FINAL

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT REPORT

CPT Inc.

LOGGING AND SAWMILLING OPERATIONS
Left Bank Cuyuni River, Right Bank Pomeroon River, Left Bank Pairawa River, Region #2

Environmental Management Consultants

December 2010

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ACRONYMS

AOP	Annual Operational Plan
BCL	Barama Company Limited
BoD	Biological Oxygen Demand
CoP	Code of Practice
CITES	Convention on International Trade in Endangered Species
DBH	Diameter at Breast Height
EAB	Environmental Assessment Board
EIS	Environemntal Impact Statement
EMC	Environmental Management Consultants
EMP	Environmental Management Plan
EP Act	Environmental Protection Act
ERP	Emergency Response Plan
ESIA	Environmental and Social Impact Assessment
EPA	Environmental Protection Agency
ERT	Emeregency Response Team
FAO	Food and Agriculture Organization
FMLI	Forest Management Level Inventory
FMP	Forest Management Plan
FTC	Forestry Training Center
GFC	Guyana Forestry Commission
GGMC	Guyana Geology and Mines Commission
GoG	Governemnt of Guyana
GLSC	Guyana Lands & Surveys Commission
GNBS	Guyana National Bureau of Standards
GPF	Guyana Police Force
IAST	Institute of Applied Science and Technology
ICZ	Inter-tropical Conveyence Zone
LCDS	Low Carbon Development Strategy
LUP	Land Use Policy
MSDS	Material Safety Data Sheet
MSL	Mean Sea Level
NDS	National Developemnt Startegy
NEAp	National Environmental Action Plan
NFP	National Forest Policy
NTFP	Non-Timber Forest Products
OH&S	Occupational Health and Safety
PET	Potential Evapotranspiration
PPE	Personal Protective Equipment
REDD	Reduced Emissions from Deforestation and Degradation
RIL	Reduced Impact Logging
SFEP	State Forest Exploratory Permit
ToR	Terms of Reference
TSA	Timber Sales Agreement
TSS	Total Suspended Solids
TDS	Total Dissolved Solids
VES	Visual Encounter Surveys

EXECUTIVE SUMMARY

The Government of Guyana (GoG) has recognised the important role the country's forest plays in maintaining global climate. The Low Carbon Development Strategy (LCDS) has identified Guyana's interest in deploying its forest towards the international efforts of combating climate change, provided the right financial incentives are provided. Through an agreement with Norway, Guyana will receive financial support to implement the LCDS from performance-based payments for avoided deforestation. While the LCDS is premised on avoided deforestation, Guyana will continue to utilise the resources of its forests in a sustainable manner. The Government has tasked the Guyana Forestry Commission (GFC) with promoting sustainable management of Guyana's forest resources. As part of its mandate, GFC has been encouraging sustainable forest operations for the promotion of social and economic development while at the same time safeguarding the integrity of forest resources.

Chaitram, Parasram Timber Inc. (CPT Inc.), a Guyanese company, has responded to this effort by GFC to implement a project based on a 'sustained yield management program' and to operate in accordance with the laws and guidelines of the sector including GFC's Code of Practice (CoP) for Forest Operations. The company has signalled its intent to adopt best-practice approaches in its operations. Approximately 60% of the concession was previously logged by Barama Company Limited (BCL) through an arrangement with the former concession holder N. Sukul and Sons However, there are significant resources still available to allow for sustainable harvest and development. There are also existing infrastructures in place such as trails and roads which will contribute to the reduction of the cost of production.

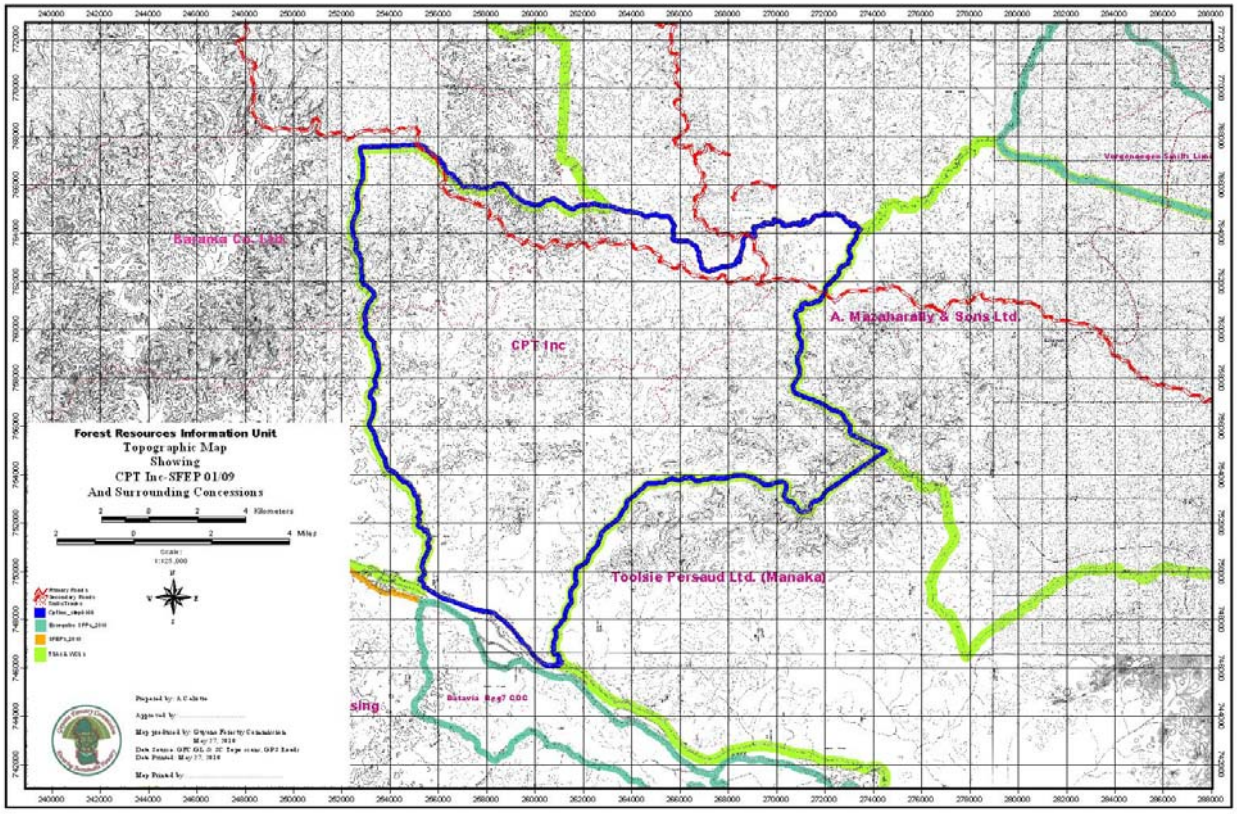
CPT Inc. plans to establish a composite forest project which would essentially involve logging and sawmilling operations as well as downstream processing. The logging operation would include: the building of secondary roads, bridges, culvert rehabilitation and/or construction and felling, bucking and skidding activities. Logs will then be transported to the Sawmilling and Wharf Complex via log trucks for primary processing. Primary processing of logs will be done by portable mills before being loaded onto barges for trans-shipment to the secondary processing facility to be located at Tuschen. The materials will be sold at the local market as well as exported. It is estimated that the amount of sawn lumber to be produced annually is 2,106 m^3 the amount of peeler logs would be 2,006 m^3 annually. A Base Camp will be established within the concession to support the operation.

The concession, based on natural surroundings, is bounded on the north by the Pomeroon River, on the south by the Essequibo River, on the east by the Toolsie Persaud Ltd. and on the west by the Paiwara River and shares a common boundary with Barama Company Ltd (BCL). It lies within the southeastern portion of the forestry belt of Central Guyana on the left bank of Cuyuni River, right bank of Pomeroon River and left bank of Pairawa River. The concession has a land area of 26,259 hectares (64,887) acres.

The main purpose in acquiring the concession is to secure raw materials needed for the sawmilling operation and downstream processing plants. Most primary species to be harvested are already well known to the market such as purpleheart, locust, crabwood, kabukalli, bulletwood, wallaba, wamara, greenheart and shibadan in the manufacture of doors, jambs, windows, outdoor decking, floor and walls for export and local markets. Greenheart is well-known species for marine use and Mora is famous for railroad sleepers and outdoor decking in the USA and Europe and already introduced in Asian countries.

CPT Inc. plans to invest one million, nine hundred thousand US dollars (US$1,900,000) during the first five (5) years of the operation. It is expected that approximately one hundred and eight (108) workers will be employed by the project.

As part of the permitting process, and in order to secure the Timber Sales Agreement (TSA) CPT Inc. was required by the Environmental Protection Agency (EPA) to conduct an Environmental and Social Impact Assessment (ESIA) Study of the project. In July 2009, CPT Inc. appointed Environmental Management Consultants (EMC) as the independent consultant to undertake the study.



Map 1: Showing the location of the CPT Inc. Concession

The objectives of this ESIA study were:

- To document the physical, ecological and socio-economic baseline conditions of the study area;
- Inform, obtain and address contributions from stakeholders including relevant authorities and the public;
- Identify the relevant laws, guidelines, regulations and standards that would define the operating framework of the project;
- Assess in detail, the environmental and social impact that would result from the project;
- Identify mitigation measures that would reduce the significance of predicted negative impacts or enhanced predicted benefits of the proposed project;
- Develop an Environmental Management Plan (EMP) and appropriate Monitoring Plan for the proposed project including a Conceptual Closure Plan; and
- Meet the requirements of the environmental regulatory agencies (EPA and GFC) in Guyana as well as international best practice for a project of this nature.

This study was conducted by an EPA approved team of specialists and has been guided by:

- EPA – ESIA Guidelines Vol. 5, Forestry;
- Issues raised during public scoping meeting, at field exercises and stakeholder engagements;
- Best-Practice Guidance for Forestry Operations (GFC CoP); and
- Terms of Reference (ToR) agreed to by the ESIA Team and EPA. (Attached as Appendix A)

A number of potential impacts were identified. These are summarized in Table 1.

Table 1: Potential Environmental and Social Impacts

Conditions	Potential Environmental Impact	Significance
Construction and Rehabilitation Phase		
Physical Environment **Environmental Aspect: Land/Soil**		
Land clearing for the construction of the base Camp, roads, workshop and logmarket.	Loss of land through direct land takes for project components. Removal of vegetation, where necessary, to facilitate construction of project facilities, thus, may contribute to erosion.	Lo, Irr, LT, Un, M, Insig.
Constructing skid trails and log ponds.	Removal of vegetation, where necessary, to facilitate marking of skid trail and construction of log ponds.	Lo, Irr, LT, Un, M, Insig.
Construction of wharf and sawmilling facility	Loss of land through direct land take for project	Lo, Irr, LT, Un, UM, Insig.
Rehabilitation of existing roads, bridges and culverts.	Site disturbance in quarries/borrow pits for sourcing road. Materials for construction of secondary logging roads can result in erosion.	Lo, Irr, ST, Un, M, Insig
Operation of machines.	Compaction of soil from operation of heavy-duty machines for construction and rehabilitation works.	Lo, Rev, LT, Un, UM, Insig
Disposal of materials (vegetation).	Improper disposal of vegetation from land clearing.	Lo, Irr, LT, UM, Un, Insig.
Storage of fuel and re-fuelling of equipment.	Fuel and/or oil spill from the operation of heavy-duty machines can cause soil contamination.	Lo, ST, Irr, Av, M, Sig
Environmental Aspect: Emissions to Water		
Fuel spills	Water contamination from fuel/oil spills.	Ex, Irr, LT, Av, M, Sig
Erosion and Sedimentation	Surface runoff to creeks from construction and rehabilitation activities: culvert, bridge & road rehabilitation; base camp, log pond and wharf construction resulting in discoloration and sedimentation.	Lo,Rev, ST, Av, M, Sig.
Waste disposal	Improper disposal of solid waste from forest camp.	Ex, Rev, LT, Av, M, Sig.
Environmental Aspect: Emissions to Air		
Operation of heavy-duty machines and equipment.	Noise from the operation of heavy-duty machines and equipment used during construction of the wharf and base facilities and the rehabilitation of roads, culverts and bridges can affect workers.	Lo, Rev, ST, Av, M, Insig.
Operation of heavy duty machines and equipment.	Fumes from the operation of machinery and equipment used during the construction of the wharf and base facilities and the rehabilitation of roads, culverts and bridges can affect workers.	Lo, Rev, ST, Av, M, Insig.
Operation of machines & storage of materials.	Dust from land clearing for construction activities, material stockpiles for road rehabilitation and constant movement of heavy duty equipment can affect workers.	Lo, Rev, ST, Av, M, Sig.
Environmental Aspect: Biological Environment		
Flora	Vegetation removal and destruction to facilitate construction activities.	Lo, Irr, LT, Un, UM, Insig
Fauna	Habitat loss, destruction, fragmentation due to land clearing as a result of construction activities.	Lo, Irr, LT, Un, UM, Insig
Socio-economic Environment **Environmental Aspect: Risks in the Working Environment**		
Health and Safety	Risk to accidents.	Lo, ST, A, Irr, M,

	Employees exposed to excessive noise & fumes from the operation of vehicles during the construction of the wharf and base facilities and the rehabilitation of roads, culverts and bridges. Employees exposed to vector-borne diseases.	Sig
Road Safety	Traffic accidents & unregulated movement on the access road.	Lo, Irr, LT, Un, M, Sig
Employment	Overall short-term increase in employment.	Ex, Rev, ST, Av, M, Sig (Positive)
Security	Risk of crime and robberies	Lo, Rev, LT, Av, M, Sig
Archaeology &Anthropology	Possibility of exposing sites of archaeological & anthropological significance with the consequences being damage and desecration.	Lo, Rev, LT, Av, M, Insig
Operational Phase		
Conditions	**Environmental Impact**	**Significance**
Operational Phase: **Physical Environment** **Environmental Aspect: Land/Soil**		
Land/Soil	Erosion from surface run off	Lo, Irr, LT, Un, M, Insig
	Soil compaction from operation of heavy machines	Lo, Rev, LT, Un, UM, Insig
	Contamination of soil from fuel spills /waste oil	Lo, Irr, LT, Av, M, Sig
	Contamination of soil from insecticide/chemicals spills	Lo, Irr, LT, Av, M, Sig
	Improper disposal of solid and liquid waste from living quarters.	Ex, Rev, LT, Av, M, Sig
Environmental Aspect: Emissions to Water		
Water	Contamination and siltation as a result of erosion and sedimentation	Ex, Rev, LT, Av, M, Sig
	Contamination from spills such as fuel and waste oil	Ex, Irr, LT, Av, M, Sig
	Contamination of soil from insecticide/chemicals spills	Lo, Irr, ST, Av, M, Sig
	Increased traffic on the Essequibo River from tug and barge movement from the wharf on the left bank Essequibo River south of Buckhall contributing to pollution of the waterway	Ex, Irr, LT, Av, M, Sig
	Contamination from improper waste disposal including solid and liquid waste	Ex, Rev, LT, Av, M, Sig
Environmental Aspect: Emissions to Air		
Air	Noise from heavy duty machinery, generator and processing equipment.	Lo, Rev, LT, Av, M, Insig
	Dust from processing equipment during the operation of the sawmill	Lo, Rev, LT, Av, M, Insig
	Dust from waste disposal area	Lo, Rev, ST, Av, M, Insig
	Fumes from the operation of heavy duty machines and generator	Lo, Rev, LT, Av, M, Insig
Environmental Aspect: Biological Environment		
Flora	Habitat disturbance/loss of tree species due to non-compliance with felling procedure, skid trails	Lo, Irr, ST, Av, M, Sig
	Habitat disturbance/fragmentation	Lo, Irr, LT, Un,

Fauna		UM, Sig
	Loss of wildlife due to hunting by workers	Lo, Rev, ST, Av, M, Insig
Environmental Aspect: Aesthetics		
Aesthetics	Improper disposal of solid waste	Lo, Rev, ST, Av, M, Sig
	Hap-hazard stacking of raw materials and finish products	Lo, Rev, ST, Av, M, Insig
Socio-economic Environment **Environmental Aspect: Risks in the Working Environment**		
Health & Safety	Risks of accidents to workers	Lo, ST, A, Irr, M, Insig
	Exposure to excessive noise from the operation of heavy-duty machines and equipment.	Lo, ST, A, Irr, M, Insig
Land Conflicts & Unplanned Economic Development	Conflicting user rights of foresters & miners & haphazard economic development	Ex, Rev, LT, Av, M, Sig
Road Safety, Security & Maintenance	Traffic accidents and unregulated movement on the access roads; Reduction in security.	Lo, Rev, LT, Av, M, Sig
Employment	Long term employment	Ex, Rev, LT, Av, M, Sig (Positive)

Impact Significance Parameters

Lo – Localised	Ex – Extensive	Rev – Reversible	Irr. Irreversible
ST – Short Term	LT – Long Term	Av. – Avoidable	Un - unavoidable
Sig. – Significant	Insig. – Insignificant	M. – Mitigable	UM – Unmitigable

Based on the impact assessment the main significant impacts were identified. Mitigation measures were identified for these impacts. A Management Plan outlining a number of mitigation and management actions to address these potential impacts was prepared. Box 1 outlined the recommended actions. In addition, the Management Plan also includes the following:

- Monitoring Plan (summarized in **Table 3**)
- Emergency Response Plan (ERP)
- Closure Plan

Box 1 Recommended Management and Mitigation Actions

Erosion, Sedimentation and Compaction

To minimize impacts of erosion, sedimentation and compaction the following measures need to be instituted:

- Limit removal of vegetation to operational areas or to areas where is absolutely necessary;
- Encourage re-vegetation in areas where possible to prevent soil exposure;
- Landscaping of the Base Camp and Sawmilling Complex should be done to reduce sloping;
- Designate routes for heavy duty equipment to prevent soil compaction;
- Plan major earthworks such as road, bridges and culvert rehabilitation and construction of secondary roads and skill trails during the dry periods;
- Locate, operate and decommission burrow pits in accordance with GFC guidelines;
- Bunding of spoil piles should be considered if storage is required for an extensive period;

- Scarify the top soil if ponding is observed as a result of soil compaction;
- Avoid discharging of storm water runoff directly into nearby water course. This discharged can be channeled through the vegetative area which will serve as a natural filter for any sediment contained;
- Road, skid trail siting, construction and use must be in accordance with GFC's Code of Practice (CoP); and
- No harvesting should be done on slopes greater than 40%.

Dust and Noise Pollution from and Logging and Sawmilling Activities

To reduce the impacts of noise and dust the following measures should be taken:

- Workers must be mandated to wear appropriate protective gears and attire in accordance with the Occupation Health and Safety (OH&S) Guidelines and CPT Inc. Standard Operational Guidelines;
- Ensure that machinery and equipment are working efficiently and have the required muffler/silencers installed;
- Construction activities should be restricted to the day time, especially at the wharf/ sawmill area;
- Noisy activities should not occur in close proximity to the living quarters during the night or on Sundays and Holidays;
- Generators should be equipped with silencers and housed in an enclosed area;
- Noisy equipment such as generator and portable mills should be sited away from living quarters;
- Institute a speed limit for vehicles around the housing and sawmill complex to reduce the quantity of air borne particulate matter;
- Where practical, ensure roads around the compound of the housing facility is watered during dry season to keep dust levels down;
- Locate portable mills downwind of living quarters. Install dust extractor system where practical; No open dumping or buring of wood waste should be done; and
- Sawdust should not be allowed to accumulate.

Fuel, Lubricants and Chemicals Management

To reduce the impacts from fuel, lubricants and chemical storage and handling the following measures should be taken:

- Designate a site away from water ways, thoroughfare, housing and sawmilling, as well as general working area to store fuel. Ensure fuel and lubricants are stored on a bunded, impervious surface and well ventilated room. The secondary containment should have the capacity of 110% of the largest storage tank. The fuel storage area should be as close as possible to the workshop and maintenance area to reduce the distance for transport and handling. The tanks should be stored above ground and in accordance with the EPA Guidelines for fuel storage;
- When handing fuel care should be taken to prevent spillage and leaks, especially during off loading and refueling. All nozzles and hoses should be properly secured and stored away to avoid spills and/or accidents;
- During the filling/refilling process drip pans can be placed under the fuel/vehicle to prevent any possible contamination and subsequent run off of fuel due to leaks;
- Regular maintenance should be conducted to ensure proper functioning of machines, equipment and vehicles and to avoid unnecessary leaks;
- Ensure necessary preventative measures such as adequate signage, fire extinguishers and/or sand buckets are placed in and around the fuel storage area;
- Ensure waste oil is collected and stored in covered containers on a bunded and impervious surface; and
- Chemicals used to treat wood and wood products should be stored in a well ventilated room with an impervious surface and on shelves. Avoid siting the storage area next to water ways and housing area. Material Safety Data Sheets (MSDS) should be made available for all chemicals used.

Water Contamination

: To prevent contamination of water resources the following measures should be taken:

- Ensure adequate drainage around the Base Camp and Sawmilling and Wharf Complex;
- Ensure fuel and other chemicals are stored as recommended in Section 6.3.1.3;
- Ensure workshop area is covered so as to prevent storm water/runoff being contaminated;
- Ensure grey water from the washroom/kitchen is discharged via a soak away system. Sewage waste should be disposed of via septic tanks. These measures ensure waste water is treated before being discharged into the environment;
- No dumping of solid waste into water bodies should be allowed;
- Restricted logging within buffer zones along all waterways;
- Construct bridges and culverts of durable hardwood logs and sawn timber and their exact location and construction should be in accordance with GFC CoP. In particular, care should be taken to ensure that downstream sedimentation during construction is minimized and temporary water-crossings are to be decommissioned after their period of usage to ensure that they do not collapse and block stream flow; and
- Care must be taken during the refueling of tugs to reduce spillage and contamination of the Essequibo River.

Waste Management

The disposal methods recommended in Table 2 below should be implemented to ensure the proper management of waste.

Table 2: Disposal Methods Recommended

Waste Category	Waste Type	Disposal Method
Liquid Waste	Sewage	Liquid waste will be generated from the housing facility. Septic tanks should be constructed in accordance with the GNBS Code of Practice for the Design and Construction of Septic Tanks and Associated Secondary Treatment and Disposal Systems. If pit latrines are utilized, these should be constructed in accordance to the Public Health Ordinance of 1953.
	Grey water	Grey water produce from bathrooms will be channeled into a soak away system for filtering before being discharged into the drainage system and finally into the environment.
Solid Waste	Construction Waste	Construction waste includes materials removed during the rehabilitation of the culverts, bridges and roads, as well as, for the construction of sawmill, housing facility and wharf. Materials should be sorted and reuse, where practical. Good materials can be used as part of the construction of the buildings.
	General Waste	General waste include waste such as paper and cardboard from the administrative buildings, empty plastic bottles, styrofoam boxes and other kitchen waste. It is necessary to sort and separate waste at the point of generation. Kitchen organic waste should be stored separately from other general solid waste. Where possible reuse paper, cardboard boxes, plastic bottles etc. Collection bins should be placed at strategic points to be used by workers and emptied on a regular basis. An area away from the

		general working area should be designated for the disposal of waste. Kitchen waste should be buried on a regular basis to prevent being used as fodder for vermin. An area should be designated for burial of other waste. This are should be locaed away from watercourses.
Hazardous Waste	Waste Oil	Waste oil generated should be collected and stored in covered containers in a designated area.
	Used Batteries	Used batteries should not be disposed in the environment. These batteries should be collected and returned to the suppliers to be shipped for recycling.

Biological Environment

To prevent/minimize impact to the biological environment the following measures should be complied with:

- All logging activities should be done in accordance with the GFC CoP for Timber Harvesting, including Reduced Impact Logging (RIL);
- No unnecessary clearing of vegetation should be done;
- Implement measures to prevent forest fires, including no burning of vegetation or other materials, provisions of fire containment measures such as extinguishers and sand buckets, etc.;
- CPT Inc. forestry workers should act as concession guards by monitoring the area for illegal activities;
- Collaborate with other neighbouring and existing concessionaires and police to utlise the existing checkpoint to monitor hunting/trapping activities. A mechanism should be established with CPT Inc. and the EPA to report all occurrences of wildlife trapping, game hunting and trading to the EPA and Wildlife Management Authority; and
- CPT Inc. employees should be prohibited from hunting, trapping, killing or capturing any wildlife. Staff should not carry firearms and punitive measures such as suspension will be instituted for violations.

Health and Safety

To reduce the impact on workers' health and safety during the project's operations the following measures should be implemented:

- Identify someone with responsibilities for OH&S;
- Establish and OH&S Committee to ensure compliance with the OH&S Act of 1997;
- Ensure safety rules, guidelines and the OH&S Act are posted at strategic locations;
- Ensure workers are properly oriented to the safety and health rules and guidelines;
- Protective gears and clothes must be provided to employees and should be worn at all times during operation;
- Well equipped first aid kits should be provided at all work sites;
- Workers trained in first aid should be on staff at the forest base camp and the sawmilling nad wharf complex;
- Liaise with Barama Company Limited (BCL) to utilize the facilities of the Health Clinic for emergencies and acute health matters requiring immediate attention;
- Adequate signage should be erected, especially in hazardous areas;
- MSDS sheets should be made available for all chemicals used;
- Develop guidelines for emergency response and evacuation and establish protocol for emergency situations;
- Provide potable water for employees; and

- Conduct periodic fogging to prevent mosquito breeding.

Land Use Conflicts and Unplanned Economic Development

Conflicts may arise as a result of competing land uses, in particular, from economically viable resources such as minerals and forest. The area allocated to CPT Inc. for forest utilization has at the same time been identified and allocated for mineral extraction by the Guyana Geolgy and Mines Commission (GGMC). In light of national development regarding Guyana's interest to market its forest carbon stocks, and its preparation for Reduce Emissions from Deforestation and [Forest] Degradation (REDD) Readiness, there is need for the sectors to collaborate. A mechanism is currently being worked out at the national level between the GGMC and the GFC and to be implemented by both forest and mining operators through the sharing of the harvest/mine plan. It is expected that the areas will be mined/logged in blocks where the forest concessionaire has the opportunity to harvest all valuable logs before mining of the subsurface can occurs. After extracting the mineral resource, the miner is mandated to reclaim the area before moving on to another block. Both the mining and forestry officers are required to monitor these operations to ensure they are in keeping with GGMC and GFC guidelines and legislation.

On the other hand, as a result of opened access to the interior regions through the upgrading of the roads, unplanned economic development such as the increase of small itinerant miners and/or illegal logging can occur. In order to ensure this does not occur, closer monitoring of the area is required by GGMC and GFC.

Road Safety, Security and Maintenance

To minimize the risk of illegal mining, wildlife hunting and general security problems as well as to safeguard the physical condition of secondary roads the following actions should be taken:

- Place road signs indicating dangerous turns, bends and approach to bridges;
- Place signs indicating the speed limits;
- CPT Inc. should ensure all drivers have valid driver's licence and years of experience driving in forest conditions;
- CPT Inc. should collaborate with GFC to conduct regular monitoring of compartments within the respective blocks once harvesting is complete;
- All secondary roads should be closed once harvesting has been completed in certain compartments;
- Vehicles should be maintained on a regular basis to ensure good working conditions; and
- Install radio sets on vehicles for ease of communication.

In opening up of the area and the introduction of other 'new' economic activities, there may be the potential to attract criminal activities. In order to safeguard company personnel, machinery and equipment the following measures should be taken:

- CPT Inc. should employ its own security personnel who are to be trained and armed;
- Develop a working relationship with the police at the police outpost at 70 km and Supennaam on the Essequibo Coast;
- Conduct in-house training for staff on safety and security procedures and emergency response;
- Erect a perimeter fence around the sawmill and wharf complex;
- Restrict movement in and out of the housing and sawmill facility to staff and authorized personnel and maintain records of movement of vehicles and personnel;
- Ensure field operations have radio communication equipment; and
- Establish regular call times with field operations.

Archaeology and Anthropology

If any archaeology or anthropology sites are found the following measure are recommended:

- CPT Inc. to inform the National Trust and Walter Roth Museum;
- CPT Inc. to halt all activities at the site and secure the area, imposing restricted access;
- CPT Inc.to facilitate personnel from the National Trust and Walter Roth Museum to visit the area to conduct research to garner further information; and
- CPT Inc. to take necessary action as guided by the National Trust and Walter Roth Museum.

Table 3: Monitoring Plan

Parameter	Institution Responsible	Frequency of Monitoring	Location of monitoring
Physical			
Air Quality Dust accumulation and suspended particles	CPT Inc.	Daily	Operational areas within the concession and in and around the Sawmill and Wharf Complex
Water Quality Temperature pH Conductivity Turbidity Oils/Grease TSS Coliform	CPT Inc.	Quarterly	Creeks within CPT Inc. Concession near to active areas being logged and the Essequib River upstream and downstream of the Sawmill and Whaf Complex. The Takatuni Creek would also be monitored
Stream Flows	CPT Inc.	Quarterly	Main Creeks and Waterways
Biological			
Canopy openings Retention of seed and keystone trees Biodiversity reserve integrity Protection of small trees Forest Damage	CPT Inc./GFC	Annually	Active logging areas, permanent sample plots and biodiversity reserves within the Concession
Socio-economic			
Employment and Social Benefits Number of residents from			

Parameter	Institution Responsible	Frequency of Monitoring	Location of monitoring
surrounding areas employed Support Services provided to local community Number of persons trained Extent of staff turnover	CPT Inc.	Annually	Sawmill and Wharf Complex & Logging Operations
Waste Management Condition of waste receptacles Waste collection and disposal methods (wood waste, waste oil, solid waste) Accumulation of solid and liquid waste	CPT Inc.	Monthly	Sawmill and Wharf Complex & Logging Operations
Mining No. of mining camps Type of mining Area coverage Vehicle movements within CPT Inc Concession outside of the M1 Road	CPT Inc.	As observed	CPT Inc. Concession
Wildlife Wildlife hunting and trapping within concession	CPT Inc.	Quarterly Reporting to GFC & EPA On Observance of hunters with game as well as from Check Point Records	Check Points at Buckhall & Logging Operations
Health and Safety Emergency Response Plans Implementation of Health and Safety Programmes Use of safety equipment and gear Status of safety equipment and gear Records of accidents and incidents including road accidents	CPT Inc. Ministry of Labour	Monthly (Quality Control) Bi-annually	Sawmill and Wharf Complex & Logging Operations
Environmental Compliance Requirements of Envirnmental Permit Implementation of EMP Requipments of GFC CoP	CPT Inc. EPA GFC	Monthly Quarterly Quarterly	Sawmill and Wharf Complex & Logging Operations

This ESIA has examined the details of the project, identifying the activities and assessing their potential impacts based on best-practice guidelines and existing laws and regulations governing the environment and forestry operations in Guyana. Most of the potential significant impacts identified can be mitigated. The ESIA has identified mitigation and management actions to be undertaken to minimize adverse environmental and social impacts of the project. It is envisaged that these recommendations will be adhered to by CPT Inc. in its operations and monitored by the EPA and the GFC.

Since a significant proportion of the concession was previously logged this operation will not be new to the area. Approximately 25% of the total concession will also be spared from logging through buffer zones, the biological reserves and swamps, waterways and slopes. It should be noted that most of the concession has also been allocated for mining by the GGMC. However, no mining is currently occurring within the area. Nevertheless, if mining should commence there is the potential for conflicts and severe environmental damages. To address this problem, effective coordination between the regulatory agencies including the GGMC and the GFC would be required.

This ESIA has identified and proposed a number of measures to address the potential impacts associated with the activities of this project, but also measures to foster closer cooperation, collaboration and joint planning and management among the users of the area, including BCL.

CPT Inc's obligations are expected to encompass not only social and economic issues, but also extend to the ecological aspect. This ESIA has recognized that the project, as with any forestry operation, will have an impact on the physical and biological environment in which it takes place. However, CPT Inc. has made a commitment to practice sustainable forest management in its widest sense which embraces ecological and social sustainability along with economic viability. Impacts to the environment will be within acceptable limits once CPT Inc. follows its commitment to best forestry practices and in particular meticulously adheres to the standards and guidelines laid down by the EPA and GFC.

This ESIA Report has examined the project and assessed its potential impacts. The ESIA Team is confident that there is an understanding of the potential impacts envisaged from this project and for some impacts, the required mitigation actions need to be taken. Once there is adherence this project can realize social, economic and ecological benefits which are sustained.

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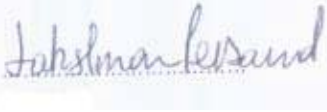
Name: Lakshman Persaud

Position on Team: Natural Resources and Social Expert

Signature: 

SECTION ONE

INTRODUCTION

1.1 Background to the Study

Guyana is endowed with an abundance of natural forest which presents an economic means to assist in the country's development through the extraction of these resources. GoG has also recognised that the country's forest plays a major role in maintaining global climate by serving as a carbon reservoir. As such, any extraction of these resources must be done in a sustainable manner. The Government has tasked GFC with promoting sustainable management of Guyana's forest resources. As part of its mandate, GFC has been encouraging sustainable forest operations for the promotion of social and economic development while at the same time safeguarding the integrity of forest resources.

CPT Inc., a Guyanese company, has responded to this effort by GFC to implement a project based on a 'sustained yield management program and to operate in accordance with GFC's CoP for Forest Operations. The company intends to adopt best-practice approaches in its operations which could eventually lead to forest certification. The project area was previously logged. However, there are significant resources still available to allow for sustainable harvest and development. There are also existing infrastructures in place which will contribute significantly to the reduction of the cost of production.

CPT Inc. plans to establish a composite forest project which would essentially involve logging and sawmilling operations as well as downstream processing. The logging operation would include construction of secondary roads, bridges, culvert rehabilitation and/or construction, as well as felling, bucking and skidding activities. Logs will then be transported to the Sawmilling and Wharf Complex via log trucks for primary processing. Primary processing of logs will be done by portable mills before being loaded onto barges for trans-shipment to the secondary processing facility to be located at Tuschen. The materials will be sold at the local market as well as exported. It is estimated that the amount of sawn lumber to be produced annually is 2,106 m^3 the amount of peeler logs would be 2,006 m^3 annually. A Base Camp will be established within the concession to support the operation.

1.2 Project Location

The Concession is located on the Left Bank of the Cuyuni River, the Right Bank of the Pomeroon River and the Left Bank of the Pairawa River, and falls within the Administrative Regions of Pomeroon – Supenaam (Region 2) and Cuyuni – Mazaruni (Region 7). The concession has a land area of 26,259 ha (64,887) acres. This area was previously allocated to N. Sukhul and Sons and a portion was logged by BCL. The concession is surrounded by other logging concessions and the BCL main road passes through the area.

A portion of land along the Left Bank of the Essequibo River south of Buckhall will be used for the establishment of a wharf and a base to support the proposed logging operation. This area is currently covered in vegetation.

Map 2: Showing location of concession

1.3 Project Status

CPT Inc. has been awarded a State Forest Exploratory Permit (SFEP) # 01/09 by the GFC to commence the relevant studies and obtain the necessary approvals before a TSA can be issued to the Company for the concession. As part of this process, CPT Inc. is required to conduct an ESIA and obtain an Environmental Authorisation from EPA. The ESIA, based on the Environmental Protection Act, 1996, must be conducted by independent consultants. The Company has conducted its management level forest inventory and prepared its Forest Management Plan (FMP) which is being reviewed by GFC.

1.4 ESIA Study

CPT Inc. appointed EMC in June 2009 as the independent consultant to undertake the ESIA Study as required by the EPA.

Following the Scoping Exercise and Site Visit EMC commenced the ESIA of the project based on the ToR agreed with EPA. A copy of this ToR is attached as Appendix A.

1.5 ESIA Objectives

The objectives of this ESIA study are:

- To document the physical, ecological and socio-economic baseline conditions of the study area;
- Inform, obtain and address contributions from stakeholders including relevant authorities and the public;
- Identify the relevant laws, guidelines, regulations and standards that would define the operating framework of the project;
- Assess in detail, the environmental and social impact that would result from the project;
- Identify mitigation measures that would reduce the significance of predicted negative impacts or enhanced predicted benefits of the proposed project;
- Develop an EMP and appropriate Monitoring Plan for the proposed project including a Conceptual Closure Plan; and
- Meet the requirements of the environmental regulatory agencies (EPA and GFC) in Guyana as well as international best practice for a project of this nature.

This study has been guided by:

- EPA – ESIA Guidelines Vol. 5, Forestry.
- Issues raised during public scoping meeting, at field exercises and stakeholder engagements
- Best-Practice Guidance for Forestry Operations (GFC CoP).
- ToR agreed to by the ESIA Team and EPA.

1.6 Approach and Methodology

The approach and methodology used in compiling this report is outlined below:

- Reviewing CPT Inc's management information including Business Plan, FMP, inventory data and other resource material on the concession area;
- Participating in a public scoping meeting to gather the concerns and views of members of the public. The minutes of this meeting is attached as Appendix B;
- Conducting meetings with key stakeholders at the local, regional and national levels. A complete list of the stakeholders consulted is attached as Appendix C;
- Conducting site visits and collecting field data;
- Analysing data and information, assessing potential impacts and identifying mitigation actions; and
- Preparing the ESIA Report.

The steps undertaken in preparing the ESIA Report are outlined in Figure 1.

1.7 Study Team

This report is the work of a multi-disciplinary team of specialists who were contracted by EMC. The team included EMC personnel as well as specialist consultants. Contribution to the preparation of this report was also made by BJ Management and Associates Inc, a private consultancy firm which was contracted by CPT Inc. to provide forestry related services. The specialists undertook the majority of the baseline

study work and also contributed to the impact assessment as shown in the Table below. More details on the Team Members qualification and experience are outlined in Appendix D.

Table 4: ESIA Study Team

Team Members	Company and Position	Role
Shyam Nokta	EMC, Managing Director, ESIA Specialist	ESIA Team Coordinator
Khalid Alladin	EMC, Projects Manager, Environmental Management Specialist	ESIA Team Leader
Preeya Rampersaud	Independent Consultant, Environmental Management Specialist	Baseline studies, impact analysis and prediction, environmental management planning
Lakshman Persaud	Independent Consultant, Natural Resources and Social Expert	Baseline studies, social and economic impact assessment
Michael Tamessar	Independent Consultant, Biodiversity Expert - Fauna	Baseline studies and impact assessment, ecology - fauna
Khalawan	Independent Consultant, Biodiversity Expert - Flora	Baseline studies and impact assessment, ecology, botany - flora

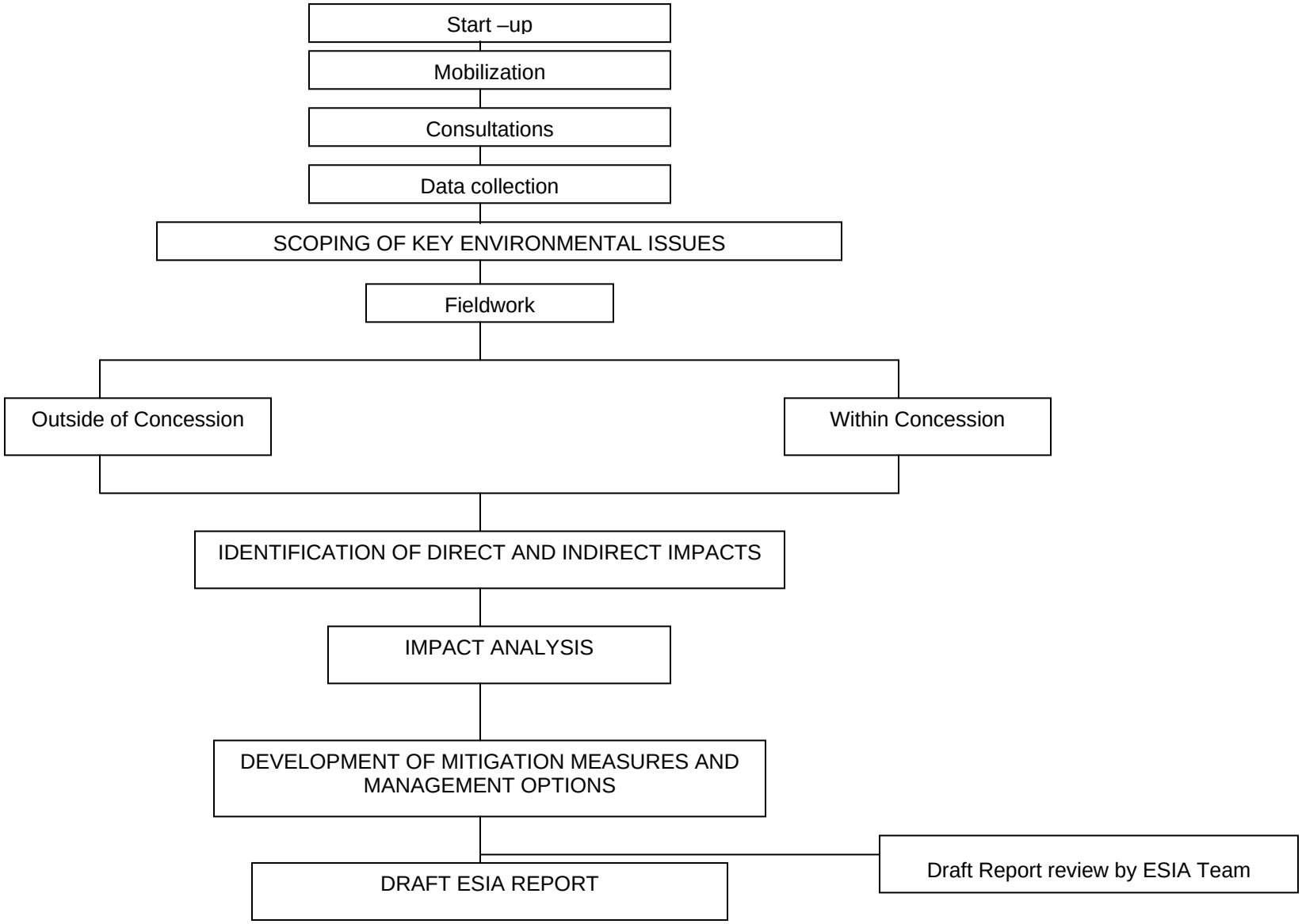


Figure 1: Diagram of the methodology for the ESIA study

1.8 Constraints and Limitations to the Study

During the conduct of the study there were not too many limitations. However, there was one major limitation that affected several aspect of the conduct of the assessment. The limitations encountered during the conduct of the EIA area discussed below:

Weather Condition – During the collection of baseline data the area experienced a prolonged dry spell. This period lasted from September 2009 to April 2010 when the Draft Report was being prepared. The dry period several affected the collection of baseline data in the following way:

- Most of the water ways within the Concession were dry. As such. It was difficult to find an area to establish a base camp to conduct field activities since there was little or no water supply for domestic use. An area in the headwaters of the Pomeroon River was found with a little water and a camp was established. However, water for drinking purposes still had to be taken from Georgetown.

- The dry streams presented little option for water quality analysis. Water samples were only available in the large streams, which had very low levels.

- As with the water analysis, fish sampling wasn't conducted since streams were dry, or had very low levels of water.

- The low level of water contributed to making access to some parts of the Concession, especially on the Cuyuni River section, difficult.

Access – Access to some sections of the Concession was difficult, especially within the southern section which was not previously logged. Within the area that was logged there is an existing network of road. However, most of these roads were blocked by fallen tress, or sections were washed away making access difficult. There were no roads going into the unlogged area. Access by waterways was very difficult given the prolonged dry period at the time.

SECTION TWO

PROJECT DESCRIPTION

2.1 Background to the Project

2.1.1 Key Events

The following is a summary of the key events to date on the project:

April 2009	CPT Inc. made application to EPA for Environmental Permit
June 2009	EPA determined that an ESIA is required
July 2009	EPA approved the Team of Consultants
July 2009	EPA published 28-day public notice
July 2009	CPT Inc. engaged services of EMC to conduct ESIA study
July 2009	Scoping Meeting held at Supenaam Marketing Complex
August 2009	EPA approved ToR
September 2009 to April 2010	Fieldwork conducted
June 2010	Draft ESIA prepared
December 2010	Revised ESIA prepared

2.2 Company Profile

CPT Inc. is a registered Guyana corporation operated and managed by a Board of Directors and is a subsidiary of M. Umraow and Sons, a local Guyanese company. Its registered office is at 110 Regent Street, Bourda.

2.2.1 General Objectives of the Company

CPT Inc. will emphasize the conservation, sustainable management and equitable use of the tropical rainforest to ensure perpetual ecological, economic and social benefits to its people. The environment, forest ecosystems and watersheds will be protected.

CPT management objectives are to ensure a sustainable yield harvesting system while safeguarding other values of the forest under GFC standards and regulations. Within this framework, CPT objectives are:

[i] To provide sufficient raw materials needed for its sawmill and downstream processing plant while ensuring maximum utilization that will increase per cubic meter of log recovery harvested from the forest and at the same time maintaining its biodiversity;

[ii] To harvest selectively the commercial species in a sustainable manner and to minimize any adverse social and environmental impact and form a basis that secures a safe working environment, sound living conditions and competent wages for employees;

[iii] To increase exports, especially for non-traditional species of timber, thereby ensuring that the current merchantable species are not over-harvested and to adhere to the rules and regulations of the GFC CoP;

[iv] To produce a high quality air dry and kiln dried wood products and to operate economically and profitably for sale on both overseas and domestic markets; and

[v] To manage the operations in a responsible manner so that it will be recognized as a well managed and profitable entity within the forest industry.

2.3 Project Description

2.3.1 Project Title

CPT Inc. Logging and Sawmilling Operation.

2.3.2 Project Location

The concession is situated on the left bank Cuyuni River, right bank Pomeroon River and left bank Pairawa River and falls within the Administrative Region # 2 (Pomeroon- Supenaam) and Region # 7 (Cuyuni-Mazaruni District).

Map 3: Showing the location of the Concession in relation to the surrounding concessions

2.3.4 Geographical Description of Concession

The concession is located at approximately 06 degrees and 14 minutes North Latitude and 59 degrees and 23 minutes West Longitude, within the forestry belt.

The concession, based on natural surroundings, is bounded on the north by the Pomeroon River, on the south by the Cuyuni River, on the east by the Toolsie Persaud Ltd. and A Mazharally and Sons Ltd logging concession, and on the west by the Paiwara River and shares a common boundary with BCL. It lies within the southeastern portion of the forestry belt of Central Guyana on the left bank of Cuyuni River, right bank of Pomeroon River and left bank of Pairawa River.

2.3.4 Technical Description of the Concession

The technical description of the boundaries of the concession as outlined in the SFEP is as follows:
Left Bank Cuyuni River, Right Bank Pomeroon River, Left Bank Pairawa River.

Commencing at the mouth of the **Pairawa River** on the left bank of **Cuyuni River** having an approximate UTM geographical coordinates of **02 55 408 E, 07 49 387 N;** thence up the left bank of **Pairawa River** for an approximate distance of **20 Km** to a point having approximate UTM geographical coordinates of **02 52 803 E, 07 67 631 N**; thence by a cut line in an Easterly direction for an approximate distance of **2.5 km** to a point near the source of the **Pomeroon River** having an approximate UTM geographical coordinates of **02 55 273 E, 07 67 682 N**; thence down the right bank of **Pomeroon River** for an approximate distance of **24 km** to the mouth of an unnamed tributary to a point near its source having an approximate UTM geographical coordinates of **02 73 111 E, 07 55 661 N;** thence by a **cut line** in **South-easterly** direction for approximately **1.6 km** to a point near the source of unnamed tributary having an approximate **UTM** geographical coordinates of **02 74 541 E, 07 55 053 N**; thence by another **cut line in a South-westerly** direction for approximately **2.5 Km** to a point near the source of an unnamed tributary of the **Cuyuni River** having an approximate UTM geographical coordinates of **02 72 416 E, 07 53 606 N**; thence down the right bank of this unnamed tributary to its mouth on the left bank of the **Cuyuni River** having an approximate UTM geographic coordinates of **02 60 999 E, 07 46 141 N**; thence up the left bank of the **Cuyuni River** to the mouth of the **Pairawa River**, this being the point of commencement.

*Save and except all lands legally held, description is subject to change upon verification since coordinates have not been field tested. Containing an approximately area of **26,259** hectares or **64,887** acres.*

Map reference: 18 **SE, NE**

2.3.6 Size of Concession

The concession has a land area of 26,259 hectares (64,887) acres.

2.3.7 Access to the Concession Area

The proposed Camp sites and Log Yards will be established in close proximity to the logging operations withing the concessions. No permanent Base Camp will be established. Lumber Trucks will be loaded with forest produce and transported to Buck Hall where a sawmill will be established consisting of protable mills to conduct primary processing.

The concession is accessed by the BCL M1 road from Buck Hall. The distance from Buck Hall to the concession is approximately sixty five (65) kilometers. A road will be constructed to link CPT Inc. site at Buck Hall to the M1 road. Maintenance and repair of the road and bridges will be coordinated with BCL and other users.

2.3.8 Brief Description

CPT Inc. plans to establish a composite forestry project that consist of a logging and sawmilling operations with downstream processing, camp facilities with housing for employees/workers, river landing with a wharf in order to realize the goals of the main beneficiaries and the vision of the organization. In the process the investors and employees will reap acceptable benefits from their investments.

Among the sustainable practices is to keep in reservation 4.5% of the productive forest in an undisturbed, pristine state. The company is committed to implementing environmentally sound forest management practices that provides a sustained yield from commercial harvesting, including other uses and values of the forest while maintaining and safeguarding its biodiversity and minimizing adverse social and environmental impact of its forest operations. The company has no intention of harvesting any other than logs for sawn lumber for its proposed furniture production.

The main purpose in acquiring the concession is to secure raw materials needed for the sawmilling operation and downstream processing plants. Most primary species to be harvested are already well known to the market such as purpleheart, locust, crabwood, kabukalli, bulletwood, wallaba, wamara, greenheart and shibadan in the manufacture of doors, jambs, windows, outdoor decking T&G floor and walls for export and local markets. Greenheart is well-known species for marine use and Mora is famous for railroad sleepers and outdoor decking in the USA and Europe and already introduced in Asian countries. Lesser known species such as burada, kakaralli, hiairiballi, etc., will be used for construction of scaffoldings, piling etc.
The company has located a suitable area to establish its Portable Sawmill along the Left Bank of the Essequibo River upstream of BCL Buck Hall Complex, where 60% of the log harvested will be transported and processed into squared timber. These squared timbers will be transported by pontoon or steel barge towed by Tug Boat to a wharf at Parika. From the wharf the materials will be trucked to the CPT Furniture Complex at Tuschen, Essequibo Coast and will be processed into sawn lumber by its downstream processing plant, then further processed into furniture for export. The CPT Furniture Complex is a separate project.

CPT Inc. will be focusing basically on materials for building construction, furniture manufacturing, doors, window jambs, flooring and profile boards. Specifically, CPT Inc. seeks to be a producer of primary and secondary high quality timber products to satisfy and compete mainly on the overseas markets. This includes logs, poles and piles, air and kiln dried lumber and other processed value added wood products.

Timber harvesting will be done systematically and will comply with the GFC's CoP, guidelines and procedures for all logging operations. Harvesting control will be implemented and the concession will be divided into compartments and then sub-divided into 100 hectares square blocks. Pre-harvest inventory will be at 100% estimate for all harvestable blocks.

2.3.9 Project Rationale

The GoG has tasked GFC with promoting sustainable management of Guyana's forest resources. As part of its mandate, GFC has been encouraging sustainable forest operations for the promotion of social and economic development while at the same time safeguarding the integrity of forest resources. CPT Inc. has responded to this effort by GFC to implement a project based on a 'sustained yield management program' and to operate in accordance with GFC's Code of Practice for Forest Operations. The company intends to adopt best-practice approaches in its operations which could eventually lead to forest certification.

In this regard, CPT Inc signed an agreement with the Government of Guyana for the issuance of SFEP # 01/09 through GFC in 2009. The concession was previously granted to N. Sukul & Sons Ltd, a local company and was logged by BCL in the early 2000's. Though the concession was previously logged, there is a significant area (approximately 40%) of virgin forest still to be logged. In addition, based on the cutting cycle, the already harvested areas will be ready for logging in a not too distant future. There is some infrastructure development already in place such as roads which will reduce the investment cost significantly.

CPT Inc. will process the materials harvested at it's sawmill operation to be located on the Left Bank of the Essequibo River and the downstream processing plant to be located at Tuschen, East Bank Essequibo. The beneficiaries will be local building contractors, furniture manufacturers, and manufacturers of other wood products in China and the Caribbean, local labourers and those organizations offering support services to the company will benefit.

2.3.10 Capital Investment

CPT Inc. plans to invest one million, nine hundred thousand US dollars (US$1,900,000) during the first five (5) years of the operation.

2.3.11 Project Comencement and Duration

This logging and sawmilling project is viewed as a perpetual development program that will have an initial 25 years life span. Although this initial planning in for twenty five (25) years, it is envisaged that the business will be maintained as a viable entity in perpetuity ensuring the sustainability of the forest resource. The project will commence as soon as the TSA is issued by the GFC. The issuance of the TSA is dependent on the acceptance of this ESIA by the EPA and the Environmental Assessment Board (EAB). Work is ongoing in meeting the other requirements of the GFC such as the conduct of inventories and the approval of the FMP.

The sustainability of this project depends on:

a) How sustainable harvesting of the forest can be done in perpetuity without destroying wildlife habitats and maintaining the genetic resources in an evolutionary and dynamic state;

b) How can end users be influenced to minimize wastage through measures such as more efficient processing plant, finding saleable products for hardwood peeler species and converting waste generated from harvesting into new composite products for building and furniture industries;

c) How much resource is utilize to improve the quality and quantity of wood and developing silvicutural guidelines for varied forest types;

d) The cost of constructing and maintaining roads and drainage and while at the same time ensuring minimum disturbance of the environment and less negative impact on the soil and water balances;

e) How much of the area can be preserved for other users and, where different users coexist, ensure there is minimum conflict and successfully display the concept of multiple use; and

f) The implemented of measures to address environmental, economic and social concerns in executing the project.

2.3.12 Employment Consideration

It is expected that approximately one hundred and eight (108) workers will be employed by the project. The majority of these personnel will be Guyanese. The human resources will be distributed in the following eight (8) Departments/Sections which are outlined below:

1. Survey & Forestry Planning
2. Production (Felling & Skidding)
3. Road Construction & Maintenance Section
4. Scaling & Quality Control Section (Log-pond)

5. Marine (Tugboats & Barges) Section
6. Sawmilling Operations (Portable Mill)
7. Workshop & Warehouse
8. Administration

The Table below outlines the manpower requirements for each Division/Sections.

Table 5: Showing the manpower requirements for each Division/Sections

Division/Department		Number of Staff
A	Survey/Forestry Department	10
B	Road Construction & Maintenance	7
C	Production Department	16
D	Log Pond (Log Yard) Section	10
E	Sawmill Department	26
F	Workshop/Warehouse Department	14
G	Administration Department	18
H	Marine (Tugs & Barges) Section	7
	TOTAL	**108**

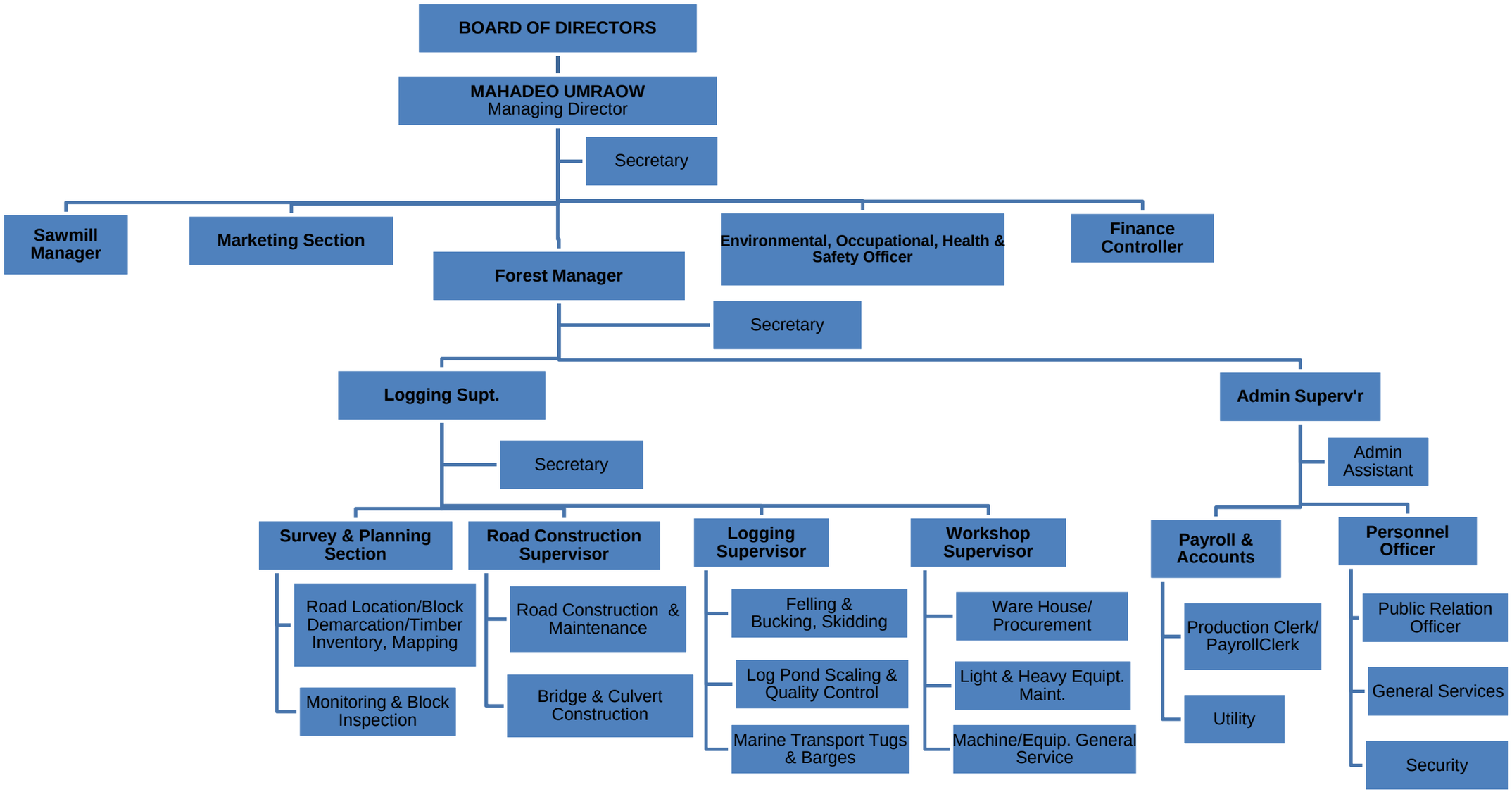


Figure 2: CPT Inc. Organisational Chart

2.4 Phases of the Project

The project will be undertaken in two principal phases as follows:

2.4.1 Construction Phrase

- Road location survey, block demarcation and timber inventory;
- Road, bridges and culverts, drainage construction and rehabilitation;
- Building of skid trials and log markets;
- Construction of forest camp; and
- Construction of processing facility.

2.4.1.1 Roads

Roads and bridges construction would be minimal during the first five (5) years of the operation since there is an existing network of roads within and around the concession. BCL has a main road from Buckhall passing through the concession. The northern portion of the concession was also previously logged. As a result, there is an existing network of roads within this section of the concession.

To access the concession, CPT Inc. will construct a road linking the Wharf Complex on the Left Bank of the Essequibo River to the existing BCL main road referred to as M1. The Company will then utlise this road for a distance of sixty five (65) km to reach the concession. This road will be used to transport equipment and supplies into the concession as well as to bring out forest produce. The Company will rehabilitate the existing sechondary roads within the concession to provide access to the logging areas. This will reduce cost significantly as well as minimize environmental damage. Below is a map showing the existing roads within and around the concession as well as the proposed road linking the wharf area to the MI road.

Map 4: Showing the existing and proposed road networks

2.4.1.2 Base Camp

Based on the inventory data collected thus far, productivity from the forest is considered low. As such, it was decided that there will be no permanent camp (Base Camp) within the concession because the volume of logs to be harvested does not require such as facility. However, the Company will utilise log market as temporary camp sites and move as need as the logging operation progress. Only a small amount of workers directly involved in logging will be based in the forest. The logging activities will be supported by the operations at Buckhall.

Workers, equipment and supplies to support the logging activities will be based at the camp sites. Logs harvested will be transported to these sites then onto the processing facility on the Essequibo River at Buckhall. Electricity and water will be provided at these locations. Water will be pumped from nearby streams and transported by a "Water Truck" to the Skid House Water Tanks. The Company will use small portable generator set to provide power. A small fuel depot will also be located at the camp.

2.4.1.3 Wharf Complex and Processing Facility

Logs harvested within the concession will be transported to Buckhall on the Essequibo River to be processed. CPT Inc. has located a suitable area to establish this processing facility on the Left Bank of the Essequibo River upstream of BCL Buckhall Complex. It is estimated the 60% of the log harvested will be transported and processed into squared timber. These squared timbers will be transported by pontoon or steel barge towed by Tug Boat to the CPT Furniture Complex in Tuschen, Essequibo Coast and will be processed into sawn lumber by its downstream processing plant then further processed into furniture.

There is no existing physical infrastructure at this site since it is covered by secondary vegetation. The proposed facility would include a wharf, housing for workers, administrative building, workshop, sawmill building and lumber shed. Four (4) portable mills will be installed at this location. A CAT genset will be used to power the mills and the rest of the facilities.

Please see Appendix E for a map showing the outline of the Wharf Complex and Processing Faclity.

2.4.2 Operations Phase

The Operations Phase of the project will involve:

- Felling of logs;
- Extraction and transport of logs the Base Camp and Log Yard;
- Transport of logs by logging trucks to Buck Hall;
- Processing of logs into squares; and
- Loading of logs to barges.

CPT Inc will prepare an Annual Operation Plan (AOP) based on the Five-Year FMP for submission to GFC and for internal use. The AOP is expected to guide the forestry operations throughout the year in detail taking into account immediate market opportunities and species production schedule.

This Plan will be based on a detailed operational inventory, which provides a description of the distribution of forest types at the block level. The Plan is expected to provide estimates for monthly production schedule, species composition and estimates of monthly costs. For each area in a compartment a Plan will be prepared before logging operations commence.

The AOP will include planning of:

- Harvesting sequence for blocks by compartments;
- Areas to be harvested;
- Alignment and sequence for construction on individual roads;
- Sequence of inventory for sections and blocks;

- Alignment of skid trails;
- Harvesting sequence within blocks;
- Location of trees to be felled and trees to be retained; and
- Location of creeks, swamps, hills and buffer zones.

Estimates of production for each block and time schedule for felling and skidding will also be given in the Plan.

2.5 Principal Activities

The two main phases of the project will involve the following principal activities:

1. Exploratory Inventory;
2. Production Planning;
3. Logging Operations;
4. Transportation; and
5. Processing.

2.5.1 Exploratory Inventory

CPT Inc. has completed the Forest nventory for the entire concession following the inventory methodology and guidelines from GFC. The inventory also incorporates a rapid appraisal of wildlife conditions and occurrence of non-timber forest products (NTFPs). All commercial trees 35cm and above Diameter Breast Height (DBH) were enumerated and measured. Separate inventories were conducted for the virgin area and the logged over area of the Concession. The field data have been analyzed and the summary results are presented in Tables 6A and 6B. This data is represented in Figures 3 and 4. These results guided the calculation of the annual allowable cut and production areas and formed the basis, among others, for the FMP and AOP. However, the GFC has subsequently recommended that a Management Level Inventory be conducted since the concession was previously logged. This inventory will assist in determine the appropriate annual allowable cut to ensure sustainable harvesting of the resources.

For the virgin section of the Concession, which includes the Paiwara and Cuyuni Compartments, strip sampling was conducted. The area sampled was approximately 22.5 ha and 3 strips were sampled, each strip being 25m x 3000m at 2000m intervals. The results are presented in the table below.

Table 6A: Showing the results of the Exploratory Inventory of the Virgin Area of the Concession

No.	Diameter Range	35 – 44 Cm		45 – 54 Cm		55 Cm & Up		TOTAL		Volume (%)
	SPECIES Local Common Name	No. of Trees	Vol. In Cu. M.	No. of Trees	Vol. In Cu. M.	No. of Trees	Vol. In Cu. M.	No. of Trees	Vol. In Cu. M.	
1.	Baromalli	6	8.13	12	17.43	45	163.80	63	189.36	35%
2.	Burada					3	15.3	3	15.30	3%
3.	Greenheart	4	4.86	6	16.80	6	17.64	16	39.30	7.4%
4.	Kabukalli					6	14.37	6	14.37	2.7%
5.	Kakaralli	2	2.21	4	4.72			6	6.93	1.3%
6.	Limonaballi			3	4.86	7	21.11	10	25.97	5%
7.	Maho	3	2.97			3	14.16	6	17.13	3.2%
8.	Monkey pot			3	4.86			3	4.86	1%
9.	Mora	3	2.55	6	10.05	13	40.32	22	52.92	10%
10.	Purpleheart					3	10.62	3	10.62	2%
11.	Shibadan	5	7.56	5	9.16	10	30.04	20	46.76	9%
12.	Simarupa			2	4.87	7	36.89	9	41.76	7.8%
13.	Wadara					9	26.57	9	26.57	5%

No.	Diameter Range	35 – 44 Cm		45 – 54 Cm		55 Cm & Up		TOTAL		Volume (%)
	SPECIES Local Common Name	No. of Trees	Vol. In Cu. M.	No. of Trees	Vol. In Cu. M.	No. of Trees	Vol. In Cu. M.	No. of Trees	Vol. In Cu. M.	
14.	Wallaba	9	6.30	9	13.26	2	4.67	20	24.24	4.5%
15.	Silverballi			3	4.62			3	4.62	1%
16.	Unknown	1	1.21	3	5.65	1	3.52	5	10.38	2%
	TOTAL	**33**	**35.79**	**56**	**96.28**	**115**	**399.01**	**204**	**531.08**	**100%**

*Average Tree/Hectare = 9.27 Trees *Average Volume/Hectare = 23.60 m^3

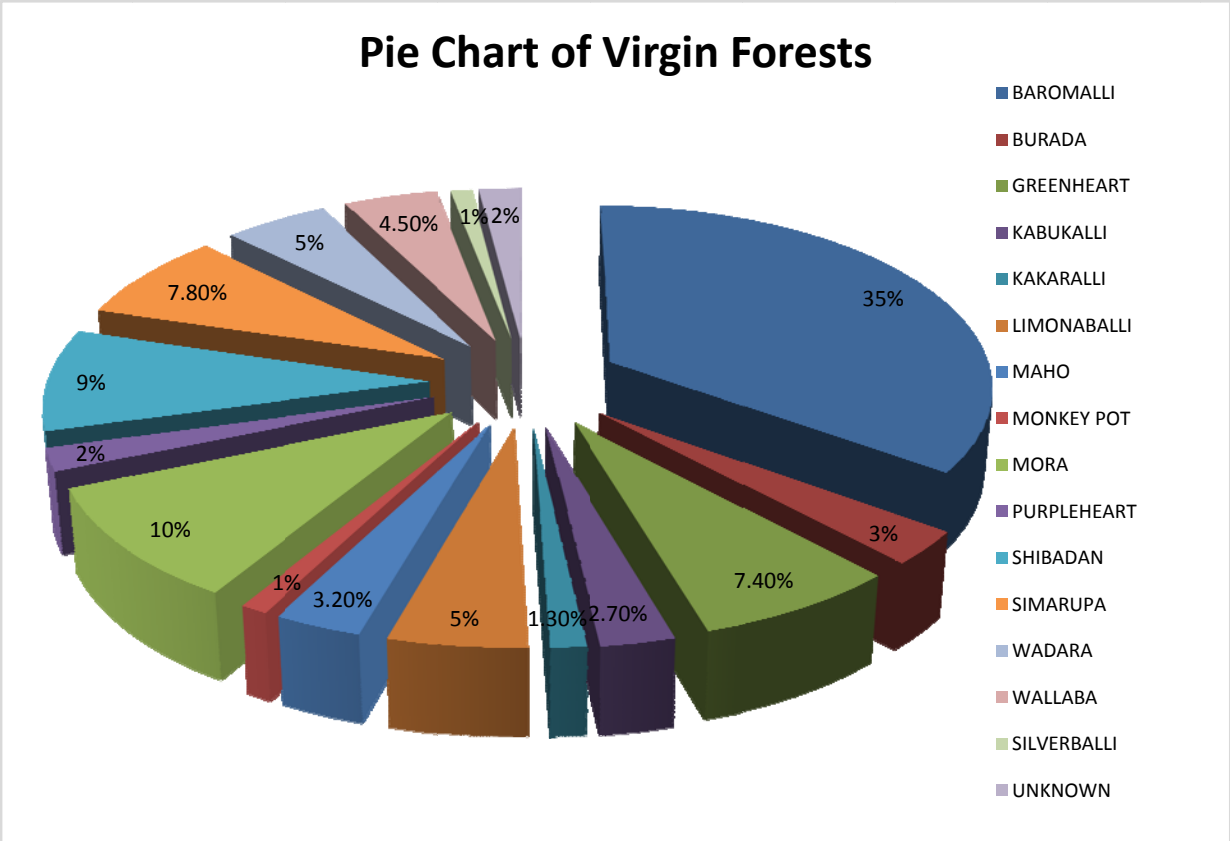


Figure 3: Showing the distribution of Commercial Species within the Virgin Forest

For the logged over section of the Concession strip sampling was also conducted. The area sampled was approximately 120 ha and 16 strips were sampled, each strip being 25m x 3000m at 2000m intervals. The results are presented in the table below.

Table 6B: Showing the results of the Exploratory Inventory of the Logged Over Area of the Concession

No.	Diameter Range	35 – 44 Cm		45 – 54 Cm		55 Cm & Up		TOTAL		Volume (%)
	SPECIES Local Common Name	No. of Trees	Vol. In Cu. M.	No. of Trees	Vol. In Cu. M.	No. of Trees	Vol. In Cu. M.	No. of Trees	Vol. In Cu. M.	
1.	Aromata	4	5.37	11	16.98	14	38.63	29	60.98	3.4%
2.	Asepoko	7	7.66	3	4.42	4	13.97	14	26.05	1.4%
3.	Baromalli	34	46.09	48	97.55	70	239.63	152	383.27	21.2%
4.	Burada					10	40.17	10	40.17	2.2%
5.	Crabwood					2	6.04	2	6.04	0.3%
6.	Dalli			3	4.54	1	2.72	4	7.26	0.4%
7.	Dukaliballi					1	1.92	1	1.92	0.1%
8.	Futui			1	1.23	1	3.15	2	4.38	0.2%
9.	Greenheart	8	9.71	23	40.78	53	175.80	84	226.29	12.5%
10.	Haiariballi	13	16.93	18	35.61	15	60.62	46	113.16	6.3%
11.	Huruballi					1	2.17	1	2.17	0.1%
12.	Kabukalli			1	1.06	6	21.12	7	22.18	1.2%
13.	Kakaralli	22	24.26	26	39.97	24	64.07	72	128.30	7.1%
14.	Kaunta	6	7.59	3	3.92	2	6.68	11	18.19	1%
15.	Kurokai	5	4.92	5	6.90	3	5.62	13	17.44	1%
16.	Limonaballi	2	2.28	1	1.36	16	48.26	19	51.90	2.9%
17.	Locust			1	1.67	1	3.40	2	5.07	0.3%
18.	Maho	7	8.33	16	23.06	12	31.35	35	62.74	3.5%
19.	Mamuburuballi					1	8.50	1	8.50	0.5%
20.	Manni			3	4.58			3	4.58	0.3%
21.	Monkey pot							17	28.14	1.6%
22.	Mora	23	21.76	41	61.14	72	232.07	136	314.97	17.4%
23.	Purpleheart					5	17.85	5	17.85	1%
24.	Red cedar					1	4.11	1	4.11	0.2%
25.	Rose of the mountain					1	2.57	1	2.57	0.1%
26.	Shibadan	2	3.01	5	9.16	7	19.12	14	31.30	1.7%
27.	Simarupa					2	10.54	2	10.54	0.6%
28.	Soap wood	1	0.94	2	2.62	2	6.18	5	9.74	0.5%
29.	Suradan			3	4.66	9	16.45	12	21.11	1.2%
30.	Trysil			1	1.00			1	1.00	0.01%
31.	Ulo					2	5.86	2	5.86	0.3%
32.	Unknown	6	8.11	3	5.65	10	35.22	19	48.98	2.7%
33.	Wadara					7	26.53	7	26.53	1.5%
34.	Wallaba	31	34.70	17	27.30	12	28.06	60	90.06	4.9%
35.	Whitee	3	2.92	1	2.31			4	5.23	0.3%
36.	Silverballi (saurie)			1	1.54			1	1.54	0.09%
	TOTAL	**178**	**208.31**	**244**	**409.91**	**373**	**1598.79**	**795**	**1810.12**	**100%**

*Average Tree/Hectare = 7 Trees *Average Cubic Meters/Hectare = 15.08 m^3

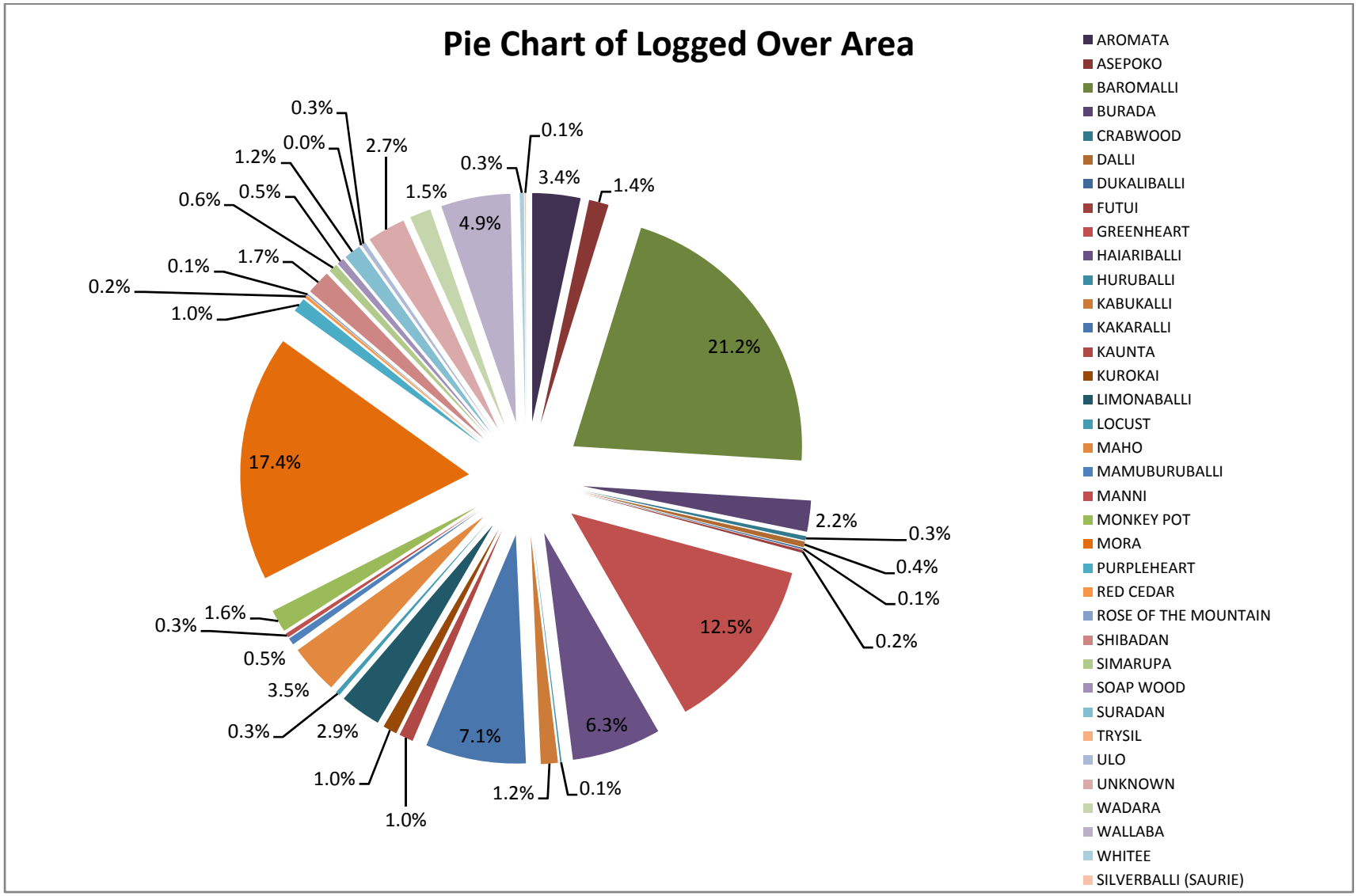


Figure 4: Showing the distribution of Commercial Species within the Logged Over Forest

2.5.2 Production Planning

2.5.2.1 Species to be Harvested

Notwithstanding the results from the inventory, CPT Inc. intends to harvest all merchantable timber species. It is generally believed that four major species, Baromalli, Greenheart, Purpleheart and Mora are likely to form the bulk of harvested species from the project area. Although it is likely that the Project Area may contain more than 70 commercial species, only about 35 species are currently merchantable. The list of Merchantable Species, provided by CPT Inc. is shown below:

Table 7: Outlining the commercial species to be harvested by CPT Inc

Hardwood		Peeler Species	
Local Name	**Scientific Name**	**Local Name**	**Scientific Name**
1. Crabwood	*Carapa guianensis*	1. Baromalli	*Catostemma commune, altsoni*
2. Huruasa	*Pithecellobium jupunba*	2. Maho	*Sterculia pruriens, rugosa*
3. Purpleheart	*Peltogyne schomburgkiamos*	3. Simarupa	*Simaruba amara*
4. Kabukalli	*Goupia glabra*	4. Cedar	*Cedrela odorata*
5. Locust	*Hymenaea Sp.*	5. Dalli	*Virola surinamensis*
6. Shibadan	*Aspidosperma Sp.*	6. Haiawa	*Protium 6spp.*
7. Tatabu	*Diplotropis purpurea*	7. Karahoro	*Didynopanax norototonii*
8. Mora	*Mora excelsa; gonggripii*	8. Kurokoai	*Protium decandrum*
9. Manni	*Symphonia globilifera*	9. Moraballi	*Pouteria minutiflora*
10. Monkey Pot	*Lecythis davishii*	10. Kairiballi	*Licania spp.*
11. Greenheart	*Chlorocardium rodiei*	11. Soapwood	
12. Washiba	*Tabebuia ipe*	12. Cow-wood	*Bagassa tiliifolia*
13. Limonaballi	*Chrysophyllum pomiferum*	13. Warakairo	*Laetia procera*
14. Tonkabean	*Dipteryx odorata (Aubl.)*	14. Futui	*Jacaranda copaia*
15. Silverballi	*Aniba ovalifolia*		
16. Wamara	*Swartzia leiocalycina*		
17. Morabukea	*Mora gonggrijpii*		
18. Tauroniro	*Humiria balsamifera*		
19. Bulletwood	*Manilkara bidentata*		
20. Arisauroballi			

2.5.2.2 Calculation of the Annual Allowable Cut

Given that the concession was previously logged, it is important that the annual allowable cut utilized will allow for sustainable harvesting. The total area of the Concession is 26,259 ha. It is expected that approximately 5,252 ha (20% of the Concession) can be classified as non – usable forest. This area consists primarily of swamps, waterways, non-productive areas and buffer zones. A further 945 ha (4.5%) of the Concession will be maintained as a Biodiversity Reserve. This will leave 20,262 ha as the productive forest. Given that approximately sixty percent (60%) of the Concession was previously logged, a cutting cycle of twenty five (25) years is being considered as the preferred option. This is still to be agreed upon by the GFC. If this cutting cycle is used, the annual allowable cut is calculated to be 6,687 m^3 with a monthly allowable cut of 557 m^3. This would allow for an annual harvesting area of 803 ha or 8 Blocks. However, once the Management Level Inventory is conducted, more information will be available to assist in determining the suitable annual allowable cut. This will be decided upon by the developer and the GFC.

2.5.2.3 Silvicultural Considerations

CPT Inc. will practice selective harvesting to minimize damage to both the residual trees and the harvested logs. Currently, silviculture work for regeneration, based on experiments done, is too costly an alternative to

regeneration. It is logical to assume that any felling within an area will create gaps in the upper canopy thus encouraging further growth from the lower canopy. This conforms with the best system advocated thus far which is the restriction of felling over to a minimum girth limit, itself a form of silvicultural treatment where the larger trees are felled, opening up the canopy, even sparsely, allowing the trees of the second upper tier to gain more light and forge ahead as the next cutting cycle.

The silvicultural system to be employed by CPT Inc. involved yield regulation by both size and area. Trees will only be felled if they are on CPT Inc. commercial species list and Diameter at Breast Height (DBH) greater than or equal to 45 cm for hardwood and peeler logs and 35 cm and up for greenheart piles. CPT Inc. will also abide by the cutting cycle agreed upon with the GFC.

2.5.3 Logging Operations

2.5.3.1 Operational planning

The Concession has been divided into three (3) management compartments. The compartment boundaries were selected, where possible, on the basis of natural ground features. Although they vary, the size of the compartments is at a scale useful for the logging operation planning over the medium term. Where it is operationally efficient to do so, two or more compartments may be harvested at the same time. Table 8 below outlines the details of the compartments.

Table 8: Outlining the details of the Concession Compartments

Item	Descriptions	Compartment Code	Area in Hectares	Area in Acres	Remarks
1.	Pomeroon Compartment	POCO	8,500	21,003	Flat/Hilly
2.	Cuyuni Compartment	CUCO	9,250	22,857	Flat-Undulating and Hilly
3.	Pairawa Compartment	PACO	8,509	21,026	Broken Hills, Undulating and Flat
Total	3 Compartments		26,259	64,886	

Below is a brief description of the Compartment Boundaries:

1. Pomeroon Compartment: Bounded in the North by the Pomeroon River; thence on the South by an unknown Creek, thence on the East by the Essequibo River, thence on the West by the Paiwara River.

2. Cuyuni Compartment: Bounded on the North by the Mazaruni and Wanapu Rivers, thence on the South by the Cuyuni River, thence on the West by the Paiwara River, thence on the East by a cut line concession boundary.

3. Pairawa Compartment: Bounded on the North by Pomeroon River thence on the South by the Cuyuni River, thence on the West by the Paiwara River, thence on the East by a cut-line.

Map 5: Showing the three (3) Compartments of the Concession

In addition to the operable compartments, areas that are inoperable have been identified along with the total area of biodiversity reserves where no harvesting activity will take place.

Table 9: Outlining the Inoperable Areas within the CPT Inc. Concession

Rivers, Creeks, Swamps and Buffer Zone	5,252
Biodiversity Area	945
TOTAL Inoperable Area	6,197
Net Productive Area	**20,062**

2.5.3.2 Skid Trails

Using the information supplied on the pre-harvest inventory map, the Block Inspector and the Skidding Team Foreman will lay out the skid trails inside the block(s) using red/yellow-flagging tapes for main and feeder skid trails respectively. Skid trails will be established along ridge tops by bulldozer. During construction the blade will be lifted so as to retain a vegetation mat on top of the soil. Skid trails will not meet at an angle greater than 45 degrees for skidding of logs so as to minimize damage to soil and trees along the skid trail. Where crossing creeks becomes necessary, poles will be felled into the creek to provide carpet material on which equipment can cross. This allows the free flow of water underneath and can be removed easily after skidding operations are complete.

Generally a skidder is capable of negotiating a 25% favourable grade (uphill) when traction is good and 20% slope when traction is poor. Where slopes above the safe operational limits of the skidder are encountered, either the area will not be logged or other methods, such as winching will be employed.

2.5.3.3 Log Markets

Log markets will be established along the road, located on top ridges or places with higher elevations to facilitate drainage. Construction of log market will be gently sloping on one side to prevent accumulation of water. Sizes of markets will allow for safe operation of equipment and be proportional to the volume to be harvested from the adjacent forest/or block and the length of time the logs are likely to remain on the market. Log market size will not exceed 4,000 square meters. Log markets will be properly planned and located and whenever possible a log market will be established between two skid trails along the access road to minimize soil/canopy clearing.

2.5.3.4 Block Allocation

Prior to allocation of harvesting blocks to Skidding Teams, a “Notice of Intention” will be delivered to the GFC Ranger Officer for comment and approval. A maximum of 2 Blocks will be allocated to each Skidding Team provided that the team has completed harvesting of previous block(s). The final block inspection by the Block Inspector/Logging Supervisor ensures that all felled merchantable timber has been skidded.

There may be circumstances, such as inaccessible areas by low lying access road, creeks, rivers, and swamps, that make it necessary to open new blocks before the previous blocks have been fully harvested. In this case, allocation of new blocks, and monitoring of the process is undertaken by the Production Section (Skidding Supervisor) and the Survey and Planning Section through the recommendation of the Block Inspector assigned. The date of issuance and closure of blocks will be submitted to the GFC Ranger Officer for reference and recording purposes.

2.5.3.5 Felling and Bucking

The Skidding Team has the responsibility to plan the felling and bucking operation and the Block Inspector monitors the felling activity to ensure that felling commences at the back of the block. This method should ensure that felled logs are not left behind and that repairs or maintenance required on the main skid trails is

minimized. For every tree felled there must be a defined extraction route and both the log and stump will be tagged.

Directional felling will be employed in all cases to increase safety of workers, maximize usable volume from the tree and to reduce damage to residual trees and the soil. Felling restrictions, for example in the vicinity of water courses, which are stated in the GFC Code of Practice, will be strictly observed. Feling will not be done within 50 meters of major rivers or creeks.

2.5.3.6 Skidding

Skid trail planning and monitoring will be the responsibility of the Block Inspector and Skidding Foreman assigned in a certain block(s) to be harvested. A skidder is capable of negotiating a 25% slope uphill when traction is good and a 20% slope when traction is poor. Where slopes above the safe operational limits of skidders are encountered, either the area will not be logged or other methods such winching will be employed.

2.5.3.7 Hauling

Hauling will be employed to minimize the time logs are left at the log markets. Log loading in the forest is accomplished at the log markets with specialized log loader and hauling to the Buckhall Wharf and SawmillComplex will be done using a fleet of specialized long-bed logging trucks. These logging trucks will have the capacity to haul an average of 30 m^3 and 35 m^3 of logs per trip respectively. Hauling will be restricted during periods of heavy rainfall in order to minimize damage to the haul roads.
All logs will be hauled once:

1. They are free from fungus and rot;
2. They have a minimum cut length of 6m;
3. The heart is no more than 15% off center;
4. Buttresses neatly trimmed;
5. The minimum small diameter is 35 cm;
6. The shortest diameter is at least ¾ of the right angle diameter;
7. The log grain spirals no more than 1 cm for each meter in length;
8. There is one bend which is not deeper that 30% of the average diameter; and
9. Radial check, heart shake and other internal defects on the butt and smaller end are less than 10% of the diameter.

2.5.3.8 Scaling and Grading

Log scaling and grading will be undertaken by the Scaling/Grading Section at the log market before the logs are loaded onto the logging trucks to the Sawmill at the river landing. A GFC and CPT Inc. serial number on plastic tags identify each log. “S” Hooks and nail plates are also applied to prevent splitting.

2.5.4 Transportation

2.5.4.1 Transportation of Logs and Shipping of Products

Logs will be hauled out from the felling areas by log trucks to the log yard for scaling, grading and segregation. Logs will then be transported via log trucks to the Sawmill at the Buckhall Wharf Site. After being cut into squares at the Sawmill the material will then be shipped by barges or pontoon to CPT Inc. Processing Facility at Tuschen for further downstream processing.

2.5.4.2 Road Construction and Maintenance

CPT Inc. will utilise the BCL Main Road (M-1) to transport its forest produce from the Concession to the primary processing area at Buck Hall. A Timber Path License will be obtained from the GFC prior to commencement of the operation. Since the concession consists of an existing road network built by BCL

when the Concession was previously logged, CPT Inc. will only upgrade and maintain these roads and construct extensions during the first five (5) years of the operation.

A road will be constructed linking the MI road to the processing facility at Buck Hall. This proposed road will be approximately 2.3 km long. The road will be 7m – 8m wide with a small log bridge to be built crossing the Takatuni Creek.

Advanced planning, well aligned and properly constructed roads are of great importance in forest operations, as the more logs a truck can carry per load the cheaper will be the cost of extraction/transportation per cubic meter of timber. Some of the main advantages of good roads include increase hauling loads, higher travel speed and shorter time, lower repair, maintenance and associated costs and reduced depreciation costs.

Main and secondary roads will be surfaced and compacted with laterite and other form of suitable materials from quarries and borrow pits. Feeder roads will only be surfaced in area where low bearing capacity of soil is found to allow log trucks to pass since these roads will only be used for short period of time.

Culverts are to be placed where required for cross drainage and will be constructed of the appropriate materials, e.g., log, wood or rubberized reinforced corrugated pipe, depending on either the permanent or temporary nature of the installation. Road culverts would be aligned perpendicular to the road and horizontal to the flow of water with an inclination side (sump) of 5% to 10% to avoid flooding of the roadway. Main roads culvert would be provided with catch basin on both ends when necessary to avoid silting.

Culverts are used where peak flows, (runoffs) are not extreme and the depth of fill not too great. Culvert size/diameter will be adequate to carry stream flow and depend on the size of the area to accommodate the runoff.

Unstable portions of roads will be scraped thoroughly of pegasse/mud loose soil. Logs will be placed close to each other to avoid misalignment and be covered with suitable filling materials or laterite and immediately compacted. Only durable, non-commercial hardwood species will be used whenever possible to avoid frequent road repair. All parts of the road that need filling will not be during heavy rain to avoid surface erosion and sedimentation.

All bridges will be constructed of durable hardwood logs and sawn timber, the size depending on the site and width of rivers or creeks. A stable log bearer cradle (log cribbing) will be set into earth works on each side of the river (bridge approaches) to set the log stringers which will then be covered with soil and laterites. An alternative bridge type is with cross pieces on the log stringers covered with running boards or transverse boards. Bridges will be perpendicular to the water flow and silt traps will be placed at the four corners.

All roads and bridges construction will be governed by the strict guidelines contained in the GFC's CoP.

2.5.4.3 Equipment

To support the logging and sawmilling operation, CPT Inc. will have to acquire a fleet of equipment and machinery. A list of the equipment and machinery to be acquired are outlined in the table below.

Table 10: Outlining the list of equipment and machinery to be used as part of the operations

Description	Model/Made	Units
Road Construction & **Maintenance:**		
Bulldozer	CAT D6H/R	1
Motor Grader	CAT 12G	1

Description	Model/Made	Units
Excavator	CAT 320C	1
Dump Truck	6x6 M181 Military Dump Truck	3
Service Jeep	Toyota 4x4	1
Chainsaw	Stihl 070 AV	1
Water Pump	Honda 5 Hp	1
Logging: ***Felling & Bucking and Skidding***		
Skidder	Caterpillar 528B	2
Bulldozer	CAT D6R w/ Winch	1
Chain Saw	Stihl 070AV	2
Service Jeep	Toyota 4x4	1
Hauling/Trucking:		
Logging Truck	Mack 6x6	3
Fuel Truck	Mack 4x6 -3,000 Gals. Capacity	1
Wheel Log Loader	CAT 966	2
Water Truck	Mack 4x6	1
Service Jeep	Toyota 4x4	1
Log Pond:		
Crane	RB 30 Ton / Hitachi 50 Ton	1
Wheel Log Loader	CAT 966F	1
Tug Boat	700 Hp Twin CAT Engine 350Hp - Each	1
Speed Boat	75/100 Hp Yamaha Out Board Engine	2
River Transport:		
Barge	750 Metric Ton Capacity	1
Transport Vehicle:		
Service Jeep	Toyota 4x4 Double Cab Pick-Up	3
Processing Equipment:		
Portable Sawmill	Woodmizer	2
Portable Sawmill	Lucas	2

2.6 Alternatives

In considering alternatives to the project the following options have been identified:

1. No Project;
2. Location of Logging; and
3. Location of Primary Processing.

(1) No Project

The no project scenario was considered during the preparation of this EIA. If there is no project then the area will remain as it. The forest will be maintained. However, the existing infrastructure, including the existing road network within the concession, will further deteriorate as a result of lack of maintenance, rendering them useless in the future, or very expensive to repair. Mining may also commence within the concession which can damage existing forest stock.

CPT Inc. will have to seek alternative to source materials for its sister construction company and for processing at the proposed processing facility to be established at Tuschen.

However, the GFC is promoting sustainable management of Guyana's forest resources. As part of its mandate, GFC has been encouraging sustainable forest operations for the promotion of social and economic development while at the same time safeguarding the integrity of forest resources. This is especially important since there is an increasing demand for wood and wood products both locally and overseas. To ensure sustainable utilization the GFC issues forest concessions to companies and individuals to harvest the forest, while monitoring the activities for compliance with all requirements. The CPT Inc. concession was allocated as part of this effort by the GFC.

(2) Location of Logging

The present SFEP has been identified by GFC to be reopened up for logging operations because of the species type as well as infrastructure in place to facilitate logging operations and the relative proximity to the coastal areas. In addition, the GFC is implementing a policy to limit the allocation of virgin forest for logging. In doing so the GFC is currently identifying inactive areas already allocated and reallocating those areas to other companies or individual desiring of pursuing logging.

Taking into consideration the species requirements of CPT Inc. proposed downstream processing operations this area is one of the most suitable in Guyana. Also, the location of the SFEP will take advantage of existing infrastructure, in particular the existing network of roads within and around the Concession.

(3) Location of Processing

Primary processing of the logs will be done at the Wharf Site on the Left Bank of the Essequibo River. At this site four (4) portable mills will be used to square logs before shipping to the Company's processing facility at Tuschen.

The option was considered to ship the logs directly to the Tuschen facility. However, it would be more economically feasible to cut the logs into squares at Buckhall, thus reducing the volume before shipping. This would allow for more usable materials to be transported in any shipment since the waste materials will remain at Buckhall.

2.7 Present Status of the Project

A forest inventory nventory has been completed and a Draft of the Forest Management Plan has been submitted to the GFC for approval. It was agreed that a Management Level Inventory be conducted to assist in determining the suitable annual allowable cut. Operations are planned to commence once the ESIA process is completed and the TSA awarded.

SECTION THREE

POLICY, LEGISLATIVE AND INSTITUTIONAL FRAMEWORK

3.1 Introduction

The framework for the operationalization of the proposed CPT Inc. project is shaped by several policies and legislation specific to area of environmental and natural resources management in Guyana. In this section, the relevant national policies, statutory requirements and guidelines that would impact on the operation of this project have been outlined. The key institutions which have regulatory oversight of the operation are also included.

3.2 Policies & Plans

3.2.1 Constitution

Articles 2:25 and 2:36 of the 1980 Constitution of Guyana provides the basis for a national environmental policy.

Article 2:25 of the Constitution 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".*

3.2.2 National Development Strategy (2001-2010)

The National Development Strategy (NDS) prepared by GoG sets out the primary development policy framework for Guyana. The NDS demonstrates GoG's policy commitment to environmental management and sustainable development. While general considerations related to environment are stated in the NDS, attention has been given to monitoring and enforcement and actions to improve environmental management practices. Further, the NDS covers aspects related to the promotion of cross-sectoral coordination and integration for environment and natural resources management across the sectors.

3.2.3 National Environmental Action Plan

The National Environmental Action Plan (NEAP) (1994) outlines the focus of GoG as it relates to environmental management. The plan presented a 12-point approach reflecting sound principles of environmental management and the ideal of sustainable development. A programme of action over a 3-year period was identified to address priority environmental issues.

A second NEAP (2001-2005) has been prepared as a continuation of NEAP (1994), setting out the *"environmental development strategy for Guyana for the next five years"* and *"a framework for integrating cross-sectoral environmental concerns in the broader context of the country's economic and social development programme".* The Action Plan outlines a further commitment to sustainable development and a thematic approach to environmental protection. The implementation strategy for NEAP involves the identification of programme areas according to sectors and cross-sectors and tools and actions for implementation.

3.2.4 National Forest Policy (1997)

The National Forest Policy (NFP) aims to *"conserve, protect, manage and utilise the nation's forests" (NFP 1997).* It places emphasis on forest management and its importance towards national development and was approved by GoG in 1997. The NFP further aims *"to achieve improved sustainable forest yields, and at the same time, it ensures conservation of ecosystems, biodiversity and the environment, and watershed protection and rehabilitation, prevent and minimize soil erosion, degradation of forests, grazing lands, soil and water"* (NFP 1997).

The NFP is the first official policy statement since the promulgation of the Forest Act 1953 and it responds to significant changes in Guyana's economic, social and political environment during that time. It also addresses the country's national and global responsibility for the sustainable management of the forest.

The environmental underpinning of the policy is the critical role of forests in maintaining the ecosystem and its life sustaining services.

The specific objectives of the policy are to:

1. Promote sustainable and efficient forest activities, which utilize the broad range of forest resources and contribute to national development while allowing fair returns to local and foreign entrepreneurs;

2. Achieve improved sustainable forest resource yields while ensuring the conservation of ecosystems, biodiversity, and the environment; and

3. Ensure watershed protection and rehabilitation: prevent an arrest the erosion of soils and the degradation of forests, grazing and reforestation; and protect the forest against fire, pests and other hazards.

In light of national development within the country, GFC has commenced the process to revise the NFP.

3.2.5 National Land Use Policy

A draft National Land Use Policy (LUP) 2005 has been prepared by the Guyana Lands and Surveys Commission (GLSC). The draft policy aims to streamline land use planning and to create conditions necessary to achieve types of land uses which are sustainable, socially desirable and environmentally compatible. It provides the framework for coordination among land uses, as well as, facilitates integration of land use and the preparation of a National Land Use Plan.

The Commission aims to also prepare regional plans for specific Administrative Regions of Guyana. To-date the Commission has prepared two (2) Regional Land Use Plans: (i) Region 6 – East Berbice Regional Land Use Plan; and (Iii) Region 9 – Rupununi Sub Region 1. Additionally, Corridor Land Use Plans for the Lethem – Linden and Linden to Soesdyke road corridors have been prepared.

3.2.6 Low Carbon Development Strategy

GoG, in 2009, launched a Low Carbon Development Strategy (LCDS). The LCDS aims to transform Guyana's current economy to that of a "low carbon economy" while addressing issues related to climate change through a compensatory scheme by marketing Guyana's standing forest. The strategy is built on Guyana's vision to encourage investments/economic development while protecting and maintaining its forest cover. The strategy has three pillars: (i) investment in low carbon economic infrastructure; (ii) investment and employment in low carbon economic sectors; and (ii) investment in communities and human capital. As part of Guyana's low carbon economic framework, forestry activities will continue to be highly regulated to ensure compliance with national requirements and international best practice.

The LCDS outlines the strategic direction for Guyana and while it does not impose any new legislation or regulations for the forestry sector, operators such as CPT Inc. are required to comply with existing legislation, as detailed in Section 3.3 and their corresponding standards and guidelines.

3.3 Legislation

3.3.1 Environmental Protection Act

Environmental protection/management is governed by the Environmental Protection Act (EP Act) 1996. The act is the first comprehensive environmental legislation in Guyana and established the EPA. The Act provides for *"the management, conservation, protection and improvement of the environment, the prevention and/or control of pollution, the assessment of the impact of economic development on the environment, the sustainable use of natural resources and for matters incidental thereto connected*

therewith". Under the Act the EPA is mandated to coordinate environmental management and outlines the legal process for undertaking sustainable and effective management of the natural environment.

Part IV of the EP Act stipulates the process governing ESIAs. The Act requires that an ESIA be conducted prior to authorization of any project, which may significantly affect the environment. The EP Act mandates the EPA to execute the following functions relating to environmental assessment:

- *To take steps, as are necessary, for the effective management of the natural environment so as to ensure conservation, protection and sustainable use of natural resources;*
- *To promote the participation of members of the public in the process of integrating environmental concerns in planning for development on a sustainable basis;*
- *To ensure that any development activity which may cause an adverse effect on the natural environment be assessed before such activity commenced and that such adverse effect be taken into account in deciding whether or not such activity should be authorized; and*
- *To provide first development consent regarding any development project.*

The EPA has determined that for a project of this nature, an ESIA is a mandatory requirement before the issuance of an environmental authorization.

The EIA Process

The Environmental Impact Assessment Guidelines outline the process taken and this commences with the submission of a project application for environmental authorization to the EPA. EPA requires specific information and these include a project summary, design and size of the project, potential environmental impacts [positive and negative] etc. The EPA screens the application and makes a determination whether an ESIA is required or not and then notify the proponent. The proponent is also required to submit a draft ToR to the EPA and the EPA subsequently publishes a notice in the printed media. The public is given 28 days to submit any written comments/concerns related to the project and its effect on their environment. These submissions detail questions and matters which members of the public consider relevant to the deliberations of the ESIA.

A public scoping meeting is also held to present the proposed project and to garner additional comments/concerns from the public, thus, aiding the EPA with the finalization of the ToR. The EPA submits the ToR to the developer and the consultants for the preparation of the environmental impact statement (EIS). During the environmental impact process the consultants are required to conduct field studies to collect baseline information and to consult members of the public, interested bodies and organizations to gather secondary information. All the data are collected and a written report – the EIS – is prepared and submitted to the EPA for evaluation and recommendations.

Upon receipt of the EIS the EPA publishes a notice in the daily print media informing the public that the EIS has been prepared and is available for review within a timeframe of 60-days. EPA also engages relevant sector agencies and, as necessary, other relevant institutions to review the document to ensure their concerns have been addressed. The Environmental Assessment Board (EAB) as stipulated by the EP Act 1996 18 (2) (b), and through the EPA, determines the need for a public hearing to allow the consultants to present the project findings and to provide another opportunity for members of the public to contribute towards designing the environmental management framework for the proposed project by raising environmental concerns related to the project.

The EAB is a body which provides an independent contribution to the development and finalization of the EIA process and makes recommendations which uphold the principles of the EP Act. In order to carry out its functions, the EAB is involved in the EIA process from the point of scoping, through public hearings and finally to establish conditions for the issuance of an Environmental Permit. The EAB evaluates the EIS and

recommends to the EPA whether it should be accepted and the terms and conditions of its acceptance which are reasonably necessary to protect human health and the environment.

The EPA then takes into account the recommendations of the EAB, sector agencies, comments of the public and its own review, and decides whether or not the project should be approved. For approved projects, the EPA issues an Environmental Permit the terms and conditions necessary to effectively manage the environment.

The project timelines within the framework of the ESIA process are outlined in Section 2.1.1.

The Act also requires measures to be implemented to prevent environmental pollution. Within this context, CPT Inc. is therefore expected to carry out its logging operations in an environmental sound manner to prevent and avoid environmental pollution. Part V Section 19 (1) specifically states that *"A person shall not (a) Undertake an activity that causes or is likely to cause pollution of the environment unless the person takes all reasonable and practicable measures to prevent or minimize any resulting adverse effect; (b) Discharge or cause or permit the entry into the environment of any contaminant in any amount, concentration or level in excess of that prescribed by the regulations or stipulated by an environmental authorization."* In general, the Act ultimately aims toward improvement of environmental quality through the management, conservation and protection of resources and the sustainable use of [natural] resources. Therefore, in cases where the project impacts are unavoidable CPT Inc. is expected to minimize the extent of impacts on the environment through the application of mitigation measures as outlined in Section 6 of this EIS.

3.3.2 Environmental Protection Regulations

The Environmental Protection Regulations, made under the Environmental Protection Act (1996), were gazetted in 2000. These regulations govern Water Quality, Noise, Air Quality and Hazardous Waste Management and are aimed at preventing pollution by regulating discharges and emissions. These pollution management regulations will regulate and control the activities of CPT Inc. forest operations during construction and operational phases.

3.3.2.1 Environmental Protection (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. The Standard sets out discharge limits that are applicable to this project and must be adhered to by CPT Inc. The limits outlined in the Standard are attached as Appendix F.

3.3.2.2 Environmental Protection (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. 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 Agency are also detailed in the regulations. No air quality standards have been developed for forest operations to date. However, for an operation of this nature, the impact on the surrounding air quality is expected to be minimal and localized, especially, in the absence of surrounding communities.

3.3.2.3 Environmental Protection (Noise Management) Regulations 2000

Operators executing various activities that cause or emitt noise above a required threshhold are required to apply to the Agency for an environmental authorization. The GNBS is responsible for the establishment of standards for permissible noise levels in industry, construction and other areas. The categories for which permissible noise levels are to be fixed by the GNBS were identified as follows: Residential, Institutional, Educational, Industrial, Commercial, Construction, Transportation and Recreational. The EPA has in collaboration with the GNBS developed noise standards which stipulate level of:

- 60 decibels during the night for residential areas
- 75 decibels during the day for residential areas
- 80 decibels during the night for industrial areas
- 100 decibels during the day for industrial areas

CPT Inc. must ensure its activities are executed, during the construction and operational phases, with minimal effect on workers and the environment. Therefore CPT Inc. must ensure adherence to the noise standards and implement measures where necessary to protect the environment and workers health and safety in keeping with the environmental protection noise management regulations.

3.3.2.4 Environmental Protection (Hazardous Wastes Management) Regulations 2000

The Environmental Protection (Hazardous Wastes Management) Regulations require 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 also outlines the provision for reporting, emergency preparedness plan, list of hazardous characteristics and hazardous waste to be controlled. Some amount of hazardous wastes will be generated during the construction and operation of the CPT Inc. logging operations, such as waste oil, used tyres, chemicals etc. CPT Inc., in keeping with the regulations must collaborate with the EPA to find the most appropriate methods for the handling, storage and disposal of hazardous wastes generated during the operations.

3.3.4 Forest Act

The 1953 Forest Act authorizes the Guyana Forestry Commission to address issues within Guyana's State Forest. Under the Act the GFC is allowed, among other things, to grant leases, TSA, and permit individuals and companies to harvest/extract timber from defined tracts of State Forest, as well as, to regulate harvesting, transport and marketing and exports of timber. The Act also outlines the ownership of forest produce, offences and legal proceeding under the Act, and penalties that may arise as a result.

The GFC commenced the process to revise the Forest Act 1953 and a Forest Bill 2008 has been prepared which will repeal the Forest Act 1953 once it has been gazetted. The Bill has been enacted in the Guyana Parliament in January 2009 and is expected to take effect following acquiesce by the President. It provides the framework within the forest sector to address a number of areas; in particular those related to sustainable forest management and permitting of operations. Part 4 of the Bill detail specific provisions for the regulation of forest operations and activities related to forest produce and quality contol of value-added forest produce respectively. The Forest Bill also sets out stringent provisions for the GFC for monitoring and enforcement and thus, stronger requirements on forest operations such as CPT Inc. CPT Inc. will be required to adhere to these provisions as established in the legislation once the Bill has been gazetted.

Further, specific reference has been made in the Bill to (i) conserve biological diversity (ii) protect specific trees and plants (iii) conserve soil and water resources and (iv) protect forests against degradation, fires, pests and disease. Once the Bill has been gazetted the GFC in collaboration with the EPA, can set aside areas for conservation and protection if the aforementioned are found within state forests. Moreover, the 4.5% of forest, as recommended by the CoP, in blocks exceeding 1000ha to be set aside by concessionaires will become a mandatory requirement of which CPT Inc. will be required to follow.

In addition, the Forest Bill 2008 aims to consolidate and amend the laws related to forest and transfers greater responsibility to the GFC, the GFC Board and the Minister responsible for forests.

3.3.4.1 Code of Practice for Timber Harvesting

The Code of Practice (CoP) for Timber Harvesting sets out the guidelines and standards that will allow Guyana's forests to be harvested sustainable and with minimal adverse impact on the forest environment. It was first developed in 1994, based on the FAO Model Code and provides the basis for ensuring that a continuing economic return can be obtained from forests in the long term. The CoP is designed to balance commercial considerations with protection of environmental and social values. The COP applies to all logging operation agreements, including Timber Sale Agreements (TSAs), Wood Cutting Leases (WCLs) and State Forest Permits (SFPs) and specific to the logging operation.

While the provisions in the Code are not legally binding, there are a few components that are mandatory such as the preparation of the FMP and Annual Operating Plans (AOP), which must be prepared in accordance with the Code. Moreover, the Forest Bill 2008, in particular Part 4, makes provisions for CoP to regulate any class or description of forest operations to become a legally binding.

Some provisions in the CoP can contribute towards a reduction of environmental impacts associated with the construction and operation of the CPT Inc. logging operations and these are related to the post harvest activities, operational hygiene, camp hygiene and health and safety.

The Code, however, does not cover the utilization of non-timber forest products or forest management for other purpose such as eco-tourism or 'conservation concessions', though Codes for the harvest of selected non-timber species such as Kufa, Nibi and Manicole, have been developed. The GFC, in collaboration with the EPA, is currently engaged in a process to develop a Code of Practice for process operations and a draft has been prepared.

3.3.4.2 The Forest Management Plan Guidelines, 1999

The GFC issues the Forest Management Plan (FMP) Guidelines and this provides a comprehensive basis for strategic and operational planning. All plans for forest operations are prepared in accordance with this guideline, the Code of Practice for timber harvesting and where relevant, the Codes of Practice for Kufa, Nibi and Manicole Harvesting.

3.3.5 Occupational Safety and Health Act

This Occupational Safety and Health Act (OS&HA), 1997 deals with the regulation and registration of workplaces and the occupational health and safety of workers. It gives authorization for OH&S 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).

This Act requires CPT Inc. to publicly display an abstract of the Act, and specific sections addressing various issues related to employees' health and safety. CPT Inc. is also required under the OS&HA to ensure workers are protected and a safe work space created.

3.3.6 Amerindian Act

The Amerindian Act 2006 guarantees the cultural and economic rights of the Amerindian people, and provides for the administration of Amerindian communities. The land rights of the Amerindians are also addressed by the Act. Under the revised Act the recognition of Amerindian land rights is probably the most significant. Amerindians will now be granted lands under the State Lands Act which is "absolute and forever." The old Act (prior to 2006) had a number of restrictions on the lands granted, including one which states that the Minister can increase or decrease the land granted at any time. The Minister was not required to have any consultations with the community. That restriction has now been removed. This would mean that no operations can be carried out by the developer without the prior consultation with the communities involved.

Importantly, under the new Act Amerindians will now be able to lease their land. However, to ensure that the communities always maintain the majority of their titled land, they will only have the authority to lease up to 10% of the titled area.

Under the revised Act, communities will maintain their exclusive rights over the forest resources on their titled land. Furthermore, the new Act makes provisions for the communities to seek the assistance of GFC, if necessary, inclusive of the need to inventorize their forest stock. Another important aspect of the Act is that it requires persons, inclusive of the developer, desirous of conducting commercial forestry operations to abide with the GFC regulations. This is a very important provision since many communities have had problems with agreements of this nature.

There are no communities within or in close proximity to the concession to be affected by CPT Inc. operations, refer to Section 4.3.2 for additional information.

3.3.7 Labour Act

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. CPT Inc. as part of its corporate responsibility has to comply with the provisions stipulated in the Labour Act throughout its operations to ensure safe and satisfying conditions for employees.

3.3.8 The Mining Act

GGMC is responsible for the implementation of the Mining Act 1989, which establishes the legal framework for the utilisation of mineral resources in Guyana. The Act makes provision for a system of mineral agreements and licences for regulating prospecting. It gives the Commission the responsibility for establishing regulations for mining and quarrying operations. A mining licence is required in order to mine any mineral and is issued at the discretion of the Commissioner of Guyana Geology and Mines with the Minister responsible for mining. The rights of persons in possession of lands grants as well as the privileges of Amerindians in relation to prospecting, mining, quarrying are preserved under this Act. Further regulatory framework under the act makes provisions for the disposal of sanitary waste and the storage of poisonous substances in mining areas.

The Act also provides for the granting, prospecting, mining licences and quarrying permits by GGMC and for the conduct of geological and geophysical surveys in any part of Guyana including forested land held under leases, TSAs and other permits issued by the GFC. Given that some parts of the CPT Inc. concession have been allocated for mining, the developer through the GFC must work closely with the GGMC and mining operators to ensure there are no conflicts, and commercial species are harvested before mining operations commence. GGMC has the responsibility to ensure the mining operators are in

compliance with the Mining Act and its regulations thereunder to minimise damage to the environment.

3.3.9 Other Relevant Laws

In addition to the aforementioned sections detailing the legislative framework within which CPT Inc. seeks an environmental permit and Timber Sales Agreement (TSA), Table 11 below outlines briefly other relevant (existing) legislation applicable to the project and may govern some aspects of environmental and social matters related to the forestry operations.

Table 11: Other relevant legislations

Agency / Ministry	Responsibility	Relevant Law
Wildlife Management Authority	Wildlife Trade and Protection	Draft Conservation of Wildlife Bill (1992) Wild Birds Protection Act Chap 71:01
Guyana Lands and Surveys Commission	Administration of State Lands	State Lands Act, 1903
Ministry of Labour	Labour Relations Occupational Health and Safety	Employment of Young Persons and Children Act
Ministry of Culture, Youth and Sports ***Walter Roth Museum of Anthropology***	Anthropological and archaeological research and publication	Cultural Heritage Act, 1993
Guyana Energy Authority (GEA)	The GEA through the Legal and Licensing Division Is responsible for enforcing the Laws/Regulations governing all activities involving petroleum and petroleum products in Guyana.	Petroleum and Petroleum Products Regulations 2004 made under the Guyana Energy Agency Act 1997

3.4 Institutional Framework

There are a number of key Ministries, Government Agencies and Institutions that will have some oversight regarding the proposed operation of the logging concession and sawmill. These inclue the Ministry of Health and Labour, Ministry of Amerindian Affairs, Ministry of Culture, Youth and Sports, Guyana Geology and Mines Commission, Guyana Lands and Surveys Commission, Guyana Energy Authority and the Wildlife Management Authority among others. The roles and functions of the two (2) main institutions, as a result of the TSA and ESIA processes, are highlighted below:

3.4.1 Environmental Protection Agency

The EPA was established under the EP Act of 1996. The Agency is governed by a Board of Directors, but falls under the direct supervision of the Office of the President. In Sec. 4 (1) (a), of the Act, the EPA is given the mandate to *"take such steps as are necessary for the effective management of the natural environment*

so as to ensure conservation, protection and sustainable use of its natural resources". The Act gives the Agency the overall responsibility to:

- *Take necessary steps for effective management of the natural environment to ensure conservation, protection and sustainable use of its natural resources;*
- *Ensure that any developmental activity, which may cause an adverse effect on the natural environment, is assessed before such activity is commenced;*
- *Coordinate and maintain a programme for the conservation of biological diversity and its sustainable use; and*
- *Coordinate the establishment of national parks and protected areas system and a wildlife protection management programme*.

In order to fulfill the responsibilities as stipulated by the Act the EPA is required to implement several principles of environmental management. These principles are:

- The "polluter pays principle" which states the polluter should bear the cost of measures to reduce pollution;
- The "precautionary principle", where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing measures to prevent environmental degradation;
- The "strict liability" legal principle: any person who contravenes this Act or regulations shall be liable to the penalties prescribed thereafter;
- The "avoidance" principle: it is preferable to avoid environmental damage, as it can be impossible or more expensive to repair rather that prevent damage;
- The "state of technology" principle: measures protecting the environment are restricted by what is technologically feasible and as technology improves, the improved technology should be used to prevent and repair environmental damage.

3.4.2 Guyana Forestry Commission

The Forest Act (1953) and the current Forest Bill 2008 mandate Guyana Forestry Commission (GFC) with the overall management of Guyana's State Forests. Approximately 80% of Guyana's are classified as State Forest and are under the jurisdiction of the GFC. The activities of all forest operators are guided by the requirements of the GFC through the Forest Act (1953) and its regulations, and codes of practice. The GFC Act stipulates the functions and responsibilities of the GFC and establishes a board of directors appointed by the President to govern the GFC.

The Commission has the responsibility to advise the subject Minister on issues relating to forest policy, forestry laws and regulations. The work of the Commission is guided by the governing legislation, the forest policy and NFP. In particular, the NFP outlines the operational aspects related to the forest sector, develops and implements forest protection and conservation strategies, oversees forest research and provides support and guidance to forest education and training. Therefore, the GFC is the institution responsible for the granting of a lease, stipulating the manner in which the concession should be operated, as well as carry out any subsequent monitoring and assessment activities.

SECTION FOUR

PROJECT LOCATION AND BASELINE CONDITIONS

4.1 Geographical Location

The concession, based on natural surrounding, is bounded on the north by the Pomeroon River, on the south by the Cuyuni River, on the east by the Toolsie Persaud Ltd. Concession and on the west by the Paiwara River and shares a common boundary with BCL. It lies within the southeastern portion of the forestry belt of Central Guyana on the left bank of Cuyuni River, right bank of Pomeroon River and left bank of Pairawa River. The Concession is located 65 km from Buckhall, which is on the left bank of the Essequibo River.

The concession has a land area of 26,259 hectares (64,887 acres) and is accessed by the BCL main road from Buckhall.
See map 3 for the location of the concession.

4.2 Physical Environment

4.2.1 Geology & Soils

The soil types in the area have previously been classified in detail according to the FAO Soil Classification System. Where the sand deposits are shallow, the streams have eroded through the sandy layers into underlying brown loamy sand and lateritic loam. The distribution of soil type in these areas therefore follows a sedimentary pattern, with brown loamy sand on the edges and flat areas, brown gravelly sand on the slopes and sandy loams in the valley bottoms.

Some areas of the CPT Inc. concession in the North-East, South-East, South-West and Central Portions are dominated with reddish-brown soils and composed of red clays with dark-brown gravely or stony clay surfaces, sandy loam and sedimentary clay sub-soils. The soils in the concession are generally poor in nutrients. Map 6 below shows the soil types within the Concession

Map 6: Showing the Soil Types within the Concession

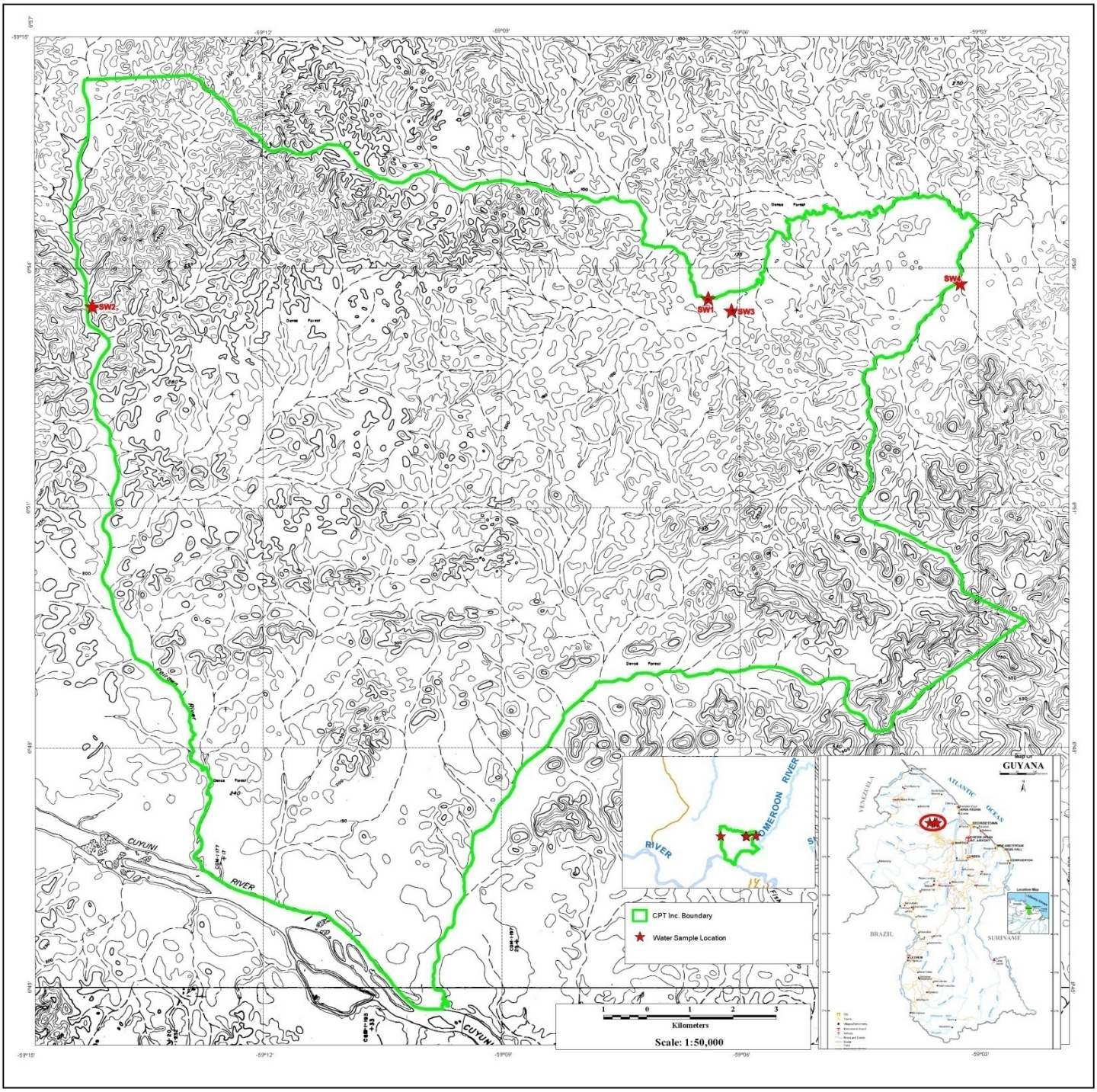
4.2.2 Topography and Hydrology

The general configuration of the concession area is mainly flat to undulating and hilly. There is no point in the Concession that is greater than 152 meters or lower than 46 meters altitude at Mean Sea Level (MSL). Two main rivers are the Pomeroon and Cuyuni Rivers on the north and south of the Concession respectively. The Paiwara River, which flows into the Cuyuni River, borders the concession to the west. These rivers form the major drainage system of the Concession. A number of minor rivers and creeks are seasonal, and are slow to fast flowing with meandering channels forming scroll complexes, oxbow lakes, swamps, back swamps and ponds. However, smaller creeks form an intricate drainage pattern that contributes to the drainage of the area. No lakes or large permanently flooding occurs within the Concession. Map 7 provides details on the topography and general hydrology of the concession.

Map 7: Showing the Topography of the Concession Area

4.2.3 Water Quality

There are several creeks and rivers within and around the Concession. These water bodies can be impacted by previous operations, including logging of the Concession, as well as mining in some areas. It should be noted that there are no known mining operation within the Concession at the time of conducting of this assessment. There are also some current activities that can impact the water quality such as BCL's Base Camp and Log Yard at 70 km, and the constant use of the M1 road as the main access road by BCL and other persons travelling to other interior locations. Runoff from previously cleared areas such as log ponds and roads and trails can also affect the water quality within the Concession. As such, it was determined that it is necessary to conduct a water quality anylysis of the water bodies within the concession to determine the present state. Surface water sampling was done at four (4) locations within the Concession. Water quality samples were collected from the major waterways which flow out of the concession at the point of the concession boundary. These were also the only water ways which contained water during the fieldwork exercise. These locations are excellent areas to give an indication as to what is happening within the concession since the watersheds cover large areas. These sample points should also be maintained as permanent sample points when the operation commences to detect any possible change. Below is a map showing the areas where the water quality samples were collected from. Access to the Cuyuni River through the concession was difficult at the time of the visit. However, from data available, the Cuyuni River has a high level of turbidity and TSS as a result of significant mining activities upstream such as Aranka and other areas.The results of the analysis are presented in the Table below.



Map 8: Showing the water quality sampling locations

Table 12: Results on Surface Water Analysis

Sample ID	Location Description	GPS Coordinates	Date and Time Sampled	Parameters											
				Turbidity (NTU)	pH	EC_w (mS/cm)	DO (mg/l)	TDS (mg/l)	TSS (mg/l)	SO_4^{2} (mg/l)	Cu (mg/l)	Fe (mg/l)	Zn (mg/l)	Al (mg/l)	NO_{3-} (ppm)
SW1	Pomeroon River – Northern Boundary of the Concession	N 06 5337.2 W 059 0623.8	March 18, 2010 13:30 hrs	2.4	7.51	0.03	6.87	35	Nd	Nd	0.002	0.92	Nd	0.33	2
SW2	Paiwara River at the Concession western boundary at 92 km	N 06 5231.5 W 059 1408.7	March 18, 2010 12:00 hrs	3.7	5.02	0.03	6.93	40	Nd	Nd	0.004	1.34	Nd	0.41	2
SW3	Creek passing through Concession at 70 km	N 06 5328.0 W 059 0606.2	March 18, 2010 11:00 hrs	62.8	5.48	0.07	6.20	70	36	Nd	0.005	6.12	Nd	2.50	2
SW4	Creek at the Concession northeastern boundary at 65 km	N 06 5311.0 W 059 0307.2	March 18, 2010 10:45 hrs	11.5	6.12	0.09	6.96	80	2	Nd	0.002	1.29	Nd	0.64	2

Key

DO - Dissolved Oxygen
TDS - Total Dissolved Solids
TSS - Total Suspended Solids
EC_W - Conductivity
Zn – Zinc
Cu – Copper
Fe – Iron
Al – Aluminum
SO4 -Sulphates
NO_3 - Oil & Grease
Nd –Not Detected

One sample was collected for each location since the analysis was done only to confirm the water quality. Activities to severely affect the water quality in the area were non-existent, except for the Camp 70 km area. The samples collected were anlaysed for several parameters which are important and generally used to determine the quality of water such as turbidity, total metals, conductivity, total suspended solids, dissolved oxygen and total dissolved solids. Generally, from observation, the water exhibited characteristics of natural waterways.The result from the anlalysis indicates that the water quality within the Concession is in good condition and within acceptable range. The Certificate of Analysis is attached as Appendix G. It should be noted that the sample for SW 3 and SW 4 were collected just after a period of heavy rainfall which could have contributed to the high level of turbidity.

4.2.4 Climate

Guyana's climate is strongly influenced by the Inter-tropical Convergence Zone (ICZ) which gives rise to two wet and dry seasons. The wet seasons usually run from May to August and December to February with the period in-between being relatively dry. Rainfall in Guyana is greatly affected by the mountain ranges, in particular the Pakaraima Mountains where orographic uplifts and subsequent condensation causes a higher rainfall of 4400 mm on the eastern sides of the mountains. The annual rainfall decreases to 1700 mm toward the east of the country. The CPT Inc. concession lies to the north-eastern side of the Pakaraima Mountains, but closer to the Coastal area and has an annual rainfall of 2700 mm.

Both temperature and relative humidity are closely related to incoming radiation. Average daily temperature is 25.9 degrees Celsius and the annual variation in average daily temperature is approximately 2 degrees Celsius while the average diurnal variation is about 6 degrees Celsius. Warmest months are September and October. Coolest months are January and February. Periods without rain can sometimes be longer than 10 days. The dry season periods have lower cloud cover and thus have higher sunshine hours. The average sunshine amounts to 45% of the total daytime. Annual Potential Evapotranspiration (PET) amounts to 1350 – 1500 mm. Relative humidity is high and fairly constant throughout the year. In the early morning, the average is approximately 95%, and then drops by mid-afternoon to an average of approximately 74%.

There are no meteorological stations within the CPT Inc. concession area. The nearest stations are based at Mazaruni Prisons and Onderneeming. The rainfall records from 1997 to 2003 from these stations have been obtained form the Hydrometeorological Division of the Ministry of Agriculture are described.

Both areas report normally experiencing two wet seasons; the first occurs from May to July and the second from November to January.

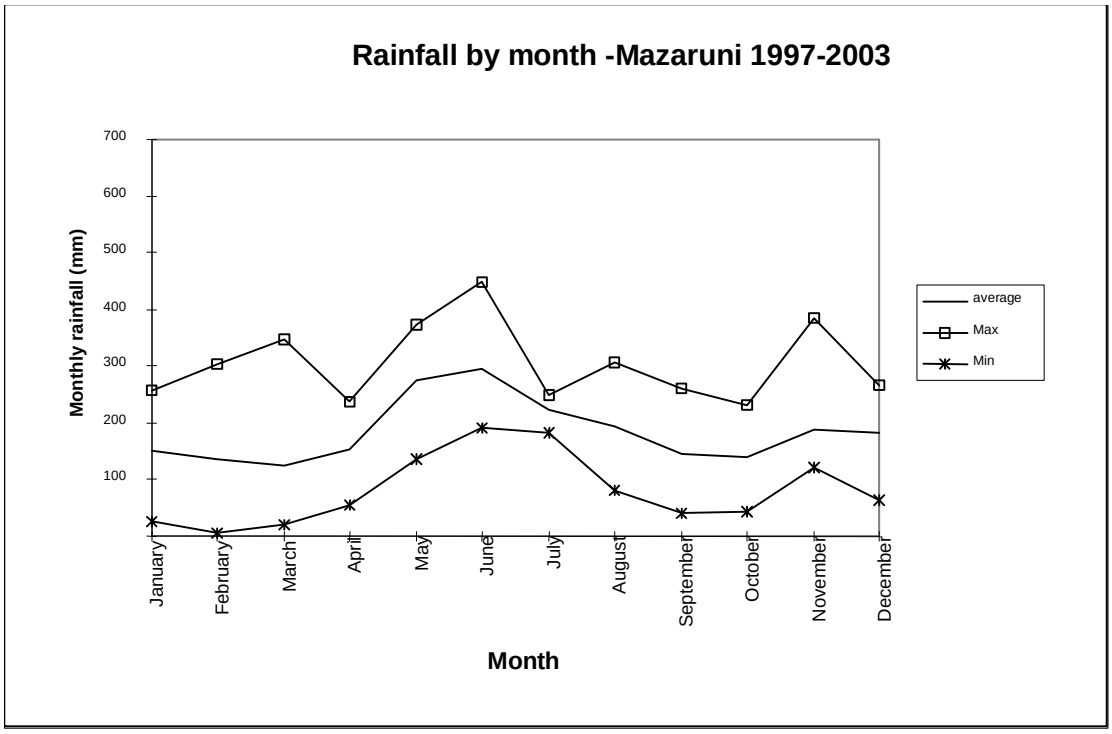
Mazaruni Station

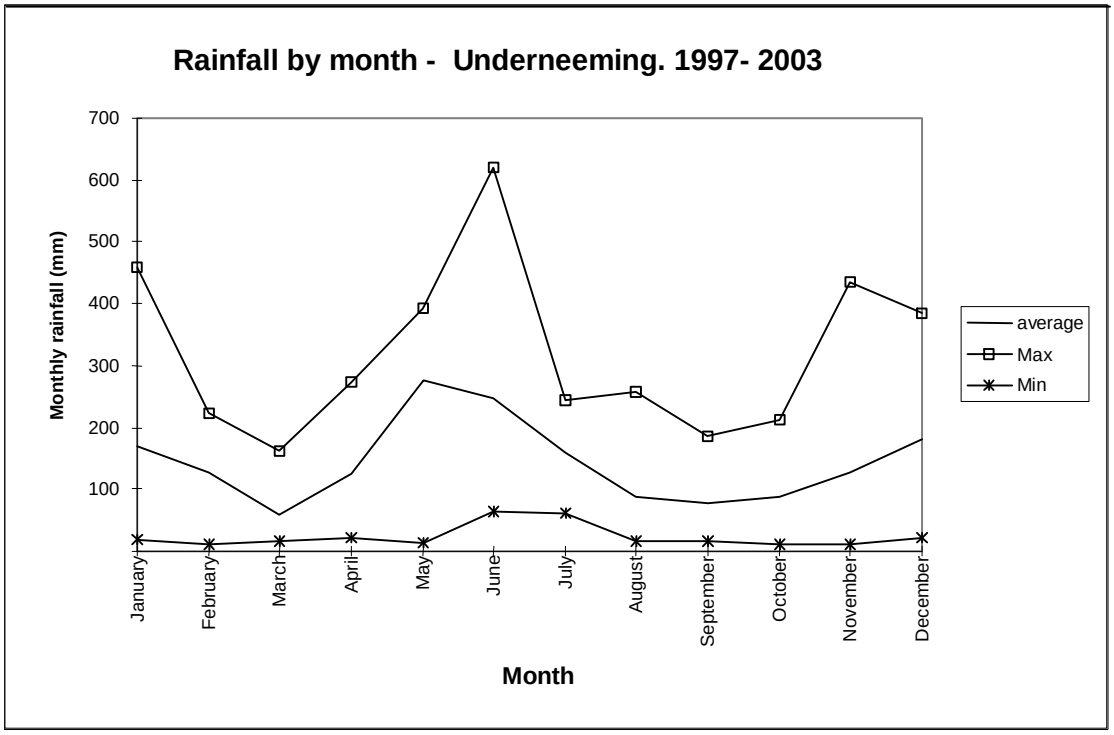
During the period 1977 to 2004, May, June and July were the three wettest months averaging over 178 mm per month. March, September and October were the driest averaging 86 mm per month.

Onderneeming Station, Essequibo Coast

During the years 1990 to 1991 and 1995 to 2003, May, June and July were the three wettest months averaging over 150 mm per month. January, February and October were the driest averaging 30 mm per month.

Figure 5: Rainfall by month for Mazaruni and Onderneeming 1997-2003





4.3 Biological Environment

4.3.1 Forest Types

The CPT Inc Concession consists mainly of type 1 mixed forest covering about about 75 % of the area, while type 1b and 1c covers about 10%. The flora within the Concession is influenced by its soil type and topography, with most of the area being undulating to hilly. Table 13 below outlines the various forest types within the oncession. Map 8 below shows the distribution of the various forest types within the concession.

Table 13: Forest Type Analysis of the Concession

Forest Types	Description	Acres	Hectares	% of Forest Type
1	Mixed Forest, undulating to hilly	48,853	19,770	75.3
1b	Mixed Forest, flat to undulating	6,611	2,675	10.2
1c	Mixed Forest, deeply dissected	6,403	2,591	9.9
1h	High hills	2,593	1,050	4.0
3	Low swamp	427	172	0.7
Grand Total		**64,887**	**26,259**	**100**

Map 9: Showing the Forest Types within the Concession

4.3.2 Flora

As part of the data collection process, the flora present within the CPT Inc. Concession was analysed to determine the types of species and distribution.

4.3.2.1 Methodology

Strip sampling at 2000m interval was established within the concession running in a north to south direction. Three (3) strips were established, all in the type 1 mixed forest which comprised 75 % of the vegetation types. The other forest was not sampled because of difficulty in access and transportation. The strips established were based on accessability from the Barama road running from east going westward. Each strip was 3000m long and 25m wide. A team leader with 2 line cutters and 2 tree spotters combed the area and recorded every tree that were 35cm and over on each side of the strip. At the beginning of the line, and every 1000m intervals, a 1x1m plot and a 2x2m plot were established. In the 1x1m plots all species present with less than 5cm in diameter were recorded. In the 2x2m plots all species greater than 5cm and up to 34cm in diameter were recorded. Below are the coordinates for the starting points and sampling locations of each strip:

Strip #1 - 268000N 762000W, 761000W, 760000W and 759000W
Strip #2 - 266000N 764000W, 763000W, 762000W and 761000W
Strip #3 - 264000N 764000W, 763000W**,** 762000W and 761000W

4.3.2.2 Result of the Survey

The list of species found within the concession during the survey is outlined in Table 14 below. Species obsereved in the undergrowth are also included.

Table 14: List of Species

Common name	***Scientific Name***	**Family**	**Under Growth Spp**
Duka	*Tapirira obtusa*	Anacardiaceae	*
Arara Broad leaf	*Unonopsis glaucopetala*	Annonaceae	*
Arara Fine Leaf	*Bocageopsis multiflora*	Annonaceae	
Arara Smooth Skin	*Guatteria atra*	Annonaceae	
Yari-yari	*Anaxagore aqlocarpa*	Annonaceae	*
Kuyama	*Xylopia pulcherrima*	Annonaceae	
Shibadan	*Aspidosperma album*	Apocynaceae	
Futi	*Jacaranda copaia*	Bignoniaceae	*
Baromalli	*Catostemma fragans*	Bombacaceae	*
Kauta	*Protium decandrum*	Burseraceae	*
Ulu	*Trattinikia rhoifloia*	Burseraceae	
Locust	*Hymenea courbaril*	Caesalpiniaceae	
Mora	*Mora excelsa*	Caesalpiniaceae	*
Purpleheart	*Peltogyne pubescens*	Caesalpiniaceae	
Rose of the mountain	*Brownea guianensis*	Caesalpiniaceae	
Wallaba Soft	*Epurea falcata*	Caesalpiniaceae	*
Sawari	*Caryocar nuciferum*	Caryocaraceae	
Kabukalli	*Goupia glabra*	Celastraceae	*
Kairiballi	*Licania heteromorpha* var. *perplexans*	Chrysobalanacea	
Konoko	*Licania cuprea*	Chrysobalanaceae	
Asashi	*Rheedia benthamiana*	Clusiaceae	
Awasokule	*Tovomita spp.*	Clusiaceae	*

Common name	***Scientific Name***	**Family**	**Under Growth Spp**
Aruadan	*Sloanea spp*	Eleocarpaceae	
Devildoer	*Glycydendron amazonicum*	Euphorbiaceae	*
Suradan	*Hieronyma laxiflora*	Euphorbiaceae	
Bloodwood	*Vismia guianensis*	Guttiferae	*
Kuruhara	*Calophyllum lucidum*	Guttiferae	*
Manni	*Symphonia globulifera*	Guttiferae	
Heliconia	*Heliconia spp*	Heliconiaceae	*
Candlewood	*Emmotum fagifoluim*	Icacinaceeae	
Buradiye	*Nectandra grandis*	Lauraceae	
Greenheart	*Chlorocardium rodiaei*	Lauraceae	*
Kakaralli Black	*Eschweilera corrugata*	Lecythidaceae	*
Monkeypot	*Lecythis davisii*	Lecythidaceae	
Wadara	*Couratari guianensis*	Lecythidaceae	
Lanaballi	*Gustavia hexapetala*	Lecythidaceae	
Blackheart	*Acosmium praeclara*	Leguminosae	
Mamuriballi	*Mouriria spp.*	Melastomaceae	*
Crabwood	*Carapa guianensis*	Meliaceae	
Maporokon	*Inga alba*	Mimosaceae	
Trysil	*Pentaclethra macroloba*	Mimosaceae	*
Congo Pump	*Cecropia juranyiana*	Moraceae	*
Dukaliballi	*Brosimum paraense*	Moraceae	
Pasture tree	*Trymatococcus paraensis*	Moraceae	
Dalli	*Virola surinamensis*	Myristicaceae	*
Dalli Hill	*Virola sebifera*	Myristicaceae	
Kokrite	*Maximillana maripa*	Palmae	
Manicole	*Euterpe oleraceae*	Palmae	*
Aromata	*Clathrotropis brachypetala*	Papilionaceae	
Barakaro	*Ormosia coccinea*	Papilionaceae	
Haiariballi	*Alexa imperatricis*	Papilionaceae	*
Korokororo	*Ormosia coutinhoi*	Papilionaceae	*
Soapwood	*Ormosia coutinhoi*	Papilionaceae	*
Fern	*Touroulia guianensis*	Quiinaceae	*
Burada	*Parinari excelsa*	Rosaceae	
Korokai	*Licania laxiflora*	Rosaceae	
Kulisheri Common	*Matayba spp.*	Sapindaceae	
Asepoko	*Pouteria guianensis*	Sapotaceae	
Asepoko	*Pouteria guianensis*	Sapotaceae	
Asepokoballi	*Pouteria jenmanni*	Sapotaceae	
Bulletwood	*Manilkara bidentata*	Sapotaceae	
Limonaballi	*Achrouteria pomifer*	Sapotaceae	
Simarupa	*Simaruba amara*	Simarubaceae	
Maho	*Sterculia pruriens*	Sterculiaceae	
Adebero	*Paypayrola longifolia*	Violaceae	

It should be noted that, during the survey, no CITES listed species nor any IUCN listed species were dectected. However, there were some keystone species such as bulletwood, kookrite and sawari. These species may need special permission from GFC before being allowed for harvesting.

4.3.3 Fauna

Information on the biological diversity of an area is essential since such knowledge can lead to better understanding of the spcies, provide baseline data, and determining how future habitat disturbances may directly affect change in the density and distribution of wildlife species. As such, a part of the assessment that was conducted, an analysis of the types and distribution of wildlife present in the area was done.

The purpose of the survey was to determine the species richness within the Concession by recording the biological diversity of the mammals, birds, reptiles and amphibians occurring within the project area. It should be noted that the CPT Inc. Concession area has been disturbed by previous logging operations.

The area is characterized by undulating terrain with gentle slopes, no rocky outcrops and small freshwater creeks, roads and logging trails. The vegetation can be described within the forest type described as mixed forest, containing trees of primary economic importance and numerous representatives of various botanical forms such as epiphytes, lianas and shrubs, the understorey vegetation is moderately abundant. Primary forest extends from ridge tops to lowland forests. This diversity of habitats provides ideal conditions for a wide selection of wildlife species, some of which are exploited for food. Wildlife commonly hunted for food includes the tapir, deer, peccaries, pacas, agoutis, monkeys, large birds and tortoises.

From observation and information received, all species expected were present, but in low densities. It should also be noted that there is still a significant presence of human activities within the Concession, including BCL Base Camp, the main access road of BCL and others, police outpost, etc.

4.3.3.1 Methodology

The consultant has tremendous knowledge and experience through the conduct on several surveys within the project area. This knowledge was utilized together with a faunal assessment which was conducted during the month of March 2010. During this assessment, survey routes were chosen using the principle of random sampling to record wildlife diversity. Several techniques were used to confirm the presence of species recorded. Detection by sight, Visual Encounter Surveys (VES), sound, tracks, scat (fecal) signs, and feeding signs were all observed. V.E.S. was done using a pair of binoculars.

Surveys were done by walking and using a motor vehicle at a very slow pace to cover large areas; this method is best applicable for covering large areas. Surveys on reptiles and amphibians were done at night using a spotlight. As a result of the prolonged dry weather at the time of the assessment, many small creek sites were dry resulting on few species observed. Apart from observation, useful information was obtained from individual residing or working in the area and hunters. Fallen fruits were also examined for feeding signs. No track signs were observed due to the prevailing dry condition. It should be noted that in tropical dense forest it is not always possible to provide species abundance. This can only be done for animals on a trap, tag, and release system. This method requires time, sometimes years of sampling where no trapping or hunting is done.

4.3.3.1 Weather

During the survey dry weather conditions prevailed. Most of the small creeks were dry with only some larger tributaries of the Pomeroon and Paiwara Rivers containing water. The water levels in these tributaries were low. Intermittent rain fell during the morning hours of the survey, but this did not alleviate the extreme dry condition. At the campsite the water in the river was less than 1m deep. Elsewhere, water exisedt only in small pools due to the prolonged dry weather. As such, no fish sampling was done.

4.3.3.1 Rare and Endangered Species

The endangered species of wild fauna in Guyana are listed in the Official Gazette of Guyana (Extraordinary) of September 29, 19999. This list was extracted from CITES. The list include

- Sixteen (16) species of Mammalian fauna;

- Seven (7) species of Avian fauna;
- One (1) species of Fish fauna;
- All species of frogs of the family Dendrobatidae;
- Two (2) species of Lizards of the family Teiidae;
- Two (2) families of Turtles, the Chelonidae and Pelomedusidae; and
- One (1) species of the family Crocodylidae.

However, it must be noted that the status of some species are still to be confirmed.

4.3.3.2 Species Expected within the CPT Inc. Concession

4.3.3.2.1 Mammalian Fauna

From the data collected, it can be interpreted that the population diversity of the mammalian fauna within the CPT Inc. Concession was low[1]. Observation has shown that many species exist but in restricted areas. Previous logging operation and hunting pressure from commercial hunters have affected the mammalian population especially the game species.

4.3.3.2.1.1 Primates (Monkeys)

The diversity of primates involves the presence or absence of the genera, each with distinctive ecological habitats. The smaller species prefer dense tangled vegetation. The squirrel monkey and the howler monkey inhabit riverain forests and vegetation along water courses. The upland terra firme forests is the home of the capuchin and spider monkeys along with the white-faced and bearded sakis. New world monkeys inhabit primary and secondary forests as well as cultivated areas. Most primates are opportunistic omnivores, taking fruits, nuts, flowers, leaves, insects as well as small vertebrates. Although these animals are arboreal they may descend to the ground to forage and move long distances.

4.3.3.2.1.2 Marsupialia (Opossums)

Opossums are small mammals with pointed snouts, short legs and long tails. They are arboreal but also forage on the ground for food. Known diets include insects, small vertebrates and fruits. Marsupials are nocturnal and can only be recorded by baited traps. They are also secretive and can only be observed at night by their bright eyeshine. The common opossum is hunted for food by forest dwelling inhabitants.

4.3.3.2.1.3 Xenarthra (Anteaters, Sloths, Armadillos)

This order is also known as edentate. Most members of this group are specialized feeders that eat mainly ants and termites or leaves. Sloths are canopy dwellers and feed only on leaves and are hard to see. They descend on the ground only to defecate.

4.3.3.2.1.4 Carnivora (Carnivores)

Carnivores are key element in the rainforest animal community. The range of their diet is wide, while some are truly carnivorous meat-eating species others feed on insects and fruits. Carnivorous mammals feed mainly on herbivores.This group includes cats, dogs, foxes, weasels etc. They are equipped with biting and piercing teeth and powerful clawed limbs. In general carnivores lead active lives and more interesting than herbivores. They are noted for their stealth and cunning in hunting prey. Omnivorous mammals live on both plant food and animals including peccaries, raccoons and coatimundis. They are opportunistic feeders and exploit an enormous variety of food sources.

4.3.3.2.1.5 Artiodactyla (Deers, Tapirs, Pecarries)

[1] Sources of information included observation and from loggers, hunters, and people living in the area, Some information was also sourced from the Barama Road ESIA Report.

This group includes the deer which is a herbivorous animal that feeds on grasses and other vegetative forms. The forest deer recorded inhabits dense vegetation in lowland forests, they are mainly browsers.
It also includes the family Tayassuidae which is widespread throughout tropical lowland forests. They are free-ranging and are omnivorous. Peccaries are strong swimmers and can move anywhere they find habitable. Tapirs are also part of this group. They posses odd number of toes and is represented by a single species in Guyana. Dense vegetation and abundance of water provide ideal condtions for this free-ranging mammal. The tapir is hunted for food throughout its known range.

4.3.3.2.1.6 Rodentia (Rodents)

Gnawing mammals, rodents are opportunistic feeders and occupy a wide range of habitats in the tropical forest ecosystem. The species recorded are terrestrial and common forest animals. Both the agouti and labba are extensively hunted for food.

4.3.3.2.1.7 Chiroptera (Bats)

Bats reach their highest densities in tropical and subtropical areas. In certain tropical localities, there are more species of bats than all mammals combined. Bats play important roles in ecosystem functioning; they consume large quantities of insects; they aid in pollination of many flowering plant species and serve as seed dispersers by feeding on fruits.

The species of mammals observed within the CPT Inc. Concession are listed in Table 15 below.

Table 15: Mammalian Specicies Observed within the CPT Inc. Concession

Local Name	Scientific Name	CITES
Mammals		
Opossums	***Marsupialia*** ***Didelphidae***	
Common Opossum	*Didelphis marsupialis*	
Anteaters, Sloths, Armadillos	***Xenarthra*** ***Myrmecophagidae***	
Tamandua	*Tamandua tetradactyla*	
Three-toed Sloth	*Bradypodidae Bradypus tridactylus*	
Armadillo	*Dasypodidae Cabassus sp.*	
Monkeys	***Primates*** ***Cebidae***	
Squirrel Monkey	*Saimiri sciureus*	II
Brown Capuchin Monkey	*Cebus apella*	II
Wedge-capped Capuchin Monkey	*Cebus olivaceus*	II
Howler Monkey	*Alouatta seniculus*	II
Spider Monkey	*Ateles paniscus*	II
White-faced Saki	*Pithecia pithecia*	II
Carnivores	***Carnivora*** ***Procyonidae***	
South American Coati	*Nasua nasua*	
Cats	*Felidae*	
Ocelot	*Leopardus pardalis*	I

Local Name	Scientific Name	CITES
Puma	*Puma concolor*	I
Jaguar	*Panthera onca*	I
Jaguarundi	*Herpailurus yagouarondi*	I
	Perissodactyla	
	Tapiridae	
	Tapirus terrestris	II
Peccaries, Deer	***Artiodactyla***	
	Tayassuidae	
	Tayassu tajacu	11
	Tayassu pecari	11
Deer	*Cervidae*	
Red Brocket Deer	*Mazama americana*	
Rodents	*Rodentia*	
Pacas labba	*Agoutidae*	
	Agouti paca	
Agoutis	*Dasyproctidae*	
Red-rumped Agouti	*Dasyprocta agouti*	
Bat	***Chiroptera Emballonuridae***	
Sac-winged Bat	*Comura brevirostris*	
Brown Sac-winged Bat	*Sacopteryx leptura*	
Moustached Bat	*Mormoophidae Pteronotus parnelli*	
Bulldog Bat	*Noctilionidae Noctilio albiventris*	
Hairy-nosed Bat	*Phyllostomidae Mimom crenulatum*	
Spear-nosed Bat	*Phyllostomus discolor*	
Round-eared Bat	*Tonatia silvicola*	
Long-tongued Bat	*Glossophaga soricina*	
Short-tailed Bat	*Carollia perspicillata*	
Fruit-eating Bat	*Artibeus glaucus*	
Fruit-eating Bat	*Artibeus concolor*	
Fruit Bat	*Rhinophylla pumilio*	
Tent-making Bat	*Uroderma bilobatum*	
Free-tailed Bat	*Molossidae Molossus molossus*	
Evening Bat	*Vespertilionidae Myotis sp*	

4.3.3.2.2 Avifauna (Birds)

Birds of Guyana are numerous and varied especially the Passiformes. There are approximately 850 species represented in the country including migrant species (Schmidt and Brown, Smithsonian Institution).

Within the CPT Inc. Concession, the many layered canopy of the forest provides a variety of habitats for the avifauna. Above the canopy is the realm of vultures and eagles. The family Psittacidae and Ramphastidae parrots and toucans dominate the upper canopy. The middle and lower levels are occupied by cotingas, trogons, tanagers etc. of the order Passeriformes. The forest floor is represented by the family Crassidae, powis and guans, and the trumpeter of the family Psophidae. Table 16 below lists the spcies of birds observed within the Concession.

Table 16: List of Avifauna present within the CPT Inc. Concession

Local Name	Scientific Name	CITES
Birds (Avifauna)		
Tinamous	***Tinamidae***	
Great Tinamou	*Tinamus major*	
Little Tinamou	*Crypturellus soui*	
Vultures	*Cathartidae*	
King Vulture	*Sarcoramphus papa*	
Turkey Vulture	*Cathartes aura*	
Eagles, Hawk	*Accipitridae*	
Roadside Hawk	*Buteo magnirostris*	
Swallow-tailed Kite	*Elanoides forficatus*	
Great Black Hawk	*Buteogallus urubitinga*	
Falcons, Caracaras	***Falconidae***	
Red-throated Caracara	*Ibycter americanus*	
Black Caracara	*Daptrius ater*	
Curassows, Guans	***Cracidae***	
Black Curassow	*Crax alector*	
Little Chachalaca	*Ortalis motmot*	
Trumpeters	***Psophiidae***	
Gray-winged Trumpeter	*Psophia crepitans*	
Rails	***Rallidae***	
Gray-necked Woodrail	*Aramides cayanea*	
Pigeons, Doves,	***Columbidae***	
Plumbeous Pigeon	*Columba subvinacea*	
Ruddy Quail Dove	*Geotrygon Montana*	
White-tipped Dove	*Leptotila verreauxi*	
Parrots	***Psittacidae***	
Red and Green Macaw	*Ara chloropterus*	
Red-bellied Macaw	*Ara manilata*	
Blue-headed Parrot	*Pionus menstruus*	
Orange-winged Parrot	*Amazona amazonica*	
Yellow-headed Parrot	*Amazona ochrocephala*	
Dusky Parrot	*Pionus fuscus*	
Cuckoos	***Cuculidae***	
Squirrel Cuckoo	*Piaya cayana*	
Black-bellied Cuckoo	*Piaya melanogaster*	
Hummingbirds	***Trochilidae***	
Long-tailed Hermit	*Phaethornis superciliosus*	
Straight-billed Hermit	*Phaethornis bourcieri*	
White-necked Jacobin	*Florisuga mellivora*	
Toucans	***Ramphastidae***	

Local Name	Scientific Name	CITES
Red-billed Toucan	*Ramphastos tucanus*	**II**
Black-necked Aracari	*Pteroglossus aracari*	**II**
Woodcreepers	***Dendrocolaptidae***	
Barred Woodcreeper	*Dendrocolaptes certhia*	
Buff-throated Woodcreeper	*Xiphorhynchus guttatus*	
Cotingas	***Cotingidae***	
Pampadous Cotinga	*Xipolena punicea*	
Screaming Phia	*Lipaugus vociferans*	
Spangled Cotinga	*Cotinga cotinga*	
Trogons	***Trogonidae***	
Violaceous Trogon	*Trogon violaceus*	
White-tailed Trogon	*Trogon viridis*	
Puffbirds	***Buconidae***	
Collared Puffbird	*Bucco capensis*	
Black Nunbird	*Monasa atra*	
Jacamars	***Galbulidae***	
Green-tailed Jacamar	*Galbula galbula*	
Paradise Jacamar	*Galbula dea*	
Woodpeckers	***Picidae***	
Lineated Woodpecker	*Dryocopus lineatus*	
Antbirds	***Thamnophilidae***	
White-plumed Antbird	*Gymnopithys rufigula*	
Tyrant Flycatchers	***Tyrannidae***	
Forest Elaenia	*Myiopagis gaimardii*	
Boat-billed Tody Tyrant	*Hemitriccus sp.*	
Piratic Flycatcher	*Legatus leucophaius*	
Tropical Kingbird	*Tyrannus melancholicus*	
Tanagers	***Thraupidae***	
Magpie Tanager	*Cissopis leveriana*	
Silver-beaked Tanager	*Ramphocelus carbo*	
Palm Tanager	*Thraupis palmarum*	
White-lined Tanager	*Tachyphonus rufus*	
Blackbirds	***Icteridae***	
Crested Oropendola	*Psarocolius decumanus*	
Yellow-rumped Cacique	*Cacicus cela*	

4.3.3.2.3 Herpetofauna (Reptiles and Amphibians)

Reptiles and amphibians comprised an important component of vertebrate fauna in tropical rainforest regions. They exhibit a high diversity and extreme ecological specialization and habitat preferences. All surveys on reptiles depends on visual searches, while frogs can be detected by their vocalizations.

The common groups known to occur in the tropical forest environment of Guyana are represented by lizards, frogs and toads, snakes, caimans, turtles and tortoises. Amphibians and reptiles are secretive in behavior and rarely encountered to provide other than presence or absence. Table 17 below lists the spcies of reptiles and amphibians observed within the Concession.

Table 17: List of Herpetofana present within the CPT Inc. Concession

Local Name	Scientific Name	CITES
Amphibian		
Toads	***Bufonidae***	
Common Toad	*Bufo marinus*	
	Bufo typhonius	
	Bufo granulosus	
Arrow Poison Frogs	***Dendrobatidae***	
	Dendrobates femoralis	
Tree Frogs	***Hylidae***	
Map Tree Frog	*Hyla geographica*	
	Hyla granosa	
Barking Tree Frog	*Hyla boans*	
Tree Frog	*Hyla crepitans*	
Tin-toed Frogs	*Leptodactylidae*	
	Leptodactylus sp.	
Reptiles		
Lizards	***Sauria (Lacterilia)***	
	Teiidae	
Lubo Lizard	*Ameiva ameiva*	
Rainbow Lizard	*Cnemidophorus lemniscatus*	
	Kentropyx sp.	
	Polychrotidae	
Anoles Lizard	*Anolis sp.*	
Snakes	***Serpentes***	
	Colubridae	
Water Snake	*Helicops angulatus*	
Night Snake	*Leptodira annulata*	
Emerald Tree Boa	*Boa canina*	
	Viperidae	
Labaria	*Bothrops atrox*	
Bushmaster	*Lachesis muta*	
	Testudininae	
Red-foot Tortoise	*Geocheline carbonaria*	
Yellow-foot Tortoise	*Geocholene denticulata*	

4.4 Socio-Economic Environment

4.4.1 Land Use

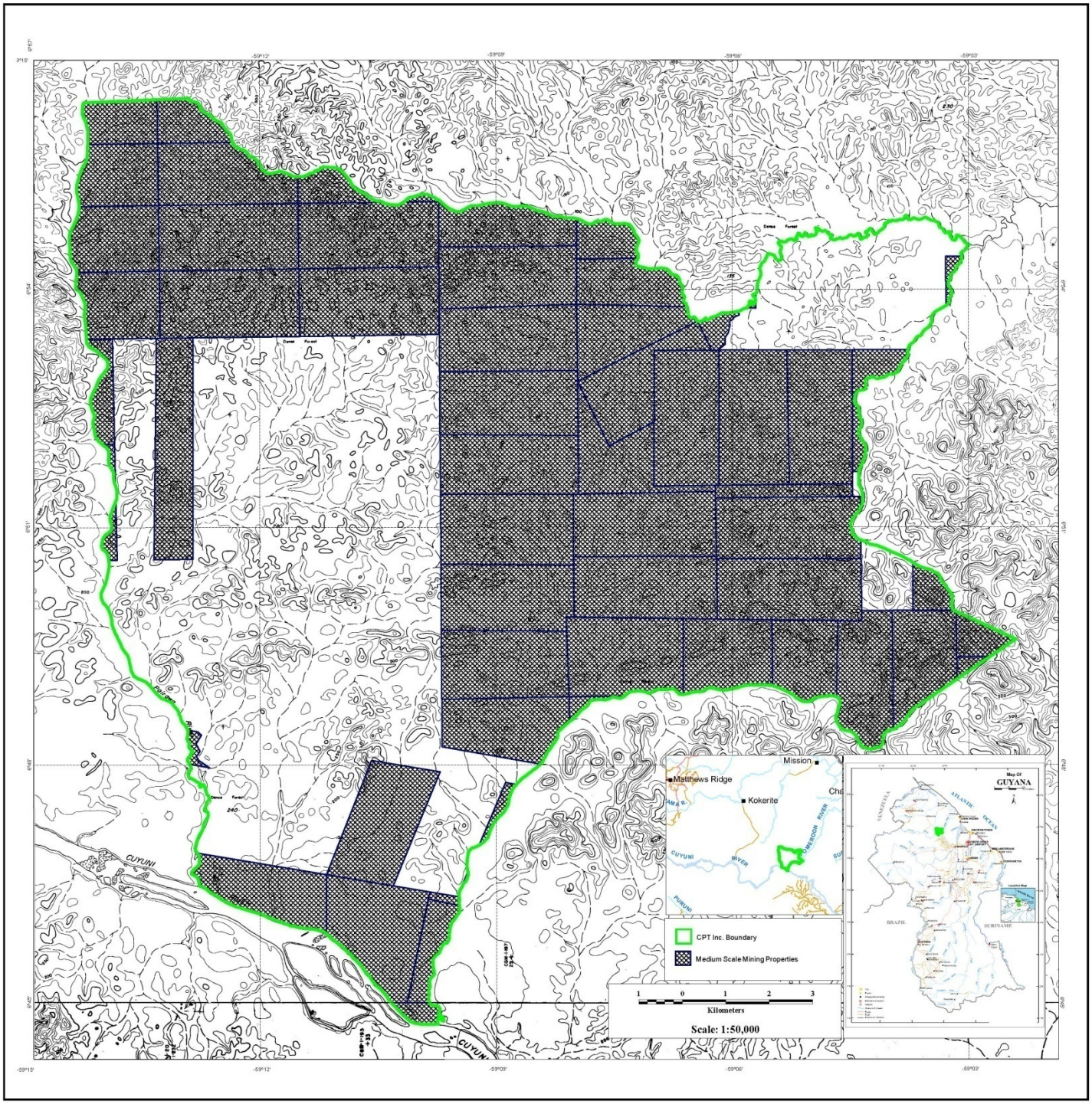
The project area is surrounded by other logging concessions including BCL, Toolsie Persaud Limited and A Mazharally and Sons. The BCL main road passes through the concession, commencing at 65km and up to 88km. Within the concession, BCL has an existing base camp, workshop, log market and other facilities. There is also a Police Outpost, a Medical Centre and a GFC Monitoring Station. This base camp is used to support BCL logging operation in the area. There are no known communities within the concession, excepting for BCL Base Camp which does not allow for private persons to stay. This Base Camp is located at 70 km. A map showing the outline of the Base Camp is attached as Appendix H.

BCL's operation at Buckhall is located just over two hundred meters before the start of the road and approximately 1.2km downstream from the proposed sawmilling location. This operations consists of a log market, sawmill, veneer plant, drying kiln, housing for workers, etc. A GFC ranger station is also located at this site.

Hunting is done by coastlanders entering the concession via the Lake Mainstay route. These hunters target wild meat for the local market. No hunter or signs of hunting was in the project area during the study. Since hunting (by non-Indigenous persons) within the concessions is prohibited by law it is not expected to find hunters who will admit to this activity.

Mining has increased in the Cuyuni River area in recent times due mainly to rising demand and price of gold plus technological innovations in the mining industry allowing miners to rework mined out areas. As a result, there is an increase in traffic on the BCL road passing through the project area. It is expected that miners will continue to use the roads within the area until their claims are exhausted or mining becomes unprofitable. Most of the traffic travels to the Aranka area. BCL also uses the road to transport logs harvested from its concession to the processing facility at Buckhall. Of particular importance is the fact that the entire concession has been allocated to mining.

It should be noted that the entire SFEP area is covered by mining concessions granted by GGMC. A few of these concessions are currently classified as inactive and may be advertised in the near future. There is no evidence of mining operations within the project area at present. However, this can change at any given time and has the potential to lead to negative social issues. Below is a map showing the mining concession issued by GGMC within the project area.



Map 10: Showing the Mining Concessions within the Project Area

The growing mining community will benefit in a positive way by the creation of better access to the mining routes and can experience reduced spending on transportation costs. This may have a greater spin off effect in the micro environment. The few resident suppliers to the mining industry are keenly monitoring this development making preparations in anticipation to capitalise on the business initiatives.

4.4.2 Local and Coastal Communities

There is no established community existing within the project area or in close vicinity to the project area. The BCL camp at 70 km houses employees only, some of whom have their families visit for short term stays. Three families operate businesses outside of the project area along the BCL road. These businesses cater mainly for the mining traffic and expect to see a small increase in business as the concession begins full production.

The closest community in the vicinity of the Concession is a scattered community surrounding the Buckhall area. This scattered community found in close proximity to the Essequibo River is located some 65 km away from the project site. Two households are found located along the trail linking to BCL's road offering a variety of services to the mining community. The remaining eleven of the households in the study are found located along the river. There are a few shops and residences scattered along the river front. Most of these persons offer business services to the miners and loggers passing through the area. This area is down river of the area proposed to the construction of the wharf and sawmill complex. The main activity at Buckhall is BCL's processing operation.

The Amerindian communities of Essequibo are not located in close proximity to the project area. There are no existing land claims to the area by an Amerindian community nor is the area used by the Amerindians in any form of traditional practices. The waterways flowing into and out of the project area are not used by any Amerindian community within close proximity to the area. The Amerindian community in closest proximity to the project site is Karawab/St. Monica at 55 five km located along the Pomeroon River. Bethany on the Supenaam River and Mashabo follows next within 60 km. Akawani on the Pomeroon River, Karau, Waikrebi and Kwabanna follow within 75 five km of the project site. Batavia and Kurutuku, which is 110km away, are located on the Cuyuni River. It should be noted that the Pairawa River is merely a small stream and has no Amerindian communities. These villages are located quite some distance away from the Concession and as such have little or no interaction with the area. There is also no direct linkage to the Concession. As such, for the purpose of this ESIA, the community located at Buckhall some 65km away is considered the closest since there is a direct road link.

4.4.3 Education and Employment

The diversity of the communities in nature, location and operational type proves to be an interesting compliment of the project. As was previously mentioned, no community lives within or in close proximity to the proposed development. The project area is surrounded by active logging concessions and traversed by loggers, miners, hunters and government officials. Employment creation has been identified as the major social issue within the area. The communities' readiness to provide such a supply of skilled labour is also questionable.

Four families are found to be operating within close proximity to the project area. Each family has an extended family dwelling and runs a private family business supplying a variety of services to the miners and loggers operating within the region. It cannot be justified in any way to identify the coastal communities of the Essequibo Coast as the primary stakeholders of the project who seemingly have bare minimal contact, if any, with the area.

Although CPT Inc. has expressed the desire to employ mainly the residents of the Essequibo Coast, reality will dictate otherwise. A close examination of a randomly selected number of workers of BCL found at Km 70 revealed that none were from the Essequibo Coast with a few migrating from as far as Lethem.

The details of residents located in close proximity around the Concession are outlined in Table 18 below.

Table 18: Details of Business/Households within or close to the Project Area

Group	Resident Location	Households	Education of Head of household	Technical Skills	Resident Status	Profession	Income (monthly)
Mining community	Guyana	N/A	N/A	Operators	Non residents	Miners/ Businessmen	N/A
Km 70 BCL	Guyana	BCL Employees (15)	Primary & Secondary	Operators	BCL employees	Logging	80-120,000
2 Km	2 Km	1 Family	Secondary	Business Management	Permanent resident	Business	100-200,000
1 Km	1 Km	2 Families with 4 households	Primary	Mechanic, Welding & Business Management	Permanent Residents	Business	100-400,000
Toolie Persaud Landing	River Landing	1 Family with 3 households	Primary	Business Management	Permanent Residents	Business	100-200,000
BCL Camp at Buckhall	Guyana	BCL Employees (250)	N/A	Operators	BCL Employees	Logging & Processing	N/A
Up River of Buckhall	River landing	5 families	N/A	Operators	Permanent residents	Speedboat operators, logging & Farming	120 – 200,000

The absence of a single worker resident of Essequibo Coast amongst more than a dozen randomly selected logging workers indeed points in the direction of migrant labour. This fact renders the employment criterion for the selection of the nearby communities as primary stakeholders null. The communities of the Essequibo Coast can be safely classified as secondary stakeholders. A second disqualification for the coastal communities is the fact that they find the conditions of employment, particularly the long stays away from family, not palatable and therefore are said to resist such job offers. Whilst there are many currently employed within the productive sectors (see Table 19) it cannot be assumed that they will readily join the timber operations.

Table 19: Employment Status of the Stakeholders of Essequibo Coast

Worked	Had worked	Looked for work	Wanted work	Attended school	House work	Retired	Disabled	Other activity	Not stated	Total
13,719	18	1,945	571	1,763	9,337	1.331	737	182	416	30,019

Source: 2002, Guyana Population & Household Census

Secondary stakeholders of importance have been identified as the residents of the coastal communities of the Essequibo Coast in close proximity to the proposed development. Table 20 below gives a qualified pool of labour that can be available for the development.

Table 20: Division of Labour for Regional Democratic Council Region No 2

Legislators, Senior Officials & Managers	Professionals	Technicians & Associate Professionals	Clerks	Service Workers, Shop & Market Sales Workers	Skilled Agricultural & Fishery Workers/ Forestry	Craft & Related Trades Workers	Plant & Machine Operators & Assemblers	Elementary	Not stated	Total
268	129	1,123	517	1,726	2,421	1,955	1,498	4,350	16,076	30,063

Source: 2002, Guyana Population & Household Census

Graduates of the Essequibo Technical Institute are also readily available seeking employment. This move is readily supported by the RDC. It is hopeful that the youths will not mind being away from home and seek to meet the employment demand. The business owners interviewed showed no interest in being employed by the company and were mainly interested in providing a service for their clients. They wanted to see others employed and move into the area thereby creating a larger permanent community. Table 21 below outlines the education levels of individuals in Region 2 and 3, since employment preference will be given to these persons.

Table 21: Education Level for RDC Regions 2 & 3

Region	None	School Leaving	Junior Cambridge Certificate	GCE "O" Level	GCE "A" Level/ CAPE	High School Certificate Senior/ Cambridge	Certificate or Diploma	Bachelors Degree	Post Graduate	Not Stated/ Other	Total
RDC 2	35,551	2,223	77	3,160	63	27	971	121	3	535	42,691
RDC 3	74,087	3,580	176	7,752	181	67	2,817	675	206	1,657	91,189

Source: 2002, Guyana Population & Household Census

At the time of the study a total of thirteen households numbering fifty one persons were found residing in close proximity to Buckhall which is sixty five kilometers away from the project site. A total of fifteen adult males and nineteen adult females along with seventeen children were reported in the study. It was noted that more children were residing away from the area in order to attend school. Children found in the area have to travel Supenaam or Fort Island in order to attend school. Persons residing in the area who were not employed by BCL showed no interest in being involved in timber operations. They indicated that they have experienced a very small increase in their businesses due to additional investments in the timber industry. Persons contacted in the study clearly stated that they were not interested in employment by the timber harvesting or processing facilities. The tables below outline the socio-economic situation in this community.

Table 22: outlining the population data for the community

Sex	**Male adult**	**Female adult**	**Male Child**	**Female Child**	**Total**
Gender	15	19	8	9	51
Ethnic Groups					
East Indians	10	12	3	2	27
Africans	4	5	4	4	17
Mixed	1	0	1	3	5
Amerindians	0	2	0	0	2

Table 23: outlining the population data for the community

Infrastructure & Household base	**Households (13 households)**						
Road Network	Paved - 0	All weather - 0		Trail- 13			
Communications	Landline- 0	Cell – 13	Post Office- 0	Short Wave Radio - 4	Radio Broadcasting	Television - 6	Newspapers - 13
House Materials	Wood - 13	Concrete-13	NTFP's - 3	Zinc roof – 13			
Toilet	Flush - 3	Pit - 13					
Power supply	GPL - 0	Solar - 2	Generator - 13	Wind turbine – 1	Batteries - 4		
Cooking	Gas - 13	Wood – 7	Electric – 0	Coals - 0			
Water supply	Well - 1	Rain - 13	Bottled - 6	Boiled water - 4	River – 11 (washing)	Creek - 6	
Transportation	Truck - 2	4x4 -2	Motor-cycle - 3	Motor boat - 8	Paddle boat - 10	Bicycle – 4	
Non- Timber Forest Product	Ite palm - 4	Lianas - 2	Fruits -3	Garden stocks - 3			

SECTION FIVE

IMPACT ASSESSMENT

5.1 Introduction

This section assesses, based on the physical, ecological and socio-economic environment, the potential impacts of the proposed project.

In order to assess the nature of the impacts it is essential to have a clearly defined starting point. For this study, the starting point is interpreted as the 'present situation' of the project where the project site has been identified and some logging was previously done. There are also some infrasturcutre in place such as the main and some feeder roads.

The potential impacts are described based on the bio-physical and socio-economic effects during the construction and operational phases of the project. The significance of the impact is based on the degree and duration, high probability of occurrence and its effect on sensitive receptors. Significance is determined by:

- Magnitude and extent;
- Reversibility;
- Longevity; and
- Probability of occurrence.

The impacts identified in this section are based on normal operating conditions. Sections 6 & 7 take into account response measures that must be in place to address impacts arising from accidents and during potential emergencies.

5. 2 Activities of the Project

5.2.1 Mobilization and Construction Activities

The main construction activities that will take place on site as part of the development include:

1. Construction of the Wharf and Sawmill Complex;
2. Construction of the Base Camp;
3. Mobilizing personnel and equipment;
4. Transportation of raw materials for filling and rehabilitation of main roads; and
5. Excavation of materials for road construction.

5.2.2 Operational Activities

1. Construction of main and secondary roads to logging compartments/blocks;
2. Pre-harvest inventory;
3. Mapping and laying out of skid-trails;
4. Establishing log markets for temporary stockpiling of logs;
5. Felling and extraction of trees;
6. Transporting logs by truck to Base Camp;
7. Storage of logs in log pond at Base Camp;
8. Loading of logs onto trucks and transporting logs to sawmill at Buckhall;
9. Primary Processing of logs at Buckhall;
10. Transport of processed material by barge to secondary processing facility; and
11. Routine maintenance of equipment and machinery.

Table 24 outlines the pontential impacts from construction and operational activities and their significance.

Table 24: Potential Environmental and Social Impacts

Conditions	Potential Environmental Impacts	Significance
Construction and Rehabilitation Phase		
Physical Environment **Environmental Aspect: Land/Soil**		
Land clearing for the construction of the Base Camp, roads, workshop and logmarket	Loss of land through direct land takes for project components. Removal of vegetation, where necessary, to facilitate construction of project facilities, thus, may contribute to erosion.	Lo, Irr, LT, Un, M, Insig
Constructing skid trails and log ponds.	Removal of vegetation, where necessary, to facilitate marking of skid trail and construction of log ponds.	Lo, Irr, LT, Un, M, Insig
Construction of wharf and , sawmilling facility	Loss of land through direct land take for project	Lo, Irr, LT, Un, UM, Insig
Rehabilitation of existing roads, bridges and culverts.	Site disturbance in quarries/borrow pits for sourcing road. Materials for construction of secondary logging roads can result in erosion.	Lo, Irr, ST, Un, M, Insig
Operation of machines	Compaction of soil from operation of heavy-duty machines for construction and rehabilitation works.	Lo, Rev, LT, Un, UM, Insig
Disposal of materials (vegetation)	Improper disposal of vegetation from land clearing.	Lo, Irr, LT, UM, Un, Insig.
Storage of fuel and re-fuelling of equipment.	Fuel and/or oil spill from the operation of heavy-duty machines can cause soil contamination.	Lo, ST, Irr, Av, M, Sig
Environmental Aspect: Emissions to Water		
Fuel spills	Water contamination from fuel/oil spills.	Ex, Irr, LT, Av, M, Sig
Erosion and Sedimentation	Surface runoff to creeks from construction and rehabilitation activities: culvert, bridge & road rehabilitation; base camp, log pond and wharf construction resulting in discoloration and sedimentation.	Lo,Rev, ST, Av, M, Sig
Waste disposal	Improper disposal of solid waste from forest camp.	Ex, Rev, LT, Av, M, Sig
Environmental Aspect: Emissions to Air		
Operation of heavy-duty machines and equipment	Noise from the operation of heavy-duty machines and equipment used during construction of the wharf and base facilities and the rehabilitation of roads, culverts and bridges can affect workers.	Lo, Rev, ST, Av, M, Insig
Operation of heavy duty machines and equipment	Fumes from the operation of machinery and equipment used during the construction of the wharf and base facilities and the rehabilitation of roads,	Lo, Rev, ST, Av, M, Insig

	culverts and bridges can affect workers.	
Operation of machines & storage of materials.	Dust from land clearing for construction activities, material stockpiles for road rehabilitation and constant movement of heavy duty equipment can affect workers.	Lo, Rev, ST, Av, M, Sig
Environmental Aspect: Biological Environment		
Flora	Vegetation removal and destruction to facilitate construction activities.	Lo, Irr, LT, Un, UM, Insig
Fauna	Habitat loss, destruction, fragmentation due to land clearing as a result of construction activities.	Lo, Irr, LT, Un, UM, Insig
Socio-economic Environment **Environmental Aspect: Risks in the Working Environment**		
Health and Safety	Risk to accidents. Employees exposed to excessive noise & fumes from the operation of vehicles during the construction of the wharf and base facilities and the rehabilitation of roads, culverts and bridges. Employees exposed to vector-borne diseases.	Lo, ST, A, Irr, M, Sig
Road Safety	Traffic accidents & unregulated movement on the access road.	Lo, Irr, LT, Un, M, Sig
Employment	Overall short-term increase in employment.	Ex, Rev, ST, Av, M, Sig (Positive)
Security	Risk of crime and robberies	Lo, Rev, LT, Av, M, Sig
Archaeology &Anthropology	Possibility of exposing sites of archaeological & anthropological significance with the consequences being damage and desecration.	Lo, Rev, LT, Av, M, Insig
Operational Phase		
Conditions	**Environmental Impact**	**Significance**
Operational Phase: **Physical Environment** **Environmental Aspect: Land/Soil**		
Land/Soil	Erosion from surface run off	Lo, Irr, LT, Un, M, Insig
	Soil compaction from operation of heavy machines	Lo, Rev, LT, Un, UM, Insig
	Contamination of soil from fuel spills /waste oil	Lo, Irr, LT, Av, M, Sig
	Contamination of soil from insecticide/chemicals spills	Lo, Irr, LT, Av, M, Sig
	Improper disposal of solid and liquid waste from living quarters.	Ex, Rev, LT, Av, M, Sig
Environmental Aspect: Emissions to Water		
Water	Contamination and siltation as a result of erosion and sedimentation	Ex, Rev, LT, Av, M, Sig
	Contamination from spills such as fuel and waste oil	Ex, Irr, LT, Av, M, Sig
	Contamination of soil from insecticide/chemicals spills	Lo, Irr, ST, Av, M, Sig
	Reduction of stream flow from the	Lo, Rev, ST, Av, M,

	installation of bridges and culverts	Insig
	Increased traffic on the Essequibo River from tug and barge movement from the wharf on the left bank Essequibo River south of Buckhall contributing to pollution of the waterway	Ex, Irr, LT, Av, M, Sig
	Contamination from improper waste disposal including solid and liquid waste	Ex, Rev, LT, Av, M, Sig
Environmental Aspect: Emissions to Air		
Air	Noise from heavy duty machinery, generator and processing equipment.	Lo, Rev, LT, Av, M, Insig
	Dust from processing equipment during the operation of the sawmill	Lo, Rev, LT, Av, M, Insig
	Dust from waste disposal area	Lo, Rev, ST, Av, M, Insig
	Fumes from the operation of heavy duty machines and generator	Lo, Rev, LT, Av, M, Insig
Environmental Aspect: Biological Environment		
Flora	Habitat disturbance/loss of tree species due to non-compliance with felling procedure, skid trails	Lo, Irr, ST, Av, M, Sig
Fauna	Habitat disturbance/fragmentation	Lo, Irr, LT, Un, UM, Sig
	Loss of wildlife due to hunting by workers	Lo, Rev, ST, Av, M, Insig
Environmental Aspect: Aesthetics		
Aesthetics	Improper disposal of solid waste	Lo, Rev, ST, Av, M, Sig
	Hap-hazard stacking of raw materials and finish products	Lo, Rev, ST, Av, M, Insig
Socio-economic Environment **Environmental Aspect: Risks in the Working Environment**		
Health & Safety	Risks of accidents to workers	Lo, ST, A, Irr, M, Insig
	Exposure to excessive noise from the operation of heavy-duty machines and equipment.	Lo, ST, A, Irr, M, Insig
Land Conflicts & Unplanned Economic Development	Conflicting user rights of foresters & miners & haphazard economic development	Ex, Rev, LT, Av, M, Sig
Road Safety, Security & Maintenance	Traffic accidents and unregulated movement on the access roads; Reduction in security.	Lo, Rev, LT, Av, M, Sig
Employment	Long term employment	Ex, Rev, LT, Av, M, Sig (Positive)

Impact Significance Parameters

Lo – Localised	Ex – Extensive	Rev – Reversible	Irr. Irreversible
ST – Short Term	LT – Long Term	Av. – Avoidable	Un - unavoidable
Sig. – Significant	Insig. – Insignificant	M. – Mitigable	UM – Unmitigable

5.3 Potential Impacts during the Construction Phase

The potential exists to directly and/or indirectly affect the environment during the implementation of project activities. The principal project activities associated with the project during the construction phase are outlined in Section 5.2 and the potential impacts and their associated magnitude are highlighted in Table 22. This section of the report, therefore, discusses and analyses these impacts in detail.

5.3.1 Impacts on the Physical Environment

5.3.1.1 Land/Soil

Potential Impact

The total area occupied by CPT Inc. concession is 26,259 hectares (64,887 acres). Approximately 70% on the northern side of the concession was logged during the period 2002 – 2006 by BCL. BCL's main road passes through the concession and an existing base camp, used to support BCL logging operation located in the vicinity on 70 km within the CPT Inc. Concession. This base camp consists of a workshop, living quarters, logmarkets, etc. There is a police outpost and at GFC substation located in this area. There is an existing network of secondary roads in the logged over area of the concession.

Given that the area was impacted as a result of previous activities, less than 1% of the proposed project area will be cleared of vegetation during the construction phase for the construction of the base camp, workshop, logmarket, secondary roads and sawmills and wharf. Rehabilitation works on existing roads, bridges, and culverts will be conducted also. Land preparation, therefore, includes land clearing, cutting, excavation and grading. The possible impacts that may arise from these activities are:

- Loss of land through direct land take;
- Removal of vegetation and soil disturbance to facilitate the construction of project facilities, skid trails, and log ponds;
- Erosion due to vegetation removal;
- Compaction of soil from operation of heavy-duty machines for construction and rehabilitation works;
- Improper disposal of vegetation from land clearing; and
- Soil contamination resulting from fuel and/or oil spill from the operation of heavy-duty machines.

Analysis

Vegetation removal is essential for a project of this nature and unavoidable. However, vegetation removal during construction will be limited to the operational areas to prepare the camp facilities, workshops, log market, workers housing facility, wharf and sawmill. The area to be cleared is discussed in Section 5.3.2.1. All land clearing activities will have to be approved by the GFC prior to commencement of clearing. Land clearing and vegetation removal will expose the soil to the elements of the weather and this increases the potential for the exposed soil to lose moisture and become dry, thereby, increasing its susceptibility to erosion. This can lead to significant erosion during heavy rainfall. Therefore, implementing adequate mitigation measures will minimize the extent of erosion and thus, reducing its significance.

The constant movement of heavy construction machines on exposed land may result in compaction beyond the ability of the soil to allow for permeation. As a consequence, ponding may become an issue after heavy rainfall and continuous compaction may affect the regenerative ability of vegetation. However, during this phase of the project, heavy equipment usage will be limited to the constructions areas and as such, this impact will be restricted.

The high soil permeability increases the risk associated with leaching of soil nutrients. The soil type in this area contains very little nutrients and removal of vegetation will expose the soil to direct rainfall, thereby, increasing the potential for further nutrient leaching. As a consequence, top-soil nutrients maybe easily leached thus, rendering it unsuitable for future vegetative growth. Contaminants impacting the soil can release harmful constituents and if leached can affect the soil quality.

Improper management of fuel and waste oil, as well as lack of care during handling can result in spills causing soil contamination. It is therefore essential to implement stringent measures to reduce risks and prevent accidents and spills given the high level of significance associated with this impact. The high permeability of this soil type can also compound the impact.

Land clearing/vegetation removal is expected to be minimal. Vegetation removed will be used for the construction of project facilities and thus, very little, if at all, will be available for disposal.

5.3.1.2 Water

Potential Impact

The logging concession is bordered by the Cuyuni, Paiwara and Pomeroon Rivers with many small tributaries flowing within the concession. The Essequibo River flows by the proposed area for the location of the wharf and sawmilling complex. The quality of the surrounding surface water bodies can be affected due to threats as listed below from activities during the construction phase:

- Pollution of surrounding water bodies from fuel/oil/lubricants spills associated with construction activities within and around the concession and the area south of Buckhall on the left bank of the Essequibo River;
- Sedimentation and discoloration due to surface runoff into creeks from construction and rehabilitation activities: culvert, bridge & road rehabilitation, base camp, log pond and wharf and sawmill construction;
- Possilbe reduction of stream flow from the installation of bridges and culverts; and
- Improper solid and liquid waste disposal by workers.

Analysis

Spills and accidents can occur as a result of inadequate storage of fuel, waste oil and lubricants during construction. These incidents, while localized, can affect large areas for an extensive period. This can be further compounded by the temporary nature of the construction activities which limits the implementation of adequate storage measures. Once spills occur, the substance can be transported through surface run-off into the surrounding creeks and rivers and can also leach into the soil and eventually resulting in ground water contamination. On the other hand, it is not expected that significant quantities of fuel will be stored onsite during the construction phase and where such activity occurs, fuel will be stored in drums and/or tanks. With adequate care, especially during the re-fueling and transporting fuel from the storage tanks/trucks to the machines, unnecessary spills can be avoided, thus, reducing the associated risks. Contamination can also result from leaks from construction equipment. In this regard, regular maintenance of machines and equipment must be carried out frequently to ensure proper functioning and to reduce the potential for oil leaks.

Land clearing and vegetation removal increase the probability of solid materials being washed into surface water bodies as well as from construction material stock piles resulting in discoloration and sedimentation. Such events are short term, localized and reversible once adequate measures are in place to reduce the amount of solid materials transported via surface run-off. Rehabilitation works of the existing bridges, culverts and road networks may impact the small creeks found in the area. However, the impact will be short term, localized and insignificant.

Construction of bridges and culverts can disrupt or reduce the flow of water bodies. A small wooden bridge would be constructed over the Takatuni Creek along the proposed road linking the Buck Hall wharf area to the M1 road. Other bridges will be constructd within the concession. No major water bodies will be bridge within the concession. Most of the creeks to be bridge are small and also seasonal. Bridges will be designed to allow for the free flow of water, taking into consideration water flow during period of extremely high intensity rainfall.

Improper management of solid and liquid waste can affect water quality. Solid waste can often end up in water bodies as a result of direct dumping which can lead to contamination and blockage. Water quality can be affected by contaminants found in the surface run-off from waste disposal areas. During the construction phase, care must be taken to sort solid waste and all workers must dispose of any solid waste material generated in keeping with the procedures outlined in Section 6.3.1.5. Liquid waste, including sewage and waste water can also flow directly into water bodies resulting in contamination. Pit latrines used for the proposed housing facility and base camp will follow the procedures as outlined in Section 6.3.1.5.

5.3.1.3 Air

Potential Impact

The potential exists during the construction phase for the local air quality to be impacted from construction activities. These impacts, however, will be short term, localized and insignificant. The following potential impacts may arise as a result of construction activities:

- Noise from the operation of heavy-duty machines and equipment used during construction of the wharf and base facilities and the rehabilitation of roads, culverts and bridges;
- Fumes from the operation of machinery and equipment used during the construction of the wharf and base facilities and the rehabilitation of roads, culverts and bridges; and
- Dust from land clearing associated with construction activities, material stockpiles for road rehabilitation and constant movement of heavy duty equipment.

Analysis

The associated noise levels produced from heavy-duty equipment and machines may likely be above the alert threshold of 86 decibels and hazard threshold of 95 decibels. Constant exposure to noise levels above 90 decibels, the internationally accepted level, may cause noise induced hearing loss. Decibel levels above the tolerable threshold of 72 decibels can result in fatigue, tiredness, low morale and decreased productivity. Construction activities often generate significant amount of noise. The construction of the base camp, wharf and sawmilling complex and the constrctuion and rehabilitation of roads and bridges will requires the use of several pieces of heavy duty equipment which can generate significant level of noise. Based on the proposed activities for the construction phase, it is expected that significant amount of noise will be produced. These impacts are localized, short term and insignificant, especially since there are no communities surrounding or in close proximity to the project site. However, it is necessary to implement measures to reduce the noise levels from construction activities for workers and other persons on-site and these are provided in greater detail in Section 6.3.1.2.

Constant movement of vehicles/machines on site and land clearing activities, in particular, during the dry periods can generate significant amount of dust. Stockpiled material can also become airborne due to heavy winds resulting in an increased level of particulate matter within the local air zone for workers. In general, the extent of air borne particulate matter will be localized, short term and insignificant once preventative and mitigative actions are taken.

Construction equipment will generate fumes which may have some effect in the micro climate of the project area. However, given the scale of the construction activities, this impact is negligible.

5.3.2 Impacts to the Biological Environment

5.3.2.1 Flora

Potential Impact

The potential impact on the flora within the project area during the construction phase is:

- Direct loss of vegetation from land clearing to facilitate construction and rehabilitation of the facilities and roads.

Analysis

Land clearing and vegetation removal will be restricted to the operational areas. The area south of Buckhall on the Left Bank of the Essequibo River has been identified for the wharf and sawmilling complex. Approximately 5-6 hectares will be cleared at this location, sufficient to accommodate the log yard, portable mills, lumber shed, workshop/warehouse, admin building, living quarters, wharf and other associated infrastructure. For the proposed road from CPT Inc. wharf to BCL M1 road approximately 2.3 km by 7m-8m will be cleared.

There will be no additional clearing to be conducted within the concession since the Company will utilize exisintg cleared areas from the previous BCL operation. Road rehabilitation and construction will result in a removal of flora. New logging roads required to support the operation in the future will be cleared. However, this will be determined at a later date since there are existing roads to be utilized for the initial phase of the project. The removal of vegetation will result in a direct loss of floral species within that area and also an effect on the micro climate of the area. Merchantable timber will be salvaged and used for the construction of the facilities. While the removal of vegetation will be localized and irreversible with a long term change on the landscape, the extent of the impact on the floral population in the project area is expected to be insignificant since the type of vegetation is homogenous throughout the area.

5.3.2.2 Fauna

Potential Impact

Construction activities will have some effect on the local fauna in the project area, especially as a result of vegetation clearing. The major impacts on the fauna are:

- Habitat loss, destruction, fragmentation due to land clearing as a result of construction activities; and
- Noise from heavy duty equipment.

Analysis

Removal of vegetation will result in habitat loss and/or fragmentation for faunal species common to the area thus; most species will eventually migrate to other areas. The construction of new roads/skid trails will also impact migration corridors of large animals. Increased turbidity and sedimentation of creeks can also affect the feeding regimes of aquatic animals.

Large animals may be lost also as a result of hunting and trapping by construction workers and other species may also be killed when in direct contact with humans or equipment.

While the removal of vegetation will be localized and irreversible with a long term change on the landscape, the extent of the impact on the faunal population in the project area is expected to be insignificant in the long term due to the homogenous nature of the area. Rainforest animals are free-ranging, especially the larger species and are not restricted to any particular area. Their presence in any area is dependant on food and protective cover. The project area consists of vast undisturbed forests which can provide shelter and food for animals sensitive to human activities.

Noise from the operation of heavy duty equipment can also contribute to the fragmentation of habitat and localized migration of animals. However, this impact is expected to be short term and localized.

5.3.3 Impacts to the Socio-Economic Environment

5.3.3.1 Health and Safety

Potential Impact

Workers health and safety can be impacted during construction activities. The major impacts are:

- Risk of accidents from the operation of heavy-duty machines during the construction and rehabilitation of the road, bridges and culverts and the construction of the base camp and the sawmill, wharf and log pond;
- Exposure to excessive noise and fumes from the operation of machines during construction; and
- Exposure to vector borne diseases.

Analysis

Workers health and safety is always a major concern on construction sites since workers are usually exposed to conditions that can result in serious accidents, to the extent where some can be fatal. Risks to workers health and safety include accidents using heavy equipment and machines, excessive exposure to noisy equipment, inhalation of fumes, and improper use of equipment. The associated impacts, while significant, are short term and can be avoided and mitigated thereby reducing the risks.

In the absence of surrounding communities, workers employed during the construction phase will be sourced mainly from villages on the West Coast Demerara, East Bank Essequibo and the Essequibo Coast. As a result workers will be required to become acclimatized to working conditions in the forest and, during this transition phase, may be susceptible to diseases if care is not taken. Further, there is the possibility for the introduction of communicable diseases to the persons found within and around the concession area. Health and safety impacts can intensify given the location of the concession and the delayed access to emergency and proper health care. However, overall these impacts will be localized, short term and can be mitigated for the duration of the construction phase.

5.3.3.2 Road Safety & Security

Potential Impact

The potential impacts are:

- Traffic accidents and unregulated movement on the access road; and
- Risks associated with crime and robberies.

Analysis

Rehabilitation of the existing roads, bridges, culverts and the construction of new roads within the concession will increase access to the general area and possibly cause an increase in traffic accidents and unregulated movement on the road thus, increasing the risk of illegal activities such as mining, forestry, wildlife hunting, narcotics and general security problems. These risks are further enhanced under the existing situation where the main road is connectected to mining areas along the Cuyuni River.

There will be increased access through the rehabilitation of existing roads. However, the area was always accessible through the BCL MI road and there is a heavy traffic passing through the concession on a daily basis. The potential for the existence of permanent settlements was always there. However, except for the Camp 70 area, there is no other settlement within the area. Any likelihood of settlement development will occur as a result of mining within the area.

5.3.3.3 Employment

Potential Impact

Construction activities will have a positive impact on employment within the wider area.

Analysis

Construction activities will require the employment of skilled and unskilled labour. Most of this labour will be sourced from the villages on the Essequibo Coast and from the East Bank Essequibo/West Demerara area. This oppurtunity will provide an additional/alternative source of income for these individuals and their families.

5.3.3.4 Archeology and Anthropology

Potential Impact

Artifacts present within the project site can be damaged or loss as a result of construction activities.

Analysis

Based on research conducted to date, there are no sites of archaeological or anthropological importance within the CPT Inc. concession. However, in the unlikely event that such sites are located during construction, the guidelines outlined in Section 6.3.3.4 will be followed.

5.4 Potential Impacts during the Operational Phase

The potential exists to directly and/or indirectly affect the environment during the implementation of project activities. The principal project activities associated with the project during the operational phase are outlined in Section 5.3 and the potential impacts and their associated magnitude are highlighted in Table 24. This section of the report, therefore, discusses these impacts in detail.

5.4.1 Impacts on the Physical Environment

5.4.1.1 Soil/Land

Impact

Forests provide a buffer to filter water and to hold soil in place. They sustain water and soil resources through recycling nutrients. Most of the potential impacts associated with soil/land will take place during the construction phase to prepare the area for the logging and sawmilling operations. The base camp will be located within the concession to support the harvesting and skidding team. The sawmill complex and wharf would be located south of Buckhall on the Left Bank of the Essequibo River. These facilities will serve as the administrative base for the operation of the concession. The facilities to be in place at the end of construction include:

- Staff accommodation;
- Kitchen;
- Ration Store;
- Admin Office;
- First aid facilities;
- Workshop;
- Log Market;
- Fuel Depot;
- Generator (2x 250 kVa);
- Sawmilling facility; and

- Wharf.

The impacts associated with operational activities impacting the soil/land are:

- Erosion from surface run-off;
- Soil compaction from the operation of heavy machines;
- Contamination of soil from fuel spills/ waste oil;
- Contamination of soil from insecticides/chemicals; and
- Improper disposal of solid and liquid waste from forest camp and housing facility.

Analysis

Once construction activities for the various facilities are completed, CPT Inc. will begin harvesting from approximately 4,015 ha of forest over the next five (5) years. Approximately 945ha (4.5%) of the productive area has been set aside as biodiversity reserve, with additional lands set aside based on sloping and accessibility.

During the construction phase vegetation will be removed, thus, exposing the soil to the weather conditions and increasing the potential for erosion. It is expected that during the operational phase, some amount of the land will still be exposed. These are the log ponds, road networks, housing facilities and sawmill area. During periods of excessive rainfall the soil can become lose and washed away with surface run-off into nearby streams, creeks and rivers. However, proper drainage systems will be installed in accordance with the CoP for Timber Harvesting to minimize this effect. Also, the main areas to be cleared are generally flat, thus, allowing for percolation of surface water into the soil. Further, the impact is localized, mitigatible and insignificant. Therefore, implementing mitigation measures will help to reduce the extent of erosion.

Heavy equipment and machinery such as skidders, log trucks, bulldozers etc. will be used during harvesting and processing. Machinery traversing continuously on the roads, skid trails, sawmill and long pond area and housing facilities can result in soil compaction beyond the permeability of the soil. As a consequence, ponding may result after periods of heavy rainfall. Soil compaction also presents some difficulties for the regeneration of vegetation. It is necessary therefore, to use designated routes for machines/vehicles movement.

Fuel, waste oil and insecticides/wood treatment chemicals, if not properly managed, can spill thereby contaminating the soil. While the impact will be localized and significant, implementing mitigation measures will reduce the risks associated with storage of these substances. Fuel will be stored in tanks onsite. Fuel storage will be done at the Sawmill and Wharf Complex as well as the Base Camp. The storage area for both fuel and chemicals will be prepared in accordance with the guidelines as outlined in Section 6.3.1.3 to reduce the risk of soil contamination from spillages. Spill kits should be provided onsite to assist in any clean up as a result of accidents. Since the operation is small with a minimum production, portable mills to be located at Buck Hall will be able to process logs without accumulating a stockpile. Therefore, the use of chemicals to preserve logs may not be necessary. However, if ever the company uses pesticides to protect logs or sawn lumber from insects/borers it will seek the necessary approval from the GFC.

Improper management of solid and liquid waste can affect soil quality. Solid waste if not managed properly can be strewn around the camp site and housing area where contaminants can be easily leached into to soil. Further, this type of practice regarding the disposal of solid waste may tend to attract animals to the site foraging for food. Therefore, during the operational phase, care must be taken to sort solid waste and all workers must dispose of any solid material generated in keeping with the procedures outlined in Section 6.3.1.5. Liquid waste, including sewerage and waste water can also affect soil quality. Pit latrines used for the proposed housing facility and forest camp will follow the procedures as outlined in Section 6.3.1.5. Waste water will be released from the housing facility into a soak-away system before final discharge.

5.4.1.2 Water

Impact

During the operation of this forest concession, both the surface and ground water can be impacted. The drainage basin of the concession borders on the Cuyuni, Pairawa and Pomeroon Rivers with several large and minor creeks flowing through the concession forming an intricate drainage pattern to facilitate drainage of the area. The Essequibo River flows by the site for the proposed sawmill and wharf complex. While large areas of the concession have been allocated to mining by GGMC (GGMC) there is no evidence of any mining activities currently on site. Therefore the potential impacts of the project on the water resources of the area from the logging operations include:

- Contamination and siltation of water bodies as a result of erosion and sedimentation;
- Pollution of creeks from waste oils, fuel, lubricants and wood treatment chemical associated with the logging operations within the concession and activities on the Left Bank Essequibo River south of Buckhall including the loading of barges;
- Increased traffic on the Essequibo River from tugs and barge movement from the wharf on the Left Bank Essequibo River south of Buckhall contributing to pollution of the waterway; and
- Improper solid and liquid waste disposal.

Analysis

There are several streams within and bordering the concession. Most of these streams are small and seasonal. The larger water bodies forms the border of the concession. Closeby to the Buck Hall wharf area is the Takatuni Creek. There is the potential for these water bodies to the affected by activities from the opreation.

During periods of heavy rainfall materials become suspended in surface runoff and are transported into water ways and lead to increased turbidity of the water bodies, thus, eventually resulting in sedimentation. However, very little vegetation removal or land clearing, if at all, will occur during the operational phase. Thus, this limits the potential for erosion and sedimentation to only the operational sites, Base Camp, Sawmilling and Wharf Complex, log markets and roads and skid trails. Runoff from the Base Camp, Sawmilling Complex and logmarkets may be filtered by surrounding vegetation which would serve to trap any sediment in the runoff before it enters any surface water body thus reducing the potential for water contamination. In addition, over time, exposed areas that are not utilized will be reclaimed with vegetation thus reducing the areas susceptible to erosion. Roadside drains will be constructed to drain water from the roads and a sump will be installed to capture any solids before the drains enter into any waterways. This will be done in accordance with the CoP for Timber Harvesting.

Long term storage of fuel, chemicals, lubricants and waste oil will be required to support a project of this nature. This will be done at both the Sawmilling and Wharf Complex and at the Base Camp. These substances, if not managed, can spill resulting in contamination of both surface and ground water. It is therefore necessary to implement measures to prevent this occurrence, especially in highly porous soils. Fuel will be stored in tanks equipped with secondary containment including bund walls with capacity to stored 110% of the largest storage tank. Measures must also be implemented in the workshop area to ensure waste oil is properly collected and stored. Contamination can also occur from spillage of chemicals used in the operation. However, it is not yet determined if any chemicals will be used during the operation. Unless the operations accumulate large stocks of logs and lumber at the forest and sawmill, only then will chemicals be used to prevent pests and borers, thus preserving the quality of the products. In this case, the quantity is expected to be minimal and adequate handling and storage measures would be implemented to prevent contamination.

Solid waste from the CPT Inc. logging operations is expected to be minimal and confined to domestic type waste from the kitchen and office. Activities at the field camps and concession operations are not expected to generate much waste or garbage and if any it would be insignificant, following the guidelines outlined in the CoP. However, this waste, if not properly managed, can find itself in waterbodies resulting in

contamination. Waste water from kitchen and bathroom/toilets and washing of vehicles can also end up in water courses if not properly managed. A waste management plan has been developed for the operation and is discussed in Section 6.3.1.5.

During operations of the project it is expected that there may be increased river traffic, however, this is not expected to be significant. Tugs/barges will be used to transport peeler logs and sawn lumber from the Sawmilling Complex to the secondary processing facility at Tuschen. The impact of this activity is not expected to be significant taking into consideration that the Essequibo River is traversed by a range of vessels, some transporting logs, and stones from quarries, fuel and other goods.

5.4.1.3 Air

Impact

The localized air quality in the concession and sawmilling operation will be affected during operations. These impacts are localized, avoidable and can be mitigated. From the following key operational activities, the potential exists to generate some level of noise and dust:

- Noise for the use of heavy duty machines, generator and processing equipment;
- Dust from the improper disposal of waste;
- Dust from the movement of equipment, machinery and raw materials to/from the concession compartments to the Base Camp and processing area;
- Noise and dust from the operation of chainsaws;
- Noise from loading of logs on to barges (wharf located south of Buckhall); and
- Changes to the micro climate of the area.

Analysis

Noise levels above the alert threshold of 86 decibels and hazard threshold of 95 decibels can be expected from the operation of heavy-duty machines and equipment. During maintenance operations vehicles in maintenance workshop can be expected to generate noise levels in the vicinity of 72-110 decibels. Exposure to noise levels above the internationally accepted level of 90 decibels can cause noise induced hearing loss. Noise levels above the tolerable threshold of 72 decibels can result in fatigue, tiredness, low morale and decreased productivity.

Noise levels from normal logging operational activities are not anticipated to have a widespread effect since the noise generated should be localized to logging sites, log market and log ponds and for short duration. Within the forest, noise will be generated by chainsaws and the felling and skidding of logs. At the Samilling and Wharf Complex sources of noise are expected from the operation of the maintenance workshop, generator, loading and off-loading logs and from the portable sawmills. At the Base Camp, noise is expected to be generated by the generator, workshop, and the loading/offloading of logs from the trucks. However, there are no permanent settlements within or in close proximity to the concession or the Sawmilling Complex that would be affected by the noise generated. None the less, measures should be implemented to reduce the noise levels and its effect on the employees.

A significant quantity of dust can be generated from the operation of wood processing equipment such as portable mills and chainsaws. Therefore, measures must be implemented to prevent or reduce the impact of dust on the environment in general and risks to workers in particular. Workers exposed to dust over lengthy periods will be at risk of developing acute to chronic lung disease and irritants to the eyes which may cause conjunctivitis.

Logging trucks and other vehicles traversing the road and trails, especially during the dry season, will tend to generate significant amount of dust. However, as was previously indicated, there are no residents in close proximity.

Significant changes in precipitation are direct and immediate when the forest cover is removed. Changes in

transpiration result in a greater intensity of tropical rainfall, enhancing both run-off and erosion, even if the total amount of rainfall remains unchanged. Forest loss can also make rainfall more erratic, thus lengthening dry periods. However, with selective logging being practiced, this impact is not expected to be significant. Heavy duty equipment and the operation of the generators will generate fumes which may also have some effect in the micro climate of the project area. However, given the scale of the activities, this impact is negligible.

5.4.1.4 Aesthetic

Impact

The establishment of the Sawmill and Wharf Complex on the Left Bank of the Essequibo River and the forest Base Camp will alter the landscape and change the project area aesthetic. However, north of the proposed Sawmilling and Wharf site is the BCL Buckhall operations which is quite significant and includes both primary and secondary processing at a larges scale. There are several other commercial operations that support the logging and mining sectors in the vicinity. BCL also operates a Base Camp at 70 km which is only 5 km away from the proposed location for CPT Inc Base Camp. As such, the change in aesthetics is not expected to be a significant impact. In addition, the facilities will be well laid to minmise this impact. However, the areas can become visually displeasing as a result of the following:

- Hap-hazard stacking of raw materials and finish products; and
- Improper disposal of solid waste

Analysis

Raw materials such as logs and processed lumber can be stacked in a hap-hazard manner, aesthetically displeasing to the eye. This method of stacking/storage can also increase the risks associated with workers safety. Therefore, it is necessary to pack and store materials, raw and processed, in an organized manner and separated in designated areas.

Waste generated from the processing of logs such as wood waste and saw dust can be stock piled and or scattered in the surrounding environment and this is often visually displeasing. Other solid waste such as domestic garbage can contribute to this issue as well. Therefore, it is essential to institute waste management practices reduce the visual and environmental effects.

5.4.2 Impacts to the Biological Environment

5.4.2.1 Flora

Potential Impact

The potential impact on the flora in the project area is:

- Habitat disturbance/loss of tree species due to non-compliance with felling procedure;
- Reduction in number of certain species (particularly in commercial and/or keystone tree species); and
- Increase in number and size of canopy openings favouring regeneration of fast-growing pioneer species, leading to long-term changes in species' composition.

Analysis

Most of the impact on the biological environment is expected to occur during the construction phase as a result of land clearing and direct land take. During operations, the floral effect will be limited to harvesting of commercial species and non-compliance with the felling procedure. Chain saw operators are expected to fell trees using Reduce Impact Logging (RIL) techniques such as 'directional felling'. If this process is not followed, damage may result to surrounding canopy and soil. While the impact is localized and insignificant it can cause changes in the canopy structure and open the canopy to rapidly growing, pioneer species such

as congo pump (*Cecropia juranyiana)* thus, altering the forest canopy structure. Even when RIL is practiced, logging severely affects the complex and rich biodiversity of forests through excessive damage to residual stands, destruction of other plant and tree species and the creaming-off of species which are the most valuable for timber.

Bullet wood and other keystone species are restricted from cutting. However, special permission is needed whenever these species have to be felled such as in clearing for roadways. Also, the Code of Practice for Timber Harvesting restricts trees to be felled at 10m apart, limiting the number of trees to be felled in a block. In cases where keystone species are present there has to be more than 5 trees per ha of a species before any is allowed to be felled.

Further, to a large extent, the significance of the impact of the logging operations on vegetation will depend on the silvicultural system and logging practices to be adopted by CPT Inc. This is detailed in Section 2.5.2.3. CPT Inc. is expected to adopt an approach of harvesting by blocks – 100ha square blocks whereby trees are selectively logged after which the block is closed to further activity for a period of 25 years to allow recovery and regeneration. A reduction in the number of commercial species would be expected but the long-term effect during the period of block closure is not expected to be significant once minimum size restrictions are enforced and the directional felling principles of RIL are followed to protect smaller trees and other vegetation.

Additionally, it is expected that approximately 5,252 ha (20% of the Concession) can be classified as non – usable forest. This area consists primarily of swamps, waterways, non-productive areas and buffer zones. A further 945 ha (4.5%) of the Concession will be maintained as a Biodiversity Reserve. This will allow for the vegetation of these areas to remain intact.

Forest fires can contribute to the destruction of the vegetation within the Concession. Most of the destruction from forest fires that have recently raged out of control across the world and especially in the Amazon region is widely acknowledged to have been either started by and/or exacerbated by logging and agricultural development companies. These fires can be started deliberately of by accident. A fire management system will be implemented including prevention ad response measures. This system will be detailed in the following sections.

5.4.2.2 Fauna

Potential Impact

Rainforest animals are free-ranging especially the larger species and not restricted to any area. Their presence in any area is dependant on food and protective cover. The area consists of vast undisturbed forests which can provide shelter and food for animals sensitive to human activities. However, operational activities will have some effect on the fauna found within the project area. Most of the impacts will occur during the construction phase as a result of vegetation clearing. Operational activities, though, will still have some impact on the faunal diversity and these are:

- Habitat loss/fragmentation/disturbance from human activities associated with forestry activities which may be intensive or extensive, temporary or long term;
- Loss of habitat in the form of, for example, food source, migration routes, nesting sites (this may occur from actual removal, or by isolation caused by a road); and
- Increase in human activity (intentional or unintentional, by increasing accessibility for example) leading to increased levels of hunting.

Analysis

The project area was found to be species diverse consistent with the rest of Guyana's rainforest and therefore species distribution is expected to cover a large area. The faunal assessment of the concession area identified the presence of a number of rare, threatened and endangered species that are CITES Listed. These include the ocelot *Leopardus pardalis*, jaguar *Panthera onca*, squirrel monkey *Saimiri*

sciureus, wedge-capped capuchin monkey *Cebus olivaceus,* howler monkey *Alouatta seniculus,* and red-billed toucan *Ramphastos tucanus.*

It is recognised that the activities of the project within the concession area will create some habitat disturbance that could lead to species migration to adjacent undisturbed areas. Faunal habitat will be modified, if only temporarily by logging activities since tree removal will give rise to consequential micro-climate changes, removal of food sources and cover. This combined with noise, vibrations and changes in air and water quality will give rise to migration of fauna.

Roads, log market, the base camp and the sawmilling complex may have some local effect on wildlife, though this will be small-scale and temporary. The general areas for the location of the Base Camp and Sawmilling and Whaf Complex have been impacted already and the presence of wildlife is limited, therefore, this is not a significant impact. In some cases logging debris may find its way into the streams and rivers and cause decline in water quality. Deterioration in water quality can cause a decline in fish stocks and can affect aquatic biological diversity because indigenous animals and plant life are highly vulnerable to oxygen depletion, suspended particulate matter and a lack of light.

In general, it is expected that the direct impact on fauna is not significant once CPT Inc. complies with the CoP and environmental management guidelines. It is expected that close to 25% of the Concession will not be logged as was previously mentioned. About 20% can be classified as unusable forest while CPT Inc. is expected to identify a biodiversity reserves which would consist of 4.5% of the concession and surrounded by 50m buffers, in representative habitat types that should provide a refuge for wildlife with reserve size taking into account large range species. These areas will provide habitats for species within the Concession.

The main threat to wildlife is expected to be from hunting as a result of increase in human activity directly from operations of this project as well as other resource users in the area and also from increased access due to road network. This impact can be long term and significant if measures are not implemented to control and to prevent illegal hunting and trapping. Hunting and trapping of wildlife by workers should be prohibited.

5.4.3 Impacts to the Socio-Economic Environment

5.4.3.1 Health and Safety

Potential Impact

Workers health and safety can be impacted during the operation of the concession. The major impacts are:

- Risk of accidents from the operation of heavy-duty machines and equipment;
- Exposure to excessive noise and fumes from the operation of machines during operation; and;
- Exposure to vector borne diseases.

Analysis

The aforementioned impacts could be exacerbated given the remoteness of the concession and the distance of the propsed base camp and logging activites from the Sawmilling and Wharf Complex. The Base Camp will be located approximately some 65 km from the Essequibo River.

To adequately address health and safety issues over the long term adequate systems must be in place to reduce the risks to workers health and safety, in particular, from accidents using heavy equipment and machines, excessive exposure to noisy equipment, inhalation of fumes, and improper use of equipment. The existing medical centre located at 70 Km along the BCL road can provide immediate response action, if required. Personal Protective Equipment (PPE) should be provided and workers should be mandated to wear so as to prevent/minimize any injury that could occur. Hard hats, ear plugs, respirators and safety boots are all necessary for this type of operation.

Since there are no permanent communities within or in close proximity to the CPT Inc. concession workers employed will be sourced from the villages on the Essequibo Coast, East Bank Essequibo and West Demerara areas. The absence of permanent communities limit employees' social interaction, thus, reduces the risk of sexually transmitted diseases. For the permanent staff stationed at the Base Camp, a more critical risk is malaria due to the ponds and swamps that maybe created during the rainy season and the constant traverse of miners through the area to and from mining districts which may be infected with malaria.

5.4.3.2 Road Safety, Security & Maintenance

Potential Impact

The potential impacts are:

- Traffic accidents and unregulated movement on the access road; and
- Risks associated with crime and robberies.

Analysis

During the operation of the concession road accidents may result due to increased road use unless adequate systems are implemented and precaution taken on the roadways. The primary road, which is the BCL M1 road, is already highly traversed given the other logging concessions and mining activities in the area. During operation of the concession, there will be an increase in traffic from the harvesting area to the Base Camp and then onto the Sawmill Complex on the Essequibo River. The risks, therefore, will be further enhanced from the existing situation. To minimize the problem, there are currently adequate signs in place and rules governing the operation of the road which must be complied by all road users. In addition, log trucks are not allowed to operate during periods of heavy rainfall.

Overall, there is also a greater risk associated with unregulated and unmonitored road access and this has the potential to increase illegal activities such as mining and logging, hunting, narcotics etc. within the area. With improved access to the area, improved infrastructure and the establishment of a new operation there is increased risk of crime in the area. As a result there is a high security risk for operations, both mining and forestry, within the wider project area and thus, could give rise to robberies, theft and damage to equipment and machinery, and risk of loss of life of personnel. However, the presence of the Guyana Police Force (GPF) Police Outpost located at 70km along the BCL road reduces the security risk by monitoring the movement of people and vehicles in the area. BCL also has in place a check point at Buckhall which monitors the road use.

5.4.3.3 Employment

Potential Impact

The provision of employment, in particular for the residents on the Essequibo Coast, is a net positive effect.

Analysis

The operation of the concession and the sawmilling activity is expected to create direct and indirect employment opportunities. The implementation of this project will provide opportunities for the residents on the Essequibo Coast and on the East Bank Essequibo and West Demerara areas to seek this as an alternative source of income since there are no permanent settlements in or around the concession. A total of 108 persons consisting of both skilled and unskilled laborers will be given direct employment opportunities during both phases of the operation.

5.4.3.4 Land Use Conflicts and Unplanned Economic Development

Impact

CPT Inc. Concession falls within an area that has been identified by GoG for forest resources utilization and at the same time, this area has also been identified and allocated for mineral extraction by the GGMC. This presents a serious challenge in the absence of land use plans and land use coordination for the CPT Inc. Concession and adjacent areas in allowing both activities to occur. BCL has a base camp ad 70 km, within CPT Inc's concession, and a processing facility at Buckhall. This could result in:

- Potential conflict over land use and rights between miners and CPT Inc. with regard to the concession;
- The forest resource being degraded significantly; and
- Conflicts between CPT Inc. and BCL.

Analysis

Conflicting land use is a concern in many regions of Guyana where state forests have been allocated for forest operations and where sub-surface rights have been given to miners. Therefore, it is not a situation or challenge unique to CPT Inc. Most of the CPT Inc. Concession has already been allocated for mining and there were evidence of previous mining activities within the Concession.

This issue is not one which should be left to be easily addressed on the ground by individual operators in isolation since both do have legal right to their respective activities. Mining and forestry activities can beneficially co-exist and this is currently being explored at the national level lead by the GFC. It is expected that a solution to this problem will be arrived at shortly by the committee tasked to do so at the national level.

BCL currently has a base camp at 70 km within the CPT Inc. concession. This facility serves as a base and a transshipment point for logs. There are currently approximately (15) employees from BCL residing at the facilty. BCL currently occupies the area based on a Timber Depot License from the GFC. In addition to BCL, the Government of Guyana has an interest in establishing facilities at the location to carry out government related functions including security. This is so since it is envisaged that the current road will eventually serve as a link to the North West, connecting to the road from Port Kaituma. As such, it would be necessary to have control mechanisms in place. The Police already have a base there and there are plans to have a Guyana Revenue Authority presence there also. GFC also has a present at the location. Once the road becomes a major transportation route it is expected that business to support travel along the road will be established at this location.

CPT Inc main activities will occur away from this area, further in the forest. As such, CPT Inc's activities will have minimal impact on the current activities being conducted at 70 km, or any future developments. The activities currently being conducted at 70 km, especially by BCL, will also have limited impacts on CPT Inc.'s proposed operations since BCL activities will be restricted to the existing log pond. However, given the above, it is in CPT Inc's interest that the area be excised from its concession since it would not have any control over the area, and more importantly, the Company will have to pay acreage fees for an area that it is not utilising. The GFC is currently contemplating excising the area from the concession. Excising the area would not have any negative implications for the project. In fact, this will allow for more services to be available at the location thus benefitting the Company. Improve health facilities may be established. There may be an increase in security presence, and the presence of other government agencies such as the GGMC to monitor both legal and illegal activities.

At Buckhall, the CPT Inc. proposed site is located well away from BCL existing operations. CPT Inc operations will be very small as compared to BCL existing operations and is located approximately 1.2 km up river from the existing BCL site. As such, the activities of the two (2) companies should not affect each other. There area between the sites is forested and serves as a buffer between the operations.

5.4.3.5 Archeology and Anthropology

Potential Impact

Logging activities within the Concession can unearth artifacts present, which, if not properly taken care of, can be damaged or loss.

Analysis

Based on research conducted to date, there are no sites of archaeological or anthropological importance within the CPT Inc. Concession. However, in the unlikely event that such sites are located during the implementation of the project, the guidelines outlined in Section 6.3.3.4 will be followed.

5.5 Impacts from Project Alternatives

The potential impacts of the alternatives to the project considered were also assessed. The following options were identified and assessed:

- No Project;
- Location of Logging; and
- Location of Primary Processing.

5.5.2 No Project

If there is no project then the area will remain as it. There will be no impact from logging of the area and the forest will be maintained. However, the existing infrastructure, including the existing road network within the concession, will further deteriorate as a result of a lack of maintenance, rendering them useless in the future, or very expensive to repair. Mining may also commence within the concession which can damage existing forest stock and result in other environmental impacts. Developmental activities around the 70 km area will also continue, increasing access to the area and potential for illegal logging and mining.

CPT Inc. will have to seek alternative source of materials for its sister construction company and for processing at the proposed processing facility to be established at Tuschen. Materials may have to be sourced from further away thus increasing transportation cost.

However, the GFC is promoting sustainable management of Guyana's forest resources. As part of its mandate, GFC has been encouraging sustainable forest operations for the promotion of social and economic development while at the same time safeguarding the integrity of forest resources. This is especially important since there is an increasing demand for wood and wood products both locally and overseas. To ensure sustainable utilization the GFC issues forest concessions to companies and individuals to harvest the forest, while monitoring the activities for compliance with all requirements. The CPT Inc. concession was allocated as part of this effort by the GFC. If there area remains unallocated, and since there is a demand for wood, illegal logging may occur. Allocating the concession to a responsible company will ensure that the forest resources are managed in a sustainable manner.

5.5.3 Location of Logging

To supply the wood demand for CPT Inc. a significant area of forest will have to be utilised. These large areas usually fall within the TSA category. Most of the areas in close proximity to the coastal areas are already allocated to other concessionaires. Therefore, an area far away consisting mainly of virgin forest will have to be allocated to the Company. Logging of an undisturbed area will result in more environmental impacts than logging of an already disturbed area which has some infrastructure already in place. Roads to access the area as well as within the concession will have to be constructed. Log markets and camp facilities will also have to be constructed. This will result in additional clearing of forest and impacts to biodiversity. Transporting logs from farther away will emit more emissions to the air while increasing

transportation costs. Access will also be opened up to previously undisturbed areas which can result in illegal activities and a degradation of the natural resources.

The present SFEP has been identified by GFC to be reopened up for logging operations because of the species type as well as infrastructure in place to facilitate logging operations and the relative proximity to the coastal areas. In addition, the GFC is implementing a policy to limit the allocation of virgin forest for logging. In doing so the GFC is currently identifying inactive areas already allocated and reallocating those areas to other companies or individual desiring of pursuing logging.

Taking into consideration the species requirements of CPT Inc. proposed downstream processing operations this area is one of the most suitable in Guyana. Also, the location of the SFEP will take advantage of existing infrastructure, in particular the existing network of roads within and around the Concession.

5.5.4 Location of Primary Processing

The option was considered to ship the logs directly to the Tuschen facility for processing. However, this will result in more environmental impacts than the option chosen which is to conduct primary processing at Buckhall. Transporting of logs will cause more materials to be transported, resulting in more fuel being consumed and more emission to the air. Cost of transportation will also increase. Conducting primary processing at the Tuschen site will require more heavy duty equipment to be in place, both for handling logs as well as processing. This will add to the noise to be generated by the planned facility, thus creating a noise nuisance, while presenting a health and safety risk. More process related waste will be generated at this location including wood ends, barks and saw dust. This waste will require disposal. More dust will be generated from the operation which can also result in a nuisance, both to workers and nearby residents.

However, it would be more economically feasible to cut the logs into squares at Buckhall, thus reducing the volume before shipping. This would allow for more usable materials to be transported in any shipment since the waste materials will remain at Buckhall. Also, this option will have far less environmental impacts than if primary processing is conducted at Tuschen.

5.6 Cumulative Impacts

The establishing of the sawmilling and wharf facilities at Buckhall will add to the growing number of establishments in that vicinity on the Left Bank of the Essequibo River. However, this change will occur with or without the project. BCL is, on an ongoing basis, expanding their operation at Buckhall. There is also a continuous increase in businesses supporting the mining sector since the BCL main road has become a major access for mining areas such as Aranka. These business supplies foodstuff, and provides transportation and accommodation to miners. Activities at this landing are expected to increase significantly once the price of gold remains high and the main road is connected to Port Kaituma.

Within the concession at the campsite at 70 km, change will occur as well, even without the project, since it is intended to establish a full control point there to monitor activities along the roadway and within the surrounding areas. It is expected that, with increase traffic on the roadway, more government agencies will establish base at the location. Other business related activities may also follow. Thus, it is expected that the area will continue to grow.

CPT Inc. concession is mainly surrounding by existing logging operations including Toolsie Persaud Ltd, A Mazarally and Sons and BCL. Since the concession was previously logged, this will not be a new activity within the area. However, it would contribute overall to increase logging being conducted at any one time within the wider area. This should not present an environmental problem though since all logging activities are highly regulated and are done under strict guidelines to ensure sustainable utilization and proper environmental management.

CPT Inc. logging activities will contribute to increase traffic on the BCL M1 road. This road is currently being used by BCL, other logging companies, and miners travelling to various locations. CPT Inc. will utilize this

roadway to transport logs from the concession to Buckhall for processing, thus increasing traffic on the roadway. This can add to the risk of accidents occurring. However, there are procedures outlined for usage of the roadway, supported by signs along the road. CPT Inc. intends to comply with all the procedures to ensure road safety. It should be noted that traffic will increase on the roadway with or without the project.

The proposed logging operation will result in rehabilitation of existing roads and construction of new roads within the concession. Opening up of access will allow for easier access to other natural resources within the concession. Miners may want to move in since some of the areas are already allocated for mining. Hunting may also increase. If there is an increase of these activities there is the potential for increased ecosystem stresses. It is hoped that, with regulatory agencies establishing a presence at 70 km, there will be control and monitoring of these activities.

SECTION SIX

MANAGEMENT PLAN

6.1 Introduction

The construction and operation of this composite project, which includes both logging and sawmilling, must be in compliance with the legislation and guidelines as stipulated in Section Three. In particular, compliance with the Environmental Permit, GFC CoP, principles of RIL and sustainable forest management (SFM) guidelines is essential. The GFC has forest station which is located at 112 km along the BCL road and the Forest Officers attached to the station is expected to conduct routine monitoring of the activities within the concession in the area for compliance.

This EMP identifies the activities to be implemented to mitigate the primary adverse effects of the project. The Plan describes the way in which the main environmental impacts of the project can be managed, and prescribes appropriate mitigation measures to be adopted during the construction and operational phases of the project. These impacts are identified and discussed in Section Five.

Specific mitigation actions are identified for the logging operations within the CPT Inc. Concession as well as the Sawmilling and Wharf Complex to be located on the Left Bank of the Essequibo River, south of Buckhall.

The objectives of the EMP are to:

- Set out measures and strategies to address the environmental issues related to the rehabilitation and construction as well as operational activities of the project.

- Formulate a monitoring plan to ensure that the activities are executed in accordance with the environmental requirements and to establish the impacts of the project with a view to implementing any necessary further action to minimize negative impacts.

To complement this EMP, a Monitoring Plan and an ERP have been develop and are outlined in the following sections.

6.2 Responsibility

CPT Inc. has a social and environmental responsibility to implement this EMP along with all other environmental requirements. An Environmental, Occupational Health and Safety Officer will be hired to coordinate environmental management efforts and implement the EMP. The Forest Manager has the overall day-to-day responsibility for ensuring the forest operation is in compliance with the requisite environmental and forest legislation, guidelines and standards. The Sawmill Manager has the responsibility to ensure the sawmill operation is also in compliance with stipulations outlined in the EPA and the environmental guidelines and standards.

6.3 Impact Mitigation

Mitigation measures are identified to prevent, minimize and manage the adverse environmental impacts discussed in Section Five. These measures are outlined below and pertain to both the construction and operational phases of the project.

6.3.1 Physical Environment

6.3.1 .1 Erosion, Sedimentation & Compaction

Project activities during the construction and operational phases will impact the environment, in particular land and soil directly and/or indirectly. These activities are part of the standard operating procedure for any forest harvesting operation of this size. To guide operators during the execution of such project, and as part of the GFC's forest planning framework, guidelines for forest management and CoP for forest operations have been developed. Detailed impacts on the land and soil were discussed in sections 5.2.1.1 and 5.3.1.1

and the main issues associated with erosion, sedimentation and compaction. Therefore, to reduce the impact on the physical environment the following measures must be implemented:

- Limit removal of vegetation to operational areas or to areas where is absolutely necessary;
- Encourage re-vegetation in areas where possible to prevent soil exposure;
- Landscaping of the Base Camp and Sawmilling Complex should be done to reduce sloping;
- Construction drainage system to adequately drain storm water;
- Designate routes for heavy duty equipment to prevent soil compaction;
- Plan major earthworks such as road, bridges and culvert rehabilitation and construction of secondary roads and skill trails during the dry periods;
- Locate, operate and decommission burrow pits in accordance with GFC guidelines;
- Bunding of spoil piles should be considered if storage is required for an extensive period;
- Scarify the top soil if ponding is observed as a result of soil compaction;
- Avoid discharging of storm water runoff directly into nearby water course. This discharged can be channeled through the vegetative area which will serve as a natural filter for any sediment contained;
- Road, skid trail siting, construction and use must be in accordance with GFC's CoP; and
- No harvesting should be done on slpoes greatr than 40%.

6.3.1.2 Dust and Noise Pollution

Noise and dust are expected to be significant environmental impact that requires mitigation, especially to reduce the impacts on workers. The absence of permanent settlements in and around the project concession may reduce the extent of the impact but it does not remove the need to implement preventative and mitigative measures. The noise emission standard developed by the EPA, in collaboration with GNBS, specifies noise limits for construction activities both for daytime and during the night. The daytime limit (6:00hr – 18:00hr) is stipulated as 90dB while the limit in the night is 75dB. For industrial activities, the nighttime limit is 100dB while the daytime limit is 80dB. Therefore, compliance with this standard is necessary to ensure the impacts on the environment and human health, particularly for workers, are reduced.

Airborne particulate matter, as discussed in sections 5.2.1.3 and 5.3.1.3 can result during the execution of project activities. The associated impacts, even though localized, must be mitigated to reduce the effect on the environment.

Therefore following measures must be implemented to reduce the impacts on noise and dust:

- Workers must be mandated to wear appropriate protective gears and attire in accordance with the Occupation Health and Safety Guidelines and CPT Inc. Standard Operational Guidelines;
- Ensure that machinery and equipment are working efficiently and have the required muffler/silencers installed; Construction activities should be restricted to the day time, especially at the wharf/ sawmill area;
- Noisy activities should not occur in close proximity to the housing areas during the night or on Sundays and Holidays;
- Generators should be equipped with silencers and housed in an enclosed area;
- Noisy equipment such as generator and portable mills should be sited away from living quarters;
- Institute a speed limit for vehicles around the housing and sawmill complex to reduce the quantity of air borne particulate matter;
- Where practical, ensure roads around the compound of the housing facility is watered during dry season to keep dust levels down;
- Locate portable mills downwind of living quarters. Install dust extractor system where practical;
- No open dumping or buring of wood waste should be done; and
- Sawdust should not be allowed to accumulate.

6.3.1.3 Fuel, Lubricants and Chemicals Contamination

During the construction and operational phases, special considerations for the transportation, handling and storage of fuel, lubricants and wood treatment chemicals must be given as these are classified as hazardous substances. To reduce the risks on the environment and human health preventative actions must be taken and/or mitigative measures implemented. It is necessary to implement the following measures to reduce the impacts on the environment, in general, and in particular contamination of soil and water from accidents and/or spills:

- Designate a site away from waterways, thoroughfare, housing and sawmilling, as well as general working area to store fuel. Ensure fuel and lubricants are stored on a bunded, impervious surface and well ventilated room. The secondary containment should have the capacity of 110% of the largest storage tank. The fuel storage area should be as close as possible to the workshop and maintenance area to reduce the distance for transport and handling. The tanks should be stored above ground and in accordance with the EPA Guidelines for fuel storage;
- When handing fuel care should be taken to prevent spillage and leaks, especially during off loading and refueling. All nozzles and hoses should be properly secured and stored away to avoid spills and/or accidents;
- During the filling/refilling process drip pans can be placed under the fuel/vehicle to prevent any possible contamination and subsequent run off of fuel due to leaks;
- Regular maintenance should be conducted to ensure proper functioning of machines, equipment and vehicles and to avoid unnecessary leaks;
- Ensure necessary preventative measures such as adequate signage, fire extinguishers and/or sand buckets are placed in and around the fuel storage area;
- Ensure waste oil is collected and stored in covered containers on a bunded and impervious surface; and
- Chemicals used to treat wood and wood products should be stored in a well ventilated room with an impervious surface and on shelves. Avoid siting the storage area next to water ways and housing area. Material Safety Data Sheets (MSDS) should be made available for all chemicals used.

6.3.1.4 Water Contamination

Water contamination can result from the implementation of activities during the construction and operational phases of the operation. To reduce the associated impacts on the water resources the following measures should be implemented:

- Ensure adequate drainage around the Base Camp and Sawmilling and Wharf Complex.
- Ensure fuel and other chemicals are stored as recommended in Section 6.3.1.3.
- Ensure workshop area is covered so as to prevent storm water/runoff being contaminated.
- Ensure grey water from the washroom/kitchen is discharged via a soak away system. Sewage waste should be disposed of via septic tanks. These measures ensure waste water is treated before being discharged into the environment;
- No dumping of solid waste into water bodies should be allowed;
- Restricted logging within buffer zones along all waterways;
- Construct bridges and culverts of durable hardwood logs and sawn timber and their exact location and construction should be in accordance with GFC CoP. In particular, care should be taken to ensure that downstream sedimentation during construction is minimized and temporary water-crossings are to be decommissioned after their period of usage to ensure that they do not collapse and block stream flow;
- Design bridges to allow for the free flow of water, taking into consideration water flow during period of extremely high intensity rainfall;
- Care must be taken during the refueling of tugs to reduce spillage and contamination of the Essequibo River. All on-board waste from the tugs and barges should be collected and disposed in accordance with the guidelines stipulated in Section 6.3.1.5

6.3.1.5 Waste Management

During project implementation several types of waste can be generated from a number of sources. Each waste stream may or may not require different disposal methods. The main categories of waste generated are (i) solid waste (ii) liquid waste; and (iii) hazardous waste.

Table 25: Waste types and recommended disposal methods

Waste Category	Waste Type	Disposal Method
Liquid Waste	Sewage	Liquid waste will be generated from the housing facility. Septic tanks should be constructed in accordance with the GNBS Code of Practice for the Design and Construction of Septic Tanks and Associated Secondary Treatment and Disposal Systems. If pit latrines are utilized, these should be constructed in accordance to the Public Health Ordinance of 1953.
	Grey water	Grey water produce from bathrooms will be channeled into a soak away system for filtering before being discharged into the drainage system and finally into the environment.
Solid Waste	Construction Waste	Construction waste includes materials removed during the rehabilitation of the culverts, bridges and roads, as well as, for the construction of sawmill, housing facility and wharf. Materials should be sorted and reuse, where practical. Good materials can be used as part of the construction of the buildings.
	General Waste	General waste include waste such as paper and cardboard from the administrative buildings, empty plastic bottles, styrofoam boxes and other kitchen waste. It is necessary to sort and separate waste at the point of generation. Kitchen organic waste should be stored separately from other general solid waste. Where possible reuse paper, cardboard boxes, plastic bottles etc. Collection bins should be placed at strategic points to be used by workers and emptied on a regular basis. An area away from the general working area should be designated for the disposal of waste. Kitchen waste should be buried on a regular basis to prevent being used as fodder for vermin. An area should be designated for burial of other waste. This are should be locaed away from watercourses.
Wood Waste from Processing	Sawdust and Bark	Efforts should be made to find ways to reduce and reuse this type of waste such as burning in a dryin kiln. However, until such time when an alternative could be found the waste should be burned in a control manner in the pit located away from vegetation.
		This waste should be used for other purposes such

Waste Category	Waste Type	Disposal Method
	Wood Ends and Strips	as construction of further processed into downstream valuable commodities.
Hazardous Waste	Waste Oil	Waste oil generated should be collected and stored in covered containers in an area as described in Section 6.3.3 until a suitable/approved disposal method is found.
	Used Batteries	Used batteries should not be disposed in the environment. These batteries should be collected and returned to the suppliers to be shipped for recycling.
	Used filters, oily rags,	By the time the project is implemented the Hazardous Waste Cell would be operational within the new Sanitary Landfill currently being constructed at Haag Bosch on the East Bank Demerara. It is expected that all hazardous materials that require disposal would be taken to this facility.

6.3.2 Biological Environment

The CPT Inc. Concession and its surrounding areas are noted to contain rich biodiversity. Wildlife commonly targeted by hunters and/or trappers can be found within the Concession. This presents a problem if control measures are not implemented. Further, the proposed improvements to the primary and secondary roads will only serve to exacerbate the impacts on the gamed animal species. Therefore it is critical that the following preventive and mitigative actions are implemented:

- All logging activities should be done in accordance with the GFC CoP for Timber Harvesting, including RIL;
- No unnecessary clearing of vegetation should be done;
- Implement measures to prevent forest fires, including no burning of vegetation or other materials, provisions of fire containment measures such as extinguishers and sand buckets, etc.;
- CPT Inc. forestry workers should act as concession guards by monitoring the area for illegal activities;
- Collaborate with other existing concessionaires and police to utlise the existing checkpoint to monitor hunting/trapping activities. A mechanism should be established with CPT Inc. and the EPA to report all occurrences of wildlife trapping, game hunting and trading to the EPA and Wildlife Management Authority; and
- CPT Inc. employees should be prohibited from hunting, trapping, killing or capturing any wildlife. Staff should not carry firearms and punitive measures such as suspension will be instituted for violations.

In keeping with the GFC's sustainable forest management practices, 945 ha representing 4.5% of CPT Inc. productive area will be set aside as biodiversity reserves. This area will increase to about 25% of the Concession (6,197 hectares) when inaccessible areas such as steep slopes and high hills (as these restrict harvesting) are added to the forest reserves. Moreover, the company intends to minimize harvesting of its timber species to 8.33 m^3 per hectare, inclusive of lesser known species all in its efforts to maintain habitats and to reduce the impact on the biological environment.

6.3.3 Socio-economic Environment

6.3.3.1 Health and Safety

As was stated earlier, an Environmental, Occupational Health and Safety Officer will be hired. This person will, in addition to environmental matters, be responsible for ensuring sound occupational health and safety

provisions and practices at the operation. The following OH&S measures must be implemented to reduce the impacts on workers during the construction and operational phases of the project:

- Identify someone with responsibilities for OH&S;
- Establish and OH&S Committee to ensure compliance with the OH&S Act of 1997;
- Ensure safety rules, guidelines and the OH&S Act are posted at strategic locations;
- Ensure workers are properly oriented to the safety and health rules and guidelines;
- Protective gears and clothes must be provided to employees and should be worn at all times during operation. Gears to be provided should include safety vest, hard hats, respirators, gloves and safety boots where necessary. Rain coats should also be provided;
- Well equipped first aid kits should be provided at all work sites;
- Workers trained in first aid should be on staff at the forest base camp and the sawmilling nad wharf complex;
- Liaise with BCL to utilize the facilities of the Health Clinic for emergencies and acute health matters requiring immediate attention;
- Adequate signage should be erected, especially in hazardous areas;
- MSDS sheets should be made available for any chemicals used;
- Develop guidelines for emergency response and evacuation and establish protocol for emergency situations;
- Provide potable water for employees. The OHS Committee will have the responsibility of looking into issues of food safety and the provision of safe drinking water; and
- Conduct periodic fogging to prevent mosquito breeding.

6.3.3.2 Land Use Conflicts and Unplanned Economic Development

Conflicts may arise as a result of competing land uses, in particular, from economically viable resources such as minerals and forest. The area allocated to CPT Inc. for forest utilization has at the same time been identified and allocated for mineral extraction by the GGMC. In light of national development regarding Guyana's interest to market its forest carbon stocks, and its preparation for REDD Readiness, there is need for the sectors to collaborate. A mechanism is currently being worked out at the national level between the GGMC and the GFC and to be implemented by both forest and mining operators through the sharing of the harvest/mine plan. It is expected that the areas will be mined/logged in blocks where the forest concessionaire has the opportunity to harvest all valuable logs before mining of the subsurface can occurs. After extracting the mineral resource, the miner is mandated to reclaim the area before moving on to another block. Both the mining and forestry officers are required to monitor these operations to ensure they are in keeping with the GGMC and GFC guidelines and legislation.

On the other hand, as a result of opened access to the interior regions through the upgrading of the roads, unplanned economic development such as the increase of small itinerant miners and/or illegal logging can occur. In order to ensure this does not occur, closer monitoring of the area is required by the GGMC and GFC.

The Company will also inform the relevant authorities of any development activities occurring within the concession area.

6.3.3.3 Road Safety, Security and Maintenance

Illegal mining, wildlife trapping/hunting, general security problems, accidents and deterioration of the road network can result due to increased access of the interior regions. To minimize these risks the following actions should be taken:

- Place road signs indicating dangerous turns, bends and approach to bridges;
- Place signs indicating the speed limits;
- Observe all procedures/signs established by BCL for the use of the M1 road;
- CPT Inc. should ensure all drivers have valid driver's licence and years of experience driving in forest conditions;

- CPT Inc. should collaborate with GFC to conduct regular monitoring of compartments within the respective blocks once harvesting is complete;
- All secondary roads should be closed once harvesting has been completed in certain compartments;
- Collaborate with BCL and the Police in maintaining and operating the established checkpoint;
- Vehicles should be maintained on a regular basis to ensure good working conditions; and
- Install radio sets on vehicles for ease of communication.

In opening up of the area and the introduction of other 'new' economic activities, there may be the potential to attract criminal activities. In order to safeguard company personnel, machinery and equipment the following measures should be taken:

- CPT Inc. should employ its own security personnel who are to be trained and armed;
- Develop a working relationship with the police at the police outpost at 70 km and Supennaam on the Essequibo Coast;
- Conduct in-house training for staff on safety and security procedures and emergency response;
- Erect a perimeter fence around the sawmill and wharf complex;
- Restrict movement in and out of the housing and sawmill facility to staff and authorized personnel and maintain records of movement of vehicles and personnel;
- Ensure field operations have radio communication equipment; and
- Establish regular call times with field operations.

6.3.3.4 Archeology and Anthropology

Research conducted to date indicates that there are no sites of archaeological or anthropological importance within the CPT Inc. Concession. However, in the unlikely event that such sites are located during operations, the following is recommended:

- CPT Inc. to inform the National Trust and Walter Roth Museum;
- CPT Inc. to halt all activities at the site and secure the area, imposing restricted access;
- CPT Inc.to facilitate personnel from the National Trust and Walter Roth Museum to visit the area to conduct research to garner further information; and
- CPT Inc. to take necessary action as guided by the National Trust and Walter Roth Museum.

6.4 Training

CPT Inc. will pursue a policy of employing a multi-skilled workforce. In-house and external training will be a priority to ensure safety, environment conservation, quality control and efficient production. Trainers from the Forestry Training Centre (FTC) will be invited at least twice per year to conduct training in RIL other techniques for better production recovery to avoid splits, heart (fiber) pull of timber and at the same time to minimize forest residual damage. CPT Inc. will conduct periodic training for its workforce in theory and actual field practice. It will be mandatory of applicants for jobs, especially operators and mechanics, to pass the qualifying test and have the necessary experience before being employed by the Company.

Any new employee will undergo a one month orientation to ensure he/she fully understands his job requirements and employment conditions. Orientation discussions would be conducted periodically during the program.

In addition, it is recommended that the workers be made aware of the requirements of the environmental management plan and their role and responsibilities. A training programme should also be developed for potential emergencies and covering the areas of fire, accidents and fuel/chemical spills.

SECTION SEVEN

MONITORING AND EMERGENCY RESPONSE

7.1 Monitoring Plan

The success of efforts at mitigation and the need for corrective action will depend on the results of a programme of monitoring. Based on the principal issues and impacts identified during this study, and the mitigation measures for implementation, a number of parameters are to be monitored during the operations of the project.

The Monitoring Plan below identifies a number of parameters to be monitored as well as identifying the frequency and location where such monitoring should take place. Prior to the commencement of monitoring activities, CPT Inc. is expected to seek EPA's approval and guidance on the methods of monitoring and analysis, equipment to be used, and operational procedures. EPA has established guidelines for sample collection in the case of water sampling. The analysis of samples is expected to utilise existing laboratory facilities such as those operated by the Institute of Applied Science and Technology (IAST), GUYSUCO and the Ministry of Health or others as advised by the EPA.

Table 26: Monitoring Plan

Parameter	Institution Responsible	Frequency of Monitoring	Location of monitoring
Physical			
Air Quality Dust accumulation and suspended particles	CPT Inc.	Daily	Operational areas within the concession and in and around the Sawmill and Wharf Complex
Water Quality Temperature pH Conductivity Turbidity Oils/Grease TSS Coliform	CPT Inc.	Quarterly	Creeks within CPT Inc. Concession near to active areas being logged and the Essequib River upstream and downstream of the Sawmill and Whaf Complex. The Takatuni Creek would also be monitored.
Stream Flows	CPT Inc.	Quarterly	Main Creeks and Waterways
Biological			
Canopy openings Retention of seed and keystone trees Biodiversity reserve integrity Protection of small trees Forest Damage	CPT Inc./GFC	Annually	Active logging areas, permanent sample plots and biodiversity reserves within the Concession

Parameter	Institution Responsible	Frequency of Monitoring	Location of monitoring
Socio-economic			
Employment and Social Benefits Number of residents from surrounding areas employed Support Services provided to local community Number of persons trained Extent of staff turnover	CPT Inc.	Annually	Sawmill and Wharf Complex & Logging Operations
Waste Management Condition of waste receptacles Waste collection and disposal methods (wood waste, waste oil, solid waste) Accumulation of solid and liquid waste	CPT Inc.	Monthly	Sawmill and Wharf Complex & Logging Operations
Mining No. of mining camps Type of mining Area coverage Vehicle movements within CPT Inc Concession outside of the M1 Road	CPT Inc.	As observed	CPT Inc. Concession
Wildlife Wildlife hunting and trapping within concession	CPT Inc.	Quarterly Reporting to GFC & EPA On Observance of hunters with game as well as from Check Point Records	Check Points at Buckhall & Logging Operations
Health and Safety Emergency Response Plans Implementation of Health and Safety Programmes Use of safety equipment and gear Status of safety equipment and gear Records of accidents and incidents including road accidents	CPT Inc. Ministry of Labour	Monthly (Quality Control) Bi-annually	Sawmill and Wharf Complex & Logging Operations

Parameter	Institution Responsible	Frequency of Monitoring	Location of monitoring
Environmental Compliance			
Requirements of Environmental Permit Implementation of EMP Requipments of GFC CoP	CPT Inc. EPA GFC	Monthly Quarterly Quarterly	Sawmill and Wharf Complex & Logging Operations

7.1.1 Monitoring Responsibility

The Environment, Occupational Health and Safety Officer will have direct responsibility for coordinating monitoring activities. This individual will liaise with the Forest Manager for the forest operations and with the Sawmill Manager for the Sawmill and Wharf Complex. The OHS Officer s will report on monitoring to the Occupational Health and Safety Committee at its monthly meeting.

7.1.2 Storage and Retrieval of Monitoring Information

All monitoring information will be stored at the main office at the Sawmill and Wharf Complex. This information will be used to compile the Annual Environmental Report to be submitted to the EPA.

7.2 Mitigation and Monitoring Costs

Table 27 below provides an annual budget for mitigation and monitoring actions. CPT Inc. will be required to maintain this annual budgetary allocation and at the end of each year to revise the budget based on the previous year's experiences and price/cost changes.

Table 27: Annual Budget for Mitigation Monitoring

	Action/s	Annual Cost	Time Frame*
Waste Management	Installing waste receptacles and general waste management	$300 000	Annual
	Collection and disposal of solid and liquid waste	$500 000	Weekly
	Sewage and soak away system	$1 000 000	Year 1
Baseline Water Quality Monitoring	Water quality tests such as pH, Temperature, Turbidity, COD, Oils/Grease, Coliform and TSS	$500 000	Quarterly
Health and Safety	First Aid Kits	$150 000	Annually
	Protective gear for workers handling fuel. e.g. gloves, overalls, respirators, safety boots	$1 500 000	Monthly
	Warning signs, fencing and lighting maintenance	$1 500 000	Monthly
Security	Establishing and operating Checkpoints	$2 000 000	Ongoing
Traffic	Maintenance of signs and markers on primary and secondary roads	$150 000	Monthly

	Action/s	Annual Cost	Time Frame*
Fire Equipment	Fire Extinguishers and fire equipment	$500 000	Annually
Mitigation Measures	Bund walls around fuel storage areas	$500 000	Year 1
	Impervious surface for workshop	$200 000	Year 1
	Enclosure for generators	$300 000	Year 1
Training	Training of personnel e.g. in first aid, emergency response as well as environmental monitoring	$1 000 000	Annual
Emergencies		$1 000 000	Incidental
TOTAL		**G$11 100 000**	

***Time Frame for implementing Action as well as frequency of activities or checks*

7.3 Emergency Response Plan

7.3.1 Introduction

This ERP is intended for use by CPT Inc. personnel and as such, the language is kept simple and generally "user friendly." It is based on hazards and potential incidents that could occur at the CPT Inc. operations within the concession, at the Base Camp and at the Sawmilling and Wharf Complex.

7.3.2 Objective

The principal objective of the ERP is the protection of the company personnel, individuals and the environment in the general area of influence of the project through the development of emergency response capabilities and systems. In so doing, the Plan seeks:

1. To eliminate as much as possible the potential causes of accidents, fire and other emergencies and prevent loss of life and property as well as damage to the environment
2. To set out procedures to be followed in case of emergencies
3. To establish command chain in responding to emergencies

This ERP has identified the following key elements:

- Emergency Contact Details;
- Emergency Procedures;
- Authority of Control; and
- Identification of potential scenarios.

All staff will be oriented to the Plan and the elements of the Plan will be reinforced on a regular basis with the conduct of emergency drills on a quarterly basis. A copy of the plan will be displayed at the Base Camp Site and the Wharf and Sawmilling Complex.

7.3.3 Emergency Contact Details

There are key institutions and agencies that would need to be contacted in cases of emergencies. Table 28 outlines these key institutions relevant to this operation. This table should be displayed at locations around the permanent mill site.

Table 28: Emergency Contact Details

Institutions	Contact Number
CPT Inc. G/town Office	227 6422
EPA	225 0506
GFC	226 7271
Guyana Police Force G/town	225 6411
Guyana Defence Force G/town	226 4664
Regional Democratic Council Region # 2	771 4324
Barama Company Ltd	225 4555
Georgetown Hospital	227 8204

7.3.4 Emergency Procedures and Responsibilities

All personnel must be aware of and take steps to manage hazards in their work area. In addition, all personnel are expected to alert security if they discover a fire or oil or chemical spill in keeping with the procedures set out in this plan. However, only duly trained personnel should respond to fires, oil or chemical spills. Response procedures shall be posted at strategic points in all work areas. Emergency Response Teams (ERT) must be identified and trained to respond to fire, oil spills, chemical spills and medical emergencies. These teams will be drawn from the relevant departments based on the nature of the potential hazards associated with each section.

7.3.4.1 Responsibilities/Chain of command

All personnel onsite may have a role to play during an emergency situation. The following outlines the major role and responsibilities for various individuals.

(a) Forest Manager/Sawmill Manager

i. Ensure implementation and maintenance of this plan.
ii. Report to relevant authorities in case of an emergency.
iii. Review event analysis reports with relevant line managers/supervisors.

(b) Security

i. Get as much information as possible on the nature of the emergency from the caller
ii. Ensure that the Managers and members of the relevant ERT are immediately alerted and given the information obtained on the emergency.
iii. Ensure the Forest Manager is informed of the emergency.

(c) Line Managers or Supervisors

i. Ensure personnel under your supervision are aware of the potential hazards of their work area and take the necessary precautions as they carry out their tasks.
ii. Ensure staff under your supervision is familiar with and trained in emergency response procedures.
iii. Ensure personnel are provided with and use the prescribed safety equipment to carry out their duties safely.
iv. Ensure an inspection of electrical wiring in your section/ department on a yearly basis. Conduct regular visual checks to ensure wiring is safe and in good condition.
v. Ensure that oil and other petroleum products as well as any hazardous chemicals used by your staff are labelled, safely stored and handled in accordance with the ERP and any other guidelines provided by the Company.

vi. Ensure that all incidents of fire, oil or chemical spills or releases are reported on in accordance with this plan. (Fill out the Oil/ Chemical Spill Report Form on the same day as the event.)
vii. Prepare an Event Analysis of any fire, oil / chemical spill that occurs in your Department with the assistance of the Administrative Manager. Provide a copy of this report to the Administrative Manager and the General Manager.

(d) Admin Supervisor

i. Provide on-going safety training and briefing sessions for staff related to operational hazards.
ii. Oversee and conduct regular inspections of all emergency response/ clean up equipment to ensure they are in working order.
iii. Ensure that the ERTs receive appropriate training to respond to fire, oil or chemical spills.
iv. Assist line managers/ supervisors with the completion of the spill report and incident investigations after any spill or fire.
v. Assist line management with the preparation of an Event Analysis for any oil product spill that exceeds 5 gallons.

(e) ERTs

i. Fire Response Team: Promptly respond to and put out fire as trained and as set out in this plan.
ii. Oil and Chemical Response Team: Promptly respond to and clean up spill as trained and as set out in this plan.
iii. Medical Response Team: Promptly respond to medical emergency as trained and as set out in this plan.

(f) All personnel

i. Be aware of the potential hazards of your work area and take precautions to prevent them from occurring in the course of carrying out your duties.
ii. Follow good housekeeping practices to prevent accidents, fires and other emergencies.
iii. Be alert for fire, oil or chemical spills in your work area.
iv. Sound the alarm and call security immediately upon notice of any fire
v. Call security immediately once you notice an oil sheen, spill or unplanned release of any chemical anywhere.
vi. Follow the emergency response procedures set out in this document.

7.3.5 Training

All personnel will benefit from occupational health and safety training and orientation and made to be:

1. Aware of the potential hazards of their work area and take necessary precautions to prevent these from occurring in the course of carrying out duties.
2. Follow good housekeeping practices to prevent accidents, fires and other emergencies.

Regular training in occupational health and safety, fire prevention and use of fire fighting equipment will be carried out.

7.3.6 Description of an Accident or Emergency and Response Procedure

An emergency is a situation in which injury to a person(s) and/or damage to the environment is involved requiring emergency service attendance or the company's duty to report to the GFC, EPA, GPF or other oversight and regulatory body.

7.3.7 Accident Response Procedure

The respective Managers and Line Supervisors have the authority to take control of such a situation and these persons have the authority to take the decision to close down all or any part of the operations following an incident.

7.3.7.1 Minor Accident (Other Than First Aid)

Inform the Manager who will arrange transport to medical facilities. Immediate treatment can be sought at BCL Medical Centre. After treatment, complete an entry into the Accident Record book.

7.3.7.2 Major Accident (involving trucks, skidders, bulldozers, or other vehicles or chainsaw operators)

1. Apply First Aid Treatment
2. Call the Sawmilling and Wharf Complex while arranging transport of injured personnel.
3. Give the details of the accident.
4. State, type of injury, i.e. broken leg, conscious or unconscious.
5. Manager or Line Supervisor to arrange MediEvac to health facility.
6. Vehicle wreck is either removed off the road or adequate signage posted indicating accident area.
7. In case of loaded lumber truck, logs are removed and transported to its original destination.

7.3.7.3 Fire Prevention and Response

7.3.7.3.1 Potential Fire Hazards

Fires can be prevented if potential hazards are identified and avoided. Some potential fire hazards to be avoided are listed below:

1. Appliances left on when not in use
2. Improper disposal of smoking material e.g. throwing cigarette butts on the ground
3. Improper use, handling and storage of flammable material e.g. gasoline, waste oil, paint
4. Improper housekeeping resulting in accumulation of flammable material e.g. paper, cardboard boxes, oil-soaked rags, flammable liquids
5. Improper use of welding torches and equipment

Good housekeeping is a major factor in prevention of fires and as such:

1. All work areas will be kept orderly and clean
2. Discarded combustible material will not be allowed to accumulate.
3. Each work area will be provided with a sufficient number of non-combustible waste or trash receptacles.

7.3.7.3.2 Types of Fires and Fire Extinguishers

There are different types of fire and this determines the type of extinguisher to be used in an emergency.

Fires can be classified into four general categories based on the type of materials or fuels involved:

- **Class A Fires:** involve ordinary combustible material such as wood, paper, rags, rubbish and other solids.
- **Class B Fires:** involve flammable or combustible liquids such as gasoline, fuel oil, paint and hydraulic fluids.
- **Class C Fires:** involve electricity or electrical equipment

- **Class D Fires:** involve combustible metals such as magnesium

Class A to C fires are the Classes of major concern relating to CPT Inc. operation. Efforts will be made to procure, install and train personnel on the use of fire extinguishers. As well, these equipment will be kept in working order and accessible at identified strategic points at the Sawmill and Wharf Complex and at the Base Camp in the event of a fire.

Sand buckets will also be kept in high risk areas to assist with any response necessary. A water pump will be kept at the operation to respond to large fires such as forest fires.

7.3.7.3.3 Fire Response Procedures:

The following fire response procedure will be re-enforced through regular fire drills.

If a fire is discovered:

1. An alarm wil be raised
2. The Manager of Supervisor will be informed on the details of the fire (emergency response personnel will respond to the fire as trained). The immediate area will be evacuated and personnel assembled in designated waiting and meeting area.
3. Fire will be contained to prevent spread with the use of fire extinguisher
4. In case of forest fire, bulldozers and/or skidders will be employed to make a clearing around the fire to minimize spread to adjacent areas. A water pump will be used to soak the area/put out the fire.
5. The Manager and Line Supervisors will oversee the completing of a full report and incident investigations.

7.3.7.4 Fuel (Petroleum Products) and Lubricants Spill Prevention and Response

7.3.7.4.1 Storage of Fuel and Waste Oil

Fuel will be stored at both within the concession and the Sawmill and Wharf Complex. Fuel will be stored in tanks in designated areas with secondary containment measures in place. These areas will be designated non-smoking areas. An area will be designated for waste oil storage which will have retaining walls and floor made of material which is impervious to the migration of oil. The storage area will have a clearly legible sign stating: “Waste Oil” and will be protected from the weather by a shed as well as having a perimeter fence.

Monthly inspection of the fuel storage tanks and the waste oil storage area will be carried out to check for any leakage or potential leaks. During these inspections the condition of the tanks and other containers will be checked and the floor and the palettes checked for any sign of oil leakage.

The fuel truck used for transporting of fuel will be equipped with spill response materials to respond in the case of a spillage.

7.3.7.4.2 Fuel Spill Response Procedures

In the event of an oil spill the following steps will be taken:

1. The immediate area will be evacuated
2. If possible efforts will be made to stop the flow e.g. by turning off any valve left open or preventing spread to other areas. Treat the spill with absorbent material such as sand or sawdust and a bund formed if possible to prevent the spill spreading and contaminating soil and ground water.
3. Resultant contaminated absorbent material will be collected and placed in a secured area.
4. Guidance will be sought from GFC & EPA on the disposal of absorbent material.
5. The site of the spill will be inspected to obtain enough information to describe the situation to

response personnel. The following minimum information will be gathered:

- Spill material (e.g. used oil or gasoline)
- Estimated quantity spilt (or surface area covered or rate of flow)
- Location and direction of spill flow
- Personnel involved, injuries description

The Manager and Line Supervisors will oversee the completing of a spill report and incident investigations after the spill.

7.3.8 Accident/Incident Reporting

All accidents and incidents will be reported and recorded in standard format. These records will be made available to senior management and regulatory agencies upon request.

7.3.9 Exercising and Maintenance of the Emergency Response Plan

Regular drills will be carried out to exercise the emergency procedures on a quarterly basis. These will be reviewed every six months. Key response information as part of the Plan will be placed at strategic locations at both the Sawmilling and Wharf Complex and the Base Camp. Such locations include the workshop and generator area, canteen and fuel storage locations.

Figure 6: Accident/Incident Record Form

CPT Inc. **Record of Accident/Incident** **ENVIRONMENT, SAFETY & HEALTH MANAGEMENT INFORMATION**	Date: _____ _____ No: _____
1. Duty Station:	2. Location of Incident:
3. Description of Accident/Incident	
4. Extent of Damages:	
5. Description of Action Taken:	
15. Follow-up Acton:	
Signature: _____ Date: _____ Title: _____	

Figure 7: Accident/Incident Record Form - Injuries

CPT Inc. **Record of Accident/Incident** **ENVIRONMENT, SAFETY & HEALTH MANAGEMENT INFORMATION**	Date: _____ _____ No: _____
TO BE COMPLETED BY SUPERVISOR 1. Reason for Record: ☐ Accident ☐ Incident	
PERSONNEL AFFECTED 2. Name: _____ (Last, First, M.I.) 3.Position: _____ 4. Phone: _____ 5. Date of Birth: _____ 6. Sex: ☐ Male ☐ Female 7. Date/Time of Accident/Incident: _____ Time: _____ ☐ AM ☐ PM	
8. Duty Station:	9. Location of Incident:
10. Description of Accident/Incident	
11. Extent of injury or illness and Body Parts Affected:	
12. Medical Treatment? ☐ Yes ☐ No No	13. Lost Time? ☐ Yes ☐
14. Description of Treatment:	
15. Follow-up Acton:	
Signature: _____ Title: _____	

SECTION EIGHT

CLOSURE PLAN

8.1 Introduction

The nature of this project's activities, as a temporary use of land, should not impose any permanent constraints on future beneficial use of the lands, or any permanent effects on the water resources, biodiversity or overall landscape quality.

The expected life of the CPT Inc. project is 25 years following which the company expects continuous renewal of their TSA for other periods of 25 years or the identification of additional TSA. At this stage CPT Inc. has not prepared a Closure Plan though consideration has been given to actions to be taken. Within the context of this ESIA, the term 'closure' is used to encompass decommissioning, demolition and rehabilitation activities at the time of conclusion of forestry operations.

8.2 Approach to Closure Planning and Decommission

8.2.1 Factors that may lead to the closure of CPT Inc. Operations:

The following factors could potentially lead to the closure of CPT Inc operations:

Permitting Conditions

1. If the 25 years of TSA cutting cycle is not granted an extension by GoG.

Biological Conditions

2. If the commercial species in the concession are exhausted.
3. Mining activities within the concession resulting in considerable damage to harvestable forest stands.

Physical Conditions

4. There is deterioration to the main access road from Buckhall to the concession preventing the trucking of logs or not making it feasible.
5. Mining activities within compartments of the CPT Inc. concession resulting in damage to secondary roads thereby making operational costs too high.

Socio-Economic Conditions

6. Increased mining activities in the area leading to a heightened threat to safety and security from crime and illegal activities.
7. Severe accident(s) leading to heavy loss of equipment and/or lives.
8. CPT Inc. is unable to sustain its financial investment.
9. There is a contraction of markets or a significant drop in price of logs and wood products making the project not profitable.

8.3 Objectives of the Closure Plan

At this stage of the project, and as a requirement of the ESIA permitting process, CPT Inc. is required to identify appropriate closure and decommissioning methods for the project. While there is no specific requirement for closure actions by the GFC, the Code of Practice for Forestry Operations which concessionaire are expected to adhere to, outlines actions which facilitate sustainable forest operations and minimise environmental and social adverse impacts, for example, at the completion of harvesting of Blocks, the CoP requires actions to be taken to cover over skid trails and log markets. Nevertheless, CPT Inc. has undertaken to develop a Closure and Decommissioning Plan during the duration of this project.

The principal objectives of the Closure Plan are to:

1. Contribute to the effective management of environmental and social issues during the operational phases as a means of facilitating effective closure;
2. Identify suitable best practice measures that are appropriate to the context of the project and are able to meet the requirements of the regulatory agencies and satisfy international benchmarks and standards for forest operations;
3. Return land and water resources to pre-logging conditions;
4. Minimise the potential for any negative post-closure impacts and liabilities;
5. Minimise the requirement for active management of the post-closure environment; and
6. Maximise the potential for post-closure environmental and social benefits

8.4 Principal Closure and Decommissioning Issues

The principal closure related issues related to the CPT Inc. operations are:

Physical

1. Skid trails, log markets and secondary roads
2. Field base camps and infrastructure at the main Base Camp and the Sawmilling and Wharf Complexm(buildings, equipment, machinery)

Socio-Economic

3. Contractual arrangements with employees and staff.
4. Obligations to GoG (taxes, royalties, fees etc)
5. Services and support being offered to local communities, businesses and residents (transport, health, employment etc)

8.5 Closure Actions

In addressing the principal closure and decommissioning issues, the Closure Plan is envisaged to include the following actions:

Physical Issues

1. All secondary roads into compartments of the concession will be closed.
2. The main Base Camp and the Sawmilling and Wharf Complex sites will be cleared and restored.
3. Machinery & Equipment will be transferred to CPT Inc.'s sister company (M Umraow and Sons) which is involved in the construction industry.

Socio-Economic Issues

4. The relevant Government Authorities and the Employees/Workers will be informed at least three months in advance.
5. NIS and PAYE contributions for staff will be discontinued.
6. 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.
7. Acreage fees and royalty fees and other obligations of the company required by the Laws of Guyana will be settled.

Within the first two years of operation, a detailed Closure Plan will be prepared by CPT Inc.

SECTION NINE

CONCLUSION

This ESIA Study for CPT Inc. proposed logging and sawmilling operation has examined the details of the project, identifying the activities and assessing their potential impacts based on best-practice guidelines and existing laws and regulations governing the environment and forestry operations in Guyana.

Most of the potential significant impacts identified can be mitigated. The ESIA has identified mitigation and management actions to be undertaken to minimize adverse environmental and social impacts of the project. It is envisaged that these recommendations will be adhere to by CPT Inc. in its operations and monitored by the EPA and the GFC as well as by other regulatory institutions.

As was indicated earlier, a significant proportion of the Concession was previously logged. As such, this activity is not new to the area. Approximately 25% of the total Concession will also be spared from logging. It should be noted that most of the Concession has also been allocated for mining by the GGMC. However, no mining is currently occurring within the area. Nevertheless, if mining should commence within the area, there is the potential for conflicts and severe environmental damages to occur. To address this problem, effective coordination between the regulatory agencies including the GGMC and the GFC would be required.

This ESIA has identified and proposed a number of measures to address the potential impacts associated with the activities of this project, but also measures to foster closer cooperation, collaboration and joint planning and management among the users of the area, including BCL.

CPT Inc's obligations are expected to encompass not only social and economic issues, but also extend to the ecological aspect. This ESIA has recognized that the project, as with any forestry operation, will have an impact on the physical and biological environment in which it takes place. However, CPT Inc. has made a commitment to practice sustainable forest management in its widest sense which embraces ecological and social sustainability along with economic viability. The Company would not be allowed to conduct its activities in a manner that is detrimental to the environment given Guyana's commitment to REDD and the implementation of LCDS. Impacts to the environment will be within acceptable limits once CPT Inc. follows its commitment to best forestry practices and in particular meticulously adheres to the standards and guidelines laid down by the EPA and GFC.

This ESIA Report has examined the project and assessed its potential impacts. The ESIA Team is confident that there is an understanding of the potential impacts envisaged from this project and for some impacts, the required mitigation actions need to be taken. Once there is adherence this project can realize social, economic and ecological benefits which are sustained.

SECTION TEN

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SECTION ELEVEN

APPENDICES

APPENDIX A - Terms of Reference

Terms of Reference

Environmental and Social Impact Assessment (EIA)

for

CPT Inc. Logging and Sawmilling Operations in an area between the Cuyuni, Pomeroon and Pairawa Rivers

1. Objective of the EIA

The objective of this EIA is to satisfy the requirements of the Environmental Protection Act for environmental authorization to be granted to CPT Inc.

2. Specific Tasks

In the preparation of the EIA the consultant team will undertake the following tasks:

- Assemble relevant baseline information on the concession area including its geology, soils, hydrology, climate and terrestrial and aquatic flora and fauna.
- Collect Information on the socio-economic background of the project area. This will require liaising with the appropriate central and regional government agencies, as well as with non-governmental organizations and on-the-ground stakeholders.
- Identify the relevant laws, guidelines, regulations and standards that would define the operating framework of the project.
- Identify, as far as is possible, and assess the biophysical, socio-economic and cumulative impacts of the project.
- Describe alternatives examined in developing the project, and identify other alternatives that would achieve the same objectives.
- Prepare an Environmental Management Plan that recommends measures to address those adverse impacts that can be avoided, or reduced to acceptable levels including plans for monitoring and emergency response during the project implementation phase.

3. Issues to be addressed as part of EIA

The consultant team will address the full range of issues as it pertains to the proposed project. These issues include:

- Adequacy of forest resource to sustain planned extraction levels.
- Potential loss of biodiversity.
- Potential changes in the structure and composition of the forest due to logging.
- Possible environmental damage due to the storage, use and disposal of fuel, and lubricating oil; the effects of road, bridge and skid trail construction on soil erosion which may cause silting of streams.

- Potential benefits of the project to neighbouring communities and benefit sharing with respect to stakeholders.
- The environmental and health issues that may arise from the development of permanent logging camps e.g. solid waste and sewage disposal, concerns about the health and safety of workers.
- The environmental and health issues that may arise from the development of a sawmill and other processing facilities e.g. noise level from equipment and machinery, dust from the processing of wood, solid waste and sewage disposal, concerns about the health and safety of workers, etc.
- Impacts of the loading and transporting of logs and processed materials onto tugs and barges.
- Impacts on the existing road constructed and maintained by Barama Company Limited from the concession to Buckhall.
- Impacts associated with the construction of the Wharf and Log Pond operations including transport and handling of logs and processed materials in the vicinity of Buckhall on the Left Bank of the Essequibo River.
- Impacts of the operation on the surface and ground water flow.
- Issue of road construction, maintenance and improved access to the public.
- Land use and development issues/conflicts.
- Effects of surrounding land uses including mining.
- Environmental and social impacts that may be occasioned by the closure of operations.
- Environmental monitoring and training requirements for staff.
- Emergency response plans.

4. Site Visit and Scoping

CPT Inc. has facilitated a site visit to the project site for the regulatory agencies including the EPA and GFC and is in the process of facilitating a public scoping exercise as part of the requirement of the EIA process.

5. EIA Report

The EIA Report will contain the following:

- A non-technical executive summary.
- A description of the project including its location, proposed staffing and consequential support services.
- A description of the project environment.
- The policy, legal and administrative framework including guidelines, regulation and GFC Code of Practice.
- An analysis of the significant environmental impacts categorizing them into direct and indirect impacts, short and long-term impacts, reversible and irreversible impacts, and avoidable and unavoidable impacts.

- An analysis of the cumulative impacts of the project.
- An analysis of alternatives.
- An Environmental Management Plan which will identify the significant adverse impacts and prescribe actions for mitigation and monitoring.
- A Monitoring Plan and Emergency Response Plan.
- Maps, tables and figures.
- Terms of Reference and Minutes of the Public Scoping Meeting.
- Constraints and Limitations to the Study
- List of References and persons/agencies consulted.
- Appendices.

6. Duration

A Forest Inventory is currently being conducted which would lead to the preparation of a Forest Management Plan. This entails the collection of extensive data and information which will assist the EIA study. It is envisaged that the EIA may be completed within a period of two to three months after approval of the Terms of Reference by the EPA.

7. EIA Submission

The EIA consultant Team will provide the following to the EPA:

- Electronic copies of EIA
- 8 Copies of EIA report (EIS) with copies signed as per Act

APPENDIX B - Scoping Meeting Minutes

Environmental
Protection
Agency

Public Scoping Meeting for the CPT Inc. Logging & Sawmilling Project

Date: Friday, July 31, 2009

Time: 10:00 hours

Venue: Supenaam Marketing Complex, Supenaam, Essequibo

Objective: To hold a scoping exercise for the Environmental Impact Assessment for the above-mentioned project. Additionally, to highlight some of the perceived environmental impacts and to incorporate the concerns of all stakeholders, and more importantly, the public's concerns into the final Terms of Reference for the EIA study.

EPA Representatives:

1. Geeta Singh – Director, EMD, EPA
2. Hance Thompson – SEO, Authorisations, EMD, EPA
3. Indira Mattai – SEO, M&E, EMD, EPA
4. Teijvarti Persaud – EOII, M&F, EMD, EPA

Developers / Representatives of the Developer:

5. Mahadeo Umraow – Developer
6. Benjamin Pacis – Employee

EIA Team:

6. Shyam Nokta – EIA Coordinator, EMC, EIA Specialist
7. Khalid Alladin – EIA Team Leader
9. Mike Tamessar – Biodiversity Specialist
10. Lakshman Richard Persaud – Natural Resources and Social Expert
11. Amanda Tiwari – EIA Team Assistant

Ms. Geeta Singh welcomed everyone to the Scoping Meeting for the proposed CPT Logging and Sawmilling Project and explained the purpose of the meeting. After speaking of the history of the project with the Agency such as the dates of application, site visit, etc., Ms. Singh briefly outlined the EPA's process and then introduced Mrs. Teijvarti Persaud to further elaborate. Mrs. Persaud

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presented on the history of the EPA and went on to outline the EIA Process, the functions of the EAB and emphasized that stakeholder involvement is key, thus highlighting the importance of the scoping meeting.

Mr. Benjamin Pacis gave a Project Summary and noted that the initial investment in the project is approximately US$2,000,000. He indicated that the operation will be located 65 Km from Buck Hall and will cover approximately 25, 899 hectares (64,000 acres). He indicated that the Barama main road passes through the area and is bounded by notable spots such as the Barama main road, the Pomeroon River, Cuyuni River, etc. He also indicated that the operation is not as large as Barama, or Mazharally. Mr. Pacis noted that a minimal work force will prepare the area since significant road construction is not needed and will focus on maintaining existing roads, although approximately 2 Km of road will need to be constructed to connect to the Barama main road. He briefly outlined the operating process and noted that a factory will also be established at Tuschen which will approximately take up 2.0 hectares (5 acres) and the company will look to introducing Guyana's first wood carving operation.

Ms. Singh then invited Mr. Khalid Alladin to outline the approach that the EIA team will take in preparing the EIA. Mr. Alladin introduced the members of the Team present at the meeting, spoke of the two consultants absent from the scoping and then proceeded to outline the current status of the project. He noted that the Terms of Reference (TOR) was prepared and submitted to EPA and outlines issues that will be covered in the EIA but pointed out that the TOR is still in a draft format since any additional issues raised by the public that should be addressed in the EIA will be incorporated.

Mr. Alladin then proceeded to inform the meeting of some of the issues and information that will be covered in the EIA including baseline information of the project area relating to biodiversity, water quality, climate, soil type, etc., along with socio-economic conditions. He noted that although there are no communities in the immediate vicinity, there may be communities in the surrounding areas that may be impacted. Along with examining relevant legislation and documents, he explained that they will be looking at potential impacts of the project on the natural and social environments as well as the cumulative impacts of the project in the area and surrounding areas. He then noted that they will develop an Environmental Management Plan which will outline measures to prevent and mitigate the impacts identified as well as an Emergency Response Plan to detail the steps to be taken in case of an emergency.

Additionally, Mr. Alladin indicated that the EIA team proposes to look at the operation and the planned level of extraction in order to determine whether the forest will be able to sustain this type

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of activity and the extent to which this will contribute to any loss of biodiversity. Additional activities will be examined to determine the potential for environmental damage such as the storage of fuel, lubricants, effects of the construction of roads, bridges and the wharf, erosion from construction of skid trails, etc. He also mentioned about the transportation of actual produce as well as the issues associated with the establishment of permanent camps and the Sawmill.

Ms. Singh then opened the floor for questions, and emphasized that all concerns and issues raised will be incorporated in the TOR.

1. **Mr. Showkat Ali, Good Hope / Pomona NDC Chairman** – indicated that he listened to various speakers but would like to know about the impact that the project will have on residents along the Essequibo coast. He further inquired whether the residents along the Essequibo coast could be involved in the logging activities as employment is difficult to obtain along the coast.

2. **Mr. Pacis** – indicated that the Company will look to recruit workers from the area and he further indicated that the Company will need to employ individuals to work in the Sawmill that will be established in Tuschen.

3. **Mr. Abee Masykeela, Resident** – questioned whether the Company is a local Company and whether it has a partner or parent company.

4. **Mr. Pacis** – indicated that the Company is local and identified Mr. Umraow as the owner.

5. **Mr. Ali** – Made a complaint about paddy dust, smoke and chemicals emanating from a Rice Mill in Vilvoorden. He indicated that all they received from EPA are notices stating that the issue is being dealt with but the nuisance continues.

6. **Ms. Singh** – Acknowledged this matter and indicated that this could be dealt with after the Scoping meeting as that was not an appropriate forum to discuss the matter.

7. **Mr. Maurice Bovell, Owner & Operator of speedboats, Parika** – Indicted that he is grateful for the meeting and commended Mr. Umraow for wanting to establish such an operation. He also indicated that there are many youths in area and that they will be able to benefit from employment that the project will offer.

8. **Mr. Pacis** – Emphasized that once the Company is in full operation, approximately 100-120 workers will be employed with about 75% of employees from the Essequibo coast. He also identified the small possibility of recruiting individuals with specialized carving skills from Asia, to support the word carving operation in the future.

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9. **Mr. Parsram Persaud, Resident** – Pointed out that approximately three years ago, the RDC had promised to build a canal in the area to alleviate constant flooding. This was supported by another female resident of the area who noted that there is no drainage in the Creek that will allow them to conduct farming activities.

10. **Ms. Singh** – Once again indicated that the meeting is to focus on issues related to the proposed project and the forum was not appropriate to discuss the matter.

After a brief description of the map of the area by Mr. Alladin, there were no more issues raised by the audience. A moment of silence was observed for the passing of Mr. Umraow's brother. Ms. Singh then thanked everyone for attending and indicated that individuals were free to discuss or raise any additional issues with the officers after the meeting. The Scoping Meeting was then concluded.

Pictures

Picture #1: Members of the Head Table

Picture #2: Residents and Representatives at Meeting

Environmental Protection Agency

List of Attendees

	Name	Agency	Designation	Contact Information
1.	*Hance Thompson*	EPA	SEO, EMD	7 Broad & Charles Street, Charlestown, 2250506, lthompson@epaguyana.org
2.	Teijvarti Persaud	EPA	EOII, EMD	7 Broad & Charles Street, Charlestown, 2250506, aharnanan@gmail.com
3.	Geeta Devi Singh	EPA	Director, EMD	7 Broad & Charles Street, Charlestown, 2250506, geeta.singh.d@gmail.com
4.	Indira Mattai	EPA	SEO, EMD	7 Broad & Charles Street, Charlestown, 2250506, indiramattai@gmail.com
5.	Amanda Tiwari	EMC	Consultant	Enterprise, 609-9319
6.	Shyam Nokta	EMC	Consultant	Ogle, 222-4565
7.	Mike Tamessar	EMC	Consultant	Ogle 222-4565
8.	Khalid Alladin	EMC	Consultant	Alberttown, 222-4565
9.	Kenny David	GFC	Assistant Commissioner of Forests	1 Water Street, Kingston, 226-7271, kenny2004_david@yahoo.com
10.	Mahadeo Umraow	CPT Investments	Developer	110 Regent Road, Bourda, 227-6422 , mumraowsons@yahoo.com
11.	B.V. Pacis	CPT Investments	Consultant	70 Da Silva St, Newtown, Kitty, 626-0022, jpacis1@yahoo.com
12.	Chaitram Umraow	CPT Investments		
13.	Showkat Ali	Good Hope / Pomona NDC	Chairman	Aurora Village, 774-5327
14.	Devika Ali	Good Hope / Pomona NDC	Assistant Overseer	Aurora Village, 774-5327
15.	Vernon Russell	-	Resident	Upper Supenaam
16.	Jerome Croualman	-	Resident	Supenaam
17.	Pasasi Ramdial	-	Resident	Supenaam
18.	Jagadat	-	Resident	Supenaam
19	Budnee	-	Resident	Supenaam
20.	Shackela Henry	-	Resident	Aurora
21.	Raywattie Prahalad	-	Resident	Hibernia
22.	Sharmilla Alphonso	-	Resident	Aurora
23.	Indira Devi	-	Resident	Spring Garden
24.	Larolanie Neeranjan	-	Resident	Supenaam
25.	Khalawattie	-	Resident	Sans Souci, Wakenaam, 681-9777
26.	Oudith Ram	-	Resident	Supenaam
27.	Vishnu Singh	-	Resident	Supenaam
28.	Somattie Devi	-	Resident	Aurora
29.	Hateez Ally	-	Resident	
30.	Raj Jones	-	Resident	Good Hope
31.	Boodram Persaud	-	Farmer, Logger	Supenaam Creek, 692-4242
32.	Maurice Bovell	-	Resident	Supenaam, 694000
33.	Totaram Singh	Captain		Supenaam M. Road
34.	Wilfred April	Councillor		Supenaam, 774-4425

APPENDIX C - List of Stakeholders Consulted

Stakeholder	Date & Location	Contact	Objective of meetings/consultations	Findings of the Engagement (s)
Guyana Forestry Commission	April 2010 at GFC Head Office April 18 at GFC Outpost at Km 70	Mr. J. Singh - Deputy Commissioner of Forests Mr. Freites – Monitoring Officer	To gather and verify information on the perceived and actual social impacts of the proposed project. To gather information on the possible impacts on the ground within and around the project area.	▪ GFC is in full support of the project and believes it to be a very lucrative area with many marketable species of commercial quantities; ▪ Looking forward to the additional development in the area with the possibility for the Commission to earn additional revenue and the potential for more employment of more Guyanese.
Regional Democratic Council Region 2	March 2010 via telephone interview & discussions	Sunil Singh - Regional Executive Officer (REO) - RDC Region # 2	To engage the RDC in discussions on the proposed project gathering information on the perceived impacts and alternatives for the stakeholders	▪ Welcomed the project on the grounds of providing employment for the youths ▪ Has reservation on the type of employment to be offered and conditions of onsite living standards and remuneration. ▪ Wishes to caution that any employment offered by the Company must be in accordance to the labour laws of the country with remuneration being above the minimum wage
Neighboring Concessions	April - May 2010 via telephone interviews	Mr. Neil Chand - Head of Corporate Affairs & Forest Planning - Barama Company Limited Mr. Nizam Barakat - Chief Executive Officer (CEO) Barakat Timbers	To gather information on the current operations and perceived impacts of CPT Inc. operation	▪ BCL has an MoU with GFC to operate in the area and is willing to accommodate CPT Inc. as a partner in the document ▪ CPT Inc. must be able to properly engage BCL in order for both operations to be successful, providing support where possible, especially in terms of road usage and employee relations. ▪ Does not envision any negative impacts from CPT Inc.'s operations as he does not foresee the operation to be of a large scale due to the unavailability of timber for exploit.
Guyana Police Force	March 18 - 2010 **-** Sub Station At Km 70	Corporal Weekes	To gather information on the Police presence within the concession and perceived impacts of CPT Inc. operations, access roads and domicile	▪ No major crime reported in the area in recent times and hopes CPT Inc will cooperate to keep it the same way. Roads must be managed along with curfews for employees. Alcohol and other goods that can lead to substance abuse must be carefully managed.
Environmental	April 2010 –	Ms. Geeta Singh –	To receive the EPA's socio-	▪ EPA does not foresee any major negative

Stakeholder	Date & Location	Contact	Objective of meetings/consultations	Findings of the Engagement (s)
Protection Agency	EPA Office	Director – Environmental Management Division (EMD)	economic concerns arising out of the proposed project for stakeholders	social impacts due to the remote location of the project site. The Agency is confident that all negative impacts can be kept within reasonable limits if properly managed by the developer. ▪ EPA is confident that the positive impact of income generation from employment and its spin off economy will greatly benefit the Essequibo Coast.
Guyana Geology & Mines Commission	April 2010 at GGMC Office	Mrs. Karen Livan – Manager - Environmental Division	To gather information on the perceived impacts of CPT Inc. on the mining industry and the distribution of mining concessions within the area.	▪ GGMC is confident that the social impacts will be positive from the development and can be beneficial to the mining community with access to roads and other services. ▪ Development must be cognizant of the Report of the Special Land Use Committee and commitments to international parties.
Coastal Communities of Essequibo Coast	July, 2009 – Public Scoping Meeting	Various Stakeholders Present	To gather feedback from the stakeholders on the proposed development. To assess the perceived impacts by/to the stakeholders.	▪ Residents provided their comments and concerns which were all of a positive nature, fully supporting the proposed development. ▪ It was noted that many of the other issues raised at the forum were not related to the development and were diverted to other forums.
Selected Stakeholders within close proximity to the Project Site	March 2010 Residents and Businesses	Various stakeholders for informal discussions and conversations	To gather feedback from the residents and businesses on the proposed project.	▪ Stakeholders welcomed the project since they believed it will boost their businesses. ▪ They did not look forward to employment opportunities but welcomed the influx of business and expected cash flow. ▪ No major negative social impact was anticipated during the discussions.

APPENDIX D - ESIA Team Members

The EIA Team comprised the following members:

Mr. Shyam Nokta – ESIA Coordinator/EIA Specialist
Mr. Khalid Alladin - Team Leader, Environmental Specialist
Ms. Preeya Rampersaud – Environmental Specialist
Mr. Khalawan – Forester and Biodiversity Expert – Flora
Mr. Mike Tamessar - Biodiversity Expert – Fauna
Mr. Lakshman Persaud – Natural Resources and Social Expert

Name: Mr. Shyam Nokta **Date and place of birth**: November 05, 1975, Guyana

Nationality: Guyanese

Present Address: 60 Area H Ogle
East Coast Demerara
Guyana
(592).222.4565
(592).222.3172
emc@networksgy.com

Position on Team: ESIA Coordinator/EIA Specialist

Qualifications:
Academic qualifications include a Masters of Science in Environmental Assessment and Management, University of Oxford–Brookes – Pass with Distinction, (1999), Diploma in Tourism Studies, University of Guyana – Pass with Distinction, (1998), BSc in Environmental Studies, University of Guyana – Pass with Distinction (1997).

Experience:
Experience includes research, execution and the review of EIAs, consulting on Biodiversity, Natural Resource Management and Tourism Planning, Protected Areas and Forest Management. Key positions and experience are Director, Environmental Management Consultants (1998 to present); In-Country Officer, Fauna & Flora International (2002-present); Part-Time lecturer, Department of Caribbean and Tourism Studies, Faculty of Education and Humanities, University of Guyana, (1999-2001); Project Director, World Wildlife Funded Protected Areas Project (2003-2004); Technical Director, Guyana Marine Turtle Conservation Society (2000-2003); Protected Areas Management Professional, Iwokrama International Centre (1998-2001).

Name: Mr. Khalid Alladin **Date and place of birth**: May 09, 1980, Guyana

Nationality: Guyanese

Present Address: 29, No. 3 Village
West Coast Berbice
Guyana
(592).623.1298
khalidalladin@gmail.com

Position on Team: Team Leader, Environmental Specialist

Qualifications:

Academic qualification includes a Bachelors of Arts Degree: Major – Geography, Minor – Law (Best Graduating Student) at the University of Guyana, Guyana (1996 – 2000).

Experience:
Experience includes Projects Manager, Environmental Management Consultants (2009 – present); Director (ag), Senior Environmental Officer and Environmental Officer I and II in the Environmental Management Division, Environmental Protection Agency, Guyana (2000 - 2009) and as an independent consultant on a range of projects, project management, training and research.

Name: Ms. Preeya Rampersaud **Date and place of birth:** May 18, 1977, Guyana

Nationality: Guyanese

Present Address: 321 Block 8 – South
New Housig Scheme
Tuschen
East Bank Essequibo
Guyana
(592).623.8171
prampersaud@gmail.com

Position on Team: Environmental Specialist

Qualifications:
Academic qualifications include a Masters of Science in Environmental Management & Policy, Lund University (2008), Postgrad. Certificate, Technology and Sustainable Development, Indian Institute of Technology, (2005), BSc in Environmental Studies, University of Guyana (1999).

Experience:
Experience includes Senior Environmental Officer and Environmental Officer I and II in the Environmental Management Division, Environmental Protection Agency, Guyana (2000 - 2007) and as an independent consultant on a range of projects.

Name: Mr. Khalawan **Date and place of birth:** January 21, 1960, Guyar

Nationality: Guyanese

Present Address: 21 Resource
Canal No. 2 Polder
West Bank Demerara
(592).613.8319
khalawan555@yahoo.com

Position on Team: Forester and Biodiversity Expert – Flora

Qualifications:
Academic qualifications include a Master in Environmental Forestry (1995), University of North Wale, Bangor, UK and a Diploma in Forestry (1986), Cyprus Forestry College

Experiences:
Experiences include Advisor/Consultant Forestry and Environment (July 2004), Head, Wildlife Division, Office of the President (July 2002 – June 2004), Project Officer III, Non-Conventional Energy Division, Guyana Energy Agency (February 1998 – June 2002), Senior Assistant Commissioner of Forests Environment, Forest Office, Guyana Forestry Commission (January 1986 – January 1998), Team

member, Barama Company Limited, EIA for Buckhall to Cuyuni Road Project, Review EIAs for Guyana Forestry Commission (1995 – 1998)

Name: Mr. Michael Tamessar **Date and place of birth:** October 27, 1937, Guyana

Nationality: Guyanese

Present Address: 8 Air Strip Road
Ogle
East Coast Demerara
Guyana
(592).222.7574

Position on Team: Biodiversity Expert – Fauna

Qualifications:
Junior and Senior Cambridge Examinations.

Experience:
Senior Scientific Officer, Faculty of Natural Science, Department of Biology, University of Guyana. IDB and Smithsonian trained in faunal studies. Extensive work and publication on the fauna in Guyana, including the Checklist of Reptiles and Birds of Guyana (1985), Revised List of Mammals of Guyana (1983), Environmental Impact Assessment , Fishes, Upper Essequibo River (RESCAN 1978), and GUYSUCO Agricultural Extension Project, Skeldon (1999). Board Member of I.U.C.N. and National Parks Commission (Guyana).

Name: Mr. Lakshman Persaud **Date and place of birth:** July 02, 1975, Guyana

Nationality: Guyanese

Present Address: Lot A, Cornelia Ida
West Coast Demerara
Guyana
(592).646.9621
richardlpersaud@yahoo.com

Position on Team: Natural Resources and Social Expert

Qualifications:
Academic qualifications include a Post Graduate Diploma (Research Methods – Development Studies), Univeristy of Guyana (1999); Bachelor of Arts (Geography/Economics), University of Guyana (1997).

Experience:
Experience includes Project Coordinator – Guiana Shield Initiative Phase II Pilot Project, Iwokrama, UNDP Guyana- Special Services Agreement (2008 – Present); Monitoring and Evaluation Specialist, The Poor Rural Communities Support Services Project (2006 - 2007); Environmental Officer II in the Protected Areas Unit of the Natural Resources Management Division, Environmental Protection Agency, Guyana (2002 – 2006).

APPENDIX E – Map showing the outline of the Campsite, Wharf Complex and Processing Facility

APPENDIX F - GNBS Standards for Industrial Effluent Discharge

Point source discharge Limits for Industrial Effluent for Operations other than Mining, Forestry and Agriculture
Table 1
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 Vl: 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 Vl: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: No3:40; SO4-2:1000; Cl:-300;

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
																	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 Vl: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

APPENDIX G - Water Quality Certificate of Analysis

GUYANA SUGAR CORPORATION INC
CENTRAL LABORATORY
Research Centre, Agriculture Department, LBI Compound, E.C.D, Guyana, S.A.
Telephone #: 592- 220-2601 Email: ganpatj@guysuco.com Fax #: 592-220-3018

CAEMS SOP/RF No.: 013.1	Version: 2	Revision Status: 1	Date of Issue: September 6, 1996	Expiry Date:

Analysis Report

Report Number: W 50/2010—C **Date:** 2010-04-13

To:
Mr. Shyam Nokta
Environmental Management Consultants
60 Area H
Ogle, ECD

Tele: 222-4565 Fax #:

From:
Mr. Ganpat Jafer
Analyst

Central Laboratory
Agronomy and Analytical Services Department

Date Sample Received: 2010-03-22 **Date Analysis Completed:** 2010-04-12

SAMPLE TYPE: Water

SAMPLE DESCRIPTION	PARAMETER												
	pH	TSS (mg/L)	DO (mg/L)	EC (mS/cm)	SO_4^{2-} (mg/L)	NO_3^- (ppm)	Turbidty (NTU)	Cu (mg/L)	Fe (mg/L)	Zn (mg/L)	TDS (mg/L)	Al (mg/L)
SW # 1	7.51	nd	6.87	0.03	nd	2	2.4	0.002	0.92	nd	35	0.33
SW # 2	5.02	nd	6.93	0.03	nd	2	3.7	0.004	1.34	nd	40	0.41
SW # 3	5.48	36	6.20	0.07	nd	2	62.8	0.005	6.12	nd	70	2.50
SW # 4	6.12	2	6.96	0.09	nd	2	11.5	0.002	1.29	nd	80	0.64

nd – not detected NTU – nephelometric turbidity units

Checked by:
.....
Laboratory Manager

Copied to: Mr. Anton Dey, Manager-Soils and Plant Nutrition, Guysuco. Inc.

APPENDIX H – Map showing the outline of the Base Camp