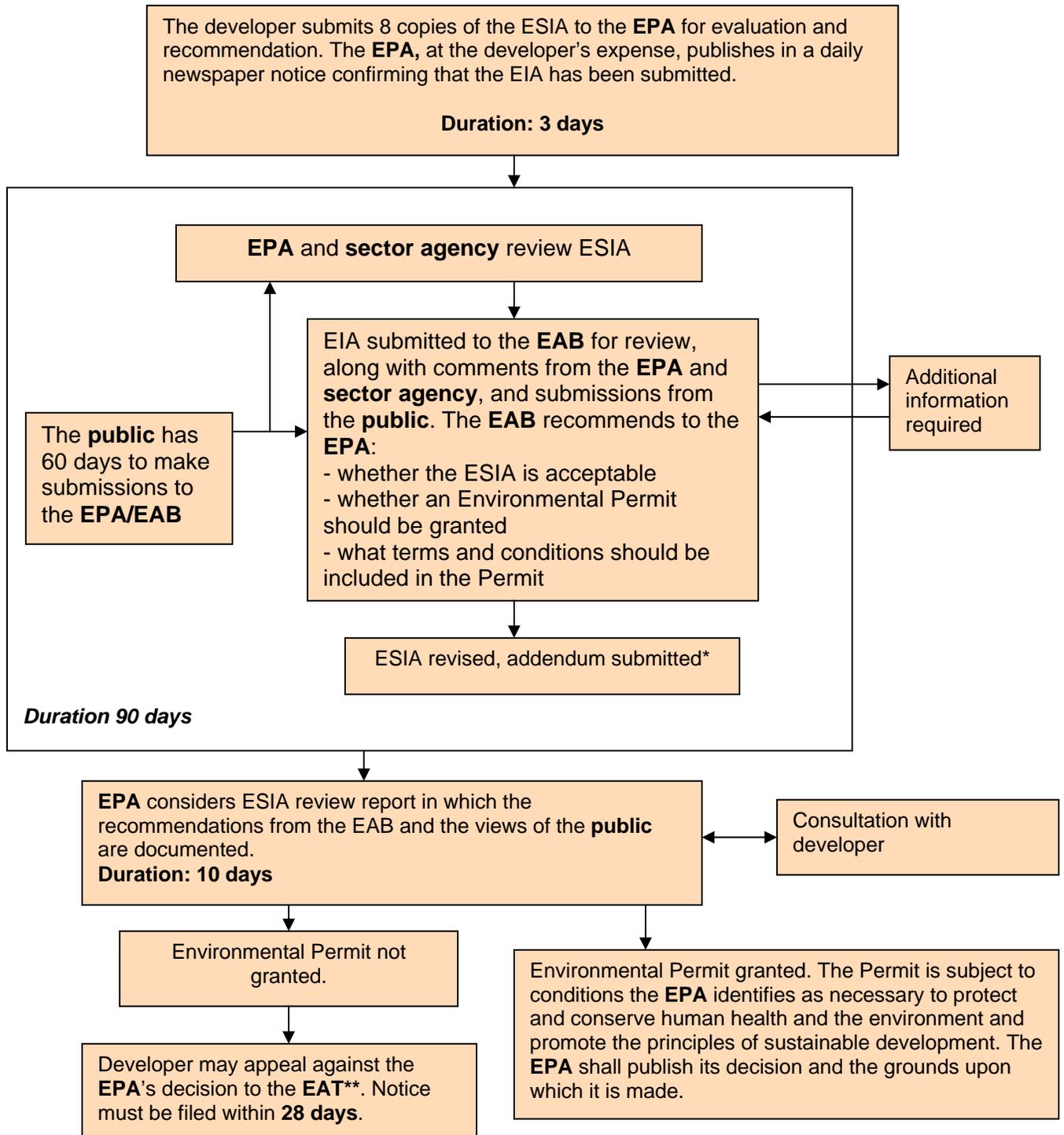
The EPA oversees the ESIA process. The following Figure 3.1 provides a summary of the process which begins with the completion of an EPA Application Form for Environmental Permit, and concludes with the issuance of an Environmental Permit by the EPA to the Developer.

The main output of the ESIA Process is the ESIA Report which comprises three components (1) An Environmental Baseline Study, (2) an Environmental Assessment, and (3) an Environmental Impact Statement.

The Environmental Baseline Study is expected to record the present quality of the environment of the area of influence of the project prior to implementation. The Environmental Assessment is expected to identify and assess the potential impacts of the project and its alternatives and to identify mitigation actions to prevent or minimize adverse impacts. The Environmental Impact Statement is a summary of the findings from the Environmental Baseline Study and the Environmental Assessment.

Figure 3.1 Stages in Obtaining an Environmental Permit – ESIA required





\*Environmental Assessment Board

\*\*Environmental Assessment Tribunal

### 3.2.3 EPA's Role in ESIA's

The Environmental Protection Agency (EPA) is mandated under the Environmental Protection Act to coordinate and oversee the ESIA Process. The EPA has developed guidelines for the conduct of ESIA's which are required to be done by independent consultants, with the requisite skills,

expertise and experience and approved by the EPA.

The Environmental Assessment Board (EAB) is the body which provides an independent contribution to the development and finalization of the ESIA Report. The EAB recommends to the EPA the acceptance or rejection of the ESIA Report and the conditions of the Environmental Permit once a decision is taken to grant one.

### 3.3 Environmental Protection Act and Regulations

The Environmental Protection Act, 1996 and its amendments thereunder, established the basic institutional and regulatory framework within which all activities that may significantly impact on the natural, social, and cultural environments are assessed.

Regulations on Hazardous Waste Management, Water Quality, Air Quality, Noise Management and Authorization were established under the Environmental Protection Act in 2000. These pollution management regulations were developed to regulate and control the activities of developmental projects during construction and operation. Standards establishing the permissible parameters under these regulations have been developed in specific areas.

#### 3.3.1 Water Quality Regulations 2000

These regulations require registration and environmental authorization by any person whose construction, installation, operation, modification or extension of any facility cause the discharge of effluents. They cover parameter limits of effluent discharges, new sources of effluent discharges, fees for registration and environmental authorization, sampling points, records and reports and general provisions for the registration of water effluent, biological integrity, spills or accidental discharges and standard methods of analysis. Guidelines on the discharge of effluents and disposal of sludge are detailed in these regulations. The Guyana National Bureau of Standards (GNBS) has established Interim Effluent Discharge Standards which have been adopted by the EPA. These are outlined in Tables 3.4 and 3.5.

**Table 3.4 Maximum Permissible Limits of Water Pollution from Effluent Point Sources into the Environment**

NO.	Water Pollutions Parameters or Substances	Receiving Environment			
		Inland Surface Water	Coastal Near-shore	Marine Offshore	Environmentally Sensitive Areas
1	Temperature	35	40	45	NIAA
2	Hydrogen Lact (pH)	6-9	6-9	6-9	6-9
3	Five day Biological Oxygen Demand (BOD <sub>5</sub> at 20°C)	30	50	100	10
4	Chemical Oxygen Demand (COD)	250	250	250	60
5	Total Suspended Solids (TSS)	50	150	200	15
6	Total Oil and Grease (YO&G) or N-Hexane Extractable Material (HEM)	10	15	100	No Discharge
7	Ammoniacal Nitrogen (as NH <sub>3</sub> -N)	10	10	10	0.1
8	Total Phosphorus (as P)	5	5	5	0.1
9	Sulphide (as S)	1	1	1	0.2
10	Chloride (as Cl)	250	NIAA	NIAA	NIAA
11	Total Residual Chlorine	1	1	2	0.2

	<b>Water Pollutions</b>	<b>Receiving Environment</b>			
12	Dissolved Hexavalent Chromium (Cr <sup>3+</sup> )	0.1	0.1	0.1	0.05
13	Total Chromium (Cr)	0.5	0.5	0.5	0.1
14	Dissolved Iron (Fe)	3.5	3.5	3.5	1.0
15	Total Petroleum Hydrocarbons (TPH)	25	40	80	No Discharge
16	Total Nickel (Ni)	0.5	0.5	0.5	0.5
17	Total Copper (Cu)	0.5	0.5	0.5	0.01
18	Total Zinc (Zn)	2	2	2	1
19	Total Arsenic (As)	0.1	0.1	0.1	0.01
20	Total Cadmium (Cd)	0.1	0.1	0.1	0.01
21	Total Mercury (Hg)	0.01	0.01	0.01	0.005
22	Total Lead	0.1	0.1	0.1	0.01
23	Cyanide (as CN)	0.1	0.1	0.1	0.01
24	Phenolic Compounds (as phenol)	0.5	0.5	0.5	0.1
25	Radioactivity	NIAA	NIAA	NIAA	NIAA
26	Toxicity	NATE	NATE	NATE	NATE
27	Faceal Coliforms	400	400	400	100
28	Solid Waste	NSD	NSD	NSD	NSD

**\*all units are in milligrams per litre (mg/L) except fro temperature (°C), pH (pH units), Faecal coliforms (counts per 100ml), radioactivity (Bo/L) and toxicity (toxic units).**

**NIAA – no increase above ambient**

**NATE – no acute toxic effects**

**NSD – no solid debris**

**Table 3.5 Point source discharge Limits for Industrial Effluent for Operations other than Mining, Forestry and Agriculture**  
Parameter and Maximum Allowable Limits  
(All values expressed as mg/L except pH, temperature and as otherwise noted)

Sector	pH	Temp.	BOD5	COD	DO	TSS	Nas NH3	Total N	P	CN (Tot)	PO4	Cl	Surfactants	Phenols	Coliforms	O&G	Other and/or Comments
Breweries	5.0-9.0	<40	<100 (t.v <50)	<250		<100 (t.v<50)	<50									10	
Cement Bagging, Manufacturing	5.0-9.0	<40			>4.0	50											WHO Stds for Ind. Manuf. Operations. Turbidity NTU: Max.dy: <150
Citrus Processing Plants	5.0-9.0	<40	<50	<250		<50	<50									<10	
Distilleries – (a) Blending Halls and Wineries	5.0-9.0	<40	<50			<50	<50										
Distilleries – (a) Fermentation/Distillation Units	5.0-9.0	<40	<500 (t.v.100)			<500 (t.v<100)											
Edible Oils	5.0-9.0	<40	<50	<250		50		<10								<10	
Meat and Seafood Processing	5.0-9.0		<100 (t.v<50)	<250		<100 (t.v<50)	<50									<30 (t.v<10)	
Metal Finishes	5.0-9.0	<40				(100 as settle-able solids)			<0.5	< 10							CD:2.0; Cr(tot):2.0; Hg:1.0; Cu:3.0; Pb:0.1; Zn:3.0; Ni:3.0; Fe:5.0; Ba:10; Cr VI: 0.5
Milk Based Industries	5.0-9.0	<40	<100 (t.v<50)	<250		<100 (t.v<50)	<50									<30 (t.v<10)	
Paint and Ink Manufacturing	5.0-9.0		<100			<100								<10		<30 (t.v<10)	Cu:<30; Pb:<10; Cr:<20; Cr VI:0.5; Ni:<3.0; Zn:<3.0; Hg:<1.0
Pharmaceutical/ Chemical Production	5.0-9.0			<150	>40								<0.2	<0.5		<10	Secondary parameters: No <sub>3</sub> :40;

Sector	pH	Temp.	BOD5	COD	DO	TSS	Nas NH3	Total N	P	CN (Tot)	PO4	Cl	Surfactants	Phenols	Coliforms	O&G	Other and/or Comments
																	SO <sub>4</sub> <sup>-2</sup> :1000; Cl:-300; NH4 as N:1.0
Petroleum Bulk Terminal	5.0-9.0	<40	<50	<250		<100										TPH<40	Pb:0.1; Cr GT 0; Cr)+A) 05
Printeries and photo-processing establishments	5.0-9.0	<40	<30	<150		<50										<10	Ag:0.5; Cd:0.1; Cr VI:0.1; Cr(tot):0.5; Cu:0.5; Zn:2.0
Soft Drinks Plants	5.0-9.0	<40	<100 (t.v<50)	<250		<100 (t.v<50)	<50										
Sugar Factories	5.0-9.0	<40	<250 (t.v<100)	<250	>4.0	<250 (t.v<100)											
Textiles	5.0-9.0			<250	>4.0	<500 (t.v100)						300	<0.2 detergts	<0.5	400 MPN per 100 mls	<10	Cr(tot):0.5; Cu:0.5; Ni:0.5; Zn:2.0; Co:0.5
Thermal Power Plants	5.0-9.0	<40				<100					5	Free CL 0.5				<20	WB Stds for metals: Cr(tot):0.2; Fe:1.0; Zn:1.0; Cu:1.0; New units are to meet these stds. Old units will be phased out within 3 yrs or pollution equipment will be installed. New WB stds available. No WB std for phosphate, limit taken from India and Sri Lanka
General Environmental Guidelines	5.0-9.0	<40	50	250	50 BS TSS	10			2	1 Free:0.4		Cl:0.2		0.5	400 MPN per 100 mls	10	WB STd: Flourine:20: No limits given for metals

### 3.3.2 Air Quality Regulations 2000

These regulations require the registration and environmental authorization by persons with facilities that emit air pollution from any process into the atmosphere are outlined in these regulations. Elements related to parameter limits on air contaminants and emission samplings are also stated in the regulations. The list of air contaminants for which parameter limits are to be set by the EPA are also detailed in the regulations. No air quality standards have been developed for tourism operations to date.

### 3.3.3 Noise Management Regulations 2000

The EP Noise Management Regulations 2000, established under the EPA Act 1996, stipulates that any person producing noise from the processes of its operation is required to obtain an environmental authorization from the EPA. The EPA, through the Guyana National Bureau of Standards (GNBS) standards development process, has established noise emissions standard based on the categories identified in the First Schedule of the Regulations. These are:

- Residential
- Institutional
- Educational
- Industrial
- Commercial
- Construction
- Transportation and
- Recreational.

The categories applicable to this project, based on the nature of activities and surrounding land use, are construction and commercial. The following table lists the categories and their permissible limits.

#### *Permissible Noise Levels*

Categories	Permissible Limits (dB)
Construction	Daytime -90 Nighttime – 75
Commercial	Daytime -80 Nighttime – 65

### 3.3.4 Hazardous Waste Management Regulations 2000

This Regulation requires that any person operating a facility that generates, treats, stores, disposes or transport hazardous waste must notify the EPA and apply for an authorisation. The Regulation outlines the provision for reporting, emergency preparedness plan, list of hazardous characteristics and hazardous waste to be controlled.

## 3.4 Planning Framework for Tourism Projects

### 3.4.1 Tourism Policies

Guyana's tourism policy is embodied within the National Development Strategy (NDS) 2001-2010. The NDS recognizes the principal challenges facing the sector and has identified strategies over a 10 year period to catalyse the growth of the sector.

The vision for tourism development is one which embraces a mix of urban and nature-based tourism as well as new market segments such as the business meetings market, the casino market, yachts and cruise visitors as well as sports and agro-tourism. With the addition of new

facilities such as the Providence Cricket Stadium, Convention Centre, emerging hotels and resorts and the expanding infrastructure of road network, principal amongst them the Berbice River Bridge and Linden-Lethem Road, Government's commitment and the favourable support of donors and the international community, Guyana is poised to move its tourism sector forward.

### **3.4.2 Tourism Planning**

The planning for the tourism sector's development has benefited from a number of assessments, plans and strategies, principal amongst them are:

- The National Development Strategy (2001-2010)
- An Integrated Ecotourism Development Plan (1997)
- The Kelly Reports.
- Report of the Tourism Task Force (2001)
- Ecotourism Charette (2003)
- Guyana Tourism Development Action Plan (2006-2010)

With the exception of the National Development Strategy, there has not been a formal endorsement of the aforementioned Plans. However, elements and recommendations from these guiding documents continue to be implemented as part of activities of the Ministry of Tourism, Industry and Commerce and the GTA.

The Ministry, GTA and THAG are working in collaboration on initiatives to:

- Improve the tourism product;
- Market the product;
- Promote education awareness of the tourism sector;
- Build capacity in-country for sector development;
- Integrate tourism within the wider national development context; and
- Provide an incentive base for the growth and development of the sector

### **3.4.3 Key Initiatives**

The following key tourism development initiatives will impact in a positive way, the Georgetown Marriott Hotel, Casino and Entertainment Complex Project.

#### The Guyana Tourism Development Action Plan (2006-2010)

The Guyana Tourism Development Action Plan (2006-2010) was developed with technical assistance from the Inter-American Development Bank (IDB) and has as its principal objective, the doubling of the current level of tourism by 2010 and elaborates a number of actions that will guide policy making and investment in the sector that will bring about the realisation of this target.

The Plan recognizes four principal constraints to the growth of the sector, (1) Too narrow vision of Guyana's potential as a tourism destination; (2) Insufficient airlift and expensive airfares; (3) Poor market-place position; and (4) Lack of critical mass, and identifies seven strategic initiatives to address critical issues to realise the vision for 2010:

1. Improve Air Access Transport
2. Diversify and Expand the Product
3. Increase Market Demand
4. Upgrade Service Skills and Standards
5. Invest in Infrastructure and Services
6. Make Tourism Investment Attractive
7. Organise for Growth.

For each of these strategic initiatives, actions, costs and potential sources of funding have been recommended for consideration by Government. Elements of the Plan are being implemented by the Ministry of Tourism, Industry and Commerce.

### The Georgetown Tourism Corridor

The Ministry of Tourism, Industry and Commerce had identified a Georgetown Tourism Corridor, encompassing the Kingston to Kitty Seawall Area, Main Street and Avenue of the Republic, Carmichael Street and Hadfield Street (see Appendix 8 – Aerial Photo outlining Corridor and key sites). This area, encompasses the main tourism sites and attractions with the city, including heritage buildings, key existing hotels, restaurants, and other tourism services as well as the historic district of Georgetown which is being proposed as a UNESCO World Heritage Site.

This proposed Georgetown Tourism Corridor is consistent with the City Council's Greater Georgetown Master Plan (2001-2010) and the CHPA's Seawall Development Plan and it puts a framework within which the specific recommendations for Georgetown made by the Ecotourism Charette can be implemented.

## **3.5 Institutions in the Tourism Sector – Roles and Responsibilities**

### **3.5.1 The Ministry of Tourism, Industry and Commerce**

The Ministry of Tourism Industry and Commerce retains the responsibilities for:

- Policy and Planning
- Project Facilitation
- Institutional Coordination

### **3.5.2 The Guyana Tourism Authority**

The Guyana Tourism Authority (GTA) was established on June 11<sup>th</sup> 2002 following the passage of the Guyana Tourism Authority Act in 2002. The mission statement of the GTA is *"To promote the sustainable development of tourism in Guyana that produces maximum economic, social, cultural and environmental benefits, while minimizing negative impacts as part of an integrated national development strategy through the optimal use of human resources and the provision of a product of the highest quality."* The GTA is headed by a Director and governed by a Board of Directors consisting (9) members.

The principal functions of the Authority, as stipulated under the legislation are:

- Marketing
- Awareness
- Education
- Product Planning and Development
- Training
- Standards Development and Regulation
- Information Management
- Tourism Research

Since its establishment, GTA has increased its staff compliment and expanded its range of activities in keeping with its functions. Among the main achievement of the GTA has been the developing and implementing of a comprehensive Marketing Programme with the preparation of quality collateral materials, and consistent representation at international tourism events; developing a comprehensive tourism web site providing up-to-date information on Guyana's tourism sector; developing tourism regulations; and improving tourism statistics and information management in particular visitor arrival information.

### **3.5.3 The Tourism and Hospitality Association of Guyana**

The Tourism & Hospitality Association of Guyana (THAG) is an umbrella body of tourism related entities in Guyana and includes hoteliers, resort owners, tour operators, travel agents, restaurants, jewellery and craft shops and transportation services among others. THAG was established in 1991 as the Tourism Association of Guyana and in 1999 evolved to the Tourism & Hospitality Association of Guyana (THAG). THAG is a member of the Private Sector Commission and the Caribbean Hotel Association. At the time of its establishment, the Ministry of Tourism was the only entity responsible for tourism functions. THAG was integral in lobbying Government to set up the Guyana Tourism Authority and partnered with the Ministry in the preparation of the Guyana Tourism Authority Bill, its subsequent passage in Parliament and the establishment of the Guyana Tourism Authority. THAG is represented on the Board of the GTA and works closely with the Government and GTA in the development of tourism in Guyana especially in the area of awareness, marketing and promotion.

### **3.6 The Guyana Tourism Authority Act, Regulations and Standards**

The enabling legislation for the tourism sector is the Guyana Tourism Authority Act of 2002. Among the responsibilities the Act vests in the Guyana Tourism Authority is the authority to regulate the tourism sector. The GTA, through consultations with stakeholders in the industry, has developed the following Regulations:

- Tourism Accommodation Establishments Regulations 2007
- Lodges and Resorts Regulations 2007
- Tour Guides Regulations 2007
- Tour Operations Regulations 2007

These Regulations are to be presented to the Parliament of Guyana by the Minister of Tourism, Industry and Commerce.

#### The Accommodation Establishments Regulations 2007

These Regulations are applicable to the Georgetown Marriott Project and sets out the procedure, conditions and requirements to be met for a licence to be obtained from the Guyana Tourism Authority

### **3.7 Other Relevant Legislation**

#### **3.7.1 Town and Country Planning Act, 1946 (Cap. 20:01, Act 25 of 1946 and amendments).**

The Act provides for the (orderly and progressive) development of urban and rural lands and the preservation and improvement of amenities pertaining to such development. Development under the Act is restricted to buildings and roadworks incidental to buildings. The Act is concerned principally with town planning schemes and regional schemes (out of urban areas). Such schemes comprise of buildings, sanitation, coordination of roads, facilities and public services, provision of amenities and the conservation and development of resources. Implementation and enforcement are vested in the Central Housing Planning Authority (CHPA). The Authority, with the approval of the Minister, has the power to make regulations to implement the Act. CHPA, by resolution, may decide to prepare and adopt a scheme. When a draft scheme is prepared, it is submitted to the Minister for approval. The Minister may approve, modify or require a new scheme to be drafted. The scheme is formally in effect on the date of public notification of approval.

The Act provides for cooperation with local authorities, establishment of a register, permit processing for building operations, land acquisition for schemes, compensation, and enforcement

of the provisions of a scheme. There is also provision for zoning and the regulation of building and site design, roads, amenities, public services, transport and communications.

### **3.7.2 Occupational Health and Safety Act (Act 32 of 1997)**

This Act deals with the regulation and registration of workplaces and the occupational health and safety of workers. It gives authorization for occupational health and safety inspectors to enter and inspect workplaces.

Under this Act the employer has a responsibility to establish a joint workplace safety committee consisting of four (4) persons. When the workplace has more than fifty (50) persons, the committee should consist of six (6) persons of which at least half the numbers should be workers who do not exercise managerial functions and should be selected by the workers themselves. The employer can select the remaining members from managerial staff of the committee. Workplace safety and health representatives must be selected by non-managerial workers and not by any person who exercises a managerial function. If however, workers are unionized, the majority may agree that their trade unions can select the safety and health representative(s).

The Act requires the employer to display publicly an abstract of the Act, and other sections addressing various issues addressed in the Act.

### **3.7.3 Labour Act (98:01)**

The Act and its conditions specify the conditions that an employer must observe in the contracting of employees. For example Part V specifies that the entire wages of the employee must be paid as money and not otherwise. However, in occupations where it is customary to make partial payment of allowances in the form of food, toiletries, housing etc. these are acceptable and not considered illegal, if both the employer and employee are agreed on such terms. Wages should be payable either weekly, fortnightly or monthly, except otherwise agreed.

### **3.7.4 Sea Defence Act, 1883**

This Act authorizes the Sea Defence Board to take any and such actions as to secure the maintenance of sea, rivers, and outer dams of properties that abut on or are near the river or sea shore.

### **3.7.5 Casino Legislation**

The Gambling Prevention Act No. 5 of 2007 was passed by the Parliament of Guyana on January 22<sup>nd</sup> 2007. This Act which amends the Gambling Prevention Act deals with the licensing, regulating and operation of casinos.

Under the Act casino premises license may be issued to a new hotel or resort complex with a minimum of 150 rooms allocated for accommodation, and must hold minimum rating as prescribed by regulations. The Act and its conditions specify that no more than 3 casinos premises license will be issued in one region of Guyana and requires that casinos only admit paying guest accommodated in a room of the hotel or a class of persons authorized by the regulations.

The regulations will allow for the establishment of a Gaming Authority and determines the criteria, form, content and application fees of any application for a license and any amendment, transfer, renewal, suspension, and revocation of a license.

**CHAPTER FOUR – DESCRIPTION OF PROJECT ENVIRONMENT AND BASELINE  
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## 4.1 Introduction

This chapter presents a detailed description of the project site as well as its surroundings in terms of the physical, biological and socio-economic characteristics and establishes the relevant baseline information.

The physical environment is described in terms of site conditions as it relates to topography, drainage, climate, water quality, and the coastal and riverine features of the surrounding area. Biological information is presented on the species present within the project site and surrounding areas (beachfront and aquatic environment). The socio-economic baseline covers the project's zone of immediate impact and offers stakeholders' perspectives on the project.

### 4.1.1 General Approach and Methodology

The baseline information has been established through primary and secondary data collection and analysis and involved a combination of:

- Field Studies
- Analysis of background documents, reports, maps etc
- Structured interviews and discussions

Primary data collected included noise and water quality data. Noise recording were done over a three day period to establish ambient recordings for the project site and immediate surrounding while surface and groundwater were sampled and analysed.

The data collection methodologies employed for the various studies are described in more details within this Chapter.

## 4.2 Physical Setting

The project site covers an area of 3.52 hectares (8.69 acres) of coastal land that previously housed the Food and Drug Analyst Department and Luckoo Pool and is contiguous to the Atlantic Ocean and the Demerara River. Neighbouring properties include the National Centre for Education Research and Development (NCERD), the Pegasus Hotel, DTL, GFC and the Coast Guard.

The site is generally flat and falls within the coastal plain which is approximately 1 m to 2 m below mean high tide level. A concrete seawall offers protection from the Atlantic Ocean and there is an area of 0.97 (2.39 acres) acres of beachfront for which the project has right of use.



**Figure 4.1 Boundary Line**

#### **4.2.1 Topography and Drainage**

##### **4.2.1.1 Soils**

The study area is located within Guyana's Coastal Plain where the soils range from predominantly alluvial deposits over organic material and silts comprising the Demerara Formation to the White Sand Plateau.

The Demerara Formation consists of soft clays and silts and is subdivided into Mara and Coronie deposits. The Mara clay settled during the period of rapid sea level rise (Holocene period). The Coronie sediments were deposited subsequently. The thickness of the Demerara and Coronie formation is approximately 30m and 15m respectively.

There are four main types of soils on the Coastal Plain (Bernard, 1999):

- Clays (found near the sea ; known as frontland or marine clays);
- Silty clays (found along major rivers);
- Histosols (known as *pegasse* in Guyana; found along the coast in swampy areas particularly in the Demerara and Essequibo areas ); and,
- Areas of mixed soils (includes clays, silts, laterites, podsols, histosols, regosols)

Soil along the Coastal Plain is considered to be of good to moderate fertility for agriculture. These soils typically require both drainage and irrigation through an intricate system of canals and sluices.

Soils in the study area are typically frontland or marine clays and are poorly drained, of fine texture and of relatively low fertility. Textures are usually clay to silt loam and subsoil textures are clay, silty clay or silty clay loam. Most soils have a thin layer of organic material on the surface, grayish colour, are deep and developed from unconsolidated and stratified deposits or marine origin. These soils are placed in land capability Class 1-11, good to moderate agricultural land.

Source: *Seawall Feasibility and Zoning Plan November 28, 1997.*

#### 4.2.1.2 Surface Drainage

The coast of Guyana lies between 1.5m and 2m below the mean high tide level. In Georgetown areas are drained by small ditches along the road side which empty into alley drains crossing the centre of each block. The alley drains empty into primary drains.

The primary drainage system consists of a series of canals or trenches running east - west which is discharged by gravity into the Demerara River. However, this drainage system is limited by the tide. The outflow from the canals or trenches is controlled by gates known as sluices or kokers. They are opened manually at low tide to drain the city and are closed at high tide to prevent flooding. They are opened for 5 to 6 hours during spring tides and 3 to 4 hours during neap tides.

The Georgetown City Council has responsibility for drainage of the city. The following is the drainage layout of the Kingston area including the project site showing the canals and trenches.

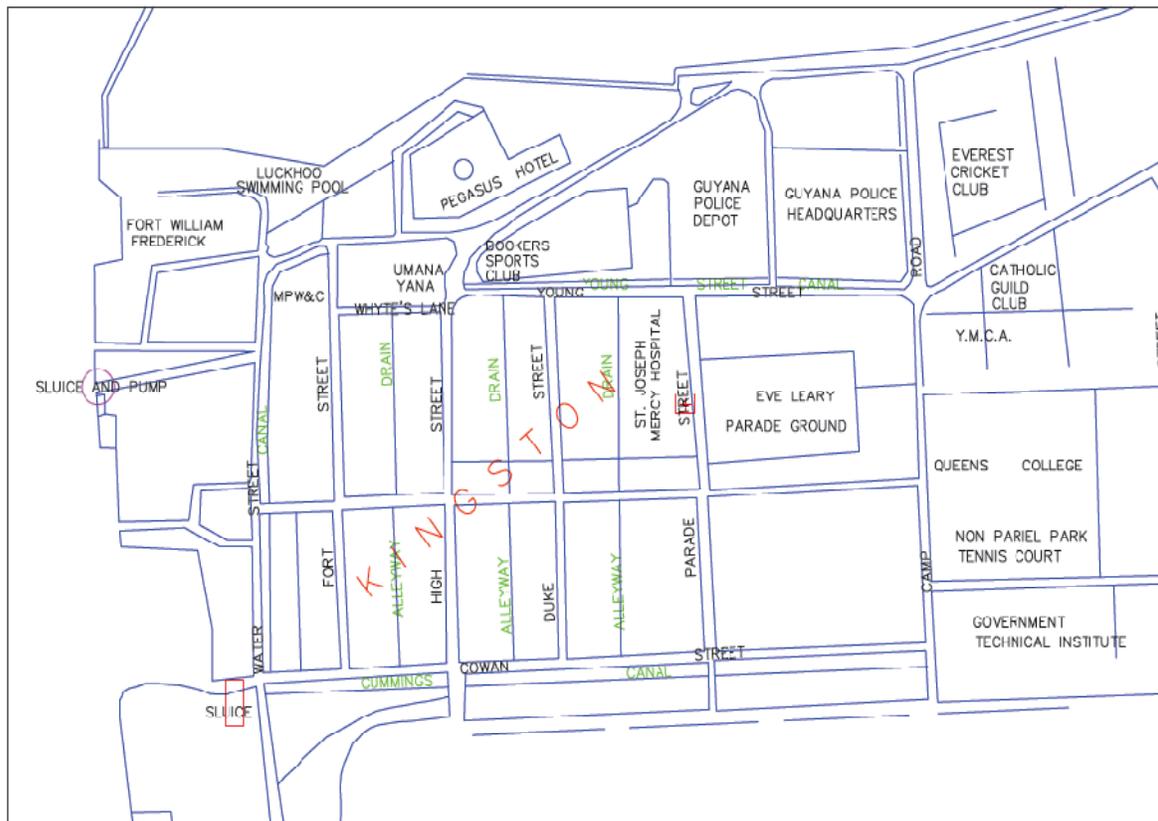


Figure 4.2 Drainage layout of the Kingston area

The specifications of the principal drains in the vicinity of the project, as provided by the Georgetown City Council are outlined below in Table 4.1:

**Table 4.1 Drainage Specification for selected drains in proximity to project site**

Street Name	From Street	To Street	Type of Drain	Top Width (m)	Bottom Width (m)	Design Depth (m)
Battery Road	River	Water Street	Concrete	0.45	0.4	0.75
Battery Road	Water Street	Fort Street	Concrete	0.3	0.15	0.15
Battery Road	Fort Street	High Street	Concrete	0.4	0.3	1.05
Water Street	Barrack Street	Battery Road	Concrete	0.8	0.75	0.75
Water Street	Battery Road	Seawall Road	Concrete	0.8	0.6	0.75
Water Street	Battery Road	Seawall Road	Concrete	1	0.7	0.8
Mud Lot road	Water Street	Outfall	Earthen Canal	3.6		2.4

There is no existing drainage system within the project site. The map below shows the area drainage system into which the project will feed. The area drainage comprises drains which feed into trenches that link to the main canal which empties into the Demerara River and is regulated by a sluice and pump.



**Figure 4.3 Drainage system into which the project will feed**

#### **4.2.2 Climate**

Guyana's climate is influenced primarily by the seasonal shifts of the Inter Tropical Convergence Zone (ITCZ) and the seasons and climate are determined mainly by the variation in rainfall patterns.

##### **4.2.2.1 Duration of Sunshine**

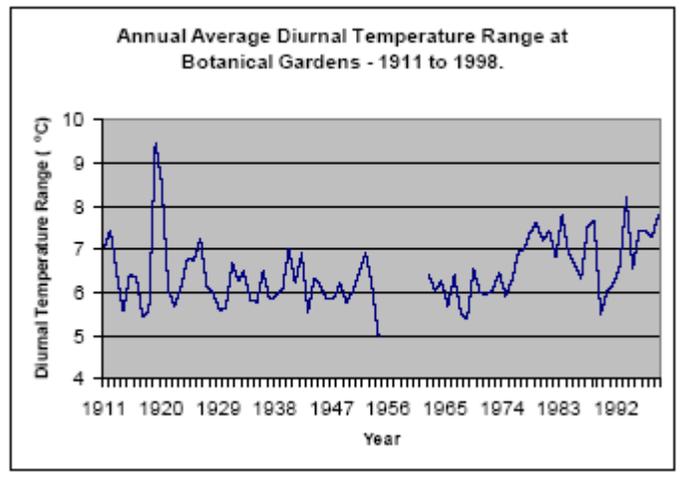
As a result of Guyana's proximity to the equator there is little variation in the hours of daylight. It varies from a minimum of 11.6 hours per day in December to a maximum of 12.5 hours per day in June. Bright sunshine is influenced by rainfall and during the rainy season the coast can experience an average of 6 hours per day.

##### **4.2.2.2 Temperature, Relative Humidity and Wind**

On the coast, daily maximum temperatures average 29.6 °C while daily minimum temperatures average 24.0 °C. Guyana's coast is subject to the north-easterly trade winds with speeds of about 6 meters per second.

At 5 degrees latitude north of the equator, the Climate of Guyana is tropical. The hot, humid conditions are moderated by the northeast trade-winds.

Temperatures range between 25° and 31° C.



Source: Guyana National Vulnerability Assessment to Sea Level Rise. EPA 2002

**Figure 4.4 Graph showing Average Diurnal temperature Range at the Botanical gardens 1911 to 1998**

The coast of Guyana is situated in the tradewinds but tropical storms or cyclones do not occur in this area. Winds and offshore wave directions are remarkably consistent with nearly 60 percent coming from the 45° northeast sector with an average velocity at sea of 6 m/s. Wind and waves are strongest during the months December to June and weakest during the period July to November. The mean sea level in Georgetown is approximately 15.52 above Georgetown Datum (GD).

#### 4.2.2.3 Rainfall

In the coastal area, there are two rainy seasons between May to mid-August and mid-November to mid-January. Rainfall averages one rain event in every five days (Bernard, 1999). Monthly rainfall data from 2002 to 2007, measured at Georgetown by the Hydro-metrological Service of the Ministry of Agriculture, is shown in Table 4.2. As the table shows, the driest months of 2002 at Georgetown were February, March, September and October. The wettest months were January, May, June and December. A similar trend exists from 2002 to 2007, as shown in Figure 4.5. From the table the extremely high and unusually rainfall can be observed for January 2005. It should be noted that, during this period, the proposed project site was not flooded.

**Table 4.2 Rainfall (mm) Data for Georgetown (2002 to 2007)**

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
2002	157.8	81.2	97	237.4	259.4	451.8	160.8	167.8	86.5	80.4	177.5	104.1
2003	36.2	29.2	28.3	27.4	370.8	355.8	322.1	96.7	29.1	11.7	143.8	306.6
2004	162.3	124	54	320.4	407.4	255.6	377.2	117	110.6	61.8	26.4	404.6
2005	1108.2	203.7	78.5	219.6	296	102.8	380.5	57.3	55.4	67.3	229.5	516.7
2006	571.3	73.2	43.8	93.4	477.6	440.8	224.6	116.5	185.7	137.7	209.6	253.7
2007	156.5	26.3	121.8	111.7	433.4	398.1	297.6	375.5	154.1	53.1	179.9	633.7

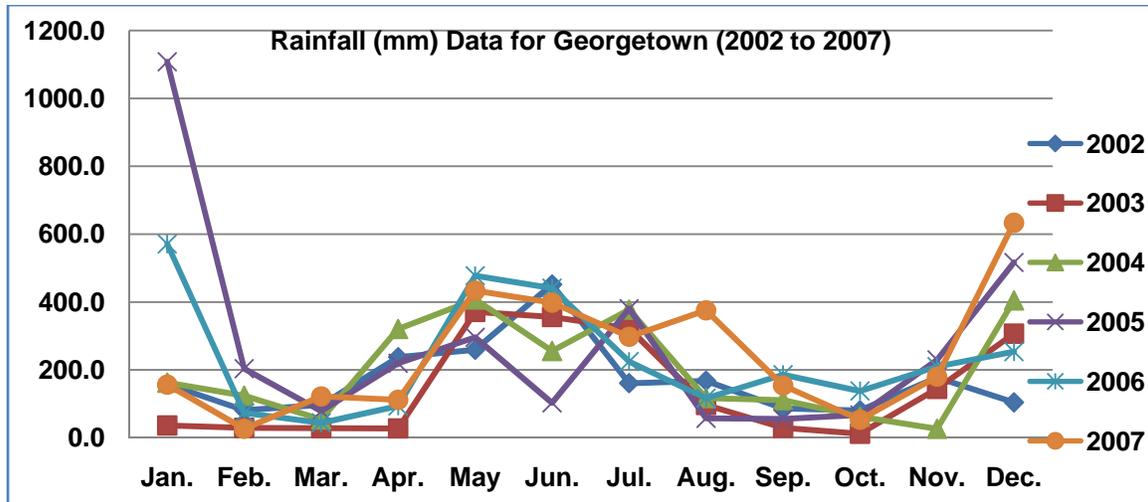


Figure 4.5 Rainfall Data for Georgetown from 2002 - 2007

#### 4.2.3 Coastal Features

The north-eastern coastal zone of the South American continent known as the Guiana coast stretches between the estuaries of the Amazon and Orinoco Rivers and forms the coastline of Guyana. In terms of geology and geomorphology Guyana's coast is that of coastal "Amazon clay" deposits and these extend under the continental shelf reaching an average thickness of 20m over the last 6000 years. This flat low-lying coastal- plain consists of natural and man-made sea-defences, mud banks, mangroves and sand flats all of which serve to protect the coast from inundation and flooding.

Guyana's coastline has a length of approximately 430km of which 70km consists of natural sandbanks and 360km is maintained with embankments and dykes. It is of varying width (between 26km-77km) and is as much as 1m below mean high tide levels in most places.

The Coastal Plain contains the following five biotic communities:

- The Marine Ecosystem includes saline mudflats, mangrove forests, sand and shell beaches. The mudflats are rich in invertebrate fauna and provide habitat for numerous resident and migratory shore birds. The mangroves protect the shoreline against erosion and provide a habitat for marine life. There are also shell beaches along the high-water mark in the north-western coast between the Moroccan and Waini Rivers, and these offer nesting sites for deep sea turtles.
- The Estuarine Ecosystem is characterised by wetlands which occur at the mouths of the rivers where the sea water is diluted by freshwater from the land or from rain.
- The Riverine Ecosystem comprises tidal wetlands which occur along river banks. These are subject to periodic or continuous inundation.
- The Palustrine Ecosystem consists of marshes and swamps in river flood plains, as well as 'water savannahs'. They provide prime habitat for waterfowl, spawning grounds for freshwater fish, pasture for domestic livestock, wildlife and sanctuaries for aquatic fauna.
- The Lacustrine Ecosystem comprises natural lakes and the water conservancies. The lakes are mainly found on the coast. They generally have a low pH, poor inorganic

nutrient content and low concentration of oxygen. Submerged plants are scarce due to poor light. Some flora includes water lilies, razor grass, ite palm and ferns  
(Source: Daniel, 1990; GAHEF, 1992)

Given the above the project will be influenced by and will also influence the following immediate ecosystems:

- The Marine Ecosystem
- The Estuarine Ecosystem
- The Riverine Ecosystem

#### **4.2.3.1 Tides, Waves and Currents**

The tides affecting the Georgetown sea defences originate in the Arctic Ocean and traverse the Atlantic Ocean from south to north. The Guyana coast is subject to semi-diurnal tides - two low and two high tides per day. The tides are known as neap or spring tides. The former is the tide with a minimum range that occurs fortnightly when the moon is in the first and third quarters while the latter has a maximum range and occurs fortnightly at the times of full and new moons.

The mean high and low water spring tides at the Demerara bar are 54.64 ft GD and 46.24 ft GD respectively. The mean high and low water neap tides are 52.44 ft GD and 48.54 ft GD respectively. The spring and neap tidal ranges (the mean value of the rise and subsequent fall of a tide) are therefore 8.4 ft and 3.9 ft respectively. The highest recorded tide of 56.72 ft GD occurred on February 28, 2002, and the highest and lowest astronomical tides are 55.70 ft GD and 45.40 ft GD respectively. The mean sea level is 51.05 ft GD (1999 analysis) and the Admiralty Datum is 45.14 ft GD.

An analysis of more than 400 observations and predictions of the high and low waters at the Demerara Beacon in 1961 showed that no high water was more than 0.5 ft higher or more than 0.8 ft lower than predicted. The corresponding low water limits were 0.6 ft and 0.8 ft respectively. These small deviations of the actual water levels from the predicted tide (Tide Tables which are published annually by the Transport and Harbours Department) can be explained by the lack of strong non-astronomical disturbances (e.g. strong winds) which might result in the development of surges.

There are inequalities in the daily high waters and low waters due to diurnal components which can give amplitude of 8 inches. It is also common knowledge that each day the tide is later since a lunar day is 24 hours 50 minutes long. In a year, there are therefore 706 low and high tides.

#### **4.2.3.2 Waves**

Waves arrive at the Guyana coast from the easterly and north-easterly directions. The most important data about waves are their average and maximum periods and the maximum and significant wave heights. The period is the time elapsed between the passing of two similar points on successive waves and the significant wave height is the average height of the highest one-third waves. The periods and wave heights measured in the ocean and at Buxton, the Demerara Beacon and Kitty Groyne are summarised in Table 4.3. This table clearly illustrates the attenuation of waves as they approach the coast. The wave heights are decreased by friction and breaking, while the wave periods increase.

**Table 4.3 Wave Length**

LOCATIONS	PERIODS		WAVE HEIGHTS			
	AVERAGE	MAXIMUM	SIGNIFICANT		MAXIMUM	
	Sec.	Sec.	(m)	Ft	(m)	Ft
Ocean	6	13	*1.30	4.3	4.0	13.1
Buxton	9	15	0.75	2.5	2.4	7.9
Demerara Beacon	8	12	0.65	2.1	1.7	5.6
Kitty Groyne	11.5	35	0.30	1.0	1.2	3.9

**Source: Source: Seawall Feasibility and Zoning Plan, 1997.**

#### 4.2.3.3 Currents

The current along the Georgetown foreshore is governed by the tide, the wind, the equatorial current and the discharges of both the Demerara and Essequibo Rivers which have mean annual discharges of 7 770 and 200 000 cusecs respectively. Due to the waves, swell, winds and the Equatorial current, a residual current exists, giving rise to velocities of 0.5 to 1 ft/sec. in the shallow near-shore zone.

#### 4.2.4 Riverine Features

The Demerara River is an important natural resource for potable water, recreation, water transportation and fisheries. The Riverine Ecosystem comprises tidal wetlands which occur along river banks. These are subject to periodic or continuous inundation.

The Demerara River separates Regions 3 and 4, and protrudes into Region 10. Its source is found in the Maccari Mountains, and it flows northwards for 346 km (215 miles) to the Atlantic Ocean at Georgetown. Its narrow estuary and rapid flow carves a direct channel of 5-6 m (20 feet) to the ocean.

Guyana's major ports and wharfs are also located on the banks of the Demerara River in Georgetown and surrounding areas. This results in the Demerara River experiencing the highest volume of river traffic of Guyana's main rivers, and the location of choice by many developments. With Georgetown being the capital city and business centre of Guyana, the Demerara Watershed is the major transportation hub for Guyana.

#### 4.2.5 Groundwater

##### 4.2.5.1 General Description

The hydrogeology of the Guyana coast, including Georgetown, consists of three main sand layers, typically referred to as the A, B, and C sands. Each layer is separated by clay layers. These layers trend downwards from east to west. The A sands occur at a depth of 500 feet and the B sands at a depth of 800 feet. Within the study area drinking water is supplied by Guyana Water Inc. from groundwater pumped via wells. The groundwater supplied to Georgetown and Greater Georgetown is abstracted from the "A" and "B" sands aquifer.

The untreated water is slightly acidic with a pH range of 6.5 to 8.5. The water contains a low chloride content, low alkalinity and hardness, but high levels of iron. Water from the "B" sands has a higher temperature and chloride content and contains hydrogen sulphide.

There are two wells in the Kingston area; one was recently established by G.W.I and the old well which is inoperable. This well taps the "A" sands aquifer. Average shallow groundwater depth is between 1 to 2 metres of the ground surface.

#### 4.2.5.2 Ground Water Sampling and Analysis

##### 4.2.5.2.1 Methodology

Groundwater sampling was undertaken to establish baseline water quality data of the existing well. Samples were collected from the existing well on the project site and analysed at the IAST laboratory.

<b>DATE TAKEN:</b> Wednesday, June 04, 2008	<b>TIME:</b> 11.00 a.m.
<b>LABS USED:</b> Institute of Applied Science and Technology (IAST) and Eureka Labs	
<b>SAMPLE LOCATION:</b> WW1 – Well at Project Site	<b>CONDITIONS/OBSERVATIONS:</b> Sunny

NO.	PARAMETERS	SAMPLING POINT
		WW1
1.	Total Dissolved Solids (mg/L)	65.6∇0
2.	Total Suspended Solids (mg/L)	ND
3.	Sulphates (mg/L)	10.043∇0
4.	Nitrates (mg/L)	0.108∇0.002
5.	Chlorides (mg/L)	ND
6.	Total Zinc (mg/L)	ND
7.	Total Copper (mg/L)	0.06∇0
8.	Total Nickel (mg/L)	0.28∇0.03
9.	Total Iron (mg/L)	2.14∇0.3
10.	Total Lead (mg/L)	ND
11.	Total Magnesium (mg/L)	78.15∇7.0
12.	Total Manganese (mg/L)	0.06∇0.03
13.	Total Calcium (mg/L)	13.46∇11
14.	Total & Faecal Coliforms	0/ ml

\*ND – Not Detected

#### 4.2.6 Surface Water Quality

Water quality analyses were conducted on a number of parameters to establish baseline conditions in the Demerara and Atlantic Ocean areas contiguous to the project site. (see Figure 4.6 of sampling points).

Samples were collected from six different points in the Demerara River and Atlantic Ocean. Plastic sample bottles were used. These were pre-cleaned then filled to the top thus precluding air, and labeled according to sampling point locations. Two sample bottles were filled for each sampling points. Samples were analysed by the IAST laboratory.

Results of the water quality analysis are presented below.

<b>DATE TAKEN:</b> Wednesday, June 04, 2008	<b>TIME:</b> S1: 6.05 am S3: 6.20 am S5: 6.30 am	S2: 6.15 am S4: 6.25 am S6: 7.30 am
<b>LABS USED:</b> Institute of Applied Science and Technology and Eureka Labs		
<b>SAMPLE LOCATIONS:</b> See attached map with sample points	<b>CONDITIONS/OBSERVATIONS:</b> Weather Condition: Sunny No sources of pollution observed i.e. waste oil or plastics etc.	

NO.	PARAMETERS	SAMPLING POINTS					
		S1 N 06° 48' 5.2" W 58° 10' 20.4"	S2 N 06° 49' 40.7" W 58° 09' 56.2"	S3 N 06° 49' 59.5" W 58° 09' 56.8"	S4 N 06° 50' 23.6" W 58° 09' 34.3"	S5 N 06° 50' 31.1" W 58° 09' 27.5"	S6 N 06° 49' 49.6" W 58° 09' 49.1"
1.	Turbidity (NTU)	9.99∇0	9.99∇0	9.99∇0	9.99∇0	9.99∇0	9.99∇0
2.	Salinity (%)	10.40∇0	9.60∇0	9.20∇0	9.30∇0	15.70∇0	12.60∇0
3.	Total Dissolved	10.03∇0	9.24∇0	8.95∇0	9.01∇0	15.14∇0	12.19∇0
4.	Total Suspended	358.75∇4.41	343.75∇5.3	363.75∇8.3	405.00∇1.76	447.50∇7.1	2525.87∇12.1
5.	Oil & Grease	119.60∇0	110.8∇0	82.80∇0	74.80∇0	56.00∇0	57.60∇0
6.	Sulphates (mg/L)	724.25∇0	677.49∇0	706.79∇0	625.79∇0	1149.86∇0	770.51∇0
7.	pH	6.37∇0	6.38∇0	6.25∇0	6.39∇0	6.86∇0	6.53∇0
8.	Temperature (°C)	29.2∇0	29.2∇0	29.3∇0	29.2∇0	29.5∇0	29.4∇0
9.	Nitrates (mg/L)	ND	ND	ND	ND	ND	0.027∇0.004
10.	Total Zinc (mg/L)	0.16∇0.04	0.15∇0.07	0.12∇0.04	0.20∇0.05	0.15∇0.04	0.29∇0.06
11.	Total Copper	0.13∇0.03	0.12∇0.01	0.11∇0.01	0.12∇0.01	0.15∇0.04	0.13∇0.03
12.	Total Nickel (mg/L)	0.48∇0.26	0.27∇0.07	0.31∇0.005	0.41∇0.1	0.29∇0.1	0.26∇0.13
13.	Total Iron (mg/L)	14.79∇1.6	16.03∇6.4	11.44∇0.4	19.31∇4.8	14.83∇0.9	59.64∇5.4
14.	Total Lead (mg/L)	0.58∇0.14	0.50∇0.08	0.56∇0.07	0.90∇0.65	0.68∇0.16	0.54∇0.21
15.	Total & Faecal	>16/ ml	>16/ ml	>16/ ml	>16/ ml	>16/ ml	>16/ ml

\*ND – Not Detected

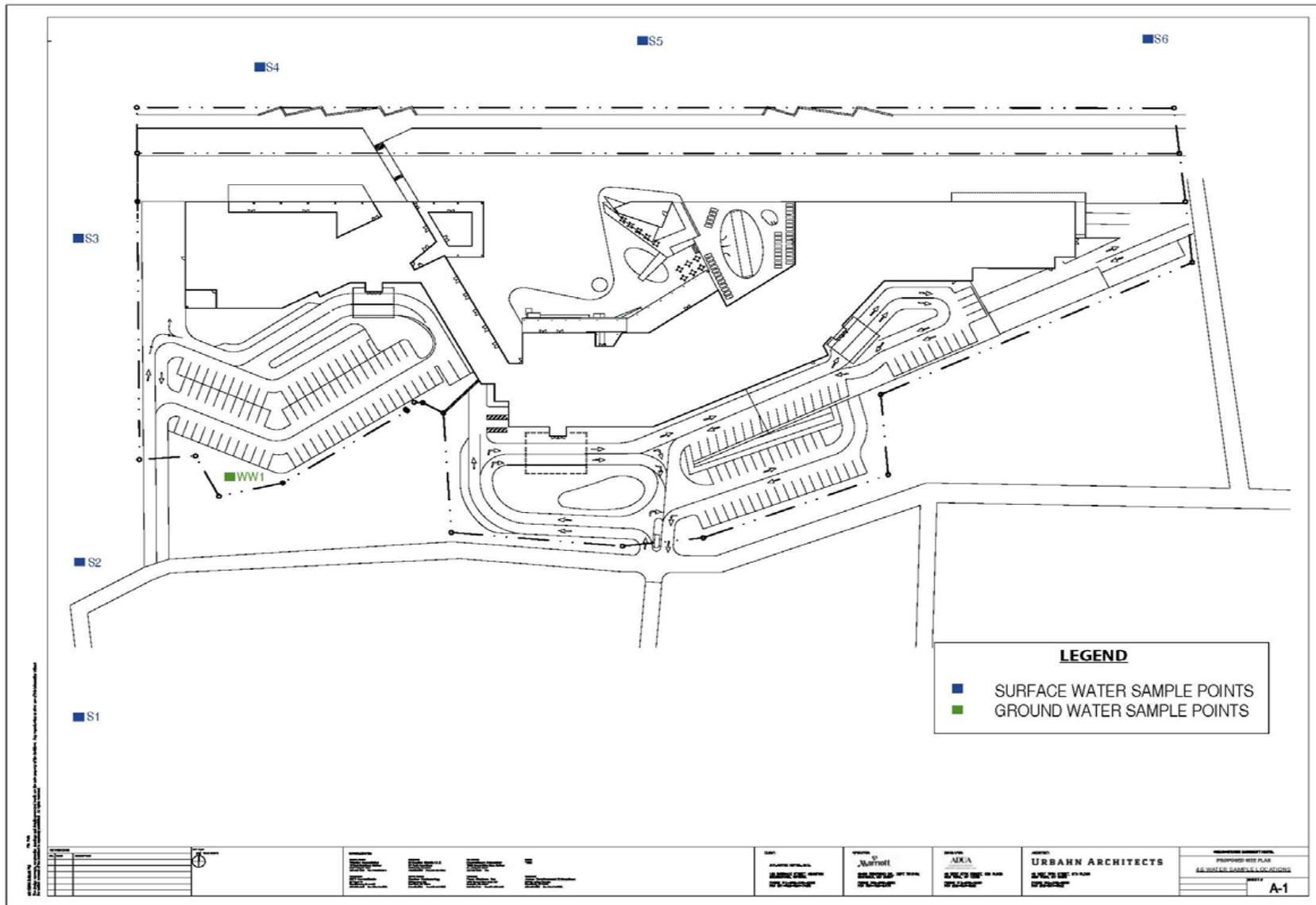


Figure 4.6 Water Sample Locations

## **4.2.7 Noise**

### **4.2.7.1 Methodology**

Noise recordings were conducted on 3 days, 30<sup>th</sup> May, 4<sup>th</sup> June and 7<sup>th</sup> June 2008 over a 12 hour period at 8 locations within and adjacent to the project site.

The following locations were sampled:

- Pegasus - NCERD road / beginning of the project property line
- Fort Street / project parking exit (eastern parking lot)
- Hotel parking lot (eastern lot) behind NCERD building
- Seawall (immediately behind proposed project main building)
- Hotel parking lot adjacent to GFC
- Hotel Main Entrance (Water Street)
- Hotel Parking Ext (between GFC and Demerara Timber Limited)
- Coast Guard / Service Road

To take measurements the sound meter was held at arms lengths. The meter readings were then recorded on prepared data sheets. The sample locations are identified on the Map below and the results presented in Table 4.4.

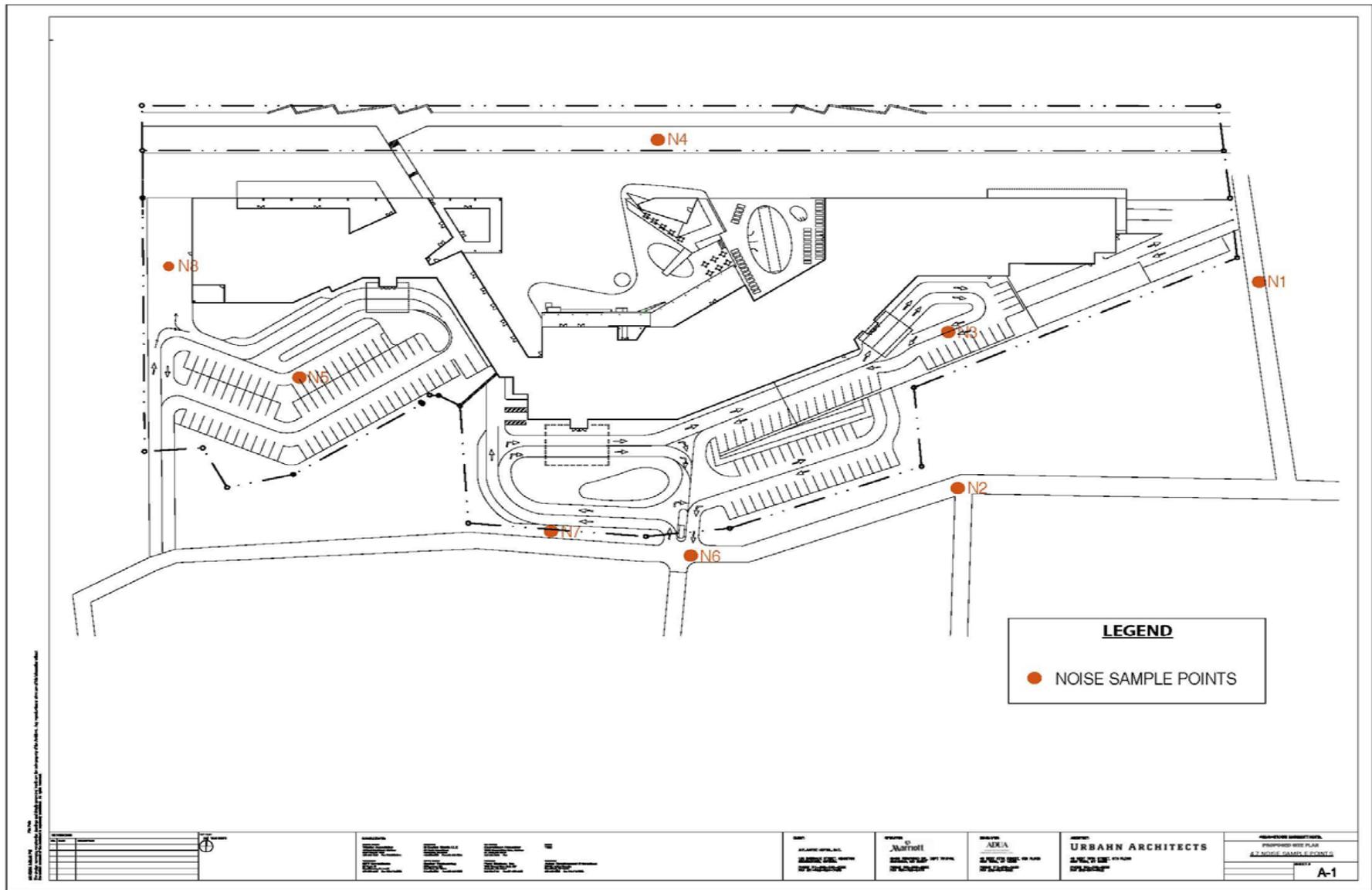


Figure 4.7 Noise Sample Points

**Table 4.4 NOISE RECORDINGS**

**MARRIOTT HOTEL PROJECT SITE**

POINTS	LOCATIONS	GPS	30 <sup>th</sup> May 2008		4 <sup>th</sup> June 2008		7 <sup>th</sup> June 2008		REMARKS
			Time	DBS	Time	DBS	Time	DBS	
N1	Pegasus - NCERD road / beginning of property line	N 06° 49' 41.6" W 58° 09' 44.1"	9.30 am	66.4	8.00 am	71.2	9.30 am	56.8	4 <sup>th</sup> June, 9.30am – Pegasus generator was on.
			6.00 pm	52.6	5.00 pm	49.7	1.00 pm	62.4	7 <sup>th</sup> June, 1.00pm – A security vehicle was leaving the Pegasus premises.
N2	Fort Street / hotel parking exit (eastern parking lot)	N 06° 49' 41.7" W 58° 09' 42.8"	9.35 am	62.3	8.10 am	59.9	9.45 am	52.9	
			6.15 pm	52.6	5.17 pm	54.6	1.12pm	63.6	30 <sup>th</sup> May, 6.15pm and 7 <sup>th</sup> June, 1.12pm – Vehicles were passing during the sampling.
N3	Hotel parking lot (eastern lot) behind NCERD building	N 06° 49' 41.7" W 58° 09' 44.7"	9.45 am	56.6	8.07 am	79.0	9.40 am	59.5	4 <sup>th</sup> June, 9.45am – A GPL truck drove to the point behind the NCERD building.
			6.20 pm	54.9	5.07 pm	52.8	1.07 pm	51.8	
N4	Seawall	N 06° 49' 45.8" W 58° 09' 44.1"	9.55 am	88.3	8.15 am	57.6	9.48 am	60.8	30 <sup>th</sup> of May, 9.55am – Waves and insects created a significant amount of noise.
			6.25 pm	86.5	5.25 pm	63.2	1.17 pm	51.4	30 <sup>th</sup> May, 6.25pm – Waves and insects created a significant amount of noise.
N5	Hotel parking adjacent to GFC	N 06° 49' 43.7" W 58° 09' 48.6"	10.00 am	68.9	8.21 am	64.6	9.50 am	65.2	
			6.30 pm	66.9	5.30 pm	64.5	1.20 pm	62.8	
N6	Hotel Main Entrance (Water Street)	N 06° 49' 41.9" W 58° 09' 45.4"	10.07 am	78.2	8.30 am	61.1	10.00 am	66.6	30 <sup>th</sup> May, 10.07am – Vehicles constantly traverse near sampling area(s).
			6.40 pm	73.3	5.35 pm	56.4	1.32 pm	61.1	30 <sup>th</sup> May, 6.40pm – Vehicles constantly traverse near sampling area.
N7	Hotel Parking Exit (between GFC and DTL)	N 06° 49' 42.2" W 58° 09' 46.8"	10.12 am	62.3	8.40 am	61.1	10.10 am	74.2	7 <sup>th</sup> June, 10.12am - Vehicles constantly traverse near sampling area
			6.47 pm	61.0	5.40 pm	69.4	1.25 pm	62.8	

POINTS	LOCATIONS	GPS	30 <sup>th</sup> May 2008		4 <sup>th</sup> June 2008		7 <sup>th</sup> June 2008		REMARKS
			Time	DBS	Time	DBS	Time	DBS	
N8	Coast Guard / Service Road	N 06° 49' 44.0" W 58° 09' 49.2"	10.20 am	56.1	8.50 am	66.0	10.20 am	52.3	
			7.00 pm	65.0	5.55 pm	60.2	1.40 pm	72.1	7 <sup>th</sup> June, 7.00pm – Insects created a significant amount of noise.

## 4.2.8 Natural Hazards

### 4.2.8.1 Flooding

The location of the project area on the coast of Guyana makes the site particularly susceptible to the effects of sea level rise in the future.

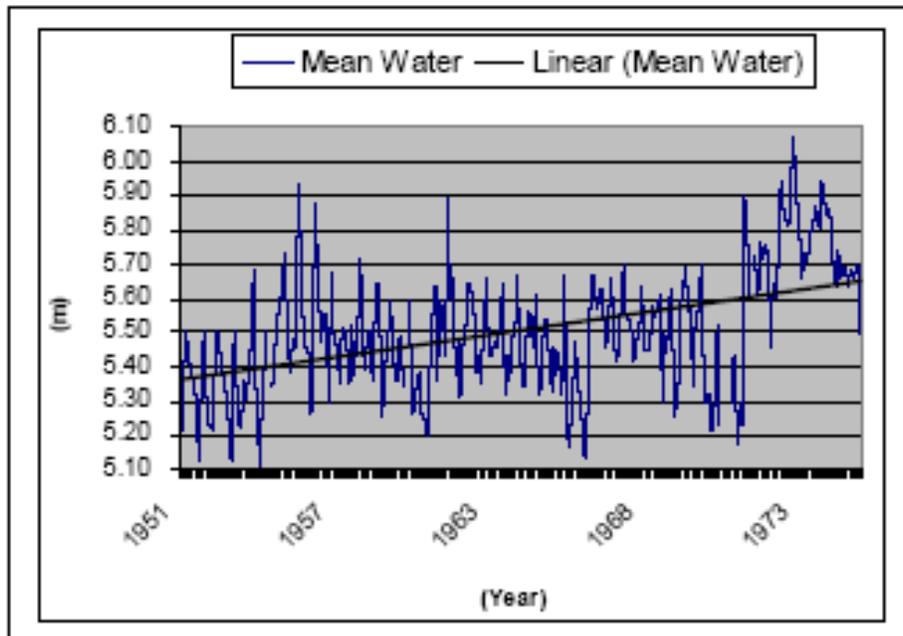
The flat low lying nature of the Guyana coast and Georgetown area makes it susceptible to flooding after long periods of intense rainfall. However, flooding in the Kingston area is not considered a widespread threat and reports from the Mayor and City Council of flooding after heavy rainfall indicate that this is confined to other areas in Georgetown. Also, the flood event of 2005 is a reference point for the location since the project site and general Kingston area was not flooded.

### 4.2.8.2 Sea Level Rise

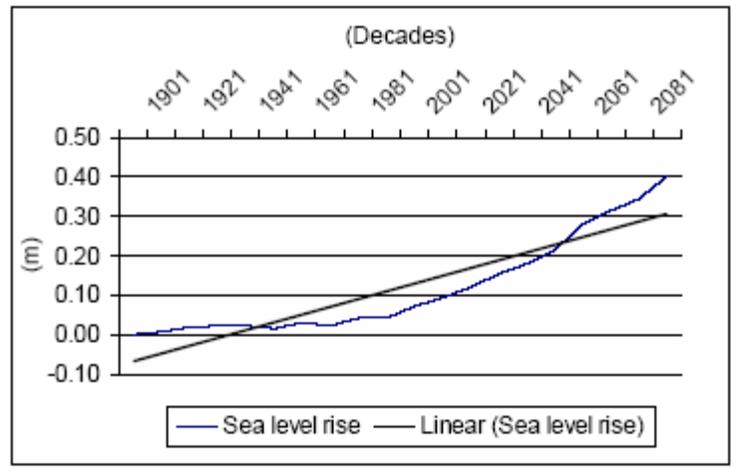
Sea level rise is expected to have disproportionately significant effects on the economic and social development of Guyana. This is especially so since Guyana's coast is below mean sea level and is the center of economic activity.

In 1969 the mean sea level was recorded as 15.46m above the Georgetown Datum. In 1999 the mean sea level is 15.56m above the Georgetown Datum. Based on data available for the period 1951 to 1979 for Port Georgetown, mean relative sea level rise using linear extrapolation is 10.2 mm/yr-1 (See graph below). High tide change has been calculated to be 9.7 mm yr-1 with the low tide change being 11.1 mm yr-1.

This rate of relative sea level rise is about 5 times the global average. Estimates of global average sea-level rise shows that mean sea level along the Atlantic Coast of Guyana is projected to rise by about 40cm by the end of the 21<sup>st</sup> century, which is at an approximate rate of 4mm/yr-1.



Source: Guyana National Vulnerability Assessment to Sea Level Rise, EPA 2002  
Figure 4.8 Graph showing observed sea level changes at port Georgetown (1951-1979)



Source: Guyana National Vulnerability Assessment to Sea Level Rise, EPA 2002

Figure 4.9 Graph showing future sea level projections

### 4.3 Biological Environment

#### 4.3.1 Methodology

The biological assessment was conducted in stages:

- Stage 1 A field reconnaissance visit was conducted to understand and become familiar with the project site.
- Stage 2 Literature review and analysis of the available literature was done to get a better understanding of the dynamics of the project location and its environs.
- Stage 3 A full site investigation to identify the flora and fauna was conducted.
- Stage 4 Analysis of the data collected to determine the potential impact on the site and its existing flora and fauna.

Assessment of the flora and fauna was conducted using combination methods for non-moving organisms. Use was made of the ACFOR scale which records the presence of species at a given site as Abundant, Common, Frequent, Occasional and Rare.

• A	Abundant
• C	Common
• F	Frequent
• O	Occasional
• R	Rare

Walking transects were also used to give coverage to the area where the assessment for faunal and floral inventory was conducted. This allowed for good ground coverage of the area. Ground coverage was on both sides of the seawall. Two zones were analyzed; Zone 1 was the beach area between the low water mark and the seawall and Zone 2 the area between the seawall and the public road.

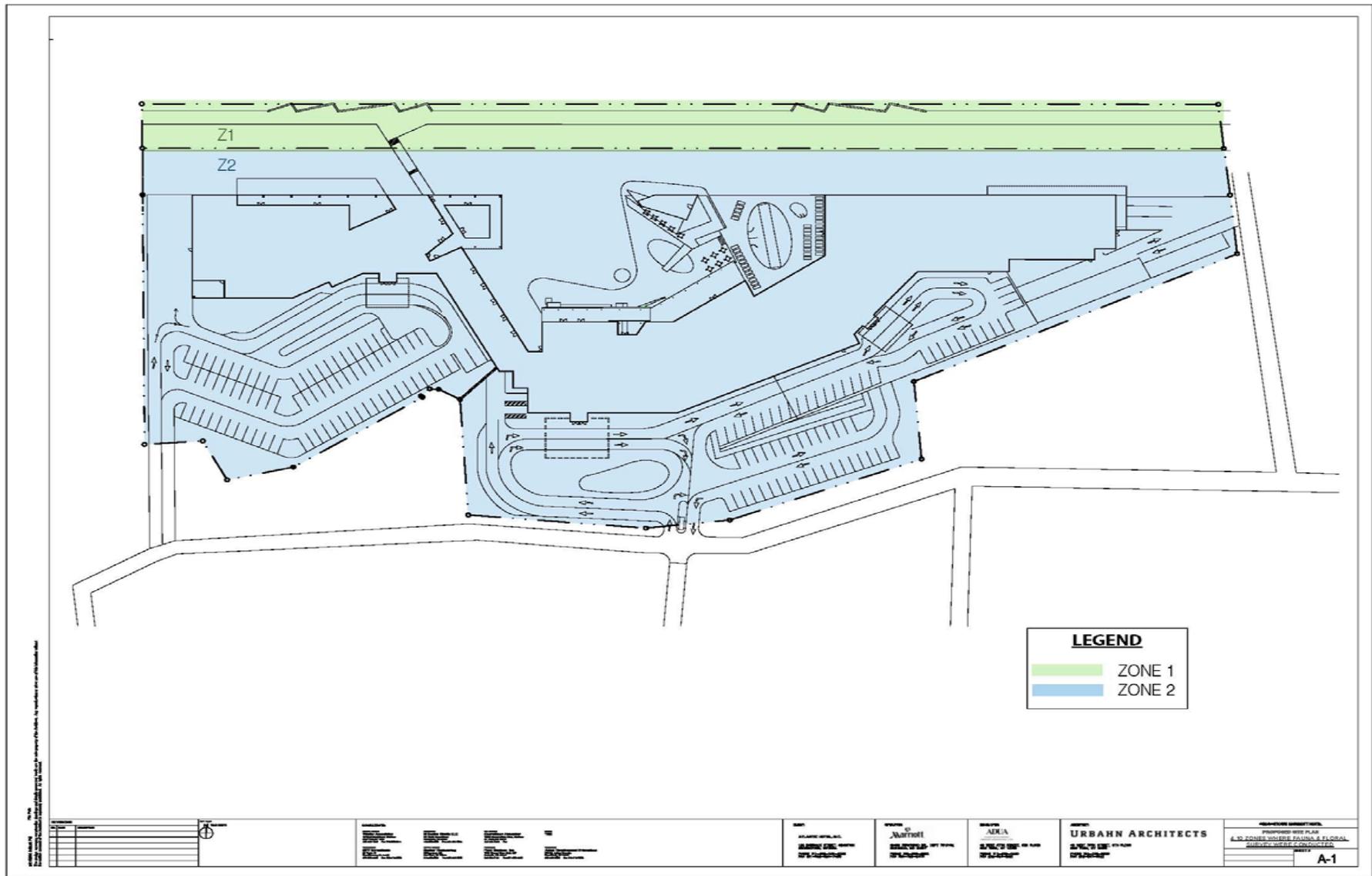


Figure 4.10 Zones where fauna and floral survey were conducted

### 4.3.2 Ecological Setting

The project is being constructed on a plot of land 2.53 ha (6.27 acres) located at the North West area of Kingston contiguous to the Atlantic Ocean and the Demerara River, and with the right to use 9,024m<sup>2</sup> (2.23 acres) of beachfront. As such, the project will be influenced by and will also influence the following immediate ecosystems:

- The Marine Ecosystem
- The Estuarine Ecosystem
- The Riverine Ecosystem

The project site is within a human disturbed area that only recently accommodated the buildings that housed the Food and Drug Analyst Department and Luckoo Pool. These buildings were recently demolished. The existing vegetation is comprised of secondary disturbed vegetation, primarily shrubs, herbaceous plants and several species of grasses. The fauna identified was typical of areas where human intervention is evident. In addition many of the avian species observed were transient and migratory. Like the flora, the fauna are very common and can be found throughout the coastal plain especially on abandoned and open lands.

### 4.3.3 Flora

The vegetation in the area is very typical of coastal areas and areas that have been disturbed by humans. Except for the presence of a few cultivated trees (coconut, mango and banana) the vegetation present was primarily weeds that are found in almost all coastal areas and human disturbed areas.

Observations of flora was made on both sides of the seawall; the beach zone between the ocean front and the seawall and between the seawall and the public road. The vegetation distribution on the beach zone was sparse at the region of the low water mark but increased as progress was made up to the seawall. The main species closer to the low water mark was *Ipomoea* sp. This was then followed by *Crotalaria* sp and then mixed patches of *Phyllanthus amarus* (Suriname bitters), *Ipomoea* and *Crotalaria* sp. This was intermixed with young *Terminalia catappa* (almond nut) plants. There were a few small *Hippomane mancinella* (manchineal) plants. Closer to the seawall were different grass species again mixed with *Ipomoea*, *Terminalia catappa* (almond) plants and some *Coccinia grandis* (baby pumpkin) vines. The vegetation present within this zone is typical of beach vegetation both in content and distribution.

In the zone between the seawall and the public road the vegetation present was primarily weeds. The main component of this vegetation was various species of grasses. There were other weed species as shown in Table 4.5.

**Table 4.5 Flora at Project Site**

COMMON NAME	FAMILY	SCIENTIFIC NAME	ZONE	ABUNDANCE
Bhajee or Pigweed	AMARANTHACEAE	<i>Amaranthus dubius</i>	1	F
Spiny pigweed	AMARANTHACEAE	<i>Amaranthus spinosus</i>	2	A
Hog bhajee or common purslane	PORTULACACEAE	<i>Portulacca oleracea</i>	2	F
Hairy galinsoga	COMPOSITAE	<i>Galinsoga ciliate</i>	1	C
Sensitive plant	MIMOSEAE	<i>Mimosa pudica</i>	1 and 2	C
Bisi bisi	CYPERACEAE	<i>Eleocharis elegans</i>	1 and 2	F
Razor grass	CYPERACEAE	<i>Cyperus difformis</i>	1 and 2	F
Razor grass	CYPERACEAE	<i>Paspalum virgatum</i>	1 and 2	F
Uri bena	CYPERACEAE	<i>Cyperus giganteus</i>	1 and 2	F
Iron grass	POACEAE / GRAMINEAE	<i>Sporobolus</i>	2	A

COMMON NAME	FAMILY	SCIENTIFIC NAME	ZONE	ABUNDANCE
		<i>jacquenmontii</i>		
Bahamia grass	POACEAE / GRAMINEAE	<i>Cynodon dactylon</i>	2	A
Bermuda grass	POACEAE / GRAMINEAE	<i>Cynodon dactylon</i>	2	A
Dewgrass	POACEAE / GRAMINEAE	<i>Imperata brasiliensis</i>	2	O
Goosefoot grass	POACEAE GRAMINAE	<i>Eleusine indica</i>	1 and 2	R
Black sage	BORAGINACEAE	<i>Cordia curaaavica</i>	1	R
Stinging nettle	URTICACEAE	<i>Laportea aestuans</i>	2	R
Sweet	VERBENACEAE	<i>Lantana camara</i>	2	O
Purple nutsedge	CYPERACEAE	<i>Cyperus rotendus</i>	2	O
Kyllinga	CYPERACEAE	<i>Cyperus kyllingia</i>	2	C
Dove weed / milk weed	EUPHORBIACEAE	<i>Euphorbia hirta</i>	2	R
Konali (Surinam bitters)	EUPHORBIACEAE	<i>Phyllanthus amarus</i>	1	A
Carion crow bush	LEGUMINOSAE CAESALPINIOIDEAE	<i>Cassia alata</i>	2	R
Shack shack	LEGUMINOSAE / PAPILIONATAE	<i>Crotalaria retusa</i>	1	A
Iron weed / Sweetheart	LEGUMINOSAE / PAPILIONATAE	<i>Desmodium adscendens</i>	1 and 2	A
Watchman	LEGUMINOSAE / PAPILIONATAE	<i>Desmodium incanum</i>	1	A
Goat pimpler	LEGUMINOSAE / MIMOSOIDEAE	<i>Mimosa pigra</i>	1	F
Baby pumpkin	CUCURBITACEAE	<i>Coccinia grandis</i>	1	F
Soldier parsley	PIPERACEAE	<i>Peperomia pellucida</i>	2	R
Aligator weed	SALVINIACEAE	<i>Hydrocleis nymphoides</i>	2	R
Alligator eye food	SALVINIACEAE	<i>Salvinia auriculata</i>	2	R
Mango	ANACARDIACEAE	<i>Mangifera sp.</i>	2	R
Banana	MUSACEAE	<i>Musa sp.</i>	1 and 2	R
Daisy	COMPOSITAE / ASTERACEAE	<i>Wedelia trilobata</i>	1 and 2	F
Coconut	PALMAE / ARECACEAE	<i>Cocus nucifera</i>	1	C
Almond nut	COMBRETACEAE	<i>Terminalia catappa</i>	1	F
Buru buru	SOLANACEAE	<i>Solanum stramonifoliuym</i>	1	A
Bura bura	SOLANACEAE	<i>Solanum jamaicense</i>	1	A
Ipomoea	CONVOLVULACEAE	<i>Ipomoea sp.</i>	1	A
Soldier rod	AMARANTHACEAE	<i>Achyranthes indica</i>	1 and 2	R
Zeb grass	COMMELINACEAE	<i>Tripogandra serrulata</i>	2	O
Manchineal	EUPHORBIACEAE	<i>Hippomane mancinella</i>	1	R
Inflammation bush	COMPOSITAE ASTERACEAE	<i>Vernonia cinerea</i>	1 and 2	C



**Image 4.1** Coconut trees (cultivated) and grass growing in Zone 1



**Image 4.2** *Ipomoea sp.* growing on beach sand of Zone 1



**Image 4.3** *Ipomoea sp.* growing on high beach ridge beyond high water mark in Zone 1



**Image 4.4** Manchineel plant in between grass and *Crotalaria sp.* in Zone 1



**Image 4.5**      **Vegetation at section of shorezone in Zone 1 (*Ipomoea and Crotalaria*)**



**Image 4.6**      **Vegetation at section of shorezone in Zone 1 (*Ipomoea and Crotalaria*)**



**Image 4.7** *Crotalaria retusa* in Zone 2

#### 4.3.4 Fauna (Terrestrial and Aquatic)

The fauna that was observed were all highly mobile and migratory species that easily adapt to changing environments. The majority of fauna observed were avian fauna which are common to Guyana's coast. The variety of fauna on the beach was limited to a few fiddler crabs.

##### 4.3.4.1 Birds

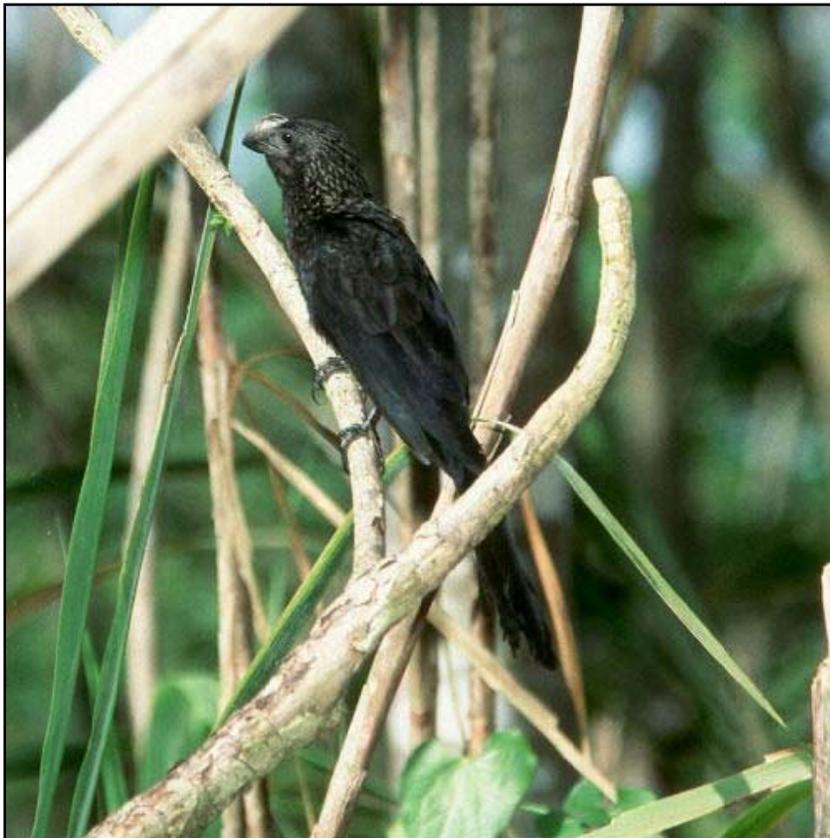
The avian species observed were transient and migratory and are generally found around area inhabited by humans.

**Table 4.6** Avian Fauna found at Project Site

COMMON NAME	COMMON GROUP	FAMILY	SCIENTIFIC NAME
Swallow	Swallows	HIRUNDINIDAE	<i>Progne chalybea</i>
Blue sakié	Tanagers	THRAUPIDAE	<i>Thraupis episcopus</i>
Cattle egret	Herons	ARDEIDAE	<i>Bulbucus ibis</i>
Black vulture	Kites, Hawks, Eagles	CATHARTIDAE	<i>Coragyps atratus</i>
Ground Dove	Columbidae	COLUMBIDAE	<i>Columbina passerina</i>
Hummingbird	Hummingbirds		<i>Schistos geoffroyi</i>
Blue-Grey Tanager	Thraupidae	THRAUPIDAE	<i>Thraupis episcopus</i>
Greater Kiskadee	Tyrant flycatchers	TYRANNIDAE	<i>Pitangu sulphuratus</i>
Lesser Kiskadee	Tyrant flycatchers	TYRANNIDAE	<i>Philohydor lictor lictor</i>
Pied Water Tyrant	Tyrants	TYRANNIDAE	<i>Flavicola pica</i>
Roadside Hawk	Kites Hawks and eagles	CATHARTIDAE	<i>Buteo magnirostris magnirostris</i>
Semi Palmated Plover	Plovers	CHARADRIIDAE	<i>Chadrius semipalmatus</i>
Smoothed- Billed Ani	Cuckoos	CUCULIDAE	<i>Crotophaga ani</i>
Snail Kite	Kites, Hawks, Eagles	CATHARTIDAE	<i>Rostrhamus sociabilis</i>
House Wren	Wrens	TROGLODYTIDAE	<i>Troglodytes musculus</i>
Yellow Plantain	New World Blackbirds	ICTERIDAE	<i>Icternus nigrogularis</i>



**Image 4.8** Egret - *Bulbucus ibis* and Spurwing - *Jacana jacana*



**Image 4.9** Smooth billed ani - *Crotophaga ani*



**Image 4.10** House Wren - *Troglodytes musculus*

#### 4.3.4.2 Mammals, Reptiles and Amphibians

**Table 4.7** Amphibians, Mammals and Reptiles at project site

COMMON NAME	FAMILY	SCIENTIFIC NAME
Crapaud	BUFONIDAE	<i>Bufo marinus</i>
Frog	HYLIDAE	<i>Hyla sp</i>
Mongoose	HERPESTIDAE	<i>Herpestes auropunctatus</i>
Lizard	TEIIDAE	<i>Trapidorus hisperus</i>
Salipenta	TEIIDAE	<i>Tupinambus tebuixin</i>

#### 4.3.4.4 Aquatic Environment

There are two (2) major aquatic systems in close proximity to the project site. These are the Demerara River and the Atlantic Ocean. However, a detail analysis on these aquatic systems was not conducted since no direct impact from the project is expected. In addition, these aquatic systems are not limited to the project environment, but are vast and extend way beyond the project area. Within the project site itself there are no major aquatic systems. No main fish or aquatic species of significant environmental or ecological importance were identified. The aquatic species of vegetation were considered aquatic weeds that obstruct effective water flow.

### 4.4 Social Environment

#### 4.4.1 Introduction

The socio-economic and cultural assessment provides an analysis of the general socio-economic setting within the context of the project. The report analysed the extent and potential socio-economic and cultural impacts of the proposed project. The assessment provides a baseline of the prevailing circumstances which would potentially influence or be impacted on by the establishment of the project. It identifies the significant negative and positive externalities that are likely to emanate during the life of the project and highlights the significance of the identified impacts. It outlines recommendations to curtail or mitigate the negative impacts while ensuring that maximum benefits are garnered from the positive impacts. The

assessment also highlights the concerns of stakeholders existing within close proximity of the proposed project site and the perspectives of those stakeholders that share an institutional linkage to the development initiative.

#### 4.4.2 Methodology

The socio-economic impact analysis was informed by a variety of methodologies that allowed for the capture of the necessary information.

The EIA stakeholders meeting hosted by the EPA (on Friday May 16<sup>th</sup> at the EPA Boardroom) and the Scoping Meeting (held on Friday May 16<sup>th</sup> at the Umana Yana in Kingston) were attended as a means of ascertaining a preliminary overview of the project design, potential impacts and stakeholders views. The attendance of these meetings allowed for the framing of an approach within which the assessment would be conducted.

A number of site visits were executed at various points of the assessment for a more comprehensive understanding of the project based on the stakeholders' views gleaned from the consultation process; the potential project impacts and information from project documents.

A list of stakeholders was drafted after consultation with team members and the EPA. The list of stakeholders included institutions whose office buildings are located within close proximity to the proposed project site; (See Table 4.8); and stakeholders that are linked to the project as a consequence of their institutional mandate or whose functions and operations are directly or indirectly linked to or would be affected by the operations of the proposed development; (See Table 4.8). The second grouping of stakeholders was further sub-divided to allow for the assessments of stakeholder perspectives within the context of their institutional function, operation and mandate. The derived groupings were *Land Use Administration and Regulatory Agencies, Religious Institutions, Tourism Agencies, Social Service and Utility Providers and Institutions within the Immediate Zone of Impact*.

**Table 4.8 List of stakeholder institutions with whom consultations were held**

	<b>Categories of Stakeholders</b>	<b>Agencies</b>
1	Land Use Administration and Regulatory	Guyana Lands and Surveys Commission (GLSC) Mayor and City Council (M & CC) Ministry of Housing and Water - Central Housing and Planning Authority (CHPA) Ministry of Public Works and Communication - Sea and River Defence Division (SRDD) MPW&C, Works Services Group (WSG) – Traffic Safety Unit
2	Religious	Guyana Council of Churches (GCC)
3	Tourism	Guyana Tourism Authority (GTA) Tourism and Hospitality Association of Guyana (THAG)
4	Social Service and Utility Providers	Guyana Power Light (GPL) Guyana Fire Service (GFS) Guyana Water Inc. (G.W.I) – Project Management Unit
5	Institutions within the Immediate Zone of Impact	Demerara Timbers Limited (DTL) Pegasus Hotel Guyana Defence Force (GDF) - Coast Guard Division* Guyana Forestry Commission (GFC) Ministry of Local Government MPW&C - Transport and Harbours Department (T&HD) National Centre for Educational Research and Development (NCERD)

*Note: Efforts to hold a stakeholder meeting with the Guyana Police Force (GPF) proved futile.*

\* Was not approached by the socio-economic consultancy specialist but was interviewed by another member of the ESIA team.

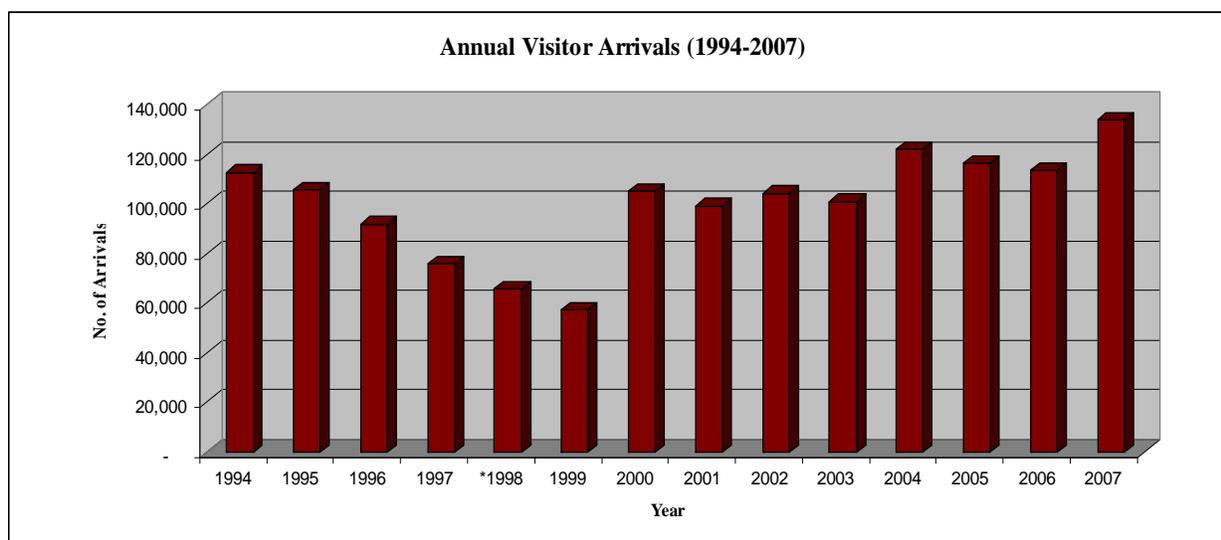
Secondary data including project documents, various studies, reports, legislative material and development plans as they relate to the socio economic and tourism and hospitality sector in Guyana were reviewed. The reviewed material included the Georgetown Development Plan 2001-2010; Guyana Sea Defences Inventory; Petition to Parliament by the Christian Community against Gambling, and the Sea Defence Act of 1998 etc. In addition to information gleaned through the review of literature and the consultation process the data bases of Guyana Bureau of Statistics and the Guyana Tourism Authority were also utilized.

#### 4.4.3 Socio-Economic Setting

##### 4.4.3.1 The Tourism Sector

Guyana's tourism industry though identified as being a potential means of increasing national revenue is yet to be recognized as a significant contributor to the nation's GDP. The contributions of this sub-sector are captured under the services sector in the national accounting system, but no records currently exists that highlight the specific contribution of this sub-sector to GDP. This is largely due to the fact that a system is yet to be implemented which tracks the spending of tourist/visitors outside of the collection of departure and entry taxes at the regulated national ports of entry.

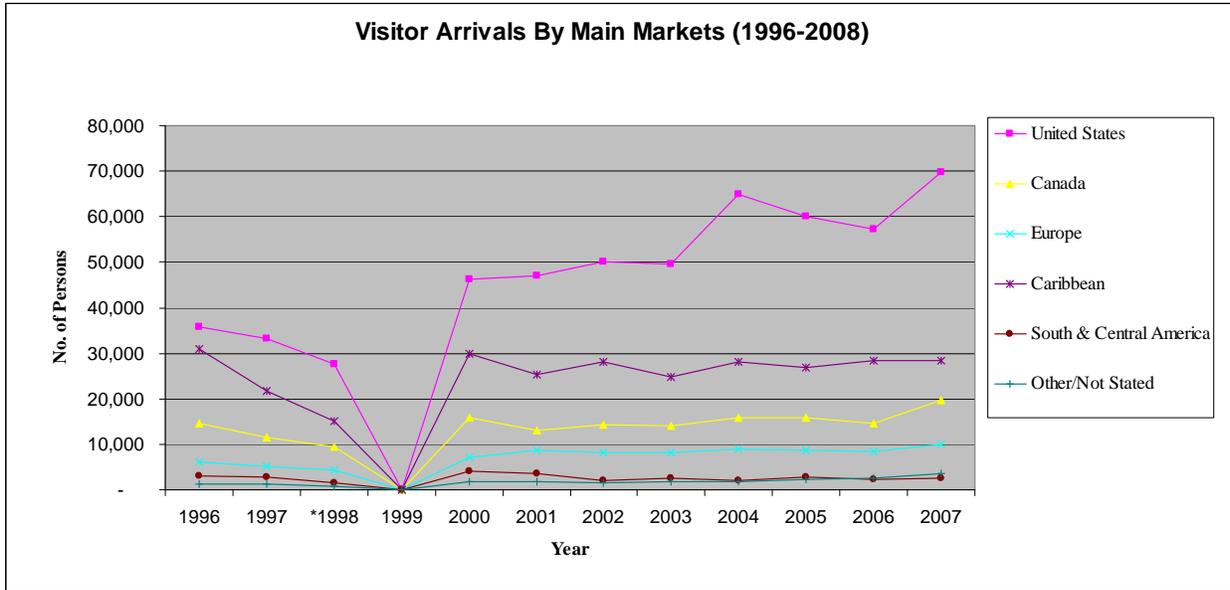
An examination of the annual visitor arrivals between 1994 and 2007 indicates that the industry has not grown significantly with visitor arrivals totaling 112 824 in 1994 and 134 057 in 2007. This represents an 18% increase in arrivals over the 13 year period. It must also be noted that Guyana would have benefited from tourist arrivals for Cricket World Cup in 2007. A comparison with the 1994 and 2006 arrivals shows just a 0.65 increase in visitor arrivals over the 12 year period. The arrivals record further reveals that apart from 2007 the number of visitor arrivals only surpassed 120 000 in 2004 between the period 1994 and 2007. This period also showed two distinct trends in visitor arrivals with there being a decline a consistent decline from 1994 to 1999 and a marginal increase between 2000 and 2007 (See Figure 4.11).



Source: Guyana Tourism Authority

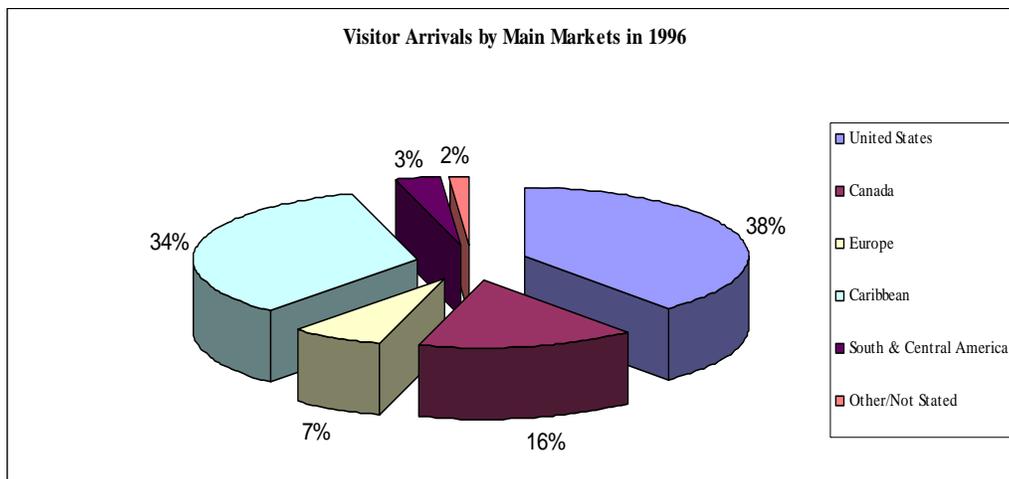
**Figure 4.11 Annual Visitor Arrivals to Guyana (1994-2007)**

Guyana's main visitor market between 1996 and 2008 has consistently been the United States of America. In fact, despite the slow growth in the number of arrivals in total arrivals from the USA has shown significant increases over the period (See Figure 4.9). In 1996 the USA accounted for 34% of totals arrivals as compared to 52% percent in 2007 (See Figure 4.10 and Figure 4.11). This represents an actual increase from 33 833 in 1996 to 69 823 visitors in 2007 a 106 % increase. The second greatest percentage of arrivals originates from the Caribbean. Other main markets include Central and South America and Europe. Efforts to source data on the category of tourist and hotel occupancy rates proved futile. Such statistics would have further enhanced the socio-economic discussion within the context of the proposed development.



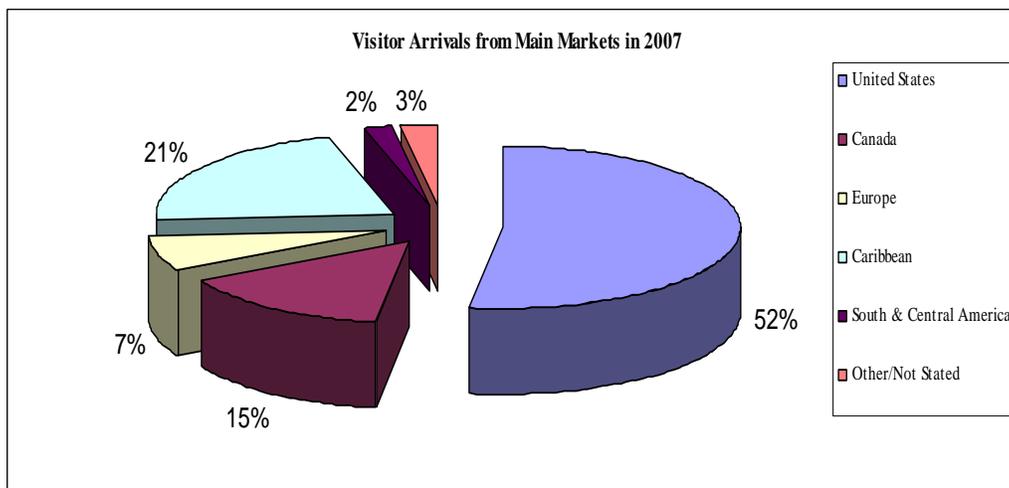
Source: Guyana Tourism Authority

**Figure 4.12** Visitor Arrivals by Main Markets (1996-2008)



Source: Guyana Tourism Authority

**Figure 4.13** Visitor Arrivals by Main Markets in 1996



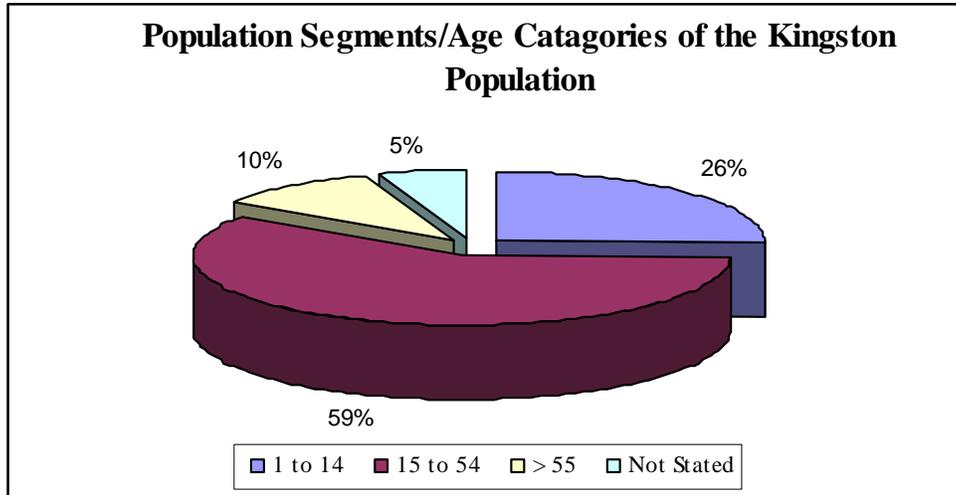
Source: Guyana Tourism Authority

**Figure 4.14 Visitor Arrivals by Main Markets in 2007**

#### 4.4.3.2 Community Profile (Kingston)

##### Population Demographics

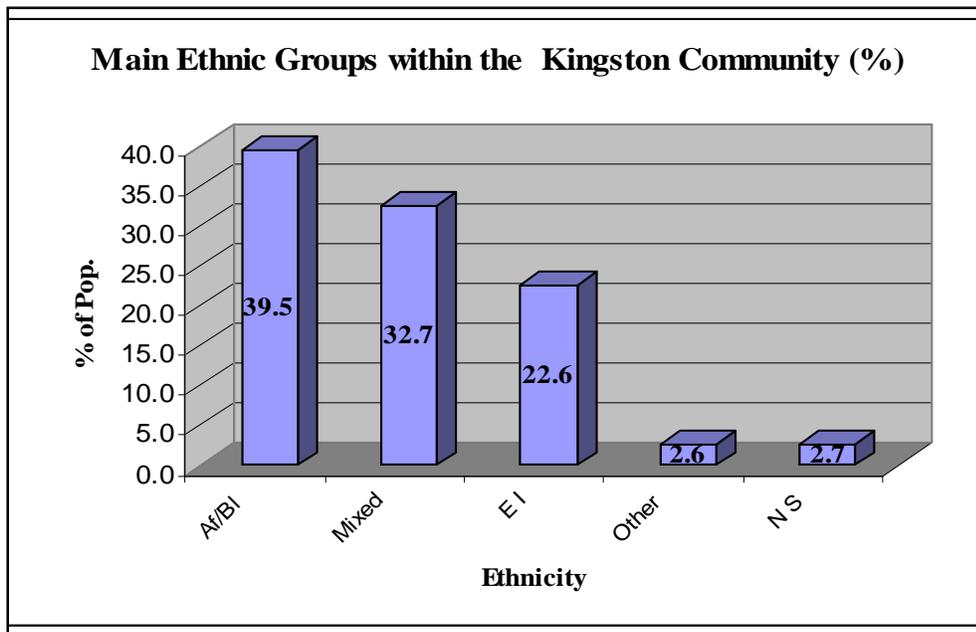
The Kingston community has a population of approximately 1 280 persons (2002 *Population and Housing Census*). The main segments of the population belong to the children/youths (1-14) and the working class (15-54) categories. These segments accounted for 26% and 59% respectively of the community's populace. According to the census (2002), females account for a marginally larger proportion of the population with 50.3%.



Source: 2002 *Population and Household Census*

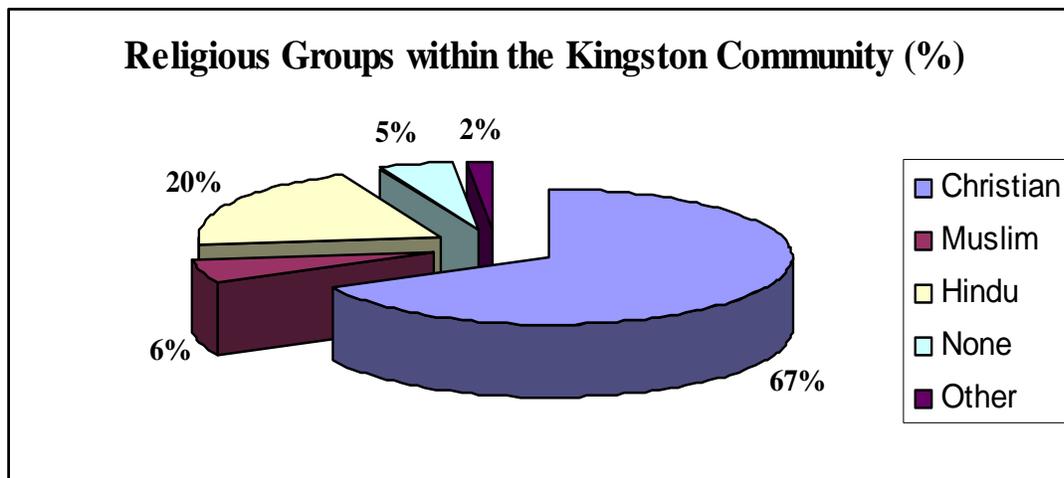
**Figure 4.15 Population Distribution**

The main ethnic groups within the community are Africans; Mixed Races; and East Indians which account for 39.5%, 32.7% and 22.6% of the population respectively (See Figure 4.16). The most dominant religious group is Christians whom account for 67% of the religious community while Hindu's are the second most dominant with 20% (See Figure 4.17). Among the Christian community Roman Catholics and Pentecostal are the most prominent denominations.



Source: 2002 Population and Household Census

**Figure 4.16 Ethnic Distribution**



Source: 2002 Population and Household Census

**Figure 4.17 Religious Groups**

Among the 952 individuals who were of an eligible working age 53% were employed, 18% performed home duties, 9.4% attended school, while the remaining 20% were unemployed or retired. Most of the employed individuals were engaged in the services sector providing clerical services. Among the 1 175 household heads, 57.6% indicated that secondary school attendance was their highest level of educational attainment, 19.4% indicated it was primary education while 16% had a post secondary or university level education.

The Kingston community has 377 private dwelling places (units). Of this total 54% are undivided private dwellings while 34% are part of a private house (that is, either upper or lower flat or a divided flat). As it related to occupancy: owned (28.7%); rented-private (31%); and rent-free (28%); were the most prevalent occupancy arrangements (See

Table 4.8).

**Table 4.9 Occupancy arrangement within the Kingston Community**

Occupancy Status	Owned/Freehold	Squatted	Rented -Private	Rented Govt.	Leased	Rent Free	Don't Know	Other	Total
Amount	108	21	117	2	3	105	15	6	377

61.5% of the residential units are classified as wooden buildings, 15.6% as concrete structures, and 21.2% as a combination of both wood and concrete while the remaining 1.7% was constructed by other materials.

#### 4.4.3.3 Land Use

The land use in the Kingston area is mainly a function of historical factors, with much of the area retaining its traditional looks. The area is made up mainly of office buildings, though there are a few housing units around the Fort Street area. While the community has undergone some change over the past two decades, it for the most part maintains its traditional land use as an employment centre for Government ministries, semi-autonomous agencies, embassies, offices of corporations, NGO's and utility service providers. Some of the more prominent entities include:

- The Ministry of Public Works and Communication Buildings;
- The Ministry of Local Government;
- The Head Office of the Guyana Elections Commission;
- The British, Canadian and United States of American Embassy Buildings;
- The Headquarters of GPF;
- The Appellate Court of Appeal;
- The Cheddi Jagan Research Centre;
- The St. Joseph Mercy Hospital;
- The GFC; and
- The Pegasus Hotel

The most visible change in land use has been the transformation of residential properties into business centres and office buildings. The proposed project will therefore complement the existing land-use found in the area.



**Image 4.12 New building developments within the Kingston Community (Barrack Street)**

#### 4.4.3.4 Land Use Planning and Zoning

The main land use plan identified for the area of the project is the Draft GGDP. Within the Plan the Kingston community is identified within the zone plan of the Georgetown seawall. The Georgetown seawall is divided into three zones which are then further subdivided in smaller geographical sections.

#### **Zone I**

- **Zone 1 – a:** this area is south of the seawall, from the Pegasus Hotel in the west to the Kitty Groyne in the east. This area is identified for pedestrian use and appropriate car parking sites will be provided for.
- **Zone 1- b:** this area is from Pere Street, Kitty (along the Seawall) to Industry Road, further east.

Permitted land uses – landscaping, mini amusement park, park furniture, mobile vending units, car parks, spots for musical entertainment. Within this any structure construction must not exceed 15 feet.

#### **Zone II**

- **Zone II – a:** the area west of Le Meridian Pegasus and east of the Demerara River estuary.
- **Zone II – b:** the built up area north and slightly east of the Kitty Groyne.
- **Zone II – c:** the built up area north of the East Coast Public Road and west of the Ogle gas station.

The permitted land uses in this zone include restaurants, discotheques, bars, video centers, craft shops, sports clubs and pharmacies.

#### **Zone III**

- **Zone III – a:** a part of the built up area 395' east of the Kitty Groyne and extending for 640' in an easterly direction, all north of the Seawall.
- **Zone III – b:** the area of land east of Cummings Lodge Road up to Atlantic Ville Public road further east.

For this zone no further development activities will be permitted.

The project site is located within Zone II-a which is the “area west of the Pegasus Hotel and east of the Demerara River Estuary” (CH&PA 2002). This zone has been proposed as an area to feature mainly recreational facilities. Hence the construction of the project along the Kingston shoreline is in keeping with the development plan for this zone of the city as outline in the Draft GGDP.

Currently, the main work plan of the SRDD includes the execution of rehabilitation and maintenance works under the 9<sup>th</sup> EDF. Under this project initiative the area of the proposed development site has not been identified for any rehabilitation or maintenance works to the SDS.

#### **4.4.3.5 Land Tenure**

In the Kingston area, land is owned either by the State or under private freehold tenure. Part of the land, including dams and canal banks, is common property. Given the fact that land is either publicly or privately owned, two types of land tenure are identifiable: freehold and leasehold.

##### *Freehold Land*

Freehold refers to land owned by persons who hold title deeds to the properties. Referred to as "proprietor's land" or "bona fide" land, freehold is the most secure form of tenure. Freehold is generally located along the sea coast and benefit from the best conditions regarding transportation, drainage and irrigation, and soils. Most of the estimated 40 households in the Kingston area occupy freehold land. This is consistent with the Housing and Population Census of 2002 that found that most households in the area owned the property in which they live, though others are in special arrangements or “children property”.<sup>\*</sup> Many of the houses in the area are occupied by tenants, with rentals ranging from between G\$28,000 for a two bedroom apartment to G\$60 000 for a three bedroom apartment. These rentals help to supplement the income of the owners. Other prominent private land owners include DTL.

##### *Leaseholds*

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<sup>\*</sup> This latter category is where the property has been bequeathed to more children of the deceased

Most of the lands in the area, including that which the proposed project is to be erected, are publicly owned Government lands. A great part of the publicly owned land is leased to government agencies. The largest single occupier of land is the Guyana Police Force whose properties include, the institution's Headquarters, the Criminal Investigation's Department (CID) building, the Photographic and Forensic Laboratory, the Barracks of the force's main Tactical Service's Unit (TSU), the Felix Austin Police College, the sports club and ground facility and residential units for officers. Other prominent lease holders are The Ministry of Public Works and Communication (MPWC) and the Guyana Water Incorporated (GWI).

The land on which the Hotel will be constructed on is currently owned by the State and will legally be transferred to NICIL. A lease will be given to AHI for a period of 99 years at an annual rent of G\$100 per annum. An option will also be extended to the Lessee to purchase the land for US\$1,000,000 one year after hotel operations commence.

#### 4.4.3.6 Infrastructure and Social Services

##### 4.4.3.6.1 Roads

The infrastructural facilities of the Kingston community were observed generally to be in good condition. All roads within the immediate vicinity of the project, with the exception of Battery Road, were well paved. Battery Road was unpaved this time due to the relocation of the sewer line. However, there was a noted absence of, or poor traffic signage on some roadways within a two kilometer radius of the proposed development.



A. Pronounced skid-like erosion and potholes evident along several points of the roadway

B. Large high density vehicle traversing Battery Road

**Image 4.13 Depleted state of Battery Road post the Sewer Pipe recounting exercise**

##### 4.4.3.6.2 Water Supply

Potable water is supplied to the pipe lines of the community on sixteen (16) hours per day schedule by GWI. 91% of the residential properties are recipients of this service. However, water is only piped directly into 69% of dwellings.

Prior to the site preparation exercise which included the relocation Kingston bore-hole to a point beyond the boundary of the proposed development site the community received water at an average flow-rate of 70m<sup>3</sup> per hour. Since the new bore hole has been commissioned the average flow rate has increased to 90m<sup>3</sup> per hour. Further, GWI is seeking to acquire a pump which will provide the community with an average flow rate of 140m<sup>3</sup> per hour.



**Image 4.14** New Kingston borehole and pump relocated to the western boundary of the project site

The project is expected to utilize an average of 90, 850L (24,000 gallons) per day. The existing pump in the area does not have the capacity to supply the water needs of the project since it was installed to meet the low demand of the area. GWI has indicated that they will install a new pump to meet the increase requirement. While the total consumption of the Kingston community cannot easily be determined according to GWI the new well in the area would ensure that the facility's water needs are easily met without compromising the water needs of other water users.

#### **4.4.3.7 Electricity and Telecommunication**

Electrical power and telecommunication to the area are provided via utility lines suspended on a network of wooden lantern-posts. The energy and telecommunication services can be described as being between fair to good. The proposed project is projected to have an energy requirement of 2.4 MW. This energy requirement will be met mainly from the national grid via the Guyana Power and Light Inc. (GPL) Company. In addition, generators will be used to service the high demanding areas and serve as backup. A total of four (4) generators will be installed by the developer of capacities ranging from 500kva to 2 MW housed in sound proof enclosures with one (1) serving as back up.

Land line telephone service is provided by GT&T but the capacity will have to be increased to satisfy the need of the project. Further, cellular signal to the community is excellent, from both service providers, Digicel and GT&T.

#### **4.4.3.8 Solid Waste Collection and Sewage**

The collection and disposal of solid waste within the Kingston community is regulated by the Georgetown Mayor and City Council (M&CC). The M&CC could not provide an estimate of the volume of solid and liquid garbage collected from the Kingston area, however, the Inter-American Development Bank (IADB) estimates that Georgetown as a whole produces 190 tonnes of solid waste daily and 65 350 tonnes yearly.<sup>†</sup> Much of this waste is deposited at the Mandela dumpsite. No estimate of liquid waste was

<sup>†</sup> IADB (2006) 'Georgetown Solid Waste Management Program: Loan and Guarantee Proposal', IDB, Washington, DC.

available. ADUA estimates that the project will generate approximately 10 cubic yards of un-compacted solid waste per day. Additionally, liquid waste is estimated to be in the range of 90,850L (24,000 US gallons) at 80% occupancy per day.

Garbage collection in the proposed project area is facilitated by private companies, contracted by the M&CC. According to the 2002 Census (325 of 375 households) 87% of households within the Kingston community benefit from this mode of garbage collection, while the remaining households either dump or burn their waste.

The proposed project will have its solid waste collected by private contractors, at a cost to the developer, and posited at the Haags Bosch landfill site.<sup>‡</sup> The private contractors are expected to have compactors and fully enclosed vehicles to reduce the possibility of stench and effluent discharge during transportation of the solid waste.

The facility is projected to generate approximately 90,849L (24,000 US gallons) at 80% occupancy of liquid waste per day during its operations. This waste will be treated by the sewage and waste water treatment plant to be installed by the developer and the treated effluent will be disposed of through the existing sewage system. Sewage collection and disposal falls within the preview of the Guyana Water Incorporated (GWI). Sewage from some wards in Central and North Georgetown including the Kingston community are serviced by a sewer main. 74% of all dwelling units within Kinston dispose of their untreated sewer via this means. The untreated sewage is pumped via pumping stations into the ring main and finally into the force main from which it is discharged approximately 100 meters into the estuary of the Demerara River.

#### **4.4.3.9 Health Facilities**

The coverage by health institutions in Guyana can be described as fair, with areas closer to the city being serviced by a variety of facilities. Within the Kingston community, and in relatively close proximity to the project site, is the St. Joseph Mercy Hospital. This is a privately owned entity, providing diagnostic and primary health care services. Additionally, the community due to its location has access to other prominent health facilities that provide a variety of health related services. These include the Woodlands Hospital, the Georgetown Public Hospital, Balwant Singh Hospital, the Georgetown Medical Centre, and the Cheddi Jagan Dental School, the Eureka Medical Laboratory and the Medical Arts Center. All of these facilities are located within the South and North Cummingsburg communities that are within a three mile radius of the proposed project site. As such, the need to access medical facilities is easily facilitated by the location of the proposed project. However, the proposed project is not anticipated to increase the pressure on the existing government health care system in any significant way.

#### **4.4.3.10 Fire Services**

Georgetown has four fire stations, namely the Central/Headquarters, Campbellville, West Ruimveldt and the Alberttown Stations. These stations are equipped with six (6) specialized fire fighting vehicles (water tenders), three (3) at the Headquarters, and one each at the other branches.

The main response unit is sourced from the central station which as a first response provides two of its three fire engines which are each manned by five (5) to six (6) firemen depending on the scale of the emergency. Additional assistance in the form of another fire engine is usually provided by another branch closest to the emergency. In a response effort each unit of personnel attached to the three water tenders has specialized task. The first unit is responsible for search and rescue, the second unit for containment of the blaze while the third unit acts as a support group to either of the first groups depending on the nature and demands of the operation.

The Central station is usually manned by thirty (30) to forty (40) staff members comprising of senior specialized officers and emergency response personnel. The most recent addition to the station's equipment is a ladder capable of reaching 30m (100 feet) in height and, thus being capable of reaching the top floor of the proposed development.

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<sup>‡</sup> This site, which should have commenced operations in 2007, is now slated to begin construction activities in 2009.

The Kingston community is viewed by the Fire Service as a 'high-risk' location due to the fact that it has a high density of old traditional wooden buildings which are in some instances closely 'stacked' together. However, given the location of this facility, and the number of fire breaks between it and other public and private properties, fires in the area is not anticipated to threaten the superstructure.

#### **4.4.3.11 Security**

The Guyana Police Force Headquarters and its Investigative and Response Units are located within this vicinity. These include the Criminal Investigation Department (CID), the forensic and photographic laboratories and the Tactical Services Unit (TSU) which is the force's main rapid response unit in the event of reported criminal activities and other emergencies. This Unit also provides Kingston and other communities within the city with day and night time patrols and has in the past been credited with the capture of criminals and foiling suspected criminal activities in the area.

#### **4.4.4 Key Heritage and Archaeological Sites**

The Kingston community has a prominent history and significant cultural and intrinsic value to the city of Georgetown. Kingston got its name from King George of England. It was part of Plantation Eve Leary which was named after the wife or daughter of its owner, Cornelius Leary. Some of the streets of Kingston have military names because the garrison used to be located there, e.g. Parade Street, Barrack Street and Fort Street. This rich heritage is still etched within many of its existing structures. According to the GGDP, the most prominent of these are the Umana Yana, the Cheddi Jagan Research Center (also known as the Red House and formerly Kamana Court), the light house and the 1974 African Liberation Monument.

##### **4.4.4.1 Cheddi Jagan Research Center**

The Cheddi Jagan Research Center with its distinctive red colour is situated in High Street, Kingston between Young and Barrack Streets. It is built of timber (pitch-pine) and is covered with red wallaba shingles. The Red House as it was formally known was acquired in 1925 by the Colony of British Guiana. Between 1925 and 1953, numerous Colonial Secretaries resided there. Dr. Cheddi Jagan, after whom it is currently named, also lived there from 1961 to 1964 while he served as Premier of British Guiana. From 1965 to the early 1990's the Red House was used as government offices. The house was left vacant until 1999 when the Cheddi Jagan Research Centre was established in the building. (Source: National Trust of Guyana (NTOG), *Historical Monuments* 2008)

##### **4.4.4.2 The Umana Yana**

The Umana Yana is a conical palm thatched hut (benab) erected for the Non-Aligned Foreign Ministers Conference in Guyana in August 1972 as a V.I.P. Lounge and recreation centre. It was constructed on the lawns of the former Mariners Club, at the northeastern end of High Street it intersected with Battery Road. The structure was constructed in the classic pattern of the benab built by the local Wai Wai people. It is now a permanent and much admired part of Georgetown's scenery, and is in constant use as an exhibition and conference centre. This structure is no more than 200 meters from the proposed project site and is likely to remain a major tourist attraction. The structure is 55 feet (16.78 meters) high and is made from thatched allibanna and manicole palm leaves, and wallaba posts lashed together with mukru, turu and nibbi vines. No nails were used in its original construction. It was erected by a team of about sixty Wai-Wai Amerindians, one of the nine indigenous tribes of Guyana. It occupies an area of 460 square metres, making it the largest structure of its kind in Guyana. "Umana Yana" is a Wai-Wai word meaning "Meeting place of the people." (Source: National Trust of Guyana (NTOG), *Historical Monuments* 2008)

##### **4.4.4.3 The Lighthouse**

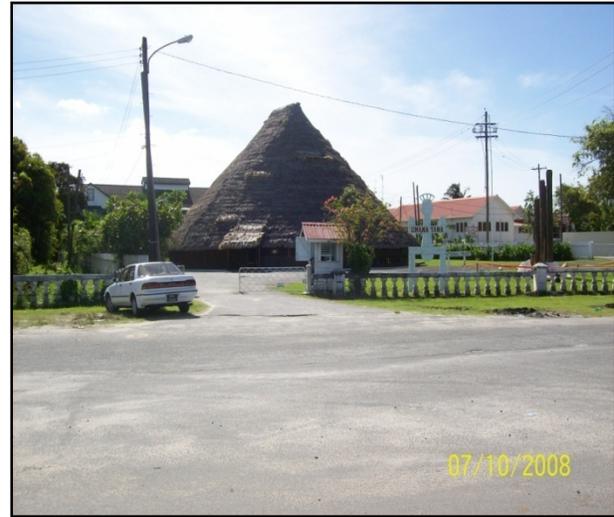
The Light House (See Figure 6) is approximately 300 metres from the proposed project site. It is situated at the mouth of the Demerara River. The foundation stone of the present building was laid in 1830, replacing a wooden lighthouse which was constructed by the Dutch in 1817. (Source: National Trust of Guyana (NTOG), *Historic Kingston* 2008)

#### 4.4.4.4 The 1974 African Liberation Monument

On 26 August 1974, President Forbes Burnham unveiled the African Liberation Monument outside the Umana Yana benab in memory of all of those who have struggled and continue to struggle for freedom from human bondage. The monument consists of five polished Greenheart logs encased in a jasper stand on a granite boulder. The varying heights of the logs are representative of the different ages of the martyrs; the slab of granite represents the strength of the freedom movement and the pebbles around the base of the monument represent the millions of peoples who are involved in the fight of human bondage. (Source: National Trust of Guyana (NTOG), *Historical Monuments* 2008)



A. The Cheddi Jagan Research Center



B. Umana Yana

**Image 4.15**      **Gazetted Heritage Sites; the Cheddi Jagan Research Center and Umana Yana located on High Street, Kingston**



**Image 4.16 The Kingston Lighthouse bellowing over the surrounding building on Water Street, Kingston**

In addition to these sites the GGDP further identifies other sites of historical and archeological importance within Kingston that can potentially be adopted as Heritage sites. These include;

- A. Band Stands
  - Eve Leary Seawall Bandstand
  
- B. Public Buildings
  - US Embassy Information Service
  - Canadian Embassy
  - Guybau House
  - Demerara Company
  - Austin House
  - Stella Maris Convent
  - Old Railway Station (Derelict)
  - Inter American Development Bank
  - The Appellate Court
  
- C. Hospitals
  - St. Joseph's Mercy Hospital
  
- D. Church
  - Kingston Methodist Church
  
- E. Barracks
  - Balaclava Barracks
  - Eve Leary Barracks
  
- F. Cemeteries
  - British Cemetery

- G. Armories
  - The Armory, Eve Leary Compound
  
- H. Dwelling houses
  - The Kingston Methodist Manse
  - Fairlie House (Bidco House)
  
- I. Monuments
  - Georgetown Seawall
  - Fort William Fedrick
  
- J. Cannons
  - Eve Leary Complex
  
- K. Miscellany
  - The Round House
  - Weiting & Richter Ice Factory

Specifically for the proposed project the heritage sites that are within closet proximity to the construction site are the Umana Yana and the Kingston Lighthouse.

#### **4.4.5 Transportation and Traffic Management**

##### **4.4.5.1 Transportation**

The main transport service providers to the Kingston community are a network of privately owned minibuses and taxi services. Though the Kingston community is not directly serviced by a particular bus route it can be accessed from the central business district via minibuses plying the Plaisance Route (often referred to as the Kingston - Plaisance Route). The suitability of this community as a feasible transport route comes from the fact that it is located away from the congested streets of Central Georgetown and the fact that High Street offers a direct connection to the East Coast of Demerara Corridor. Further the presence of numerous offices allow for a constant supply of passengers for this locality.

Minibuses plying the Alberttown/Hospital Route upon returning to the city sometimes detour to the community and along with minibuses exiting the East Coast of Demerara corridor; provide the main means of transportation to the central business district.



**Image 4.17 Private minibus plying the Plaisance Route via High Street Kingston**

#### **4.4.5.2 Traffic Survey**

##### **4.4.5.2.1 Objective**

The main objective of the traffic surveys was to capture the volume of traffic flowing in the Kingston area that would be considered to have an influence on the traffic flow of the proposed hotel construction site. EMC retained the services of Winners Innovations to conduct 12-hour traffic counts over a three (3) day period.

##### **4.4.5.2.2 Methodology**

Due to the demographics of the area, mostly office and government buildings, it was decided that a representative sample would be sufficient to capture the traffic flows. Manual traffic surveys were conducted on Friday, June 27, and Monday, June 30 and Thursday July 03, 2008, between the hours of 06:00 hr to 18:00 hr at the following locations:

- Battery Road and High Street (Pegasus Junction) **STATION #1**
- Young Street and High Street (Appeal Court Junction) **STATION #2**
- Battery Road and Water Street (Forestry Junction) **STATION #3**
- Fort Street and Barrack Street (Digicell Junction) **STATION #4**

Traffic surveys were conducted manually by four technicians by the use of a data collection form. The form captured four classes of vehicles, cars; mini-buses; light trucks and heavy trucks and all the directions of traffic flow through the junction.

##### **4.4.5.2.3 Road Characteristics**

The basic characteristics of the roadway subtended in the survey area are as follows:

**Table 4.9 Basic Characteristics of the Roadway subtended in the Survey Area**

Item	Street Name	Road Width	Surface Treatment	Lane Type	Designed Structural Number	Classification	
A	High Street	35'-0"	Asphaltic Concrete (A/C)	2 way single lane	4.0	Declared Public Road	P
B	Battery Road	18'-0"	Unsurfaced <sup>§</sup>	2 way single lane	?	Declared Public Road	S
C	Fort Street	15'-0"	A/C	1 way single lane	3.0	Declared Public Road	S
D	Barrack Street	20'-0"	A/C	2 way single lane	Unknown	City Street	S
E	Water Street	20'-0"	A/C	2 way single lane	3.0	Declared Public Road	P
F	Young Street	38'-0"	A/C	2 way single lane	4.0	City Street	P

#### 4.4.5.2.4 Analysis of Survey

##### *Three (3) Day Summary Matrix*

- The Daily Traffic Volumes with the associated vehicle classification is discussed in the tabular matrices overleaf.
- In each matrix the alphabetical series header represent the various directions of traffic flow through the named junction.
- The Total column summarizes the total number of categorized vehicles passing through the junction during the period of the survey on a usual weekday.
- The bottom left cell / box indicates the total volume of traffic traveling through each junction.

<sup>§</sup> Base compaction and Asphaltic Concrete Surface finish works to be undertaken shortly by the Ministry of Public Works and Communications.

P = Primary Road

S = Secondary Road

**Table 4.10 Matrices Summary**

**MATRICES SUMMARY**

- Three (3) days Average

**A Pegasus Junction**

	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>Totals</b>	<b>%</b>
Cars	160.67	415.00	600.67	312.33	11.00	140.33	<b>1,640.00</b>	<b>74.8%</b>
Busses	17.67	55.33	76.67	36.67	1.33	23.00	<b>210.67</b>	<b>9.6%</b>
Lt Trucks	40.00	108.67	64.00	36.00	2.33	62.00	<b>313.00</b>	<b>14.3%</b>
Hv Trucks	9.00	11.67	5.00	1.33	0.00	2.67	<b>29.67</b>	<b>1.4%</b>
	<b>227.33</b>	<b>590.67</b>	<b>746.33</b>	<b>386.33</b>	<b>14.67</b>	<b>228.00</b>	<b>2,193.33</b>	

**B Appeal Court Junction**

	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>Totals</b>	<b>%</b>
Cars	849.00	1,397.67	143.33	284.67	417.67	438.33	<b>3,530.67</b>	<b>58.6%</b>
Busses	1,111.33	397.33	24.00	39.00	73.33	48.00	<b>1,693.00</b>	<b>28.1%</b>
Lt Trucks	146.00	220.67	28.67	56.33	73.33	90.00	<b>615.00</b>	<b>10.2%</b>
Hv Trucks	68.33	66.67	11.33	12.67	17.33	10.00	<b>186.33</b>	<b>3.1%</b>
	<b>2,174.67</b>	<b>2,082.33</b>	<b>207.33</b>	<b>392.67</b>	<b>581.67</b>	<b>586.33</b>	<b>6,025.00</b>	

**C Forestry Junction**

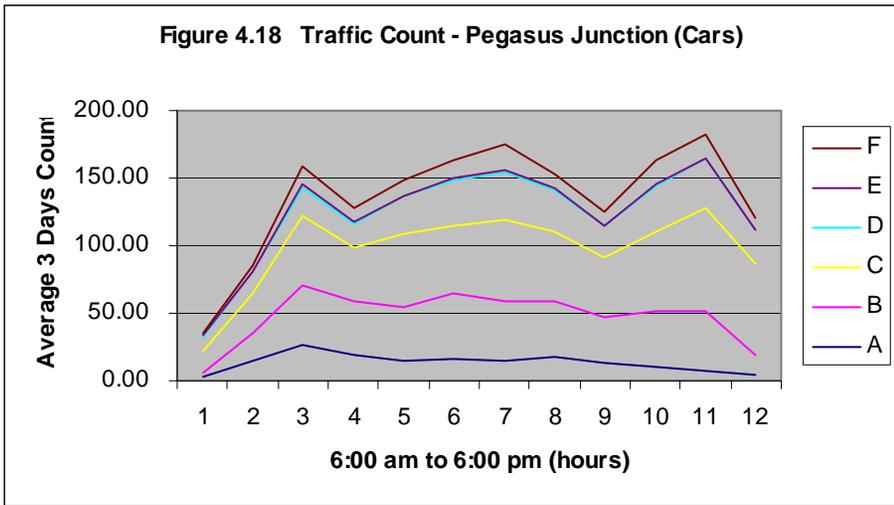
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>Totals</b>	<b>%</b>
Cars	109.67	122.33	66.67	58.67	45.33	33.33	<b>436.00</b>	<b>54.3%</b>
Busses	17.00	15.67	24.67	15.67	2.00	3.67	<b>78.67</b>	<b>9.8%</b>
Lt Trucks	48.67	53.67	37.67	37.67	26.00	20.00	<b>223.67</b>	<b>27.9%</b>
Hv Trucks	9.33	6.00	13.00	8.67	10.67	16.33	<b>64.00</b>	<b>8.0%</b>
	<b>184.67</b>	<b>197.67</b>	<b>142.00</b>	<b>120.67</b>	<b>84.00</b>	<b>73.33</b>	<b>802.33</b>	

**D Digicel Junction**

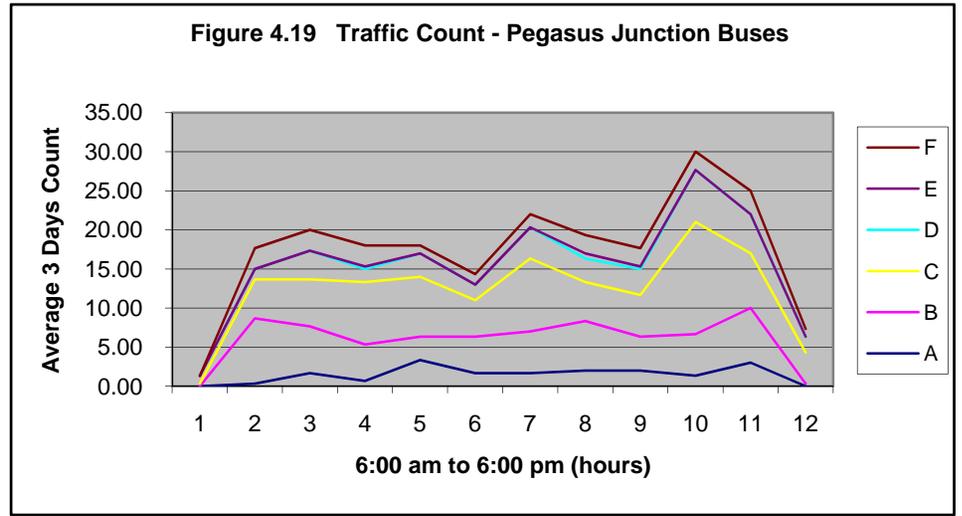
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>	<b>H</b>	<b>I</b>	<b>Totals</b>	<b>%</b>
Cars	283.33	25.67	67.33	730.33	185.00	8.33	33.00	135.67	107.00	<b>1,575.67</b>	<b>64.8%</b>
Busses	24.67	5.67	22.33	168.00	30.33	0.33	3.67	20.33	21.33	<b>296.67</b>	<b>12.2%</b>
Lt Trucks	87.67	8.33	30.00	212.33	65.00	3.67	9.67	40.00	39.33	<b>496.00</b>	<b>20.4%</b>
Hv Trucks	0.33	0.67	1.00	51.00	9.00	0.00	0.00	0.67	1.67	<b>64.33</b>	<b>2.6%</b>
	<b>396.00</b>	<b>40.33</b>	<b>120.67</b>	<b>1161.67</b>	<b>289.33</b>	<b>12.33</b>	<b>46.33</b>	<b>196.67</b>	<b>169.33</b>	<b>2,020.33</b>	

#### **4.4.5.3 Peak Hour Summary Graphs**

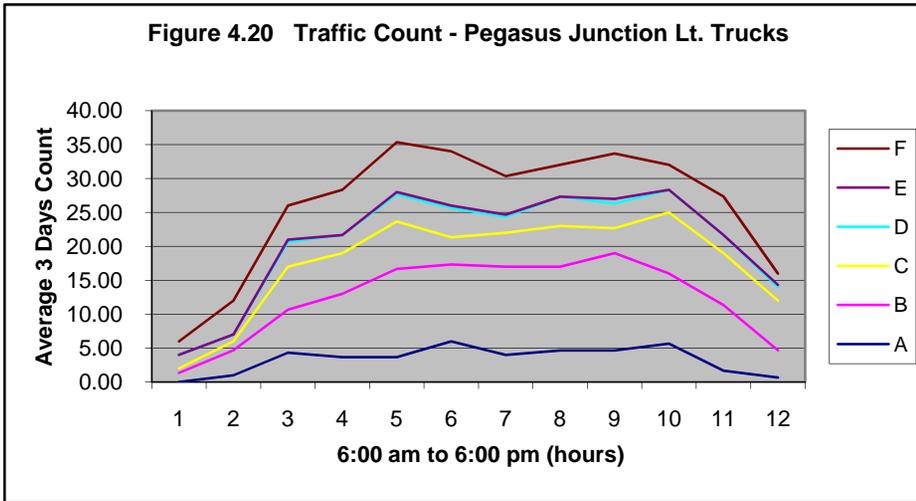
Four graphs are generated for each junction. Each graph is generated with stacked lines, each representing the different directions of traffic flow through a given junction – see Map 4.34. In essence, the graphs display the trend of the vehicles over a twelve hour period (06:00 hr to 18:00 hr) for each vehicle category.



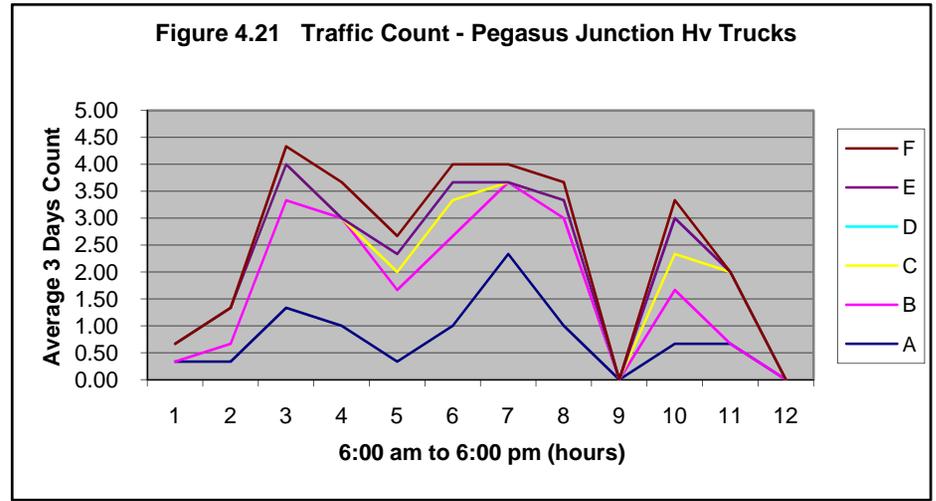
A to F represent Traffic Flow directions through the Junction - See Fig 4.34



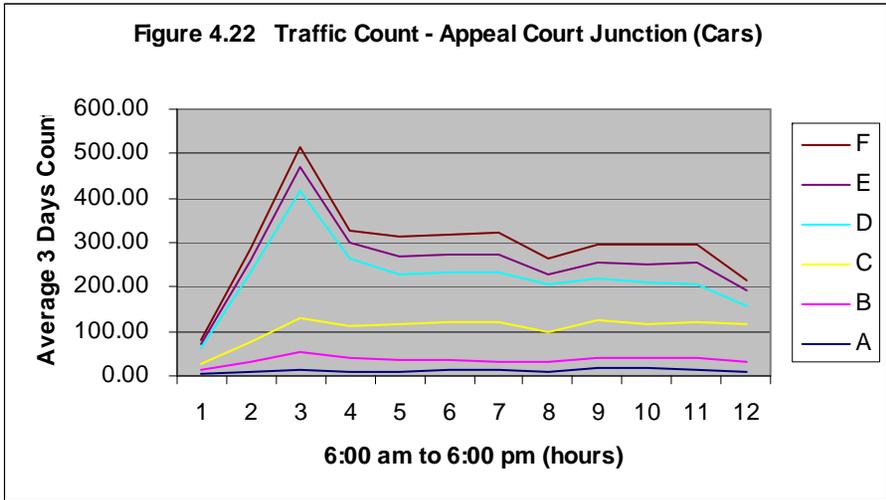
A to F represent Traffic Flow directions through the Junction - See Fig 4.34



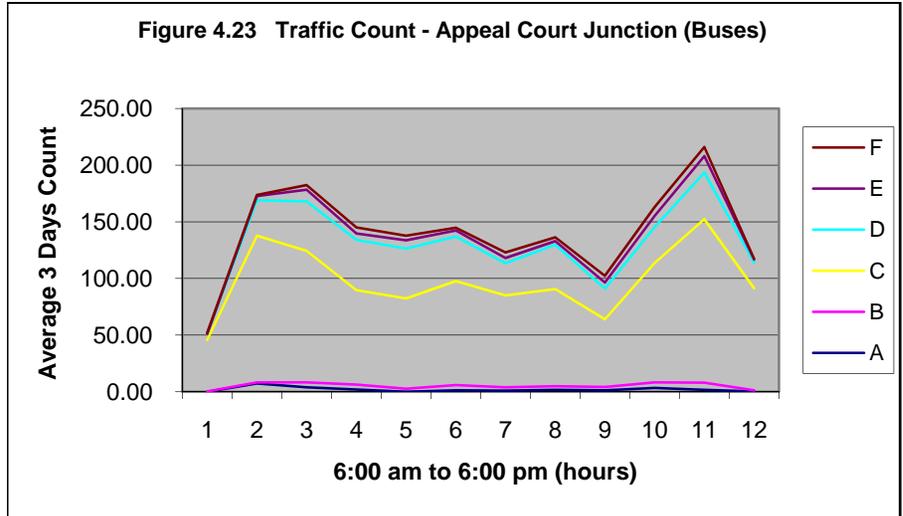
A to F represent Traffic Flow directions through the Junction - See Fig 4.34



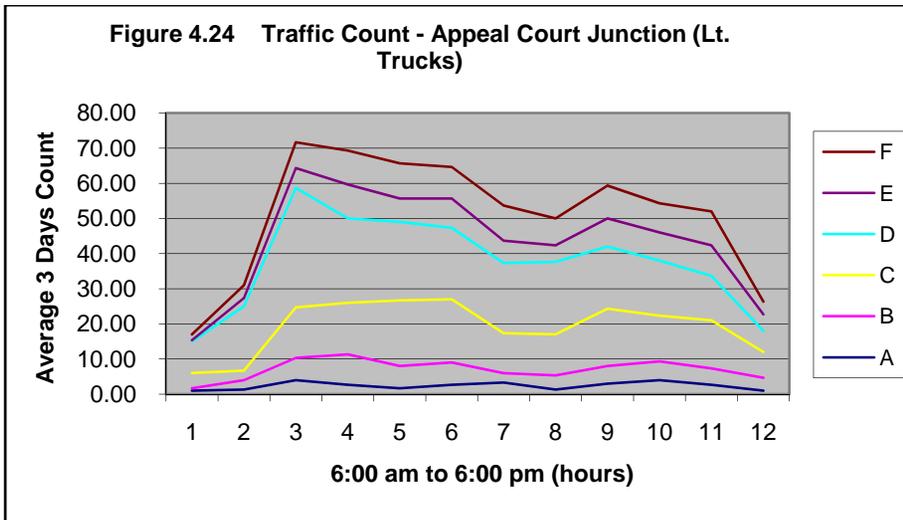
A to F represent Traffic Flow directions through the Junction - See Fig 4.34



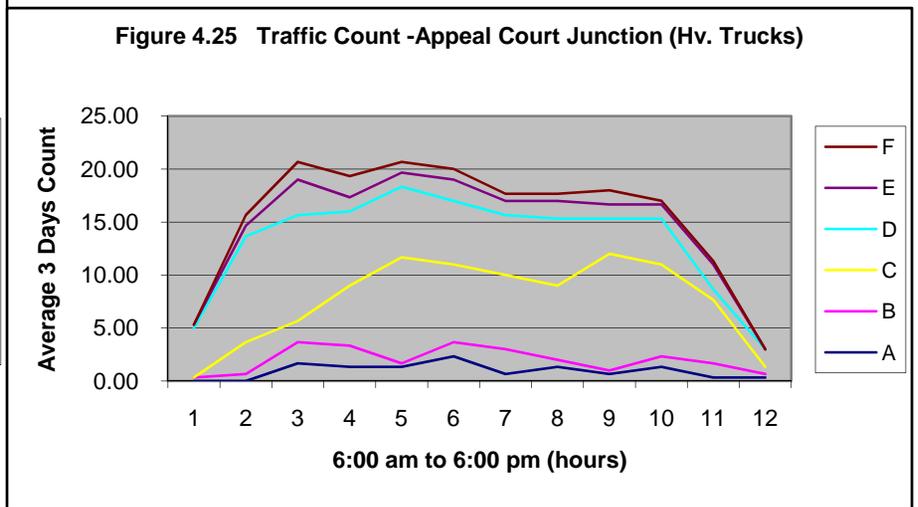
A to F represent Traffic Flow directions through the Junction - See Fig 4.34



A to F represent Traffic Flow directions through the Junction - See Fig 4.34

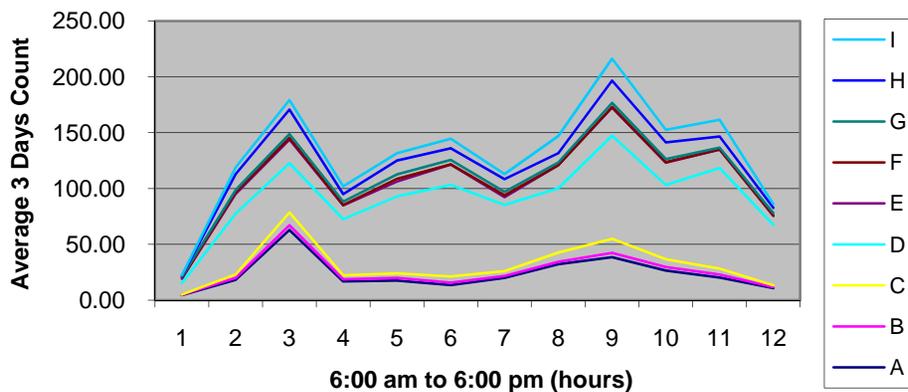


A to F represent Traffic Flow directions through the Junction - See Fig 4.34



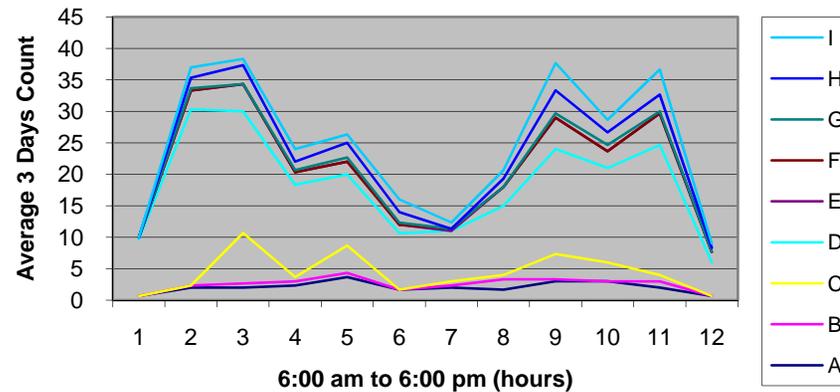
A to F represent Traffic Flow directions through the Junction - See Fig 4.34

Figure 4.26 Traffic Count - Digicell Junction (Cars)



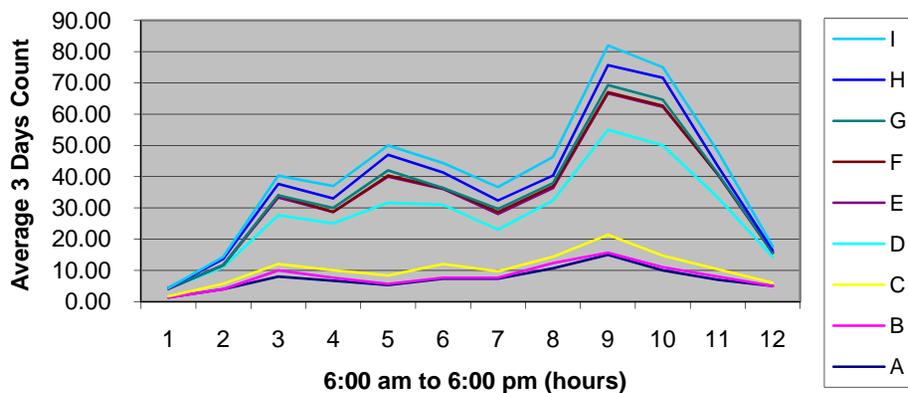
A to F represent Traffic Flow directions through the Junction - See Fig 4.34

Figure 4.27 Traffic Count - Digicell Junction Buses



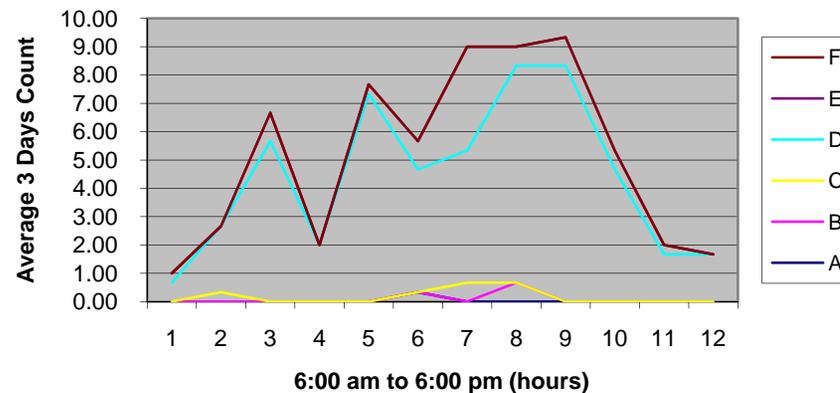
A to F represent Traffic Flow directions through the Junction - See Fig 4.34

Figure 4.28 Traffic Count - Digicell Junction Lt. Trucks



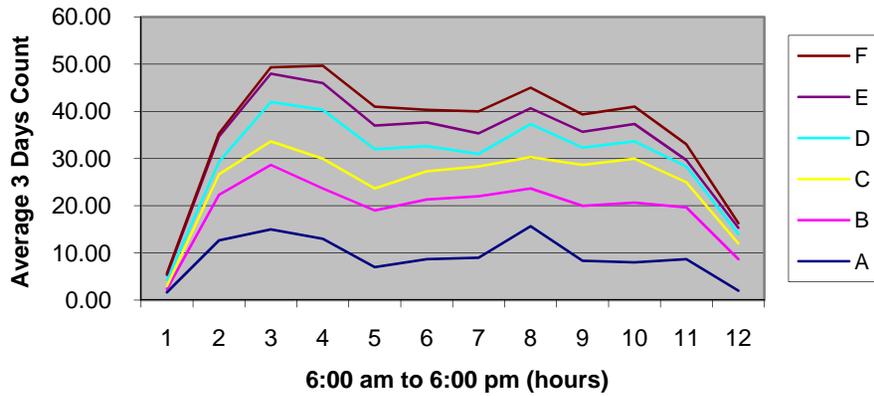
A to F represent Traffic Flow directions through the Junction - See Fig 4.34

Figure 4.29 Traffic Count - Digicell (Hv Trucks)



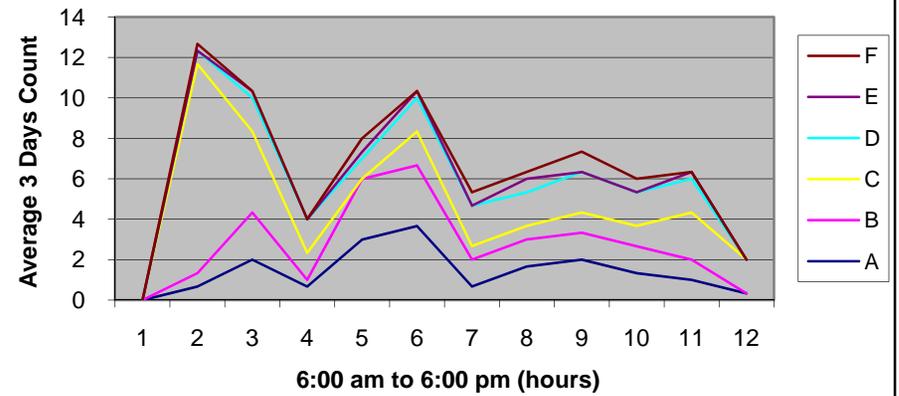
A to F represent Traffic Flow directions through the Junction - See Fig 4.34

**Figure 4.30 Traffic Count - Forestry Junction (Cars)**



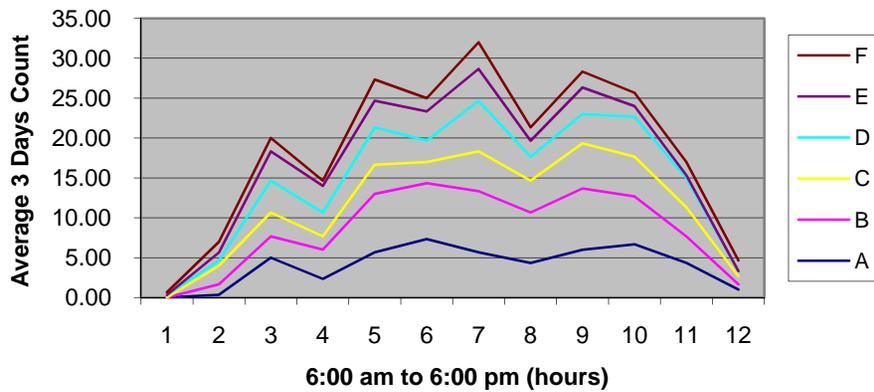
A to F represent Traffic Flow directions through the Junction - See Fig 4.34

**Figure 4.31 Traffic Count - Forestry Junction Buses**



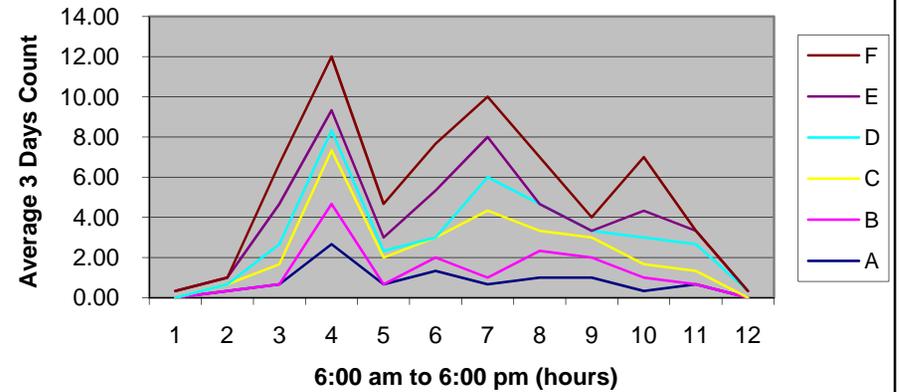
A to F represent Traffic Flow directions through the Junction - See Fig 4.34

**Figure 4.32 Traffic Count - Forestry Junction Lt. Trucks**



A to F represent Traffic Flow directions through the Junction - See Fig 4.34

**Figure 4.33 Traffic Count - Forestry Junction Hv Trucks**



A to F represent Traffic Flow directions through the Junction - See Fig 4.34

Peak Hours Traffic Flow into Survey Area

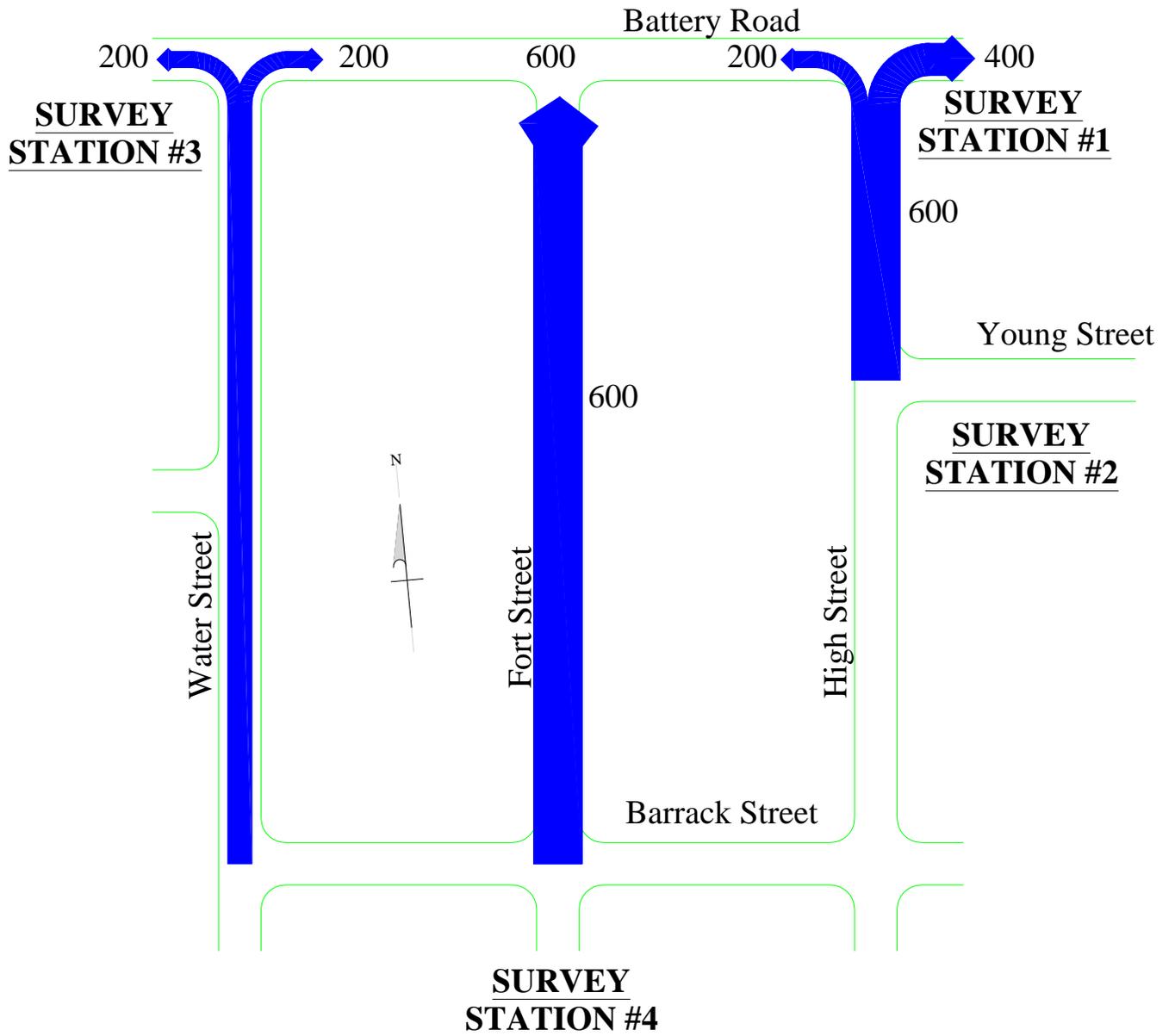


Figure 4.34 Traffic Flow into Survey Area

Peak Hours Traffic Flow out of Survey Area

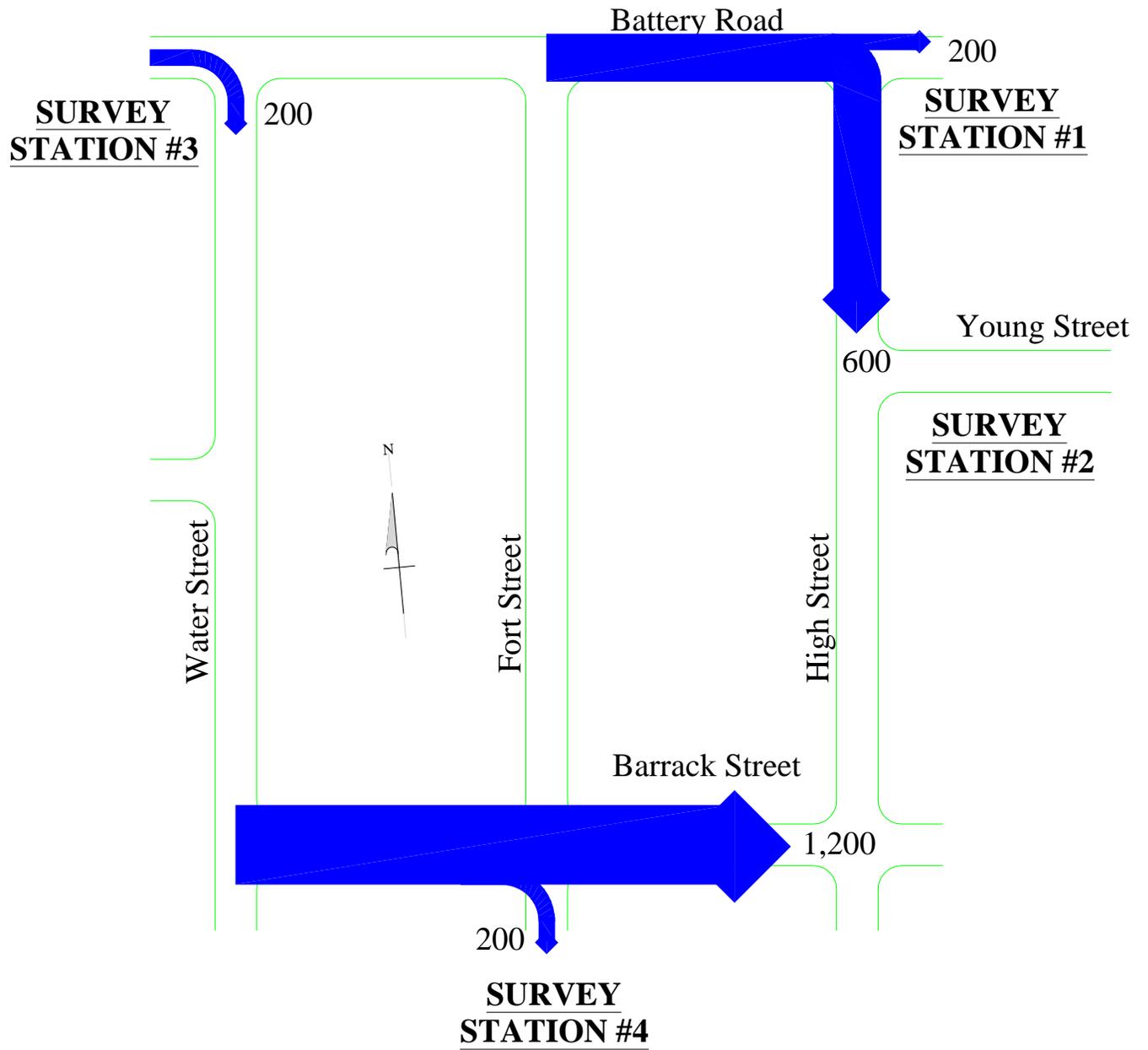


Figure 4.32 Traffic Flow out of Survey Area

#### 4.4.5.4 Findings

##### 4.4.5.4.1 Peak Hours in the survey area occurring for all junctions

0700 hr to 0900hr = 2 hrs

1100 hr to 1400hr = 3 hrs

1600 hr to 1700hr = 1 hr

**6 hrs**

##### 4.4.5.4.2 Route Mostly Used

The roads mostly used are Fort Street and Barrack Street.

Judging from the summarized raw data, the Appeal Court Junction appears to be the junction with the highest daily volume of traffic, with mini buses accounting for the greater proportion in the count, in the A and B directions. See Figure 4.31.

However it is important to note that these mini buses do not contribute to or affect the traffic flow volumes or patterns within the High Street to Water Street, Barrack Street or Battery Road Area. Mini buses and cars were found to be the most traversed vehicle class.

**CHAPTER FIVE – ENVIRONMENTAL IMPACTS AND MITIGATION  
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**5.1 Introduction**

In general the main objective of the ESIA study has been to determine the potential “significant impacts” that might arise from the implementation of the project on the existing natural and built environment and including socio-economic considerations.

**5.1.1 Specialist Studies**

The specialist studies examined the baseline characteristics of the three components, of the existing environment, the physical, biological, and socio-economic. The potential impacts of the proposed project features and activities on the existing environment were evaluated as part of the specialist studies. A qualitative analysis was carried out utilizing the experience and expertise of the respective specialists to determine the potential negative and positive impacts related to specific aspects of the proposed project.

**5.1.2 Impact Assessment Methodology**

The full ranges of potential impacts were examined to determine qualitatively the potential impacts based on the following criteria.

- Direction - positive or negative
- Magnitude - large or small
- Duration - long or short term
- Location - direct or indirect
- Extent - wide or local
- Significance - low or high

The impact analysis divided the proposed project activities into two categories, a construction phase and an operational phase. The potential impact criteria were applied for specific activities that will occur in each phase of the project.

**5.1.3 Presentation of Impacts**

An impact matrix is presented to summarise the potential impacts of specific activities of the projects using the above criteria. Two separate matrices, Table 5.1 and 5.2 are presented for the two phases of the project. The potential impacts indicated in the impact matrix are discussed below in terms of the activity responsible for the impact for each phase of the project. Recommendations are presented for reducing and mitigating potential negative impacts as well as maximising the expected positive impacts.

**Table 5.1 Construction Phase of the Project**

CONSTRUCTION PHASE	Component			Criteria				Location	Extent		Significance		
				Magnitude		Duration							
	Physical	Biological	Socio-economic	Low	High	Short term	Long term	Direct	Indirect	Local	Wide	Low	High
<b>Activities &amp; Effects</b>													
<b>Site clearance</b>	Erosion												
	Vegetation removal												
	Loss of Fauna												
	Noise												
	Dust												
<b>Traffic Congestion and Disruption</b>													
<b>Impact on Existing Infrastructure</b>													
	Damage to Sea Defence structure												
	Surrounding Building												
	Damage to Road												
<b>Construction Waste</b>													
<b>Employment</b>													
	Construction workers												
	Indirect employment												

KEY	
Positive	Negative

**Table 5.2 Operation Phase of the Project**

OPERATION PHASE		Component			Criteria									
		Physical	Biological	Socio-economic	Magnitude		Duration		Location		Extent		Significance	
					Low	High	Short term	Long term	Direct	Indirect	Local	Wide	Low	High
Activities & Effects														
Modification of Surface Drainage														
Employment														
Utilities (water & electricity)														
Solid Waste Mng & Disposal														
Sewage Disposal														
Enhancing Landscape & Aesthetics														
Traffic Congestion & Parking														
Proliferation of social Ills														
Marine Navigation(obstruction of Lighthouse)														
Sea Level Rise														
Support to Tourism and Economy														
Conflicting Land Use														

## 5.2 Construction Phase Impacts and Mitigation

### 5.2.1 Physical Environment

#### 5.2.1.1 Erosion of Cleared Areas

##### Impact Description and Analysis

Site clearance and excavation works will involve the use of heavy earth moving equipment to clear existing vegetation and remains of existing buildings on-site. This activity will expose the soil to the elements and make cleared areas vulnerable to erosion by surface-runoff and wind. This could increase water turbidity levels and sediment deposit in nearby drains and canals.

Based on the construction approach this impact will be localized, short term and limited to the construction phase.

##### Mitigation Recommendations

The following actions are recommended to avoid and mitigate against erosion:

- Temporarily bund exposed soil, placement of silt fences at property lines and the use of construction crushed rock at entrances and inlets.
- Monitor areas of exposed soil during periods of heavy rainfall throughout the remaining construction phase.
- Cover large material stockpiles during periods of heavy rainfall with tarpaulin.
- Place silt traps in vulnerable areas.

### 5.2.2 Ecological Environment

#### 5.2.2.1 Loss of Vegetation

##### Impact Description and Analysis

The clearing and removal of trees and vegetation to facilitate construction will result in the loss of a part of the existing vegetative cover and, as a consequence, a reduction of arboreal habitat. The site has been an active ecosystem and the vegetation in the area is typical of coastal areas and areas that have been disturbed by humans. Except for a few cultivated trees (coconut, mango and banana) the vegetation present was primarily weeds that are found in almost all coastal and human disturbed areas.

The vegetation distribution on the beach zone was sparse at the region of the low water mark but increased as progress was made up to the seawall. The main species closer to the low water mark was *Ipomoea sp.* This was then followed by *Crotalaria sp.* and then mixed patches of *Phyllanthus amarus* (Suriname bitters), *Ipomoea and Crotalaria sp.* This was intermixed with young, *Terminalia catappa* (almond nut) plants. There were a few small manchineel plants. Closer to the seawall were different grass species again mixed with *Ipomoea*, *Terminalia catappa* (almond plants) and some *Coccinia grandis* (baby pumpkin) vines.

The vegetation present area between the beachfront and seawall is typical of beach vegetation both in content and distribution. The vegetation offers some stability to the beach zone and removal should be avoided. Vegetation types such as *Solanum stramonifoliuym* (buru buru) and *Amaranthus dubius* (spiny pigweed) which are present in this zone can be removed. Strategic removal of these vegetation will not create any undue threat to beach and seawall stability and will improve the aesthetics and safety for visitors to the beach and also the resident guests of the Hotel.

The area between the sea wall and Battery Road consist mainly of common grass species and weeds, therefore removal will not be a significant impact.

Based on the vegetation distribution and the presence of no sensitive habitat or rare, threatened or endangered species, removal of vegetation will not constitute a significant impact although there will be loss of habitat.

#### Mitigation Recommendation

The following actions are recommended to avoid and mitigate against loss of vegetation:

- The vegetation present on the beach zone is typical of beach vegetation both in content and distribution. The vegetation offers some stability to the beach zone and therefore should not be removed. If they are removed this will reduce the stability of the beach and promote easy erosion of the beach sediment by water and wind. This will then pose threats to the stability of the seawall and eventually the proposed structure.
- Landscaping of the project site is important to restore vegetative cover to unpaved areas and should also use native flowering plants to provide habitat and host plants for some species.
- Vegetation planted for landscaping and for aesthetic appeal should be maintained, and a maintenance programme should be established and implemented
- Vegetation selected should be based on: suitability, habitat, flowering plants and shrubs.

#### **5.2.2.2 Loss of Habitat - Fauna**

##### Impact Description and Analysis

With respect to fauna, noise, vibrations, and intrusive activities related to construction will affect and scare away terrestrial and avi-fauna.

The fauna (Section 4.3.4) that was observed were all highly mobile and migratory species that easily adapt to changing environments. The majority of fauna observed were avian fauna which are common to human inhabited areas along Guyana's coast while the variety of fauna on the beach was limited to a few fiddler crabs.

During the construction phase the fauna may in extreme cases migrate due to the loss of feeding and nesting habitats. However they will find suitable habitats nearby since suitable habitats are in close proximity. It is also anticipated that they will return when construction is complete and when the disturbance due to noise from construction no longer exists. Also, the species that will be displaced are not considered to be rare, threatened or endangered. Given the low species diversity and species richness at the site any disruption as a result of construction and operation will have little impact on the environment and the fauna.

##### Mitigation Recommendations

The following actions are recommended to avoid and mitigate against loss of fauna:

- Landscaping component should include species of trees that will attract avian species by providing feeding and nesting habitats.
- Species chosen to re-vegetate the site should serve both a landscape function and a habitat function without compromising either.

#### **5.2.2.3 Aquatic System**

##### Impact Description and Analysis

There are two (2) major aquatic systems in close proximity to the project site. These are the Demerara River and the Atlantic Ocean. However, a detail analysis on these aquatic systems was not conducted since no direct impact from the project is expected. In addition, these aquatic systems are not limited to the project environment, but are vast and extend way beyond the project area. It should be noted that there would be no direct discharge of effluent or other waste into these ecosystems. Within the project site itself there are no major aquatic systems nor any fish or aquatic species of significant environmental

or ecological importance. The aquatic species of vegetation present are considered aquatic weeds that are usually removed since they tend to obstruct flow of water..

The drains at the project site will be reconfigured in the engineering works of the facility during the construction phase. Section 2.4 outlined the drainage plan for the site.

### **5.2.3 Social-Economic Environment**

#### **5.2.3.1 Dust**

##### Impact Description and Analysis

Dust generated by various construction site activities can make a significant contribution to local air pollution. Earth moving activities during building construction and offloading of material will generate a certain amount of air borne particulate matter (dust). This situation could worsen during the dry season. Material storage stockpiles can also cause increase levels of airborne dust particles.

This impact will be localized, short term, and limited to the construction phase

##### Mitigation Recommendation

The following actions are recommended to avoid and mitigate against dust pollution:

- Access roads and exposed ground should be regularly wetted in a manner that effectively keeps down the dust.
- Stockpiles of fine materials (e.g. loam) should be wetted or covered with tarpaulin at all times.
- Workers on the site should be issued with dust masks during dry and windy conditions.
- Where possible a wall structure (probably of ply board) can be placed behind stockpiles of sand, earth and gravel to act as receptor for larger dust particles which are still subject to the force of the wind. This measure can also prevent the build up of construction material in nearby water ways.
- Activities which could result in high volumes of dust being generated can be scheduled for periods when offices have a reduced occupancy (i.e. on weekends, before and after working hours).  
Dust screens/blinds will be erected on the leeward side of the building during construction to reduce the spread of air borne particles.

#### **5.2.3.2 Noise**

##### Impact Description and Analysis

The use of heavy equipment during site clearance and construction works will generate above normal noise levels.

The dominant source of noise from most construction equipment is the engine, usually fueled by diesel, and often without sufficient muffling. In a few cases, such as impact pile-driving or pavement-breaking, noise generated by the process dominates. The noise levels generated by construction equipment will vary greatly depending on factors such as the type of equipment, the specific model, the operation being performed, and the condition of the equipment. The equivalent sound level (Leq) of the construction activity also depends on the fraction of time that the equipment is operated over the time period of construction. The EPA has in collaboration with the GNBS developed interim noise standards which stipulate permissible levels from activities within specific categories as listed in Section 3.3.3:

Based on noise sampling done (see Section 4.2.7, Table 4.3) there is already a significant ambient noise level consistent with a built up area according to GNBS noise limits. Highest recordings during the day were 83 and 88 dB respectively. These limits are above the recommended levels. Some recording taken during the afternoon hours were above 70 decibels. Ambient noise levels on the project site and surrounding area are already high. This is mainly due to the presence of various organisation and agencies and their activities along with the regular vehicular traffic traversing the area.

## Mitigation Recommendations

The potential noise impact will only be over the short-term (limited to the duration of the construction works). A package of mitigation measures has been designed to control construction noise impacts. Whilst not sufficient to fully resolve the predicted noise impacts, general good site practices will help to control the residual impacts. Below are three categories of noise control approaches:

### *1. Design considerations and project layout:*

- Construct noise barriers, such as temporary walls or piles of excavated material, between noisy activities and noise-sensitive receivers.
- Re-route truck traffic away from residential streets, if possible. Select streets with fewest homes if no alternatives are available.
- Site equipment on the construction lot as far away from noise-sensitive sites as possible.
- Construct walled enclosures around especially noisy activities or clusters of noisy equipment. For example, shields can be used. The entire construction site would also be enclosed thus adding another barrier to noise generated.

### *2. Sequence of operations:*

- Combine noisy operations to occur in the same time period. The total noise level produced will not be significantly greater than the level produced if the operations were performed separately.
- Avoid nighttime activities. Sensitivity to noise increases during the nighttime hours in residential neighborhoods.
- Workers will be mandated to wear appropriate protective gears and attire during construction in accordance with the company's occupation health and safety guidelines.

### *3. Alternative construction methods:*

- Avoid use of an impact pile driver where possible in noise-sensitive areas. Drilled piles or the use of a sonic or vibratory pile driver are quieter alternatives where the geological conditions permit their use.
- Use specially-quieted equipment, such as quieted and enclosed air compressors and properly working mufflers on all engines.
- Machines and equipment will be maintained to ensure these are working efficiently and the required muffler/silencers installed are installed and working efficiently.

## **5.2.3.3 Traffic Disruption and Congestion**

### Impact Description and Analysis

During the construction period, traffic is likely to build up around the construction zone for various reasons other than the traffic increase. The access route to the project site, Battery Road, Fort Street, lower Water Street and High Street are likely to see a slightly more traffic growth than the others. These roads are going to experience an increase in both passenger vehicles and heavy construction vehicles.

Based on the results of the traffic surveys and the projections for traffic volumes, the project will not significantly add to the existing traffic in the Kingston area. During construction, Ready-mix trucks bringing concrete along with other vehicles with supplies will use Water Street onto the project site while bulk materials will be brought in. Initial suggestion from the TSU and stakeholders within the primary zone of impact is that Water Street be used as the main access and exit road to and from the project site during construction. This is due to the fact that its construction design was done to facilitate usage by large high density vehicles, the wide carriage way that the street affords.

The transport of construction materials to the project site will utilize the road network within Georgetown and specifically the roads around the site in the Kingston area. The potential negative impacts related to

the transport of material by trucks include increased dust and noise levels as well as increased traffic congestion along roadways.

The potential socioeconomic impacts along roadways from increased noise, dust and increased traffic congestion is expected to be low and insignificant. These impacts will be distribute along the roadways utilized and will last for the duration of the construction phase.

#### Mitigation Recommendations

The following actions are recommended to avoid and mitigate Traffic Disruption and Congestion:

- No road closure is anticipated to facilitate construction activities. However, if closure is required, it would be for a short duration. In this regard, the MPW&C will be informed least ten days in advance to minimize conflicts with other road work;
- The GFC and private companies such as DTL located in close proximity to the project will be informed of any road closure at least 2 days prior;
- Provide the public with advance information on any road closure through weekly announcement in newspapers radio and television;
- Road closure will be posted with detour signs and the detour routes will be fully sign posted throughout to ensure the traffic follows the correct routing;
- An assessment of the routing of major equipment and material transfer from the port should be done in advance, to identify any constraints;
- Where partial or full lane closures are required, proper road signs and flags persons will be utilized to assist traffic movement;
- The impact of traffic congestion can be minimized by transporting materials during off peak hours, and by using the recommended route;
- The potential nuisance impacts associated with the transport of construction materials by truck can be minimized by ensuring that truck are adequately covered;
- For movement of oversized loads, all routes should be assessed in advance to determine constraints such as overhead wires and sharp turns. The MPW&C should be provided with a plan indicating the routing, need for road closure, date, time and duration of the movement; and
- As much as possible, materials will be transported to the site via the wharf.

The following route is recommended for vehicles transporting material to site.

#### Vehicles Transporting Materials to Site;

East Bank Public Road onto Lombard Street,  
Lombard Street onto Hadfield Street;  
Hadfield Street onto Avenue of the Republic;  
Avenue of the Republic onto America Street  
America Street onto Water Street, and  
Water Street onto Battery Road, then into Site.

#### Vehicles Leaving the Site;

Battery Road onto High Street  
High Street onto Main Street  
Main Street onto Avenue of the Republic  
Avenue of the Republic onto High Street,  
High street onto Saffon Street,  
Saffon Street onto East Bank Public Road.

#### Alternative Route for Vehicles Leaving Site;

Battery Road onto Young Street  
Young Street onto Camp Street  
Camp Street onto Hunter Street

## 5.2.4 Impacts on Existing Infrastructure

### Impact Description and Analysis

#### *Sea Defence System (SDS)*

The most critical issue as it relates to the impact of the project on existing infrastructure is the potential damage that can be done to the SDS during the construction phase of the project. The existing SDS in the area consists of pre-cast concrete slabs 1.8 m in width and with rubber bar joints missing in most places.

According to the Sea and River Defence Division of the Ministry of Public Works and Communications, this situation prevailed since the 1996 Sea Defence Inventory was conducted.

During both the construction and operation of the project, adherence will be made to the Sea Defence Act and there will be no activity, interaction or disturbance to the SDS which borders the project site. Activities to be conducted will contribute to strengthening the integrity of the structure. On the ocean side rocks will be placed and a concrete promenade will be constructed. On the side of the Hotel the area will be bermed with soil and planted with trees. Additionally, the Site Layout Plan (Section 2.3.7, Figure 2.3 showing road network layout) makes provisions for a service road on-site which would also provide access for the Sea and River Defence Division in the event repair and rehabilitation works are required for the SDS.

#### *Surrounding Buildings*

The project requires driven pre-cast concrete piles, shoring, some minor underpinning, soil improvements and general earthwork that may generate vibrations during construction. Building located within 50-100m range of the construction site may experience vibration from pile driving activities. This can cause structural damage to property. However, this largely depends on soil condition and the pile driving hammer used. Generally within the 50-100m radius vibration levels will be between 1 to 3 mm/s. If vibration levels exceed 0.35 mm/s occupants of buildings could be affected. Buildings outside the 100m radius will not experience any structural damages to their property.

The main concern of stakeholders located within close proximity of the project site was the possibility of structural damage to their properties. Some stakeholder representatives indicated that during the rerouting of the sewer lines their office building vibrated when heavy machinery was in operation or from the movement of large high density vehicles.

Stakeholders were concerned about the ability of surrounding buildings to withstand the pile driving operations during the project's construction phase. It is noted that some of the nearby building including the Transport and Harbours Department (T&HD) and the Ministry of Local Government (MoLG) can be described as old wooden buildings which have not undergone any structural repairs or renovation in excess of 25 years. Further, entities such as the Pegasus Hotel, NCERD, and GFC which have been recently renovated and are in excellent structural condition could possibly be impacted structurally from pile driving activities due to the fact that they were closest to the site.

The building scheme for the project is typical of building built in Guyana over the past decades. Most of the buildings above three stories would have been constructed using pile foundation (G.H or Pre-cast concrete piles). Therefore, once the building is designed and constructed in accordance with either the BS or ACI code; it should not pose any threat to the surrounding buildings or the environment. It should be noted that the construction of the 7 floor Pegasus Hotel just north the Umana Yana, and the soon to be completed GBTI multi-story offices occurred without noticeable structural weakening of this National Trust Site or other buildings nearby.

Nevertheless, monitoring of nearby building and structures will be done during construction to prevent any damage as a result of vibration.

### *Road Surface*

During both the construction and operational phases of the project there will be a projected large increase in vehicular traffic. The current state of Battery Road, which spans the south of the project site running east to west, has been an issue of concern for residents and road commuters. This roadway in its current state is used by high density trucks collecting boulders from the BK International depot at Kingston wharf at the estuary of the Demerara River and facilitates the fueling of DTL timber trucks at the DTL main office. Under this current use pattern several stakeholders expressed the view that the underplaying water main and rerouted sewer lines can be jeopardized and leakage can occur.

During construction phase it is expected that the site will be frequented by high density trucks transporting ready-mix cement, sand gravel, wood and other high density raw materials. Should Battery Road remaining its current state of disrepair the implications can be dire not only for the overall quality of the road way but also for the submerged water and sewer lines. Further, during the operational phase the current road network in the vicinity of the proposed development will come under increased pressure from the intensified volume of traffic flow.

It should be noted that the rerouted sewer line has been in place for almost two (2) years now and the heavy duty traffic which traverse the area has not in any way affect the lines so as to result in breakages or leaks.

### Mitigation Recommendations

The following mitigation actions are recommended for the issues discussed:

#### *Sea Defence System (SDS)*

- AHI should establish a MoU with the SRDD regarding access, maintenance and management of the SDS bordering the project site. Such a MoU would enhance cooperation and collaboration as well as set out clear roles and responsibilities.

#### *Surrounding Buildings*

- Before the commencement of pile driving activities a structural assessment should be done of buildings including heritage sites within the immediate vicinity of the project site to determine the suitability of buildings for occupancy during this period.
- A detailed inventory should be taken of the immediate neighbouring structures to allow the developer to adequately address any complaints of structural damage blamed on activities carried out at the construction site.
- A vibration monitoring program will be established during these activities to monitor the vibration level to adjacent buildings. The monitoring devices will be placed in selected buildings and on the SDS. If vibration exceeds the agreed upon specified limits, pile driving will cease immediately and the necessary adjustment made. Helical screw piles may be used at the client's discretion to mitigate some vibration.
- Local residents and businesses should be given notice of the scheduling of pile driving activities to prepare for the increased levels of noise and vibration. In an effort to mitigate some increased noise levels, acoustic barriers may be added to the pile driving equipment.

### *Road Surface*

- AHI along with stakeholders who are located on Battery Road should approach the Government to rehabilitate and improve this road following the completion of the construction phase of the project.
- Given the high density and volume of vehicles which currently and is expected to traverse this roadway it is recommended that for its rehabilitation, extensive compacting is done to ensure the safety of the submerged water mains and rerouted sewer lines. Placing a limit on the size/type of vehicles that traverse the road should be also considered.

## 5.2.5 Construction Waste

### Impact Description and Analysis

Construction activities will generate significant quantities of solid waste. This mainly comprises material scraps, debris from site clearance, excavation, construction, demolition and road works. Construction waste can be divided in to two categories

- Inert construction waste
- Non-inert construction waste

Non-inert construction waste is made-up of approximately 25 percent of the total construction waste, and usually comprises paper, plastic, timber, electrical wire, vegetation, packaging waste and other organic materials. Some of these can be recycled while others are disposed of at landfills.

In contrast, inert waste - otherwise known as public fill - mainly includes construction debris, rubble, earth, bitumen and concrete, which can be used for land formation. Materials like concrete and asphalt can also be recovered for construction use.

The developer has arrangement in place for waste to be collected on a regular basis by a private contracted disposal service.

### Mitigation Recommendations

The following actions are recommended to mitigate the negative impacts of improper solid waste management.

- Skips should be placed at strategic locations around the construction site,
- The skips should be properly designed and covered to prevent access by vermin and minimize odour, and
- The skips should be adequately covered to prevent a dust nuisance.
- Waste should be sorted for re-use and recycling and should be disposed on a regular basis.

## 5.2.6 Aesthetics

### Impact Description and Analysis

The improper management of construction waste identified above can contribute to reducing the aesthetic of the general area. In addition, since the project is of a large scale, construction activities will be of a similar scale and can also reduce the aesthetic of the area since these sites can be unsightly.

### Mitigation Recommendations

The following actions are recommended to mitigate the negative impacts of construction activities on the aesthetics of the project area.

- Dispose of all construction waste as outlined in Section 5.2.5; and
- Enclose the construction site as much as possible to block the full view of the public.

## 5.2.7 Employment

### Impact Discussion

The construction phase of the project will have a significant positive effect on the economy of Georgetown in terms of increased direct and indirect employment. There will be a significant increase in the demand for both skilled and unskilled labour. Additionally there will be a significant increased demand for a wide range of supplies and services.

The impact of employment levels will be distributed widely as the construction site workforce will originate from the wider Georgetown area. Increased indirect employment by businesses providing sales and services will also be widely distributed.

The positive socioeconomic impact of increased direct and indirect employment will be significant and will continue for the duration of construction activities. Table 5.3 outlines the various construction activities and number of workers required for each. 125 locals will be employed during construction.

**Table 5.3 Total Number of Employees during the Construction Phase of the Project.**

<b>Construction Activities</b>	<b>No of Workers</b>
Clearing, Grubbing, Temporary Utilities	25
Rough Grading and Utilities	10
Foundations	35
Concrete Superstructure	55
Carpentry Work	45
Exterior Walls, Window Walls and Storefront closures	20
Roofing	15
Building Finishes	55
Vertical Transportation	10
Plumbing and Fire Protection	65
Electrical and Communications	35
Ventilation and Air Conditioning	60
Final Grading, Landscaping and Final Utilities Connected	35
Complete Punch List Work	20
<b>Total locals employed (125 people)</b>	<b>485</b>

### 5.3 Operational Phase Impacts and Mitigation

#### 5.3.1 Physical Environment

##### 5.3.1.1 Surface Drainage

###### Impact Discussion

Construction of the Hotel will modify the characteristics of the existing drainage network as described in Section 4.2.1.2. The impervious surface created by the hotel building, amenities, parking areas, asphalted roads and other areas will generate an additional amount equal to what would have previously infiltrated to the soil during the periods of prolonged rainfall. Prolonged periods of heavy rainfall could result in ponding, soil erosion and localized flooding within the hotel compound or in the immediate surroundings. Based on the construction approach this impact will be minimized or non-existent since adequate drainage system will be constructed to facilitate drainage. With the implementation of the LEED Certification, storm water management will aim at collecting and reusing some amount of that water. Consideration will also be given to the quantity and quality of discharged into the environment. The project site will be provided with a properly designed internal drainage network. The hydraulics of the system will be closely examined to ensure no buildup of water on the site. Roof runoff will be channeled into water storage tanks provided on site and the overflow will be channeled to the drainage network (see Section 2.4, drainage layout map). A storage tank with a capacity of 3,625 m<sup>3</sup> (128, 000 cubic ft) will be installed to collect storm water from the roof. This water will be treated for grey water re-use in toilets and process water while some would also be utilized on the green vegetative roof for irrigation. Storm water management for the site will consist of a detention basin of approximately 850 m<sup>3</sup> (30 000 cubic ft). This will ensure the discharge of storm water into the surrounding drainage system is controlled. The parking lot will be constructed of partially pervious material to allow for percolation into the ground thus reducing the amount of storm water to be managed. This internal drainage network would then exit into the façade drain along Battery road, which will discharge into the Young's Canal which is approximately 15 m from the site. The total peak discharge for the site is approximately 0.5m<sup>3</sup>/sec.

Kingston is drained by the Young canal which is one of the better maintained drainage canals in the city. The Young's canal is lined and has an overall length of about 1064 m. This canal drains a catchment area of approximately 65 hectares (161 acres) which is bounded by the Atlantic Ocean on the North, Cowan Street on the South, the Demerara River on the West and Camp Street on the East. Table 4.1, page 82 provides details on the specifications of the main drains in the area.

It should be noted that the project site is well drained. It was reported that during the January 2005 flood, this site was not inundated at all. It is considerably higher than the existing elevation of Battery Road, which is about 17.0GD. During the rainy periods, the runoff from the site is very good, as the water across the surface would find its way to the surrounding drains within 2 hours after the rains cease. Notwithstanding, the ground floor (level 1) of the buildings would be set at approximately 18.5 GD.

### Mitigation Recommendation

The following actions are recommended to support surface drainage measures:

#### Surface Drainage Systems

- Open channel storm drains should be designed in such a manner to permit runoff from the buildings, roads and all paved areas around the site.
- Primary considerations in selecting and designing a surface drainage system involve preventing on-site erosion where the flow of water is concentrated within channels or at drainage outlet points. These areas must be adequately designed, stabilized, and maintained, particularly where accumulated runoff flows at increased concentrations and velocities from large paved areas.
- Vegetation may help to slow runoff, but proper stabilization may require that some areas be lined with hard material such as riprap or concrete. Unpaved areas subject to sheet flow should be stabilized with vegetation or inert materials.
- If on-site erosion could be adequately controlled with only a small percentage of the total drainage system lined with hard material, surface drainage may be a cost effective approach to erosion control. Surface drainage structures are also generally more accessible than underground systems for maintenance, including sediment removal. Sites subject to large volumes or concentrations of runoff may not be well suited to a surface drainage approach to erosion control because the capacity of the system to adequately channel and remove runoff may be exceeded.

#### Underground Drainage Systems

Underground drainage systems convey site runoff in enclosed, below-grade storm sewers. Runoff should be collected at storm drain inlets and can be released into the main installation or main sewerage system or at the surface outlet.

- Primary considerations in selecting and designing an underground drainage system involve controlling the amount of sediment that enters the underground system, the availability of existing underground sewer systems with which to connect, and reducing the velocity of runoff released at surface outlets.
- The most effective means to reduce the amount of sediment entering an underground system is to protect erodible areas by diverting and channeling surface runoff and providing vegetation or other soil cover. Sediment carried by runoff to the underground system can be removed at either the inlet or the outlet to that system. Catch basins, traps, or filters can reduce the amount of sediment that enters the underground system, but they must be regularly cleaned out to maintain the system's capacity. Sediment can also be controlled at a surface outlet of an underground system by providing detention and settling areas.
- Because runoff collected in an underground system is conveyed in an enclosed pipe, it can attain higher velocities than in a surface drainage system. If runoff conveyed in sewer pipes must be

released at a surface outlet, the velocity of the runoff should be reduced to non-erosive levels and the area around the outlet should be properly graded and stabilized to lessen erosion.

- If the accumulation of sediment and the erosion at surface outlets could be adequately controlled, underground drainage systems are effective approaches to erosion control. Underground systems could safely and efficiently convey higher concentrations of runoff than can surface drainage systems and significantly reduce on-site erosion. However, no storm drainage system can be entirely underground, since water must be conveyed overland to sewer inlets.

### 5.3.2 Socio-Economic Environment

#### 5.3.2.1 Employment

##### Impact Description and Analysis

The most visible direct benefit of the project is the creation of employment opportunities. As outlined in Section 2.6, the project proposes to make available 554 jobs for locals. On a short term basis 125 individuals will be employed during the construction phase in which Guyanese will make up 25% of the contracted staff. During the operational phase of the project locals will also make up the greater proportion of the immediate staff for the hotel (174 local staff), night club (41 local staff), restaurant (50 local staff) and casino (164 local staff).

Short Term – Construction	125
Long Term – Permanent Staffing	429
<b>Total Local Employment</b>	<b>554</b>

In addition to direct employment, the project will also create opportunities for suppliers of goods and services during both construction and operations.

##### Recommendations

- Where possible, the developer should include wider participation from the local hospitality sector in training being implemented by the project for its personnel.
- Though no managerial positions will be initially offered to locals this should not be adopted as a policy by the project since on-the-job training can be done to enhance the capacity of locals to fill managerial positions.

#### 5.3.2.2 Provision of Utility Services

##### Impact Description and Analysis

Some stakeholders within the Kingston community were concerned about the ability of the utility providers to provide for the needs of the existing community in light of the demands of the project.

Plans are already in train to cope with the increased demand on the water and energy supply.

##### *Water Supply*

The Guyana Water Inc. (GWI) indicated that the Kingston borehole was relocated as part of the site preparation exercises and gave the assurance that the new borehole can accommodate a larger pump-unit and as such the volume of water supplied to the Kingston community had increased. Previously the community received water at an average flow-rate of 70m<sup>3</sup> per hour while the new supply well and pumping system operates at a flow-rate 90m<sup>3</sup> per hour.

The average daily demand is estimated to be 90, 850L (24,000 gallons). The existing pump in the area does not have the capacity to supply the water needs of the Hotel since it was installed to meet the low demand of the area. GWI has indicated that it will install a new pump to meet the increase requirement. The current pump functions 24 hours per day. However, the new pump will function less than 24 hours. As such, the facility will store enough water to cater for this cut in supply. The water will be stored in a

170, 344 L (45,000 US Gallon) tank to be located on the roof of the facility. Fire service water will also be connected to the distribution system and held in an approximately 151,417L (40 000 US gallon) water storage tank.

The LEED system will also contribute to a reduction in water usage at the facility. A grey water system to irrigate the landscape will be implemented while management is considering providing processed water in lieu of using GWI supplied water. It is anticipated that overall water use reduction would be in the vicinity of 30% to 40% over standards. A fully integrated rainwater collection and storage system will be installed to supplement the water provided by GWI and to reduce the demand on the system. A storage tank with a capacity of 3,625 m<sup>3</sup> (128, 000 cubic ft) will be installed to collect storm water from the roof. This water will be treated for grey water re-use in toilets and process water.

#### *Electricity Supply*

The designing and implementation of the Project to meet the requirements of LEED will result in a reduction of energy required by the facility by ensure efficient energy usage is practiced. The plan is to improve energy performance of the building by 18% to 26% over standard practices, thus reducing the cost of energy. The management will be engaging the services of a Commissioning Authority to ensure maximum performance of the selected building systems that affect energy usage.

The management of Guyana Power and Light Inc. (GPL) indicated that they would be able to cater for the electricity needs of the project since the company is seeking to increase its supply of energy to Kingston and other neighbouring communities. The project is expected to have an electrical demand of 2.4 MW. The Guyana Power and Light Company (GPL) currently do not have the capacity in the area to support the entire project. However, GPL has indicated that it will bring the additional power to the area. In addition, generators will be used to service the high demanding areas and serve as backups. A total of four (4) generators will be installed of capacities ranging from 500 kVA to 2 MW housed in sound proof enclosures with one (1) serving as back up. Power from the National Grid will be fed to a main transformer before being connected to the Complex's main control panel.

During the operation phase diesel will be stored to supply the generators. Diesel will be stored in two (2) 37,854L (10,000 gallons) tanks on the hotel side of the site and two (2) 11,356L (3,000 gallons) tanks on the entertainment complex side of the site. It is anticipated that these tanks will be located above ground. The fuel storage area will be strategically located at least 10m from any water source and will be on an impervious base which is bermed with 110% containment. This area will have installed a perimeter fence for security and appropriate signage and personnel management and monitoring.

#### Mitigation Recommendations

Marriott International has implemented a five point system for energy conservation and measures are being practiced to conserve water resources. These should be adopted along with the establishing of a water conservation system to effectively manage water use and mitigate the impacts of wastage on the public water distribution in the area. Such a water conservation system should involve staff procedures and operations in addition to installation of water-efficient equipment and fixtures. The programme should include the following basic steps:

- Educate, train and motivate staff to practice water conservation - educate staff to be aware about the consequences of wasting water and the benefits of conservation. Train them in methods and procedures for conserving water during their day-to-day activities. Motivate them by rewarding employees who participate.
- Leak Detection - institute a comprehensive leak detection and correction programme by implementing daily and monthly utility monitoring, and staff training for leak detection. The main storage tank will be located on the roof of the Hotel to allow for gravity flow.
- Discourage practices such as food thawing and washing vegetables under running water.
- Irrigation - monitor grounds irrigation system and ensure that they are turned off when it is raining. Do not irrigate during the middle of the day, and make sure that irrigation method only delivers water to plants that need it.
- Preventative maintenance for toilets - leaky toilets are a major source of water wastage. On average, hotels have leaks and other water-related maintenance problems in more than 40% of their toilets. Although sometimes these problems are not high priorities for maintenance staff, they can easily increase the total water consumption of a hotel by more than 20%.

- Don't backwash pool filters more than necessary - avoid backwashing sand filters more often than indicated by the pressure buildup in the filter (this is why most pool filters come equipped with a pressure gauge). In most cases, pool filters should be backwashed when the pressure at the inlet of the filter increases by 10 psi (69 kPa) over the clean filter pressure (i.e., the inlet pressure measured when the pump is turned on right after the filter has been backwashed). In pools with light to medium use, the pressure in the sand filters generally increases by about 2 to 3 psi each day, meaning that these filters should be backwashed every 3 to 5 days.
- Convert to Low-Flush Toilets: since water-saving toilets use 50 to 75% less water than their older and inefficient counterparts, installing effective water-saving toilets can significantly reduce total water consumption.

### **5.3.2.3 Solid Waste Management and Disposal**

#### Impact Description and Analysis

Solid waste will be generated during the construction and operational phases. In both cases several types of waste will be generated from different sources and if these are not managed properly, the effect on the environment could be significant. Each waste stream may or may not require different methods of handling, storage and disposal. However, by applying waste minimization techniques, the quantity of waste produced can significantly reduce and therefore the associated impacts on the environment.

Waste separation for reuse/recycling will be undertaken during construction to reduce the quantity of solid waste disposed off. Further the company will seek EPA's guidance for the disposal of hazardous waste materials such as paint/varnish containers, electrical waste and any other waste type found in this category.

Waste generated from kitchen, restaurant and ancillary services, if not properly managed, could cause direct impact to the surrounding environment. An indirect impact in such a situation will be the proliferation of vermin and emission of offensive odour associated with it. Operational wastes will consist of ordinary municipal waste such as food waste, paper, plastic, bottles, cans, food waste, etc. Operational waste is projected to be 10 cubic yards of un-compacted solid waste per day .

#### Mitigation Recommendations

The following actions are recommended to avoid and mitigate the negative impacts of improper solid waste disposal.

- Waste separation by category and type will be undertaken;
- Materials will be separated for reuse/recycle;
- Skips should be placed at strategic locations around the construction site,
- The skips should be properly designed and covered to prevent access by vermin and minimize odour,
- The skips should be adequately covered to prevent a dust nuisance.
- Arrangements will be made by the developer for all solid waste to be collected by a contracted waste disposal service on a weekly basis.
- The developer should ensure private contractors have compactors and fully enclosed vehicles to reduce the possibility of stench and effluent discharge during transportation of the solid waste.

### **5.3.2.4 Sewage Disposal**

#### Impact Description and Analysis

Improper disposal of sewage, whether in small or large quantities, can pose health risks. In addition, sewage that contains a high level of nutrients can lead to eutrophication and subsequent loss of aquatic species.

Sewage can often be categorized into blackwater and greywater. Blackwater sewage refers to waste from toilets. It consists mainly of faeces, urine, toilet tissues, and sometimes many other non-dissolvable items that people find convenient to release into the system. On the other hand, greywater consists mainly of

effluent from washbasins, kitchen sinks, washing machine, baths etc. This may contain detergent, oil, dirt and water.

The amount of sewage that would be generated during the daily operational life of the project will depend on the type and level of occupancy. It is estimated that the quantity of sewage and waste water to be generated is 90,850L (24000 US gallons).

It is anticipated that a large percentage of the persons that would be visiting the casino, clubs, restaurants, etc. would be occupants of the Hotel.

While the project acknowledges the impact the sewage could have on the environment, it also took into consideration the common practice of direct discharge of untreated sewage into the city's main sewer network. The common practice in Georgetown is that all internal sewage networks are connected to the main Georgetown sewage network, which exits into the Demerara River at the Kingston outfall which is located approximately 100 metres into the estuary. In addition there are reports that mobile sewage disposal units dispose their sewage at this location also. The present disposal method of sewage from the city at the Kingston site takes advantage of favorable dispersion conditions. These conditions include:

- Relatively fast tidal currents
- Prevailing wind conditions and directions
- Increased river depth from the point of discharge to the confluence with the Atlantic Ocean
- The tidal nature of the Demerara River

From the information gathered it is noted that the fishing grounds are a considerable distance away from the point of discharge of the sewage. No fishing is reported to take place in the Demerara River at the location of discharge. Fishing is reported to take place distances up stream. However, from the analysis of surface water samples from the Demerara River and Atlantic Ocean (see Section 4.2.6) there are noticeable high levels of faecal coliform in these water bodies. Faecal coliform levels were greater than 16 ml for all the points sampled (See figure 4.3 Map of sample points).

All liquid waste will be treated onsite before discharge into the receiving environment. A split sewage and waste water treatment plant will be installed to cater for both the hotel and the entertainment areas. This effluent will be treated to acceptable limits before being discharged from the facility. Currently two (2) options for disposals are being considered and were proposed to GWI. The first option, which is preferred, is to pump the treated material into the forced sewer main of the Georgetown Sewer System for discharge into the Demerara River via gravity flow. The other option is to discharge the sewage from the treatment plant to an onsite ejector pump. This ejector pump will force the sewage down either Water or Fort Street to a new pressure relief manhole which would then discharge into the gravity sewer system. This treatment facility will ensure minimum effect on the existing sewer system.

#### Mitigation Recommendations

The following actions are recommended to avoid and mitigate sewage disposal impacts.

- Ensure sewage and waste water is treated to acceptable quality before discharge into the Georgetown Sewage System.
- The facility managerial staff should educate its occupants on the items that should not be disposed in toilets. Items such as condoms, tampons, etc. should not be allowed into the system.
- Grease traps should be constructed as part of the internal sewage system to intercept the grease from the kitchen. Grease traps should be cleaned on a regular basis to ensure its efficiency and materials removed should be sealed and disposed of at the Haag Bosch Sanitary Landfill.
- A holding tank with the capacity of about two-thirds of the daily discharge should be constructed on site as emergency backup should the sewage outflow encounter any problems.

### **5.3.2.5 Enhancing Landscape and Aesthetics**

#### Impact Description and Analysis

The construction of the project along the Kingston shoreline will bring about a significant change to the current infrastructure of the area. However, this initiative though dramatic will be a welcomed change to the landscape of the ever evolving Kingston community and further, is in keeping with the proposed development plan for this zone of the city as outline in the Draft GGDP. Within the GGDP the Georgetown seawall is divided into three zones which are then further subdivided in smaller geographical sections. The proposed development site is located within Zone 11 Section A which is the “area west of the Pegasus and east of the Demerara River Estuary” (CH&PA 2002) and which is earmarked for ocean hotels/recreation.

The project signifies a new form of modern architectural design within the Kingston landscape. While this initiative may be viewed as a threat to the architectural heritage of the community it must be noted that while harnessing its rich cultural wealth of heritage sites the community of Kingston has in recent years attracted its fair share of modernization and development. The recent establishment of the Digicel Head Office, the construction the Peace Corp Office, the construction of the new United States Embassy, and the current construction of a new branch of the Guyana Bank of Trade and Industry office complex serve as a testimony of this.

From the social impact study, all of the stakeholders within close proximity of the project site felt that the establishment of the project will be a welcomed change to the existing landscape and will serve to beautify an area previously populated by illegal squatters, vagrants, shrubs and a work site for boat builders. However the construction phase of the project could mean reduced aesthetic appeal of the surrounding buildings if they are defaced by dust particles. Section 5.2.3.1 and Section 5.2.6 outlines a number of mitigation measures to be adopted to prevent and mitigate the likelihood of this occurring during construction.

### **5.3.2.6 Traffic Congestion and Parking**

#### Impact Description and Analysis

Another critical issue that can evolve during the construction and operational phases of the project development is traffic congestion and parking.

#### *Traffic Congestion*

During the construction and operation of the project, the access route of Battery Road, Fort Street, lower Water Street and High Street are likely to see a slightly more traffic growth than the others. These roads can be expected to experience an increase in both passenger vehicles and heavy construction vehicles. On the other hand, after the construction is completed, the heavy traffic is only likely to increase just marginally for some roads while remaining constant for Fort Street.

According to the traffic projection and analysis presented in Section 4.4.5, passenger vehicle traffic on Battery Road is expected to increase from 989 vehicles to 1986 vehicles per day. This is an approximately 100 percent increase over the 20-year period, while the light and heavy trucks shown an increase from 56 percent and 66 percent respectively. However, while the domestic vehicles continue to increase at a regulator rate throughout the projected period, the heavy truck traffic only increase from 37 in 2010 to 40 in 2027, a mere 12.5 in a 17 years. This road will be directly affected during the construction and operation of the Hotel.

From the traffic analysis done for this project, High Street is expected to see the greatest traffic increase over the life of the project. Regular passenger vehicles are predicted to rise from 6,268 to 12,591, an increase in excess of 100 percent over the projected period. Light truck traffic is also expected to increase around 100 percent whereas, heavy truck traffic shown an increase of about 65 percent for the same period. However, the projected increase would not contribute to traffic-jam since this corridor is currently underutilized. Water and Fort Streets are roads that are highly underutilized. Even though, these roads are like many other which would see a rapid increase of traffic over the next 20 years, should the project

be realized, the carrying capacity would not be affected since the present traffic on these roads is less than a third of the designed density.

With the increase in traffic comes the increase of ESAL (18 kip equivalent single axle load), which is not proportional to daily traffic, but would increase significantly over the projected period. For instance, from the traffic analysis, the total 10-year projected ESAL for Battery Road, High Street, Water Street and Fort Street are 0.4M, 1.8M, 0.4M and 0.2M respectively, which are significantly higher for the 20-year. This would require a properly designed and constructed road to endure these loads. For example, a properly designed road to withstand these loads should have a minimum structural number (SN) of about 4.5.

However, the traffic pattern does not always follow the projection even with using the best mathematical model available. Nevertheless, this is the best estimate based on current modeling techniques. Traffic often diverts for various reasons and therefore these eventualities have to be taken into consideration.

### *Parking*

Under the current land use the existing establishments within close proximity to the project cannot provide adequate parking for staff and visitors. Parking along the street is necessary, since only priority parking in most compounds is restricted to staff and at some entities it is only provided for supervisory or managerial employees. This situation is particularly true for Fort Street and Battery Road. Parking on Fort Street is mainly the result of inadequate parking available within compounds and the entrance of most entities being on the street. While for Battery Road though parking is available for staff members visitors to DTL, GFC and NCERD offices are forced to park on either side of the road. With a situation of double parking occurring on these two roadways the build up of traffic volumes along either road ways can result in a further congested environment.

Many stakeholders within proximity to the project expressed the concern that, for a project of this scale, if parking is not made available for vehicles such as taxis and other service providers the traffic situation can become chaotic, especially during the peak hours of the day.

According to the project design, car parks would be provided across the site, decked and contained by the site boundary wall and the buildings. The parking would be provided in appropriate ratios for the guests, employees and visitors alike. The main parking area would be positioned west of the buildings with a total two hundred and thirty-five (235) parking spots. A taxi park would also be provided in the compound to accommodate eight (8) drop-off taxis. There will be no provision for parking along Battery Road.

The developer has indicated that these parking areas will also be made available to the GFC for its staff and visitors use. Based on the projected occupancy and visitors, these parking facilities would be adequate to ensure there is no over spilling onto the surrounding roadways and verges of neighbouring properties.

### Mitigation Recommendations

The following actions are recommended to avoid and mitigate against traffic congestion.

- Before construction commences, the developer should consult with the relevant traffic agencies including the Guyana Police Force, Central Planning and Transportation Unit (CPTU) and TSU of the WSG to present its traffic flow arrangement for this phase of the project. This engagement process should result in a traffic flow plan for the streets likely to incur increases in traffic volume and density during the construction phase but more importantly to ensure that the specification of the roadways can handle the weight and volume.
- Lighting should be installed for roads immediate to the project area as installation of the appropriate signs, both warning and guidance.
- A right turning lane for traffic going into the complex should be constructed. The turning lane should have a holding capacity for five passenger cars.

### **5.3.2.7 Conflicting Land Uses**

#### Impact Description and Analysis

Several stakeholders neighbouring the project expressed a concern regarding future development plans of the complex which may result in the acquisition of their properties. One neighbour indicated that the nature of their operations results in their compound being frequented by vehicles of non-aesthetic appearance and was concerned that with a rated hotel in close proximity their building this practice would seem out-of-place and they would be eventually forced to relocate. There was also a concern that the project would restrict access to portions of the seawall and beach area.

#### Mitigation Recommendations

The following recommendations are offered:

- The seawall and beach area must remain a public good always being accessible for public utilization and in keeping with the permission granted by Government a promenade will be constructed in this regard. The developer should have responsibility over the cleaning, maintaining and security of the beachfront
- The SRDD should have access to the seawall and beach area for routine inspection and for emergency and maintenance works as may be required.
- Neighbouring properties which will be impacted by the construction works should receive prior notice and be informed of activities which may affect their staff members and the execution of their daily operations.
- The developer should be forthright in sharing the future development plans of the project so that negotiations for possible compensation and relocation of neighbouring properties, if required, can be effected in an atmosphere of tranquility free of suspicion and controversy.

### **5.3.2.8 Proliferation of Social Ills**

#### Impact Description and Analysis

Some stakeholders were concerned about the potential impact of the project on the socio-cultural aspect of the society. There was particular concern about the negative impacts that are associated with a culture of gambling and casinos even while there was recognition of the potential fiscal benefits that can be accrued from such a venture. These impacts included prostitution and the potential spread of STD's, money laundering and the other such criminal activities and such impacts could be exacerbated by Guyana's already weakened judicial system which would be strained to grapple with these issues and other negatives which may evolve from casino gambling activities.

The project will operate under the Marriott brand name and is expected to adhere to the principles and high standards that are consistent with this international brand. As it regards the operations of the casino, these will be subject to the oversight of the Gaming Authority established under the Gambling Prevention (Licences) Act No. 5 2007.

#### Mitigation Recommendations

- Stringent measures should be taken that only individuals who are residing at the hotel be granted access to the casino as mandated by the 2007 Gambling Prevention (Amendment) Act.
- Local patrons who wish to stay at the hotel as a means of acquiring the use of the casino facility must be made to pay necessary taxes on their winning which should be declared to the GRA by the management of the casino.

### 5.3.2.9 Marine Navigation

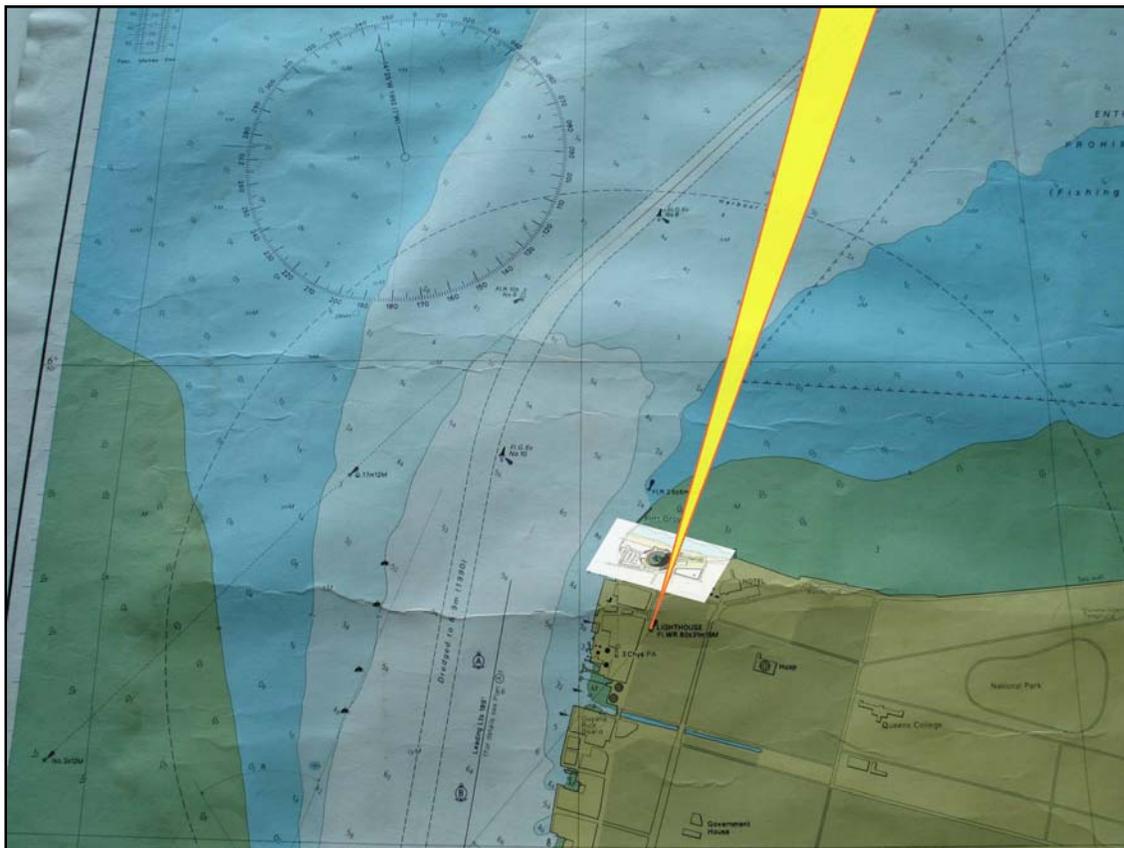
#### Impact Description and Analysis

The lighthouse is visible as far as sixteen (16) nautical miles from sea and is thirty-one (31) metres above mean high water. The lighthouse has a revolving light that flashes every sixty seconds, this serves as an important navigation landmark to guide ocean going vessels to port Georgetown. The height of the lighthouse is approximately 31.4 meters. The highest point of the facility is 59 meters (above sea level at its highest point), and is directly in the line of sight of the lighthouse.

Construction of the facility will directly obstruct the visibility of the lighthouse from a certain angle of approach along the existing channel into the Demerara River as well as block orientation and bearing of vessels making their way to the pilot station (Quarantine Anchorate) located approximately 10 miles from the mouth of the Demerara River (see Figure 5.1). The angle and area of obstruction is depicted by the tangent drawn on the diagram below. It shows clearly that only a small area of the shipping channel will be obstructed.

This impact is considered to be significant and discussions with the Maritime Administration revealed that there are other navigation markers such as buoys to guide ocean going vessels. However, ships further out to sea will be affected. There is also the use of improved navigation technology by ships such as the use of GPS to assist with navigation and reduce this impact. This impact will be manifested throughout the life of the project.

The option of placing a beacon on the highest point of the facility was discussed and the solution was found to be workable. MARAD indicated that the old light should be replaced with a new light with greater visibility. The existing light provides 12 miles of visibility and MARAD officials indicated that the new light should provide 20 miles of visibility. A low-maintenance rotational light is the preferred option.



**Figure 5.1** Angle of obstruction of visibility of the Light House

## Mitigation Recommendations

The current lighthouse is located 31m above the Georgetown Benchmark and the height of the proposed hotel will be approximately 40m above the benchmark, thereby blocking the view of the lighthouse beacon from incoming ships. The architects, ADUA, in discussion with MARAD decided on the placement of a lighthouse beacon or other similar light on top of the Hotel and this will be incorporated into the designs. Improvements in navigational technology and the expected new Coast Guard Station reduce the dependence on the light provided by the light house to guide ships at night.

Discussion will continue on this matter to sort out the agreement between MARAD and AHI, placement and specification as well as the operational arrangement of the beacon. The light should be mounted on the structure as early as possible to address the blockage that would occur during the construction phase.

### **5.3.2.10 Security**

#### Impact Discussion and Analysis

The Kingston neighbourhood is home to the Headquarters of the Guyana Police Force. Also, the Investigative and Response Units are located within this vicinity. These include the Criminal Investigation Department (CID), the forensic and photographic laboratories and the Tactical Services Unit (TSU) which is the force's main rapid response Unit in the event of reported criminal activities and other emergencies. This Unit also provides Kingston and other communities within the city with day and night time patrols and has in the past been credited with the capture of criminals and foiling suspected criminal activities in the area.

The proposed activity is likely to lead to increase pressure on the GPF to increase its patrols in the area, as they is likely to be more persons frequenting the area, particularly those seeking to access the Casino. But another area of security concern may be the ability of the Bank of Guyana (BoG) Supervision Department to ensure that the Casino is not abused by individuals seeking to launder money. In this regard, the absence of the Anti-Money Laundering Unit that should have been established remains pivotal to this effort.

The project will provide its own internal security.

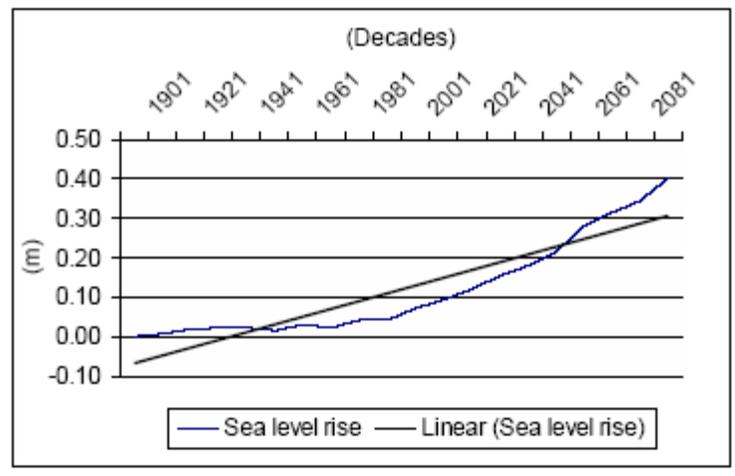
### **5.3.3 Cumulative Impacts**

#### **5.3.3.1 Sea Level Rise and Implications**

##### Impact Description and Analysis

The project site is location on the Coastal Plain of Guyana which is approximately 1 m to 2 m below mean high tide level. This makes the Coast vulnerable it inundation by rise in Sea Level.

Based on data available for the period 1951 to 1979 for Port Georgetown, mean relative sea level rise using linear extrapolation is 10.2 mm/yr-1. High tide change has been calculated to be 9.7 mm yr-1 with the low tide change being 11.1 mm yr-1. This rate of relative sea level rise is about 5 times the global average. Estimates of global average sea-level rise is set to fluctuate over a wide range varying from 1.0 to 2.4 mmyr-1(See Section 4.2.8.2) Source: *Guyana National Vulnerability Assessment to Sea Level Rise.EPA 2002*



Source: *Guyana National Vulnerability Assessment to Sea Level Rise, EPA 2002*

**Figure 5.2 Graph showing future sea level projections**

ADUA has designed the ground floor (level 1) of the buildings at approximately 18.5 G.D. This aligns to the top of the seawall and which adequately takes into consideration the current mean sea level rise of 9.7 mm yr if projected for a period of over 50 years, notwithstanding future efforts to enhance the SDS. This measure is in place as a precautionary measure against flooding of the site from any possible overtopping during high tides.

#### Mitigation Recommendations

The following actions are recommended to avoid and mitigate any negative issues related to security.

- AHI should work closely with the Environmental Protection Agency, Sea and River Defense and other agencies responsible for assessment of sea level changes and participate in workshops and relevant forums.

### **5.3.3.2 Support to Guyana's Tourism Sector and Economy**

#### Impact Description and Analysis

Once brought to fruition the project would be the first establishment of this rating, magnitude and scale within the local chain of hotels. The proposed development will provide a much needed boost for Guyana's tourism and hospitality sector. The key tourism stakeholders, and in particular Guyana's principal tourism institutions the Guyana Tourism Authority (GTA) and the Tourism and Hospitality Association of Guyana indicated that the project would be of significant importance to the sector and could not have been better timed. The presence of the Marriott brand is seen as raising Guyana's tourism profile and as a result would attract a new class of tourists to the country. The tourism sector stands to benefit as well from a more organized and structured marketing machinery of this world renowned hotel chain. The presence of the Marriott will also afford the country much needed publicity in previously untried territories.

Further, the project with its facilities can also allow Guyana to be marketed as a conference destination. The conference facilities to be offered can potentially serve many of the surrounding Government Ministries, Agencies and private entities in the hosting of meetings, workshops and other such special events. Tourists and locals will also be afforded the opportunity to utilize recreational facilities that were previously unavailable within the country.

Additionally the presence of a hotel facility with a high rating can potentially catalyze establishments of a similar nature to adopt new and improved standards of service and hospitality. It is also expected that the

project will play a direct role in enhancing the capacity of local service and hospitality providers through the provision of training.

The successful integration of the project within the local economy will result in increased revenue as a consequence of increased arrivals into Guyana, the payment of taxes and license fees and the demand for increased goods and services from manufacturers and other service providers.

### Recommendations

To support the successful integration of the project into the local economic spectrum and tourism sector a deliberate effort should be made by institutional stakeholders to develop linkages where possible with the project principals.

- While it may be expected that project will integrate with the local tourism sector, in the interest of the development of the local sector some effort should be made by institutions such as THAG and GTA to facilitate linkages between the project and reputable local service providers.
- Local service providers who offer unique services and experiences which are not provided within the proposed project should seek to have their products showcased.
- The architectural heritage of the Kingston community can also be showcased to travelers staying at the facility.

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## CHAPTER 6 ENVIRONMENTAL MANAGEMENT MEASURES

### 6.1 Introduction

This chapter presents the Environment Management and Monitoring Plan (EMMP) which addresses construction and subsequent operational activities of the project.

#### 6.1.1 Approach to Environmental Management

The primary purpose of the EMMP is to detail environmental management measures proposed for the project so that all the activities associated with construction, operation, and closure that could affect the environment can be managed, and that responsibilities and appropriate resources can be allocated to the aspects requiring management. The EMMP will be implemented by the Health, Safety and Environment Officer.

#### 6.1.2 Principal Activities and Aspects Addressed

The principal activities and aspects are summarized in Table 6.1 (construction phase) and Table 6.2 (operations phase).

**Table 6.1 Summary of Activities and Aspects addressed in EMMP - Construction Phase**

ASPECT	MITIGATION MEASURES
<b>Bio-Physical Environment</b>	
<b>Erosion of Cleared Areas</b>	<ul style="list-style-type: none"> <li>▪ Temporarily bund exposed soil, placement of silt fences at property lines and the use of construction crushed rock at entrances and inlets.</li> <li>▪ Monitor areas of exposed soil during periods of heavy rainfall throughout the remaining construction phase.</li> <li>▪ Cover large material stockpiles during periods of heavy rainfall with tarpaulin.</li> <li>▪ Place silt traps in vulnerable areas.</li> <li>▪</li> </ul>
<b>Loss of Vegetation</b>	<ul style="list-style-type: none"> <li>▪ The vegetation removal on the shorezone should be limited to certain species.</li> <li>▪ Landscaping of the project site to restore vegetative cover to unpaved areas.</li> <li>▪ Use native flowering plants to provide habitat and host plants for some species.</li> <li>▪ A landscape maintenance programme should be established and implemented</li> <li>▪ Vegetation selected should be based on: suitability, habitat, flowering plants and shrubs</li> </ul>
<b>Loss of Fauna</b>	<ul style="list-style-type: none"> <li>▪ Landscaping component should include species of trees that will attract avian species.</li> <li>▪ Species chosen to re-vegetate the site should serve both a landscape function and a habitat function without compromising either.</li> </ul>
<b>Socio-Economic Environment</b>	
<b>Dust</b>	<ul style="list-style-type: none"> <li>▪ Access roads and exposed ground should be regularly wetted in a manner that effectively keeps down the dust.</li> <li>▪ Stockpiles of fine materials (e.g. loam) should be wetted or covered with tarpaulin at all times.</li> <li>▪ Workers on the site should be issued with dust masks during dry and windy conditions.</li> <li>▪ Where possible a wall structure (probably of ply board) can be placed behind stockpiles of sand, earth and gravel to act as receptor for larger dust particles which are still subject to the force of the wind. This measure can also prevent the build up of construction material in nearby water ways.</li> <li>▪ Activities which could result in high volumes of dust being generated can be scheduled for periods when offices have a reduced occupancy (i.e. on weekends, before and after working hours). Dust screens/blinds will be erected on the leeward side of the building during construction to reduce the spread of air borne particles.</li> </ul>

ASPECT	MITIGATION MEASURES
<b>Noise</b>	<ul style="list-style-type: none"> <li>▪ Construct noise barriers, such as temporary walls or piles of excavated material, between noisy activities and noise-sensitive receivers.</li> <li>▪ Site equipment on the construction lot as far away from noise-sensitive sites.</li> <li>▪ Construct walled enclosures around especially noisy activities.</li> <li>▪ Combine noisy operations to occur in the same time period.</li> <li>▪ Avoid nighttime activities.</li> <li>▪ Avoid use of an impact pile driver where possible.</li> <li>▪ Ensure noisy equipment have adequate muffler device installed.</li> </ul>
<b>Traffic and Transport</b>	<ul style="list-style-type: none"> <li>▪ Provide the MPW&amp;C with construction schedule and any required road closure at least 10 days in advance.</li> <li>▪ Provide the public with advance information on road closure.</li> <li>▪ Road closure should be posted with detour signs and the detour routes should be fully sign posted throughout to ensure the traffic follows the correct routing</li> <li>▪ An assessment of the routing of major equipment and material transfer from the Kingston wharf should be done in advance, to identify any constraints; and</li> <li>▪ Where partial or full lane closures are required, proper road signs, flags persons should be utilized to assist traffic movement.</li> <li>▪ Materials should be transported during off peak hours.</li> <li>▪ The trucks transporting fine material should be properly covered.</li> <li>▪ For movement of oversized loads, all routes should be assessed in advance to determine constraints such as overhead wires and sharp turns. The MPW&amp;C should be provided with a plan indicating the routing, need for road closure, date, time and duration of the movement.</li> <li>▪ Adopt the recommended route for transporting materials to the site.</li> <li>▪ As much as possible, materials should be transported to the site via the wharf.</li> </ul>
<b>Impact on Existing Infrastructure</b>	<p><i>Sea Defence System (SDS)</i></p> <ul style="list-style-type: none"> <li>▪ AHI should establish a MoU with the SRDD regarding access, maintenance and management of the SDS bordering the project site.</li> </ul> <p><i>Surrounding Buildings</i></p> <ul style="list-style-type: none"> <li>▪ Before the commencement of pile driving activities a structural assessment should be done of buildings including heritage sites within the immediate vicinity of the project site.</li> <li>▪ A detailed inventory should be taken of the immediate neighbouring structures to allow AHI to adequately address any complaints of structural damage.</li> <li>▪ A vibration monitoring program should be established.</li> <li>▪ If significant vibration is detected, make adjustments as necessary.</li> <li>▪ Local residents and businesses should be given notice of the scheduling of pile driving activities to prepare for the increased levels of noise and vibration, in an effort to mitigate some increased noise levels, acoustic barriers may be added to the pile driving equipment.</li> </ul> <p><i>Road Surface</i></p> <ul style="list-style-type: none"> <li>▪ Given the high density and volume of vehicles which currently and is expected to traverse this road it is recommended that for its rehabilitation, extensive compacting is done to ensure the safety of the submerged water mains and rerouted sewer lines.</li> </ul>
<b>Construction Waste</b>	<ul style="list-style-type: none"> <li>▪ Skips should be placed at strategic locations around the construction site.</li> <li>▪ The skips should be properly designed and covered to prevent access by vermin and minimize odour and dust nuisance.</li> <li>▪ Waste should be sorted for re-use and recycling and should be disposed on a regular basis.</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>▪ Dispose of all construction waste as outlined in above.</li> <li>▪ Enclose the construction site as much as possible to block the full view of the public.</li> </ul>

ASPECT	MITIGATION MEASURES
Employment	<ul style="list-style-type: none"> <li>Working with local contractors, on-the-job training and exposure to new technologies and construction approaches should be implemented</li> </ul>

**Table 6.2 Operational Phase**

ASPECT	MITIGATION MEASURES
<b>Bio-Physical Environment</b>	
<b>Modification of Surface Drainage</b>	<p><b>Surface Drainage Systems</b></p> <ul style="list-style-type: none"> <li>Design storm drains to permit runoff from the buildings, roads and all paved areas around the site.</li> <li>Drainage System should prevent on-site erosion.</li> <li>System should be adequately designed, stabilized, and maintained, particularly where accumulated runoff flows.</li> <li>Unpaved areas subject to sheet flow should be stabilized with vegetation or inert materials.</li> <li>Use partial pervious materials to construct open areas such as the parking lots to allow for percolation.</li> <li>Install a storm water detention system.</li> <li>Collect and reuse storm water as much as possible.</li> </ul> <p><b>Underground Drainage Systems</b></p> <ul style="list-style-type: none"> <li>Underground drainage systems convey site runoff in enclosed, below-grade storm sewers. Runoff should be collected at storm drain inlets and can be released into the main installation or main sewerage system or at a surface outlet.</li> <li>Runoff conveyed in sewer pipes must be released at a surface outlet, the velocity of the runoff should be reduced to non-erosive levels and the area around the outlet should be properly graded and stabilized to lessen erosion.</li> </ul>
	<b>Socio-Economic Environment</b>
<b>Employment</b>	<ul style="list-style-type: none"> <li>Wider participation from the local hospitality sector should be encouraged.</li> <li>On-the-job training should be done to enhance the capacity of locals to fill managerial positions.</li> </ul>
<b>Utility System and Water Management</b>	<ul style="list-style-type: none"> <li>Educate, train and motivate staff to practice water conservation.</li> <li>Institute a comprehensive leak detection and correction programme.</li> <li>Discourage practices such as food thawing and washing vegetables under running water.</li> <li>Irrigation - monitor grounds irrigation system and conduct irrigation in cool environment such as evening or nights.</li> <li>Implement preventative maintenance for toilets.</li> <li>Don't backwash pool filters more than necessary.</li> <li>Convert to Low-Flush Toilets: since water-saving toilets use 50 to 75% less water.</li> <li>Ensure fuel storage areas have secondary containment with a capacity of 110% of the largest storage tank.</li> </ul>
<b>Solid Waste Management and Disposal</b>	<ul style="list-style-type: none"> <li>Skips should be placed at strategic locations</li> <li>The skips should be properly designed and covered to prevent access by vermin and minimize odour,</li> <li>Arrangements should be made by AHI for all solid waste to be collected by a contracted waste disposal service.</li> <li>Waste should be sorted and reuse and recycling should be practiced.</li> </ul>
<b>Noise</b>	<ul style="list-style-type: none"> <li>Ensure generators are housed in sound proofed enclosed rooms.</li> <li>Ensure night clubs and other entertainment areas are sound proofed.</li> </ul>
<b>Sewage Disposal</b>	<ul style="list-style-type: none"> <li>Install a sewage and waste water treatment plant.</li> <li>Ensure all waste water and sewage is treated to acceptable levels before</li> </ul>

ASPECT	MITIGATION MEASURES
	<ul style="list-style-type: none"> <li>discharge into the receiving waterways.</li> <li>▪ The project should educate its occupants on the items that should not be disposed in toilets.</li> <li>▪ Grease traps should be constructed as part of the internal sewage system.</li> <li>▪ A holding tank with the capacity of two-thirds of the daily discharge should be constructed on site as emergency backup.</li> <li>▪</li> </ul>
<b>Traffic Congestion and Parking</b>	<ul style="list-style-type: none"> <li>▪ Before construction commences, AHI should consult with the relevant traffic agencies including the Guyana Police Force, Central Planning and Transportation Unit (CPTA) and TSU of the WSG to present its traffic flow arrangement for this phase of the project.</li> <li>▪ Lighting should be installed for roads immediate to the project area as installation of the appropriate signs, both warning and guidance.</li> <li>▪ A right turning lane for traffic going into the complex should be constructed. The turning lane should have a holding capacity for five passenger cars.</li> </ul>
<b>Conflicting Land Use</b>	<ul style="list-style-type: none"> <li>▪ The seawall and beach area must remain a public good always being accessible for public utilization and in keeping with the permission granted by Government a promenade will be constructed in this regard. The developer should have responsibility over the cleaning, maintaining and security of the beachfront</li> <li>▪</li> <li>▪ The SRDD should have access to the seawall and beach area for routine inspection and for emergency and maintenance works as may be required.</li> <li>▪ Neighbouring properties which will be impacted by construction works should receive prior notice and be informed of activities which may affect their staff members and the execution of their daily operations.</li> <li>▪ AHI should be forthright in sharing future development plans with neighbouring properties.</li> </ul>
<b>Proliferation of Social Ills</b>	<ul style="list-style-type: none"> <li>▪ Stringent measures should be taken that only individuals who are residing at the Hotel be granted access to the casino as mandate by the 2007 Gambling Prevention (Amendment) Act.</li> <li>▪ Local patrons who wish to stay at the Hotel as a means of acquiring the use of the casino facility must be made to pay necessary taxes on their winning which should be declared to the GRA by the management of the casino.</li> </ul>
<b>Marine Navigation</b>	<ul style="list-style-type: none"> <li>▪ AHI should work with MARAD towards placing a beacon on the highest point of the Marriott and to consider a new beacon light with a further range and greater visibility and with low maintenance. The light should be placed during the construction phase to address any blockage that may occur.</li> </ul>
<b>Stakeholder Relations</b>	<ul style="list-style-type: none"> <li>▪ Implement a Public Awareness Programme as outlined in Section 5.</li> </ul>
<b>Cumulative Impacts</b>	
<b>Sea Level Rise</b>	<ul style="list-style-type: none"> <li>▪ AHI should work closely with agencies responsible for coastal zone monitoring and management, sea level rise, and sea defence.</li> </ul>
<b>Support to Guyana Tourism Sector and Economy</b>	<ul style="list-style-type: none"> <li>▪ Efforts should be made by institutions such as THAG and GTA to facilitate linkages between the project and reputable local service providers.</li> <li>▪ Local service providers who offer unique services and experiences which are not provided within the proposed project should seek to have their products showcased.</li> <li>▪ The architectural heritage of the Kingston community can be showcased to travelers staying at the facility.</li> </ul>

## 6.2 Mitigation and Monitoring Costs

The Table 6.3 below outlines the key mitigation actions and an indicative annual budget of estimated costs. ADUA will be expected to maintain this annual budgetary allocation and at the end of each year to revise the budget based on previous year's experiences and price/cost changes.

**Table 6.3 Budgets for Mitigation and Monitoring**

<b>Impact</b>	<b>Action/s</b>	<b>Equipment</b>	<b>Annual Cost</b>	<b>Frequency</b>
Waste	Replacing and/or rehabilitating waste receptacles and general waste management.	Bins and garbage receptacles Onsite OHSE Officer responsible for garbage management.	\$200 000 \$1 000 000	Monthly
Water Pollution	Water quality tests such as pH, Turbidity, COD, Oils/Grease, and TSS	Samples collected and outsourced to Lab for analysis	\$2 400 000	Quarterly
	Building of sediment traps and bearers traps		\$200 000	Month 1
	Building of a berm around the fuel storage tanks and maintenance.		\$400 000	Month 1
Air Pollution	Air Quality tests such as Total Suspended Particles (TSPs)	Samples will be collected and analysed by an external agency	\$4 000 000	Quarterly
Noise Pollution	Maintenance of generator and housing	Arc welding equipment	\$200 000	Biannually
	Routine maintenance of equipment and machinery, in particular muffler devices		\$300 000	
Health and Safety	First Aid Kits	To be sourced from overseas	\$500 000	Month 1
	Protective gear for workers e.g. gloves, overalls, respirators, safety boots and ear piece.	To be sourced from overseas	\$2 000 000	Month 1
	Training of workers in occupational health, safety and environment.		\$700 000	Annually
	Warning signs within key buildings and work site areas	Signs outsourced	\$500 000	Annually
Traffic	Maintenance of signs and markers on site and on approach roads.		\$500 000	Quarterly
Fire Equipment	Fire Extinguishers and other spill kit equipment.	To be sources from overseas	\$700 000	Month 1

Impact	Action/s	Equipment	Annual Cost	Frequency
Training	Training of personnel e.g. in First Aid as well as environmental monitoring and fire safety and emergency evacuation.		\$300 000	Annually
Incidentals and Emergencies	Response needed in event of accidents and emergencies.		\$2 000 000	Annually
<b>TOTAL</b>			<b>\$15 900 000</b>	

### 6.3 Monitoring Plan

#### 6.3.1 Monitoring Schedule and Responsibility

This Monitoring Plan has focused on social and environmental parameters to be monitored during the construction and operation of the project as shown in Table 6.4. The Plan is based on the principal issues and impacts identified during the study, and taking into consideration the roles and responsibilities of key institutions during the operation of the project.

For the construction phase of the project, an Environmental Inspection Reporting Format (Form 6.1 and 6.2) is proposed for use.

**Table 6.4 Monitoring Plan**

Parameter	Institution Responsible	Frequency of Monitoring	Location of Monitoring
<b>Physical environment</b>			
<b>Weather</b> Rainfall Temperature Humidity Evaporation Wind	AHI	Daily (Automatic Weather Station)	At fixed location agreed with Hydromet Division
<b>Dust</b> Total suspended particulates (TSP)	AHI	Monthly during construction	Around the property
<b>Biological environment</b>			

Parameter	Institution Responsible	Frequency of Monitoring	Location of Monitoring
Noise Decibels	AHI	Quarterly	Location as identified in Figure 4.4 for noise baseline
Water Quality Ph Turbidity COD Heavy Metals TSS Conductivity Coliform (total and faecal) Sulphates Chlorides Oil and Grease	AHI	Biannually	Points of site drainage into area drainage  Effluent from waste water treatment plant.  Ground water from well
Waste Management	AHI	Weekly	Waste receptacles General project area
<b>Socio-economic environment</b>			
Health and Safety	AHI	Monthly	Use of protective gear by staff Condition of fire-fighting stations and equipment Adequate and appropriate signage for emergencies Location of Emergency Procedures  In house training to keep employees up to date with various safety procedures. Health conditions of staff, in particular as it relates to respiratory ailments
Employment and Benefits	AHI	Biannually	Number of Guyanese employed Conditions of employment  Assistance to employees by company

Form. 6.1 Environmental Inspection Reporting Format

Kingston, Georgetown		
PROJECT: Georgetown Marriott Hotel, Casino & Entertainment Complex		
<b>ENVIRONMENTAL INSPECTION REPORT – CONSTRUCTION</b>		
INSPECTION DATE:	LOCATION	
INSPECTOR NAME:		

Yes	No	N/A	
<b>Health &amp; Safety Management</b>			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Personal protective equipment worn on site (e.g. helmet, boots, vests, etc.)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Traffic signs, speed control and other traffic movement controls are in place
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sufficient drinking water supply available on-site
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Toilet facilities provided on-site
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Dust control measures in place (i.e., water tankers are available)
<b>Waste and Spills Management</b>			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Garbage, scrap material and waste collected in suitable receptacles
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Waste construction material stockpiles no older than 30 days
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Spent oil, lubricants and filters collected and removed from site
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Refueling follows correct protocols
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No servicing or refueling of equipment within 30 m of residences, schools, watercourses, etc.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Spills & Emergency Response Plan available on-site
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Spill kit available on site (e.g. containment/absorption material)
<b>Erosion and Sediment Control</b>			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Erosion and sediment control measures in place prior to construction
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Stockpiles protected from wind and water erosion
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Silt fencing/trenching/beaming in place adjacent to stockpiles
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Stockpiles not located within 10 m of a watercourse
<b>Dust and Noise Management</b>			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Stockpiles adequately covered
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Dry areas are constantly soaked
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Noisy equipment are enclosed
<b>Water Management</b>			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Watercourse flow maintained (no obstructions)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No equipment, waste or materials are stored within 10 m of a watercourse

Kingston, Georgetown		
PROJECT: Georgetown Marriott Hotel, Casino & Entertainment Complex		
<b>ENVIRONMENTAL INSPECTION REPORT – CONSTRUCTION</b>		





Monthly summary reports should be prepared to include:

- Quality of construction work and work techniques or mitigation recommendations
- Follow-up on previous recommendations
- Outstanding environmental works
- Proactive measures taken to protect the environment
- Other environmental issues

### **6.3.3 Storage and Retrieval of Monitoring Information**

Records of monitoring should be kept by AHI on-site and made available to EPA or other regulatory Authorities upon request. Monitoring results which exceed national standards will be immediately reported to EPA.

## **6.4 Emergency Response Plan**

### **6.4.1 Objectives**

This Emergency Response Plan (ERP) describes the general types of emergency and actions to be followed, should an emergency occur during the construction and operational phase of the project. The ERP includes:

- Emergency Contact Details
- Emergency Procedures
- Description of an Emergency
- Authority of Control
- Scenario Description and Response.
- Materials Inventory
- Incident Reporting

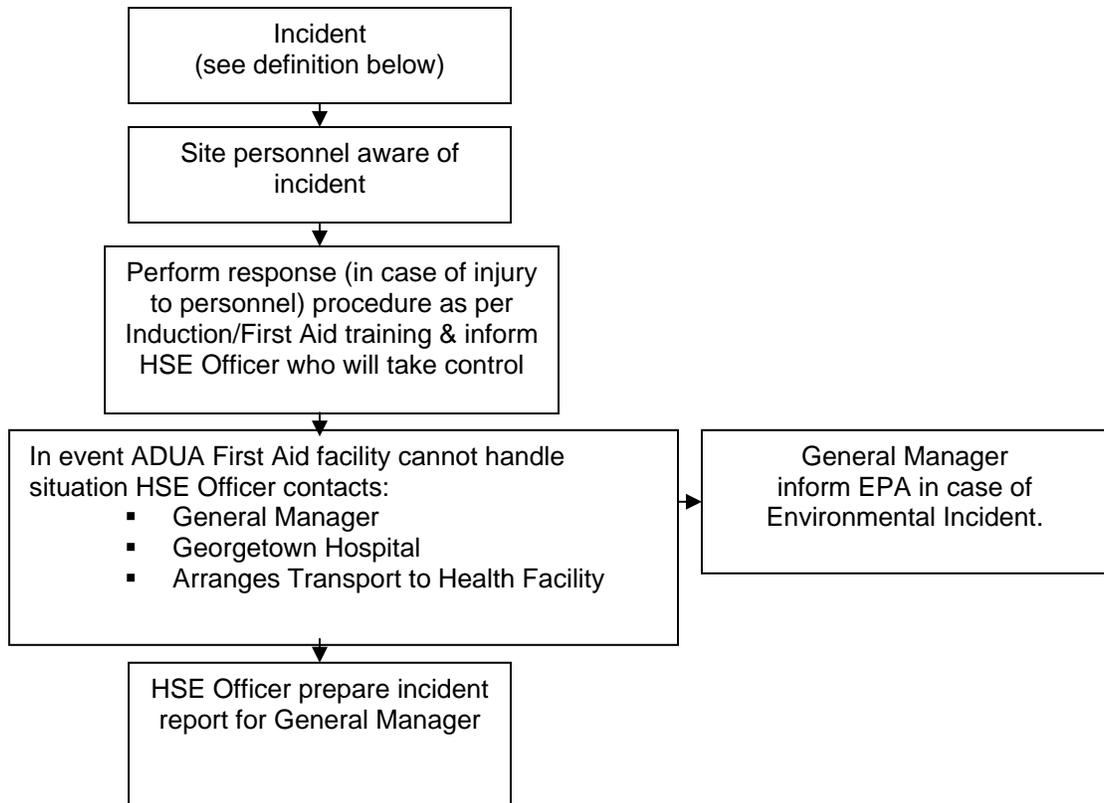
The above information should be provided to employees and placed at strategic locations within the project site. Such locations will include the site office, storage bond and discharge areas for trucks and barge.

As part of ISO 14001 it is critical that staff are adequately trained on safety and emergency procedures along with the conduct of frequent emergency drills. AHI should designate a HSE Officer who would take responsibility for the coordination and execution of actions as they relate to health, safety and the environment.

### **6.4.2 Emergency Contact Details**

Georgetown Hospital	227 8210-2
Ambulance Service	913
GPF, Commander A Division	Emergency 911
Quick Response Headquarters	225 6411
Guyana Fire Service	912
Environmental Protection Agency	225 0506

### 6.4.3 Emergency Procedures



### 6.4.4 Description of an Emergency

An emergency is a situation in which injury to a person(s) and/or damage to the environment is involved requiring emergency service attendance.

### 6.4.5 Authority of Control

The HSE Officer and General Manager have the authority to take control of any Incident. These persons have the authority to take the decision to close down all or any part of the operations following an incident.

### 6.4.6 Minor Accident

In the event of a minor accident, the HSE Officer will be informed and who then takes the responsibility for on-site treatment utilizing First Aid facilities. An entry will be done into the Accident and Emergency Record book.

**Table 6.5 Description of Scenario**

Accident	Fire	Fuel Spills	Sewage or Wastewater Spills
	<p>Fire is perhaps one of the principal emergency a hotel may be faced with. It is expected that the project, in keeping with the high standards of the Marriott Brand, will develop a Hotel Evacuation Plan to cater for emergencies such as a fire.</p> <p>Fire fighting equipment such as fire hydrants, extinguishers and sand buckets will be located at strategic points within the project area. These strategic points will be clearly marked, be visible to staff and guests and employees should have knowledge of their position and operation. In the event of a fire, employees will initiate the following procedure which that they would be familiar with as a result of fire drills:</p>	<p>Fuel will be stored on-site for the generator. However, this is expected only to be in small quantities. In the event of a spill covering more than 2m x 2m the following action will be taken.</p>	<p>This is another potential issues associated with hotel projects. The project will undertake on-site wastewater treatment and link into the Georgetown Sewage System. In the event of a sewage or wastewater spill, covering more than 5m x 5m the following action will be taken</p>
<ol style="list-style-type: none"> <li>1) Inform HSE Officer and/or General Manager.</li> <li>2) In the case of injury, First Aid treatment to be applied.</li> <li>3) Assess type of injury, i.e. broken leg, conscious or unconscious.</li> <li>4) Arrange transportation to Hospital.</li> <li>5) HSE Officer make entry into the Accident and Emergency Record book</li> </ol>	<ol style="list-style-type: none"> <li>1) Immediately warn others and evacuate buildings or area.</li> <li>2) Attack the fire if safe to do so, with fire fighting equipment provided, but without taking personal risks.</li> <li>3) Contact the HSE Officer and/or General Manager.</li> <li>4) Take decisions on containment. If it is a small fire, use fire extinguisher (Dry chemical such CO<sub>2</sub> or Halon). In the vent of a larger fire, employ water spray, fog or standard foam if available. In the event of a fuel fire, move container from fire area if possible without risk, cool containers that are exposed to flames with water from side until well after fire is out and stay away from ends of tanks. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tank due to fire.</li> </ol>	<ol style="list-style-type: none"> <li>1) Inform HSE Officer and/or General Manager.</li> <li>2) With the use of on-site Spill Kits stop the flow if possible.</li> <li>3) Prevent the movement of people or vehicles into restricted area.</li> <li>4) Treat spill with absorbent materials such as sand or sawdust and a bund formed if possible to prevent the spill spreading.</li> <li>5) Collect absorbent materials and placed in a secured area with an impervious base at a restricted zone.</li> <li>6) Make entry into the Accident and</li> </ol>	<ol style="list-style-type: none"> <li>1) Inform HSE Officer and/or General Manager.</li> <li>2) With the use of on-site Spill Kits stop the flow if possible.</li> <li>3) Prevent the movement of people or vehicles into restricted area.</li> <li>4) Treat spill with absorbent materials such as sand or sawdust and a bund formed if possible to prevent the spill spreading.</li> <li>5) Collect absorbent materials and placed in a secured area for disposal.</li> </ol>

Accident	Fire	Fuel Spills	Sewage or Wastewater Spills
	5) Contact Guyana Fire Service.  6) HSE Officer makes entry into the Accident and Emergency Record book.	Emergency Record book.  7) HSE Officer to prepare a detailed report.	6) Make entry into the Accident and Emergency Record book.  7) HSE Officer to prepare a detailed report.

### 6.4.7 Fuel and Materials Inventory

Table 6.8 provides an example of an Inventory Data Sheet for tracking and monitoring the type, quantities and storage requirements for fuels and other combustible materials.

**Table 6.6 Inventory Data Sheet for Fuels**

Common Name	Material Type	State	Location	Quantity	Storage Requirements
Oil	Lubricating Oils	Liquid	Drums in fuel storage bond		
Gas Diesel	Gasolene Diesoline	Liquid	Storage Tanks		
Paint	Paint	Liquid	Storage Bond		

### 6.4.8 Incident Reporting

After every incident/accident a report will be required. The Environmental Officer will have direct responsibility for the preparation of such a report. The following is a format which should be used.

**Form 6.3 Safety & Health Management Information**

<b>Atlantic Hotel Inc. Record of Accident/Incident</b>		Type/Source: _____ / _____	
<b>SAFETY &amp; HEALTH MANAGEMENT INFORMATION</b>		Org. Code: _____	
<b>TO BE COMPLETED BY HEALTH, SAFETY &amp; ENVIRONMENT OFFICER</b>			
1. Reason for Record: <input type="checkbox"/> Accident <input type="checkbox"/> Incident			
2. Name: _____ <small>(Last, First, M.I.)</small>		3. SSN: _____	
4. Position: _____		5. Phone: _____	
6. Date of Birth: _____ Female		7. Sex: <input type="checkbox"/> Male <input type="checkbox"/>	
8. Date/Time of Accident/Incident: _____ Time: _____ <input type="checkbox"/> AM <input type="checkbox"/> PM			
9. Duty Station Address: _____		10. Location of Incident: _____	
11. Description of Accident/Incident _____			
12. Extent of injury or illness and Body Parts Affected: _____			
12. Medical Treatment? <input type="checkbox"/> Yes <input type="checkbox"/> No			
13. Lost Time? <input type="checkbox"/> Yes <input type="checkbox"/> No			

Signature: _____	Date: _____
14. Description of Treatment:	
15. Follow-up Acton:	
Signature: _____	Date: _____
Title: _____	

## 6.5 Stakeholder Relations Programme

As the project progresses, it is vital that a programme of external relations and awareness be established and implemented to target in particular neighbouring stakeholders. Stakeholders should be kept informed of developments. In that way, stakeholders will be reassured that communication has not ended once formal consultation process has been completed, and that there will be formal methods of voicing issues and concerns throughout the project.

**Table 6.7 Outline of Stakeholders Relations Programme**

Component	Objective	Participants and/or targets	Details
Appointed of a Stakeholder Liaison Officer	<ul style="list-style-type: none"> <li>▪ To implement the Programme</li> </ul>	<ul style="list-style-type: none"> <li>▪ AHI Personnel</li> <li>▪ Neighbouring Stakeholders</li> </ul>	<ul style="list-style-type: none"> <li>▪ Appointment should take place prior to commencement of construction phase.</li> <li>▪ Position and responsibility to be effective immediately.</li> </ul>
Establishment of formal communications protocol	<ul style="list-style-type: none"> <li>▪ To formally document the protocol for communication between the company and stakeholders.</li> <li>▪ To provide formal channels for stakeholders to raise complaints, and procedures for those complaints to be addressed.</li> </ul>	<ul style="list-style-type: none"> <li>▪ All stakeholders.</li> <li>▪ Any parties that may be affected by the project.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Protocols and procedures to be developed by personnel manager</li> </ul>
Ongoing feedback and dialogue with stakeholders	<ul style="list-style-type: none"> <li>▪ To maintain dialogue and flow of information between the stakeholders and AHI.</li> </ul>	<ul style="list-style-type: none"> <li>▪ All stakeholders</li> </ul>	<ul style="list-style-type: none"> <li>▪ Periodic face to face meetings with key stakeholders.</li> </ul>

## 6.6 Closure Plan

### 6.6.1 Introduction

Ideally a project of this nature involves a long-term operation and use of land. As such, it will bring with it some permanence in terms of constraints on the options for future beneficial use of the site though it is recognised, that by design, it is envisaged to enhance and provide positive effects on the local water resources, biodiversity and overall landscape quality and associated socio-economic development.

As a requirement of the ESIA process, ADUA is required to identify appropriate closure and decommissioning methods for the project. In the context of this ESIA report, the term 'closure' is taken to encompass decommissioning, demolition and rehabilitation activities prior to closure of the site.

This conceptual Closure and Decommissioning Plan (CDP) details in conceptual form the measures that will be employed at the closure of the project to ensure that the site is rehabilitated to an appropriate level. The final plan will need to be developed in consultation with relevant authorities and stakeholders in advance of closure.

### 6.6.2 Approach to Closure Planning

This CDP addresses individual closure issues and action required. More specifically, the objective of the overall closure planning process, and the specific provisions within is to:

- Contribute to the management of environmental issues during planning and operational phases as a means of facilitating the effective closure;
- Identify suitable best practice measures that are appropriate to the project context and that are able to meet the requirements of the regulatory Agencies and satisfy international benchmarks and standards for tourism operations;
- Satisfy the requirements of existing Guyana legislation, specifically the Environmental Protection Act;
- Through consultation, obtain stakeholder acceptance of closure proposals;
- Minimize the potential for any negative post-closure impacts and liabilities;
- Minimize the requirement for active management of the post-closure environment; and
- Maximize the potential for post-closure environmental and socio-economic benefits.

### 6.6.3 Principal Closure Issues

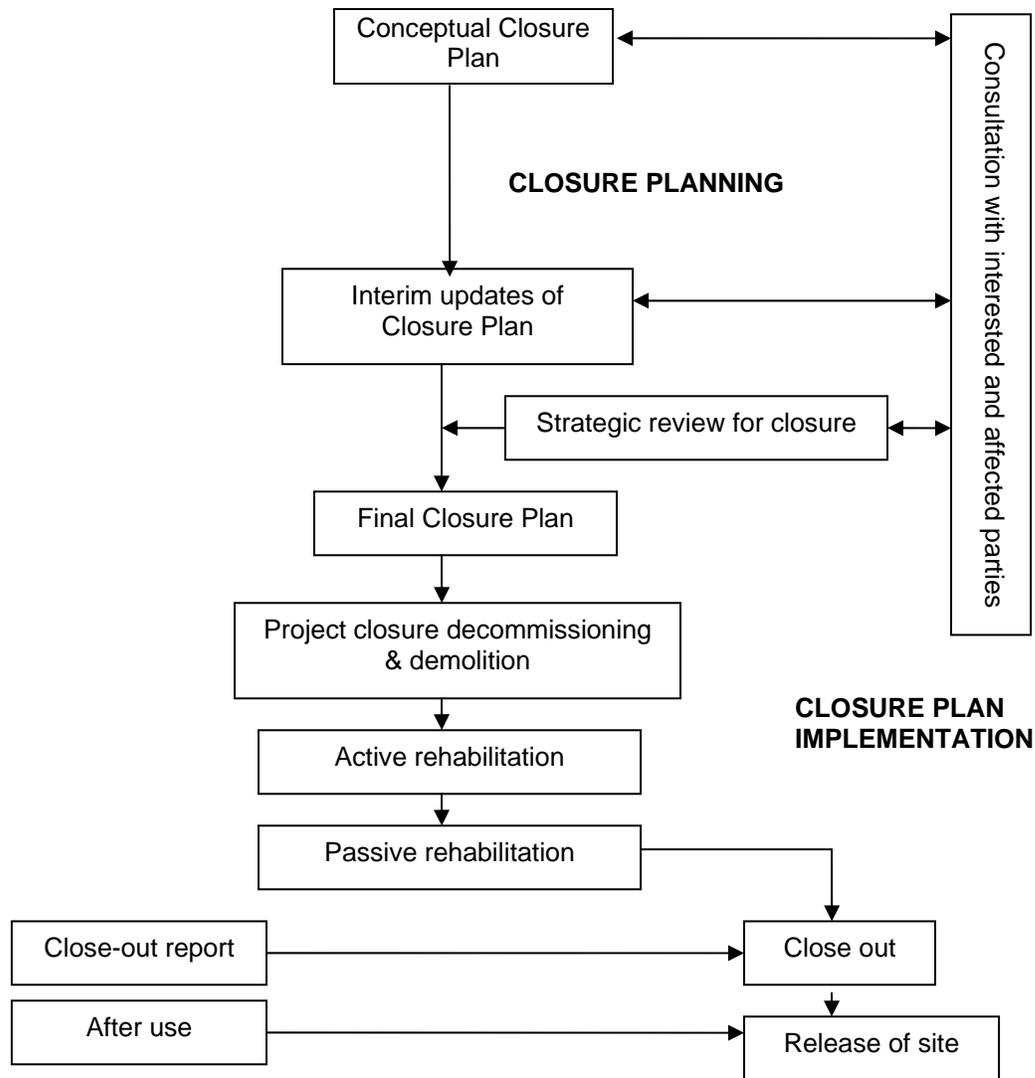
The principal closure related issues related to the project have been identified as:

- Surface water management
- Infrastructure (buildings, access roads, drainage infrastructure etc.); and
- Retrenchment of employees.

Subsequent refinements of the closure plan will be influenced by ongoing consultations and will address in more details specific to closure issues and proposed options. It is anticipated that these will address, amongst other items, the following areas:

- **Water quality management:** detailed proposals for post-closure prevention and control of erosion, sedimentation, siltation and leaching to ensure appropriate water quality standards are achieved.
- **Infrastructure:** facilities such as roads, power lines, buildings and structures and their future utilization will be evaluated and where relevant the measures for their maintenance will be described. If decommissioning is proposed, the dismantling and disposal of building structures, support facilities and other infrastructure (such as electric power lines, water and sewage pipelines, water well,) will be discussed in detail.
- **Retrenchment:** description of the socio-economic opportunities in the area, inventory of employees and associated skills, formation of a plan to retrain and re-skill employees and facilitate re-employment to minimize impacts of retrenchment and to ensure facilities and services provided by ADUA are supported.

In the specific environmental and socio-economical context of the project, options for post-closure land use with respect to these issues will be limited due to the potential for long term tourism activities at the site.



**Figure 6.1 Overview of Anticipated Closure Process**

#### 6.6.4 Closure Actions

Figure 33.1 provides an outline of the Closure Actions, from planning to implementation. In addressing the principal closure and decommissioning issues, the Closure Plan is envisaged to include the following actions:

##### Physical Issues

1. Arrangements should be in place for reuse of some solid waste, including concrete, timber, glass and steel by contractors or other recipients. This is essential to reduce the potential of environmental contamination.
2. Waste removed should be contained adequately in order to minimize spillage of materials and fugitive dust nuisance.

3. Structural steel waste products may be sold to scrap metal merchants.
4. Heavy equipment and machinery will be sold/and or be removed from the site to a suitable area by the developer.
5. Re-vegetation should commence immediately so as to prevent exposure of soil and possible erosion of exposed areas.

#### Socio-Economic Issues

6. The relevant Government Authorities and the Employees/Workers will be informed at least three months in advance.
7. NIS and PAYE contributions for staff will be discontinued.
8. Severance pay for employees/workers will be paid and other monies due to them as required by Guyana's Labour Act and the Termination and Severance Payment Act (TESPA).

Within the first five years of operation, a detailed Closure Plan should be prepared by ADUA.

**CHAPTER SEVEN – CONCLUSION AND RECOMMENDATIONS  
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This section provides a summary of the principal findings of the ESIA Study and general recommendations regarding the project. Additionally, specific recommendations in the form of an overall summary of the required mitigation measures that should be implemented to reduce potential negative and maximize positive environmental, social and economic impacts of the project is outlined.

### 7.1 Principal Findings of the Impact Assessment

The principal findings of the ESIA study are summarized as follows:

- The proposed project will have both negative and positive direct and indirect impacts on the socio-economic environment of Kingston, Greater Georgetown and the nation as a whole.
- Most of the negative impacts are essentially limited to the construction phase of the project. Direct adverse effects on the physical, biological and social environment are considered to be manageable through the implementation of mitigation measures and the majority of impacts associated with this project are of low significance.
- Direct impacts on the ecology due to loss of vegetation and faunal habitats are regarded as low significance, largely due to the small percentage of the total footprint of the project in relation to the distribution of these widespread flora and faunal species.
- Impacts on the visual environment, noise and traffic are expected to be limited to the construction phase of the hotel. These impacts can thus be effectively mitigated and managed to acceptable levels.
- While drainage is recognised as an issue, ADUA has proposed a drainage network system that will assist in storm water discharge and adequate drainage of the project site.
- Measures will be implemented to address solid waste by engaging a private contracted service for collection and disposal in addition to on-site best-practices for collection and recycling and sewage will be discharged into the existing Georgetown sewer system with contingency measures on-site to cater to emergencies.
- The positive impacts centre on the ability of the project to boost Guyana's tourism sector and the employment opportunities created during the construction and operational phases. The benefits resulting from the project will depend to a large extent on the project's ability to integrate within the local tourism and services sectors.
- There is a sufficient level of confidence in the ESIA analysis and findings to enable a decision to be taken based on existing information.

The implementation of the Georgetown Marriott Hotel, Casino and Entertainment Complex project will not produce any significant negative environmental or social impacts either in the construction or operational phases. Potential negative impacts are all low magnitude impacts of low environmental or socio-economic significance. These negative impacts can be further minimised by applying the recommended mitigation measures where appropriate.

The project when implemented will have a significant positive impact on the socio-economic environment primarily through the creation of a significant number of job opportunities for a wide range of skilled and unskilled workers. The economy will also benefit from increased demand for goods and services during both the construction and operational phases of the project.

The project will therefore have a net positive impact on the larger economy of Guyana by adding to the hospitality and entertainment product of Georgetown, and creating significant job and economic opportunities.

The project is therefore considered to be environmentally acceptable, provided all mitigation measures are implemented in advance of other additional project related activities.

## **7.2 Recommendations**

### **7.2.1 General Recommendations**

The general recommendations are for the developer to:

- Incorporate the findings and recommendations of the ESIA study into the detailed planning for the project and its implementation;
- Commit to effectively implement the mitigation measures listed.
- Develop an Environmental Policy and demonstrate an ongoing commitment to minimize environmental damage, at all stages of the project;
- Treat the EMMP as a living document that is regularly reviewed and updated to ensure that management measures are effective and practicable.
- Continue to liaise with stakeholders and affected parties throughout the project life cycle, be further developing and implementing the Stakeholder Relations Programme;
- Pursue Leadership in Energy and Environmental Design Certification (LEED) from the United States Green Building Council (USGBC).

### **7.2.2 Specific Recommendations**

It is envisaged that the proposed mitigation measures will be effectively implemented and incorporated into design and operation of the project. Any deviation from the measures described in the ESIA may therefore alter the significance rating assigned to each potential impact. The specific mitigation measures required to manage the impact associated with the project are listed in the Tables in the EMP section.

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