Management of Bio-Medical Wastes

General
The Environmental Health Division of the Ministry of Health (MOH) conducted a Biomedical Waste Survey during the months of March and April 2003. The survey was carried out in Public Hospitals, Private Hospitals (Nursing Homes), Accident and Emergency Health facilities, Health Centers, Dental Clinics, Funeral Homes and Medical Laboratories.

A summary of the numbers of sites visited and the amounts of general and biomedical waste generated is given in Table 1.

### Summary of Biomedical Waste Generation
Sample of Public and Private Facilities*
March, April 2003

<table>
<thead>
<tr>
<th>Type of Facility</th>
<th>Number</th>
<th>Number Visited</th>
<th>Total Waste Generated (t/month)</th>
<th>Biomedical Waste (t/mo) (%)</th>
<th>Total Waste Generated (t/mo) prorated</th>
<th>Biomedical Waste (t/mo) prorated to total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Hospitals</td>
<td>14</td>
<td>11</td>
<td>38.6</td>
<td>2.7 (7)</td>
<td>49.1</td>
<td>3.4</td>
</tr>
<tr>
<td>Emergency Facilities</td>
<td>5</td>
<td>5</td>
<td>13.2</td>
<td>0.6 (5)</td>
<td>0.6</td>
<td>0.6</td>
</tr>
<tr>
<td>Private Hospitals</td>
<td>15</td>
<td>8</td>
<td>21.7</td>
<td>1.1 (5)</td>
<td>40.7</td>
<td>2.1</td>
</tr>
<tr>
<td>Health Care Clinics</td>
<td>104</td>
<td>38</td>
<td>19.7</td>
<td>3.4 (17)</td>
<td>53.9</td>
<td>9.3</td>
</tr>
<tr>
<td>Funeral Homes</td>
<td>35</td>
<td>10</td>
<td>14.8</td>
<td>1.6 (11)</td>
<td>51.8</td>
<td>5.6</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>173</strong></td>
<td><strong>72</strong></td>
<td><strong>108</strong></td>
<td><strong>9.4</strong></td>
<td><strong>196.1</strong></td>
<td><strong>21</strong></td>
</tr>
</tbody>
</table>

* Dental facilities accounted for negligible amounts of waste and are excluded

Overall, about 108 tons of general hospital/clinic waste is produced each month in the facilities surveyed which would indicate that about 196 tons per month were generated overall (equivalent to 2,400 tons per year). Of this amount, about 10% on average is biomedical waste, of which almost all is considered to be infectious waste. While the generation of general waste is relatively homogenous across types of facility (with the exception of emergency facilities), a preponderance of the biomedical waste is generated in numerous, small, and decentralized health care clinics. This implies that reliable and secure transportation is as significant factor in the safety of the overall system as may be in-house collection, sorting, handling and treatment.

**Legal Framework**

While there are laws which govern the management of waste in general, Trinidad and Tobago do not have a body of regulation dedicated to the specific issues of Biomedical Waste Management.
Among the sources of current regulation are:

- **Public Health Ordinance (1950)**. This Ordinance is used to control general conditions which may adversely impact on public health. To a large extent it addresses:
  - Vector Control
  - Food and Water Quality
  - Approval of Building Plans
  - Domestic Waste Disposal

- **The Environmental Management Act (2000)**. This Act deals specifically with Pollution Control and at present the emphasis is on the Industrial Sector.

- **Private Hospitals Act**. This is an instrument which can be used to exert control in Private Health Facilities, but will require the enactment of appropriate regulation.

A number of topics are not specifically treated including the definition of various categories of waste making the identification of “biomedical” and “infectious” waste transparent and actionable; the transportation of such wastes and residues; the differentiated treatment and disposal of such wastes and the definition of mandatory management structures for consistent collection, treatment and disposal.

In light of the above observations, a framework for assuring the effective monitoring and control of the Biomedical Waste environment may require the improvement in relevant legislation.

**Biomedical Waste Management Practices**

Despite the absence of a complete legal and regulatory framework and documented protocols for Biomedical Waste Management, the practices employed at the health institutions have emerged from the background of infection control and in fact the hospital infection control committees have done quite well. However, there is no organized record keeping in the system. Each institution benefit from specific Biomedical Programs with clearly identified budgetary financing. There is also the risk that without adequate framework and protocols, there is a risk to the present systems from a change in the volume and character of the potentially infectious wastes that an expanded HIV/AIDS treatment and control program might create.

While segregation, collection, treatment and disposal of waste are in general satisfactory, there still remains the need to address the issue of open burning at the Port of Spain General Hospital.

**Assessments of Types of Facilities**

1. **Public Hospitals**

The survey covered 11 of 14 such facilities. These produce about 17% of all biomedical waste. There was little record keeping in these institutions on medical waste generated. Approximate figures were made available by quality control officers, nursing administrator.

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1 This section is summarized from an audit report prepared by the Environmental Health Division, Ministry of Health, April 25, 2003. Specific facility-by-facility data are included in that report.
There were no written guidelines with respect to collection, storage and disposal of health care waste. However, there was a working system of waste segregation at all hospitals and health care facilities.

Incinerators were operating at Port of Spain, San Fernando Caura, Mt. Hope and Sangre Grande. The Port of Spain incinerator is in disrepair and non functional leading to open burning. The San Fernando, Caura, Mt. Hope and Sangre Grande incinerators are in good working condition. The Point Fortin, Mayaro, and St. Ann's incinerators are non-functional. Amoco and Atlantic LNG have committed to provide incinerators for Mayaro and Point Fortin Hospitals respectively. Sharps items are collected at all health care institutions in red/white plastic bins. These bins are collected for incineration at Mt. Hope, Sangre Grande and San Fernando Hospitals. All ash wastes from incinerators are bagged and disposed of at the landfill sites.

All infections waste/pathological wastes were collected in biohazard bags, which are red in color or black bags red banded. The waste was then incinerated. General wastes at the hospitals were removed by contractors and at the health facilities by the Regional corporations.

All body fluids and washings from the mortuary and laboratory wastes were disposed of in the sewer. All used chemicals were neutralized before disposal into the sewer. Laboratory facilities existed at Mt. Hope, San Fernando, Port of Spain, Sangre Grande and Caura.

All expired drugs at the government institutions were kept for inspection by Food and Drugs Division before disposal. All packaging materials were disposed of as general garbage. Pressurized containers were disposed of as general garbage at all the institutions.

All infectious wastes/pathological waste generated at St. Ann's, St. James Medical Complex, and RadioTherapy Centre were sent to Mt. Hope for incineration. Staff was provided with adequate protective gear.

2. Accident and Emergency Facilities:

Five (5) Accident and Emergency health facilities or 100% were surveyed in this exercise. Health care waste accounted for 4.9% of the total waste produced (general and health care waste). All sharps were collected in the prescribed bins and sent to Mt. Hope, Sangre Grande or San Fernando Hospitals for incineration.

Although segregation of waste is practiced, infectious waste produced is removed with general wastes by the Regional Corporation. The incinerator at Chaguanas is non-functional. All liquid bio-medical waste go into roadside drain or into the septic tank and general waste produced is removed by the Regional Corporations.

Hospital staff are provided with adequate protective gears. Ground staff, who remove wastes from hospital, are only provided with gloves. However, there are no written guidelines for the collection, storage and disposal of health care waste.

3. Private Hospitals and Nursing Homes

Out of a total of fifteen (15) Private Hospitals, eight (8) or 53% were surveyed. Of the total waste produced by these facilities, health care waste accounted for 5.25%. Incinerators were provided at
Medical Associates, Surgi Med and Augustus Long Hospital for disposal of infectious, pathological waste and sharps.

Southern Specialist center practices open burning in a concrete bin. St/ Augustine Private Hospital sends their wastes for incineration to Mt. Hope (EWMSC). Sharps, infectious waste and pathological waste produced at Gulf View Medical Complex are sent to Kaizen Environmental at Pointe-a-Pierre for incineration.

Segregation of waste is practiced at all the private hospitals. However, there was no proper record keeping on waste generated. Approximate figures were provided by the matron, store manager and maintenance staff.

The nursing assistants and wardsmen handle the waste in the building and the ground staff removes waste to the outside. The hospital staff was provided with adequate protective gears, the ground staff were provided with gloves.

All liquid wastes, laboratory wastes produced at private hospitals were disposed of into the sewer in sewered areas. Where no such facility existed, liquid wastes (biomedical) were disposed of into roadside drains. Removal of general wastes and ash from incinerators were taken by the regional corporations and private contractors.

There were no written guidelines for the collection, storage and disposal of health care waste.

3. Health Centers

Out of a total of 104 Health Centers in Trinidad 38 or 37% were surveyed. This class of facility accounts for the largest volume of biomedical waste (almost 50%). However, as elsewhere, there were no records of medical waste generated at these facilities with respect to type and quantity.

There were no written guideline concerning collection, storage and disposal of health care waste.

None of the staff handling health care waste had any formal training in handling such waste except some nurses in cases as they relate to Aids patients.

Eighty percent 80% of the waste generated at these facilities can be categorized as general waste (kitchen etc.). Twenty percent 20% can be categorized as medical waste. This includes sharps, dressings, protective gear (gloves, linens, blood, aprons etc.)

At all these institutions sharps were collected in plastic bins (red and white) designated for this purpose. These are taken to different sites for incineration, e.g. Sangre Grande District Hospital, Eric Williams Medical Complex and San Fernando General Hospital. The containers as well as the sharps are incinerated.

At some health centers e.g. Arima and Sangre Grande some dressings are collected and sent for incineration. However at other Health Centres this waste is put out with general waste to be collected by the various Regional Corporations. At some health centers where collection of waste by the regional corporations was not regular some burning was carried out.

All liquid waste is washed into public drains, septic tanks or sewer systems. All staff was generally provided with adequate protective gear, (gloves, aprons, face masks etc.).
All expired drugs are kept at the dispensaries until checked and disposed of by the food and drugs division.

There were no designated areas at these facilities for the temporary storage of waste before collection by the Regional Corporations. However the waste was stored in closed areas. It should be noted that some of the health centers surveyed were housed at temporary locations due to renovation works at the permanent locations, this has resulted in inadequate space at these facilities, creating problems re-storage of waste.

5. **Funeral Homes**

Of the thirty-five (35) Funeral Homes in Trinidad ten (10) or 29% were surveyed. Again, records of waste generated at Funeral Homes are not kept.

Protective clothing is up to required standards and the international code of handling of the dead is practiced. Infectious wastes are placed in garbage bags and are disposed of as general waste except at Belgrove Funeral Home where they are incinerated and ash placed in garbage bags for removal by the respective Regional Corporations. With respect to Dass Funeral home, general waste and infectious waste are taken to the landfill site at Claxton Bay. All sharps are placed in 300ml Plastic bottles and is disposed of as general garbage.

Ash (cremains) are removed by relatives of the deceased or placed in cremation gardens at Belgroves and the St.James crematorium. All body washings from Dass and Belgrove Funeral Homes enter the central Sewer system. The others surveyed disposed of their liquid waste into septic tank and S/A pits. The embalming process involves placing the chemicals into the jugular vein replacing the blood. The blood (body fluids) is disposed of into the sewer/septic tank system.

Victoria Laboratory at Chaguanas is a branch of the Victoria Laboratory of Vistabella. All body fluids are disposed of at the Laboratory in Vistabella. Chemicals are neutralized before disposal.

All body parts are placed within the corpse. No body parts are disposed of outside the body. The corpses are brought prepared for cremation from the funeral homes at the St.James crematorium. The cremains are either taken away by the relatives of the deceased or those unclaimed is buried on the compound. One acre of land is provided for this purpose.

**Conclusions and Action Plan for Improving Biomedical Waste Management Practices**

The Survey shows that there is an adequate level of segregation, in-house handling, treatment and ultimate disposal of most biomedical wastes, although there are gaps in management, equipment, incineration and treatment that present risks to the integrity of the overall system. This results in part from the system being derived from the application of general infection control practices, and not seen as a specifically targeted or regulated area of attention.

Improving the situation, and mitigating the risks would be addressed through a set of system-wide interventions as follows:

(a) Improving the legal and regulatory framework: Consultants would review the legal and regulatory framework that exists and propose improvements in
definitions, management arrangements, scope of coverage of regulation to include the transportation of wastes and residues and site disposal.

(b) Codification of practices: In consultation with facility management and with the support of outside experts, practices and procedures would be codified, to assure that all steps in the system were specifically covered, and that “international standards” were being applied.

(c) Clarification of management responsibilities: From practice and regulations, facilities would reinforce and/or establish biomedical waste management responsibilities in clear personnel assignments.

(d) Staff training and development: The MOH would organize and conduct a program to train and familiarize employees in all of the 173 facilities with the new guidelines and protocols that have been developed. It would then continue to monitor the application of these under the authority of the revised regulatory framework.

(e) Upgrading facilities and equipment: The application of new practices would be supported with a complement of small equipment and specific site improvements and/or equipment repairs as necessary for their application (protective gear, trolleys, bins and containers, monitoring and recording equipment, fluid waste containers and piping, etc.). In addition, consultants would review the system demands for inter-site transportation of wastes, incineration and disposal, leading to a recommendation for investments in new incineration and disposal technology. These investments would also be financed.

The Ministry of Health, with the support of the Project Coordination Unit (PCU), would manage the implementation of the above action plan to be supported under the project. A budget envelope of about US$ 2.8 million would be allocated for these activities.

Civil Works to be Financed Under Proposed Project

The objective of the interventions to improve the infrastructure as part of the proposed project would be to enhance the response capacity of health facilities to provide quality services and scale up the HIV/AIDS program. During project preparation, the project team conducted site visits and met with the directors and staff of health facilities, and with the Project Administrative Unit of IDB (currently financing a Health Sector Reform Program through the Ministry of Health), in order to identify and confirm a list of sites requiring space conditioning and construction with World Bank project financing. These sites would include: the National Public Health Laboratory, QPCC&C, National Blood Bank, ambulatory health centers and those that require some smaller reforms for the installation of the information system. Needs include:

i) The National Public Health Laboratory would be replaced owing to its deterioration and limited size. Based on the actual equipment, services and staff, the operation area without expansion of services was established in 9500 square feet;

ii) A new Queens Park Counseling Center and Clinic (QPCC&C) of about 10,500 sq. ft. would be built to meet present demands for space, however, the size could be adjusted when the location of the new building is decided and demand for services reestimated;

iii) National Blood Bank would add about 1,100 sq ft to the current laboratory which is too small for efficient operations;

iv) Seven district health facilities will have small space conditioning reforms to meet the program’s needs; and
v) Four enhanced health centers will be reorganized.

The investment would cost about US$5.4 million and would include construction, studies, designs and supervision of construction. Appropriate complements of equipment valued at US$1.2 million and training valued at US$ 0.1 million would also be financed.

As assessed during project preparation by the Project team, it is expected that the environmental and social impacts resulting from the execution of the above-mentioned civil works during the implementation of the project will be minimal, in view of the following considerations: the vast majority of the interventions are rehabilitation works within the interior of the facilities, thus they will not affect the activities nor the traffic in the neighborhoods. The construction of the new National Public Health Laboratory and the Queen Park Counseling Center and Clinic would take into the account the environmental guidelines listed below for civil works. The project’s Operations Manual, a loan effectiveness condition, will include World Bank’s guidelines and framework in the event of any resettlement caused by the project, alongside guidelines for construction works and for improving biomedical waste management and disposal in the participating institutions.

In addition, the programming of works for the new project would include the adoption of the above guidelines, and in detail in the bidding and contracting documents, for the protection of the environment and occupational safety.

Stakeholder Consultation

The preparation of the biomedical waste management audit involved ample consultation with authorities and staff of health facilities, including private sector providers. Different stakeholders (line ministries, non-governmental entities such as the Medical Research Foundation of Trinidad and Tobago, and other organizations such as the Caribbean Network of People Living with AIDS), more recently during the May 5-9, 2003 period, have provided feedback on project objectives, components, assessments (including technical, environmental, and economic and financial assessments), and implementation strategies. These groups also endorsed the proposed investments, including those contemplated for the strengthening of the biomedical waste management systems in the participating health facilities. The country’s Cabinet, comprised of the Prime Minister and all sectoral ministries, also approved the proposed investments under this project, including the investments needed for improving the biomedical waste management system in participating health facilities.

Management of Environmental Risks of Small Construction Works

The proposed HIV/AIDS Prevention and Control Project in Trinidad and Tobago, building upon the environmental norms and guidelines used during the implementation of the IDB-financed health project, envisages building and/or conditioning available space of several health facilities. In the preparation of the request for proposals, the project’s PCU, along with the line ministries involved, would take into account the following guidelines that will be incorporated in the project’s Operations Manual and Standard Bidding Documents for Civil Works. Particularly, appropriate specifications would be described in the bidding documents for civil works to mitigate environmental risks that may be identified.
Environmental Screening

The PCU would assess the potential environmental risks of the project’s civil works investments which would depend on the type of construction (new National Public Health Laboratory and QP Counseling Center and Clinic, space conditioning in existing facilities), area available (congested vs. open area), the location (urban vs. rural) of the proposed construction and whether it is new work or space conditioning in existing facilities. It may call on the Ministry of Public Works and the Ministry of Health for expert advice on the matter.

Proposals for the new new construction of the National Public Health Laboratory and the Queen Park Counseling Center and Clinic would be screened to identify the following risk of:

(a) Resettlement of families and businesses, the presence of squatters or any other land titling conflicts, this risk is not envisioned in the construction of the new Public Health Laboratory as the proposed site is located within the premises of the existing building that will be demolished;
(b) Interruption or limitation of accesses to dwellings or businesses either permanently or temporarily (during construction);
(c) Encroachment/reduction of green areas, parks, and other recreational areas;
(d) Demolition of buildings of high architectural or historical value;
(e) Deterioration of urban quality and property value in the immediate vicinity of the works or deterioration of unique architectural characteristics in the neighborhood;
(f) Increased accidents in areas with high density of schools, hospitals, and commercial use;
(g) Harming urban infrastructure (sidewalks, power and telephone lines, water and sewerage mains, etc.);
(h) Creating nuisances during construction (dust, wastes, and heavy construction traffic);
(i) Raising natural hazards (floods, soil instability);
(j) Protecting historically and culturally significant sites.

Bidding documents and contracts would specify terms and conditions governing the works activity to minimize and mitigate these risks.

Environmental Management Tools

Environmental considerations for the engineering design

The engineering design of project works would take into consideration: (i) connections of the buildings to the potable water system and the capacity of the existing water distribution network or the need to establish a water supply system for the building (well, storage tank, pumping station, etc.); (ii) connection to the sewerage network and the need for capacity expansion for receiving collectors or the need for a wastewater treatment system for the building (septic tank, infiltration ditch); (iii) the treatment of wastewater before being discharged to the sewerage networks or the wastewater treatment system (iv) the management of runoff and the facilities for
its recollection and evacuation, having in mind the existing downstream systems; (iv) the systems of recollection, storage and transportation of solid wastes generated in the building, incorporating the structures for separation and recycling; (v) appropriate access systems for pedestrians, municipal and inter-municipal buses, bicycles, children and handicapped people; (vii) the need to integrate building design with architectonic characteristics of the surrounding neighborhood; and (vii) avoiding the use of materials such as wood from tropical forests, lead-based paints, asbestos, for example.

Environmental Enhancement

The architectural design for the National Public Health Laboratory building and the QP Counseling Center and Clinic could bring opportunities to incorporate and reinforce the criteria of environmentally friendly buildings. The feasibility of incorporating these aspects into the design would be analyzed during the conceptualization phase of the architectural designs and during the engineering designs. This analysis could include: (i) solar panels to satisfy totally or partially the electricity needs; (ii) rain water storage for the irrigation of gardens and green zones; (iii) maximizing natural light in order to minimize artificial light needs; (iv) planting of native species in gardens and green areas; (v) natural ventilation systems, minimizing the necessities of air conditioning; and (vi) the stabilization of slopes using vegetative measures.

Environmental Management of Construction Activities

Bidding documents would request contractors to address the following issues when deemed significant by the PCU and participating line ministries: (i) pedestrian safety and traffic congestion during construction due to the increase of heavy traffic (of the construction itself and from traffic detours) in high traffic avenues and exit ramps; (ii) dust and particulate materials, causing nuisances to surrounding families and businesses, specially to vulnerable people (children, elders); (iii) undesirable noise levels due to the machinery and equipment specially in areas with hospitals, homes for the elderly, schools; (iv) degradation of lateral streets due to heavy equipment machinery and traffic detours; (v) the interruption of services (water, electricity, telephone, bus routes) during construction; (vi) the adequate disposal of garbage, metals, used oils, and excess material, generated during construction; (vii) the need of informing the population about construction and work schedules, interruption of services, traffic detour routes, provisional bus routes, and (viii) pedestrian security measures, specially for school children, during construction.

Bidding documents would also ask for the identification of suitable sites for waste disposal, the environmental management necessary (compacting, re-soiling and re-vegetation, drainage control), and the associated transportation costs should be included in project design and cost estimates.
Environmental Supervision during Construction

Supervision of construction would include the compliance with the environmental specifications of contracts.

Environmental Measures during the Operational Phase

During the operation phase of the construction of the National Public Health Laboratory and the Queen Park Counseling Center and Clinic adequate provisions would guarantee: (i) the maintenance of the systems of collection and treatment of wastewater; (ii) the adequate collection and disposal of solid waste, incorporating recycling systems and the separation of materials; (iii) the maintenance of complimentary systems (solar panels, etc.). The engineering design should include the preparation of operational manuals and maintenance of all systems.

Public Consultation Prior to the Construction Phase

The PCU may identify the need for community consultation in the area of influence of the proposed new constructions. To this end, a process would be undertaken with the assistance of recognized professionals for disseminating information and generating feedback from stakeholders who may be specifically targeted and the public at large. The consultation program may involve both formal and informal presentations and meetings with the target groups, and information dissemination campaigns.

Institutional Arrangements and Responsibilities for Implementation and Supervision of Mitigation Activities

The Office of the Prime Minister through the PCU will be in charge of managing the implementation and supervision of the mitigation activities identified in this environmental assessment, with the participation of the Ministry of Health.

Implementation Arrangements for Civil Works

Construction and rehabilitation complement will have separate implementation arrangements to ensure the effective implementation of the project’s construction and rehabilitation activities. The PCU will function as the implementation entity of the project, including decision-making on bid awards/contracting, request for disbursement, and payment for contracts. The PCU will (a) review the final designs for new constructions or rehabilitations, the way will be directly or across the consultants; (b) prepare a construction procurement plan; (c) prepare technical specifications; (d) prepare and conduct the bidding process for the constructions and rehabilitations of the hospitals and health centers (a member of the line ministries involved will be included in the evaluation committee to make the award recommendation); (e) verify the equipment inventory; (f) prepare an equipment procurement plan; (g) prepare technical specification for the equipment; (h) prepare and conduct the bidding process for the equipment, centers (a member of the line ministries involved will be included in the evaluation committee to make the award recommendation); (i) prepare contracts for contractors and supervision of their works; (j) prepare payment orders and their documentations for contractors; (k) prepare contracts amendments and the necessary documentation; (l) manage breach of contracts and contractor complaints; (m) maintain contract accounts and contract management reports in a manner acceptable to the World Bank, (n) prepare periodic reports for physical/financial and procurement plan monitoring; and
(e) prepare all technical and financial reports requested by GOTT and the Bank. The PCU will be 
responsible for the quality of the construction and the opportune implementation of contract 
schedules. Also, the PCU will be responsible for contracting the consultants, inspectors and all 
the personnel to do a good supervision of the works.

Others activities of the PCU will be to draft and process construction contracts, review documents 
and forward the necessary documentation to the World Bank to ensure that it has no objection.

**Phases to the Rehabilitation /or New Constructions**

**Feasibility Phase:** This phase includes an analysis of the rehabilitation of internal functionality of 
the each Health Center that conduct to make suitable the HIV/AIDS programs, likewise inside 
this phase to be revised the studies and plans that have been executed for the new installations of 
the National Public Health Laboratory and the Queen Park Counseling Center and Clinic. The 
final product will be a master plan for the rehabilitation and new works included into for the 
national network of HIV/AIDS programs.

**Design Phase:** The design phase includes the preparation of design briefs of each Health Centers 
and the new National Public Health Laboratory, containing details of the requirements for each 
rehabilitation and new work (as identified in the master plan). The schematics designs will be 
approve by the Secretariat, and finally, the detailed design will be executed with the technical 
construction specifications, quantity of materials, unit prices and total costs. As part of the design 
phase, technical environmental specifications for construction management will be prepared that 
will be applied to the all works.

Once detailed designs are finalized and agreed upon by the GOTT, any modifications that are 
deemed necessary will be introduced prior to the preparation of bidding documents. The 
Secretariat will be prepared the bidding documents for review by the Bank. The Secretariat and 
the GOTT conduct the bidding process jointly. All this process will be agree with the master plan. 
The PCU would hire according to the Guidelines of the Bank, consultant companies with 
experience verified in these tasks.

**Construction Phase:** Construction phase will be managed by the PCU, with the support of a 
supervision company. Main responsibility would be to ensure the quality of the construction and 
its timeliness. The PCU will develop an information system to keep track of subcomponent cost 
and physical advance. The PCU will hire supervision companies, which will assign teams to 
supervise each one of the works during the full construction period. These companies will 
supervise construction progress and prepare the necessary documentation and payment orders to 
pay contractors as specified in the individual contracts. It will also contract inspectors to assess 
the quality of building materials employed and ensure they are complying with agreed standards. 
The PCU will be make the payments from the contracts.