

## **APPENDIX A**

- EIA Terms of Reference

TERMS OF REFERENCE  
ENVIRONMENTAL IMPACT ASSESSMENT  
BELIZE SOLID WASTE MANAGEMENT PROJECT  
TC-96-01-37-0

I. INTRODUCTION

- 1.1 This section should state the purpose of the terms of reference, identify the development project to be assessed, and explain the executing arrangements for the environmental assessment.
- 1.2 Background Information. Pertinent background for potential parties who may conduct the environmental assessment, whether they are consultants or government agencies, would include a brief description of the major components of the proposed project, a statement of the need for it and the objectives it is intended to meet, the implementing agency, a brief history of the project, (including alternatives considered), its current status and timetable, and the identities of any associated projects. If there are other projects in progress or planned within the region which may compete for the same resources, they should also be identified here.
- 1.3 Objectives. This section will summarize the general scope of the environmental assessment and discuss its timing in relation to the processes of project preparation, design, and execution.
- 1.4 Environmental Assessment Requirements. This paragraph should identify any regulations and guidelines which will govern the conduct of the assessment or specify the content of its report. They may include any or all of the following:
  - a. national laws and/or regulations on environmental reviews and impact assessments;
  - b. regional, provincial or communal environmental assessment regulations;
  - c. environmental assessment regulations of any financing organizations involved in the project.
- 1.5 Study Area. Specify the boundaries of the study area for the assessment (e.g., water catchment, airshed). If there are any adjacent or remote areas which should be considered with respect to impacts of particular.

1.6 Scope of Work. In some cases, the tasks to be carried out by a consultant will be known with sufficient certainty to be specified completely in the terms of reference. In other cases, information deficiencies need to be alleviated or specialized field studies or modelling activities performed to assess impacts, and the consultant will be asked to define particular tasks in more detail for contracting agency review and approval. Task 4 in the Scope of Work is an example of the latter situation.

1.7 Task 1. Description of the Proposed Project.

a. For project improvements to solid waste collection, include: physical layout of the neighborhoods to receive improved collection; social, cultural and economic conditions of the neighborhoods to receive improved collection; and description of the project elements, including method of collection proposed, pilot tests to confirm the proposed collection method as appropriate, pre-implementation activities of public education and involvement, cost recovery systems, equipment specifications and procurement plans, implementation plans, operation and maintenance procedures, responsible parties for each aspect of the system.

b. For project improvements to solid waste transfer and disposal, include: ① physical layout of the overall urban area to be served by transfer and/or disposal facilities, including mapping of all major roads; ② strategic siting of the facilities, including economic justification for the overall strategic plan of collection service areas, direct haul routes, transfer stations, transfer routes and disposal locations; ③ physical, ecological and demographic setting of facilities, including surrounding land use characteristics, proximity to residential neighborhoods, location of public water supply sources and private wells, direction of ground water flow, uses of surface waters, prevailing wind direction; and description of the project elements, including layout of proposed facilities (e.g., fencing, buildings, weighbridges, roads, ramps, drainage, gas and leachate control systems, monitoring wells); construction schedule, operating plans, closure plans, long-term monitoring plans, and responsible parties.

1.8 Task 2. Description of the Environment.

a. For project improvements to collection systems:

Physical environment: neighborhood layout, showing locations for communal containers, stops for truck during block collection, or streets served by curb-side collection; conditions of road or walkway access for collection equipment; and climate and meteorology, as it affects refuse containment and frequency of collection.

Socio-cultural environment: population density and demographic level by neighborhood; community structure of local leaders and traditional public involvement process; employment and other activities indicating patterns of movement to and from neighborhood; education level with regard to sanitation and public health; and customs and attitudes relative to cooperation with collection system.

b. For project improvements to transfer and disposal facilities:

Physical environment: location of proposed facilities with regard to nature of surrounding land uses and proximity to homes and other establishments; existing road and traffic conditions in the area of proposed facilities, versus proposed road and traffic conditions; existing topography and proposed changes, including area which will be affected by any visible aesthetic impacts; soils and geology; surface and ground water hydrology, and hydraulic connections between the proposed sites and receiving waters downgradient of the sites; existing and proposed uses of receiving waters, including location of private and public water supply wells and intakes; climate and meteorology, including prevailing wind direction.

Biological environment: flora and fauna; sensitive habitats (e.g., wetlands delineation); and rare, endangered, or commercially important species.

Socio-cultural environment: past uses of sites and consideration of any historic significance; land use and demographic character of surrounding neighborhoods; planned development activities; education, awareness, and sensitivity of public to proposed siting of facilities; and public concerns over traffic, insects, noise, dust, odor, smoke, or aesthetic issues.

1.9 Task 3. Legislative and Regulatory Considerations:

a. Describe national laws and local ordinances which delineate the solid waste management responsibility and authority delegated to local government. Describe national laws and guidelines which define the design and operating standards which local governments are to meet in the conduct of their responsibilities. Include description of any environmental standards which are to be met, including any requirements for submission of environmental monitoring data or environmental impact assessment statements by local governments to the national government. Describe local ordinances which govern citizen responsibility to participate in and cooperate with the solid waste system.

b. Discuss the extent to which the local government uses education, inspection and enforcement to assure compliance with the available regulations. Describe the technical assistance,

environmental monitoring, and regulatory enforcement activities provided by national and provisional government as a support to local government operations and actions.

1.10 Task 4. Determination of the Potential Impacts of the Proposed Project.

- a. For solid waste projects, there are numerous potential impacts to be reviewed as a part of design. For the most part, well conceived designs will minimize adverse impacts. Also, many potential impacts can be minimized by altering operating practices.
- b. There are some potential impact issues whose consequences would be environmentally significant over the long term. With regard to these impact issues, special studies conducted as a part of environmental impact assessment are recommended. Specifically, prior to design of a land disposal site, borings need to be drilled both on-site and off-site to assess the character of soils and geology and confirm the flow of ground water. Data from these borings coupled with information on rainfall and infiltration should be used to make a simple determination of the quantity of leachate which could be generated and released from the land disposal site and its potential effect on the nearest receiving water.

1.11 Task 5. Analysis of Alternatives to the Proposed Project. Describe alternatives that were examined in the course of developing the proposed project and identify other alternatives which would achieve the same objectives. The concept of alternatives extends to siting, design, technology selection, construction techniques and phasing, and operating and maintenance procedures. Compare alternatives in terms of potential environmental impacts; capital and operating costs; suitability under local conditions; and institutional, training, and monitoring requirements. When describing the impacts, indicate which are irreversible or unavoidable and which can be mitigated. To the extent possible, quantify the costs and benefits of each alternative, incorporating the estimated costs of any associated mitigating measures. Include the alternative of not constructing the project, in order to demonstrate environmental conditions without it.

1.12 Task 6. Development of Management Plan to Mitigate Negative Impacts. Recommend feasible and cost-effective measures to prevent or reduce significant negative impacts to acceptable levels. Estimate the impacts and costs of those measures, and of the institutional and training requirements to implement them. Consider compensation to affected parties for impacts which cannot be mitigated. Prepare a management plan including proposed work programs, budget estimates, schedules, staffing and training requirements, and other necessary support services to implement the mitigating measures.

- 1.13 Task 7. Identification of Institutional Needs to Implement Environmental Assessment Recommendations. Review the authority and capability of institutions at local, provincial/regional, and national levels and recommend steps to strengthen or expand them so that the management and monitoring plans in the environmental assessment can be implemented. The recommendations may extend to new laws and regulations, new agencies or agency functions, intersectoral arrangements, management procedures and training, staffing, operation and maintenance training, budgeting, and financial support.
- 1.14 Task 8. Development of a Monitoring Plan. For solid waste projects which include a land disposal facility, environmental monitoring should include gas and ground water monitoring wells and a regular schedule of monitoring for key indicators of contamination. If the land disposal site has a gas collection and ventilation system, periodic monitoring of the composition of gas being discharged from the vents is recommended. Also recommended is periodic monitoring, on-site and off-site with a portable meter, of the ambient air's oxygen and combustible gas levels. Similarly, for projects which include an incinerator or resource recovery plan, environmental monitoring should include air quality monitoring of stack gases.
- 1.15 Task 9. Assist in Inter-Agency Coordination and Public/NGO Participation. Assist in coordinating the environmental assessment with other government agencies, in obtaining the views of local NGO's and affected groups, and in keeping records of meetings and other activities, communications, and comments and their disposition.
- 1.16 Report. The environmental assessment report should be concise and limited to significant environmental issues. The main text should focus on findings, conclusions and recommended actions, supported by summaries of the data collected and citations for any references used in interpreting those data. Detailed or uninterpreted data are not appropriate in the main text and should be presented in appendices or a separate volume. Unpublished documents used in the assessment may not be readily available and should also be assembled in an appendix. Organize the environmental assessment report according to the outline below.
- . Executive Summary
  - . Policy, Legal and Administrative Framework
  - . Description of the Proposed Project
  - . Baseline Data
  - . Significant Environmental Impacts
  - . Analysis of Alternatives
  - . Training
  - . Environmental Mitigation or Environmental Management Plan
  - . Environmental Monitoring Plan
  - . Appendices:
    - List of Environmental Assessment Preparers
    - References
    - Record of Interagency/Forum/Consultation Meetings

- 1.17 Consulting Team. For solid waste projects, an optimum consulting team would include the following, in order of priority: civil engineers with experience in solid waste collection and disposal; hydrogeologists with experience in ground water pollution control; sociologists or psychologists with experience in community participation in project design and operation; land use planners with experience in facility siting; biologists with environmental assessment experience in facility siting; and meteorologists with experience in air pollution control.
- 1.18 Schedule. Specify dates for progress reviews, interim and final reports, and other significant events.
- 1.19 Other Information. Include here lists of data sources, project background reports and studies, relevant publications, and other items to which the consultant's attention should be directed..

## **APPENDIX B**

- List of Environmental Assessment Contributors

## **APPENDIX B List of Environmental Assessment Contributors**

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<b>Team Member</b>	<b>Affiliation</b>	<b>Component</b>
<b>Dr. B. Thompson</b>	<b>Stantec Consulting International Ltd Edmonton, Alberta, Canada</b>	<b>EIA Team Leader, Report Preparation</b>
<b>Mr. P. Garcia</b>	<b>Stantec Consulting International Ltd Belize</b>	<b>Local Environmental and Institutional Issues</b>
<b>Mr. N. Nutall</b>	<b>Stantec Consulting International Ltd Edmonton, Alberta, Canada</b>	<b>Project Design Features Overall Project Co-ordination</b>
<b>Dr. D. Hackbarth</b>	<b>Stantec Consulting International Ltd Edmonton, Alberta, Canada</b>	<b>Geology and Hydrogeology</b>

## **APPENDIX C**

- **Siting Matrix**

# Government of Belize: Belize Solid Waste Management Project Environmental Impact Assessment: Criteria for Siting a Major Sanitary Landfill

Criteria	Sites	Site 1 Mile 27 South of Highway	Site 2 Aren East of Hattleville Prison	Site 3 Mile 7 Sand Quarries to South of Highway	Site 4 Limestone Quarries at Mile 21	Site 5 Big Falls Road at Mile 24+	Site 6 Mile 29 Adjacent to Zoo North of Highway	Site 7 Mile 29 Across Highway from Zoo	Site 8 Mile 33 North of Highway	Site 9 Mile 34.5 South of Highway	Site 10 Mile 34.5 North of Highway	Site 11 Ladyville Transfer Site In Subdivision	Site 12 Mile 22 Site	Site 13 Mile 24 Site	Site 14 Ladyville/Sandhill Old Army Shooting Range	Site 15 Mile 38 South of Highway, subdivision
<b>Stage I: Criteria that can be Observed by Site Inspection:</b>																
- water wells within 500 metres		n	n	n	y	n			n		n	n	n	n	n	n
- environmentally significant wetlands on site		n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
- protected forests on site		n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
- open areas that would allow litter to blow off site		n		n	n		n		n	n	-	n				
- major powerlines on site		n	n	n	n			n	n	n	n	n	n	n	n	n
- mining activity under/on the site		n	n	n		n	n	n	n	n	n	n	n	n	n	n
- residential development within 500 metres of site		n	n	n	-				n	n	n	n	n	n	n	n
- site is visible from adjacent development		n							y	n	n		n	n	n	
- permanent stream within 300 metres, down-gradient of waste cell		n	n	n	-	n	n		n		n	n	n	n	n	-
- airport within 3000 metres		n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
- site on a flood plain, or area prone to flooding		n	-		n	n	n	n	n	n	n	n	n	n	n	n
- no politically sensitive sites within 1000 metres		-		n	n				n	n	n	n	n	n	n	n
- site has potential life for wastes, 10 plus years		y	y	y	y	y	y	y	y	y	y		y	y		y
- using transfer stations, site is within 2 hours travel time		y	y	y	y	y	y	y	y	y	y	y	y	y	y	y
- access to site from major paved roadway		y			y	y	y	y	y	y	y				y	y
- site has gentle slopes to encourage stormwater drainage		y				y	y	y	n	y	y		y	y		y
- site has area suitable for onsite leachate treatment		y	n	n	n	y	n	n	y	y	y		y	y	-	-
- site has extra land for ancillary functions (i.e., recycling)		y	y	y	-	y	y	y	y	y	y		y	y		y
- site is suitable for residential development		y	n	n	n	y	y	y	n	n	y		-	-	-	
- site located to economically serve majority of waste from Belize City and environs		y	y	y	y	y	y	y	n	n	n	y	-	-	y	n
- site able to provide wet weather disposal area		y	y	y	y	y	y	y	y	y	y	y	y	y	-	y
<b>Stage II: Secondary Criteria Involving Field Test Programs</b>																
Note: Only sites that have had a field testing program will be presented in Section II.																
- no seismic risks		n												n		
- no geologic structures or faults on or near site		n												n		
- groundwater levels 1.5 metres or greater below base of waste cells		y												y		
- waste cell base to have 1 metre of low permeability soil (K=10 <sup>-9</sup> n/s)		y												y		
- adequate excavated material for cover based on 6:1 ratio		y												y		
- land is available for proposed use		y												y		

**Legend:**

y	Yes
n	No
-	Neutral Assignment
	Constraint to Site Location

**Appendix C  
Siting Matrix for Selecting a  
Landfill for the Western  
Corridor**

## **APPENDIX D**

- Meeting Minutes  
Stakeholder's Meeting,  
June 1, 2001

**Minutes of the Meeting  
of the  
Project Advisory Committee (PAC)  
National Solid Waste Management Project  
June 1, 2001  
National Fire Service  
Belize City, Belize**

**Present were:** Ambassador Charles Tsai, Embassy of the Republic of China  
Mr. Ismael Fabro, Chief Environmental Officer  
Mr. Norm Nutall, STANTEC  
Mr. José Garcia, Chairman-National Solid Waste Management Authority  
Mr. Harold Arzu, Inter-American Development Bank  
Ms. Sharon Lindo, Ministry of Foreign Affairs  
Mr. Kenrick Leslie, America-Belize Investment Company  
Mr. Henry Gordon, America-Belize Investment Company  
Mr. Wilfred Elrington, Legal Representative for Jih Chan Company  
Ms. Chantalle Clarke, Department of the Environment  
Residents of the Jih Chan Residential Area (**See Names Attached**)

**1. OPENING OF THE MEETING:**

1.01 Mr. Ismael Fabro called the meeting to order at 9:20 a. m.

Mr. Fabro gave a brief presentation on the National Solid Waste Management Project and its status, leading up to Cabinet's decision to relocate the Sanitary Landfill from Mile 27 to Mile 22 on the Western Highway. Mr. Norm Nutall gave a brief explanation of the methodology and technical criteria used for the selection of the Sanitary Landfill Site and the issues associated with these types of development. Mr. Garcia then gave a presentation on the description of the new proposed site in relationship to other landowners and other proposed developments adjacent to the area.

**2. MATTERS ARISING FROM THE MEETING (PRESENTATIONS):**

***Issues raised by the Residents of the Jih Chan Residential Area and American-Belize Investment Company***

2.01 Inquiries were made by the two parties with respect to the basis upon which Cabinet made its decision to relocate the proposed sanitary landfill site from Mile 27 to Mile 24, both of which are located on the Western Highway.

2.02 It was mentioned that during the Public Consultation Process, information was made available to the public on the proposed sanitary landfill site at Mile 27 and that those who would have been impacted had formed a very strong advocacy against the site. This had probably impacted on Cabinet's decision to relocate the site.

- 2.03 The question was raised that if a similar advocacy against the Mile 24 site would develop, as was the case with the Mile 27 site, would Cabinet make a decision to relocate the sanitary landfill to another site.
- 2.04 Concerns were raised by the residents with respect to the potential negative impacts and financial implications associated with the relocation of the sanitary landfill site to Mile 24. Such concerns included the possible contamination of ground water and the percentage increase in capital and operational costs for the Mile 24 site, as opposed to the projected cost associated with Mile 27 site.
- 2.05 Both the representatives of Jih Chan and Black Orchid Gardens expressed concerns of the potential impacts that the new sanitary landfill could have on the surrounding environment of the area and their communities.
- 2.06 Residents also inquired whether the Mile 24 Site will be required to have an EIA prepared for it or whether Cabinet's Decision to relocate was final, with the site not having to undergo the EIA process.
- 2.07 Participants also expressed the need to give the potential impacts on nearby residents, priority consideration versus other concerns expressed with respect to Mile 27, such as wildlife and The Belize Zoo.

**3.0 The following comments were made by the members of the Project Advisory Committee (PAC):**

- 3.1 It was explained by Mr. Fabro that the pre-consultation meeting being held is similar to the one that was held for the proposed Mile 27 site. He went on further to explain that the intent of the meeting was to capture any concerns and/or opinions of any person(s)/group(s) concerned, with respect to the Mile 24 Site.
- 3.2 Both of the sites are similar in terms of the geology of the area. However, based on preliminary studies, there is a substantial increase in capital and operational costs for the Mile 24 site compared to the Mile 27 site.
- 3.3 The project will conform with Belize's legal procedural requirements and as such, an Environmental Impact Assessment (EIA) study will be carried out for the Mile 24 site as was conducted for the Mile 27 site.
- 3.4 Mr. Garcia reminded the residents that the proposed Mile 24 Site was approximately 4 km away from the Jih Chan Subdivision which may actually be a short distance further away from the proposed Mile 27.

**4.0 RESOLUTIONS:**

- 4.1 An Environmental Impact Assessment (EIA) study for the project must be conducted as soon as possible for the proposed sanitary landfill site at Mile 24. The EIA process should determine the final decision and costs of the relocation of the sanitary landfill site to Mile 24.

4.2 The EIA study should take into consideration and reflect all the concerns raised by the residents of the Jih Chan Residential Area as well as America-Belize Investment Company.

4.3 The residents must be kept informed of any new information available on the status of the Mile 24 site.

**5.0 ADJOURNMENT OF THE MEETING:**

5.1 The meeting was adjourned at 11:30 A. M.

NAME	ADDRESS	CONTACT NUMBER
Cheng-Hao Yu	Mile 25 Western highway	025-8021
San-O, Yang	Mile 25 Western Highway	025-8021
Wei-Chung Yu	Mile 25 Western Highway	025-8021
Lin Chin Hui	Mile 25 Western Highway	025-8039
Wu Yi Ju	Mile 25 Western Highway	025-8038
Hsiao-Chun, Chiu	Mile 25 Western Highway	025-8013
Tseng Pacemei	Mile 25 Western Highway	025-8033
Chen Chin San	Mile 25 Western Highway	025-8011
Ching Yung Zen	Mile 25 Western Highway	025-6275
Ambassador Charles Tsai	Mile 6 ½ Northern Highway	025-2346
Rick Shi	Mile 25 Western Highway	02-31988
Chin Ming-Yuan	Mile 25 Western Highway	02-508003
Huang, Chin - Li	Mile 25 Western Highway	025-8025
Chin Chang-Ying	Mile 25 Western Highway	02-8013
Wu Kai Cheng	Mile 25 Western Highway	025-8031
Chen Yi-Wen	Mile 25 Western Highway	025-8030
Lee Yiane Yen	Mile 25 Western Highway	025-8004
Chiang Che-Ming	Mile 25 Western Highway	025-6275
Be Yu	Mile 25 Western Highway	025-8013
Yu Ju	Mile 25 Western Highway	025-8016
Shu-Lien	Mile 25 Western Highway	025-8005
Sao Ming-Chang	Mile 25 Western Highway	025-8080
Wu Chen Mei	Mile 25 Western Highway	025-8080