

THE BAHAMAS POST HURRICANE DORIAN RECONSTRUCTION



ENVIRONMENT

MINISTRY OF THE ENVIRONMENT AND HOUSING Department of Environmental Services

1. BACKGROUND

As a result of Hurricane Dorian, the island of Abaco suffered severe damage with almost 100% building damaged in Central Abaco. In some areas this level of building damage has also affected all government services including essential services such as electricity and access to potable water. One hospital is operational; 10% piped water supply has been restored; and there is limited power supply. The initial housing damage assessment indicates that 60% of the houses are uninhabitable, 20% are habitable and 30% need repair and retrofitting. Before accommodations were provided them, Government personnel were unable to stay on the island due to the lack of basic services and therefore frequently travel between Nassau and Abaco to provide services to residents on the island.

Fallen telephone poles, wires, vehicles, concrete, zinc, board and vegetation constitute debris. The debris poses a particular challenge due to unavailability of space on the islands for recycling and disposal and the challenges posed by the removal of debris and regular municipal solid waste by boat to the mainland. The initial estimates, based on satellite imagery and cross-referencing with the preliminary Building Damage Assessment (BDA) data, show nearly 1.7 million m³ of debris on the affected islands. This excludes the household debris of significantly affected main areas such as Marsh Harbour in Abaco which will be cleared separately. Additionally, the pine forests between Marsh Harbour and Coopers Town and the broad-leaved forest on the islands have been heavily affected. It is estimated that in the pine forests at least half of the trees will die due to storm surge; the high wind that destroyed most of the tree cover on the island. Combined the natural vegetation waste will also need to be managed.

2. VISION FOR RESTORING THE LAND AND MARINE ENVIRONMENTS

It is the short-term objective for the Ministry of the Environment and Housing and the Department of Environmental Health Services to restore the land and marine environments of Grand Bahama and Abaco to its pre-Dorian state. Further to that, to seek opportunity to sort and repurpose waste, and develop debris management plans that deliver pristine, healthy and diverse environment to support the desired standard of living.

3. PROJECTS SUMMARY

Demolition and Debris Clearance on Abaco

PROJECT 1: DEMOLITION OF UNSAFE STRUCTURES, CLEARANCE AND REMOVAL

AMOUNT: US\$3 Million

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In North Abaco, partially destroyed homes will have to be demolished and disaster waste and debris managed. While people have started to return to their homes and businesses, the clean-up and demolition of unsafe structures may pose serious health and environmental challenges that need to be considered. Safety measures should be taken to guarantee protection of human health, compliance with regulations, conservation of disposal capacity, reduction of injuries, and minimization of environmental impacts.

Caution should also be used when moving building materials to prevent physical injury or other health impacts. Building materials may contain hazardous materials such as asbestos that, when carried by air, can cause significant health problems.

PROJECT 2: REMAINING DEBRIS CLEARANCE

AMOUNT: US\$50 Million

Managing debris relies not only on the mixed waste streams but also on volumes to be transported and space needed to allocate those. As activities are on-going focusing only on the debris piled alongside the roads and on clearing the shanty towns, (almost 100% of damages: The Mudd, Pigeon Peas, Sand Banks, The Farm Road, Leisure Lee Community) the debris are being transported to a laydown site in Spring City created for this purpose as well as to an engineered landfill cell (Snake Cay) that has been managed as a dumpsite for the last few years.

The problematic of different streams, including hazardous materials, as well as challenging volumes, has created an additional stress to a facility that was already struggling. Fires are the daily nightmare of this dumpsite, with all the health risks associated, not to mention the risk associated of having hazardous and inflammable materials dumped together.

The lack of specific equipment for managing certain debris streams (as organic and vegetative debris, metals, wood) is definitely increasing the volumes being disposed after the Hurricane, with the problematic of increasing the leachate production as well as contributing for the Carbon Footprint.

PROJECT 3: REHABILITATION OF SNAKE CAY DUMPSITE

AMOUNT: US\$7.5 Million

The Great Abaco Sanitary Landfill located on the Snake Cay Road off the Great Abaco Highway was severely impacted as a result of the large quantities of unsorted debris being deposited on site. The mishandling of the landfill, the scarcity of oversight, and the absence of a Landfill Management Plan have resulted in a number of negative impacts, including multiple on-going fires.

In order to rejuvenate this site and reengineer the landfill, all efforts would be made to redesign the footprint with a view to reconstructing the engineered cell and leachate collecting system. This would require extensive renovations of the site and the implementation of a landfill management team to oversee the daily operations in a scientific manner utilizing proper landfill equipment and data collection methodologies.

PROJECT 4: MARINE DEBRIS REMOVAL FROM WATERWAYS

AMOUNT: US\$40 Million

- To remove marine debris, and wreckage from public waterways that may be an immediate threat to lives, public health and safety so as to ensure the economic recovery of the affected communities.

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- To define precise boundaries that are designated for commercial and recreational use that are inundated with marine debris.
- To develop a strategy for the disposal and reuse of debris, including where applicable shipping from The Bahamas.

Clean Energy Projects

PROJECT 5: WASTE TO ENERGY - INCINERATION VS GASIFICATION

AMOUNT: US\$20 Million*

The gasification process represents significant advances over incineration.

- Burn waste and render to ash
- Use Municipal Solid Waste (MSW) as a fuel, burning it with high volumes of air to form carbon dioxide and heat
- Generate electricity using incineration, these hot gases are used to make steam, which is then used to generate electricity

PROJECT 6: WASTE-TO-POWER GASIFICATION PLANT

AMOUNT: US\$20 Million*

- Deliver waste-to-power gasification plant that will help stabilize the cost of electricity for residents and eliminate further environmental damage at the landfill;
- Partner with existing technology as a power source for desalinization of up to 2mm litres of potable water per system, per day;
- Provide technology that will enable Bahamas-based development of waste management policy to eliminate industrial wastes, tires, etc. via gasification;
- Institute a waterside facility to take single-use plastic and other wastes for a fee and use it as a feedstock to produce clean water and energy, while reducing volumes of ocean plastic;
- Reclaim portions of existing site for alternative energy initiatives;
- Eliminate gas flares and fires through the introduction of landfill gas mining in new cells; integrate with alternative energy technology strategies for best use of landfill gas;
- Introduce environmental monitoring to detect and remedy existing environmental hazards, such as groundwater contamination.

TOTAL BUDGET \$40 MILLION PER INSTALLATION

(*Actual cost will be determined based on size of installation)

TOTAL AMOUNT FOR THE 6 PROJECTS: US\$140 MILLION