

2013

PERFORMANCE AUDIT REPORT ON THE NATIONAL SOLID WASTE MANAGEMENT AUTHORITY (NSWMA)



OFFICE OF THE
DIRECTOR OF AUDIT
ANTIGUA & BARBUDA

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EXECUTIVE SUMMARY

The National Solid Waste Management Authority (NSWMA) was established under the Solid Waste Management Act of 1995 (revised in 2005). The Act sets up the NSWMA as a Statutory Corporation within the Ministry of Health; it is governed by a Board of Directors.

The primary function of the NSWMA is the management of solid waste within the state of Antigua and Barbuda. This includes the storage, collection, treatment, and disposal of waste. The NSWMA operates from two locations: an administrative headquarters on Airport Road, and a disposal facility at Cooks Estate.

The audit of the NSWMA was conducted between February and May 2013 through interviews, site visits, and documentation reviews. During the audit the team examined the records for the years 2010–2012.

The audit focused on the processes/procedures for solid waste collection, transportation, and treatment/disposal activities to determine how effectively waste management protects the citizens and residents of the twin island state. Attention was also paid to the potential harmful effects and impact that waste management activities have on the environment.

The NSWMA requires a new landfill that should be properly designed, constructed, and managed to provide a safe alternative to uncontrolled dumping, as well as to protect groundwater from the liquids and chemicals that collect in the landfills. The design of the new landfill should incorporate new disposal techniques and take into consideration the increasing population of Antigua and Barbuda. A properly designed landfill has to be equipped with an earthen or synthetic liner, as the decomposition of waste emits methane – a greenhouse gas that can also cause fire.

Currently the NSWMA faces financial challenges and is operating at a loss. These financial constraints have put the Authority in contravention of the Act that governs it. It is imperative that the Authority use all means necessary to generate maximum revenue. For example, funds are needed to replace the fleet of vehicles that are critical for the effective and efficient operations of the Authority.

Our findings revealed that many of the audit criteria were not met. It is expected that the Authority will implement the recommendations so that it can function as required by the Act and its regulations.

INTRODUCTION

Mandate

1. The primary duties and powers of the Director of Audit are outlined in Cap. 168, Part VI, Section 34 and 39 of the Revised Finance and Audit Act No. 29/1982.
2. In discharging his duties, the Director of Audit is required in terms of Section 34 of the Revised Finance and Audit Act No. 29/1982 to satisfy himself that:
 - (a) All reasonable precautions have been taken to safeguard the collection and custody of revenue, and that the law, directions, and instructions relating thereto have been duly observed.
 - (b) Expenditure has been incurred with due regard to the economy and to the value obtained.
 - (c) Public monies, other than those that have been appropriated, have been dealt with in accordance with proper authority.
 - (d) Adequate regulation, directions, or instructions exist for the guidance of accounting officers and accountable officers.

BACKGROUND

The National Solid Waste Management Authority (NSWMA) was established under the Solid Waste Management Act of 1995 (revised in 2005). The Act sets up the NSWMA as a Statutory Corporation within the Ministry of Health. Governed by a Board of Directors, the NSWMA is currently managed by Ms. Denise Roberts in the capacity of General Manager. The NSWMA has the overall responsibility of managing solid waste generated within the state of Antigua and Barbuda; this includes waste storage, collection, treatment, and disposal.

In addition to the two mainland locations – an administrative headquarters on Airport Road and a disposal facility at Cooks Estate – there is a disposal site in Barbuda. The sanitary landfill in Barbuda is located at Plantation. Barbuda's facilities and equipment include the sanitary cell and leachate treatment lagoon, equipment storage shed and office, two compactor trucks, and one side loader. The facilities are considered to be state-of-the-art and well worth being proud of, considering the size of the Barbudian population.

The Act lists the responsibilities of the NSWMA as follows:

- ✧ The management of solid waste, including ship-generated solid waste in Antigua and Barbuda.
- ✧ Own, operate, or contract facilities and equipment for the collection, treatment or processing, reutilization, and disposal of solid waste, non-hazardous waste, quarantine waste, and liquid waste.

- ⤴ Provide collection and storage facilities at ports, harbours, and anchorages for the reception of ship-generated solid waste.
- ⤴ Train its staff in those aspects of waste management for which they are responsible.
- ⤴ Design, implement, and maintain a programme of public education on waste management.

AUDIT SCOPE

During the audit of the NSWMA a team of auditors examined records for the years 2010–2012. The audit was conducted between 27 February 2013 and May 2013 and included interviews and site visits. However, because of the non-submission of documents, the audit period was extended to 31 July 2013.

Photographs in this report were taken by officers of the Audit Department in March and April 2013.

AUDIT OBJECTIVE

Our audit objective was to determine whether the government's solid waste collection, transportation, and disposal activities effectively protect the citizens and people of the twin island state and the environment from all potentially harmful effects as they relate to waste management activities.

AUDIT METHODOLOGY

The audit team gathered of all information necessary to effectively evaluate the functions and operations of the NSWMA. This was done through interviews, site visits, and review of documents.

LIMITATIONS

During the information-gathering process the audit team conducted interviews and site visits and reviewed various documents that were requested and presented to the team. On a few occasions requests were made for copies of Board minutes and/or financial decisions made by the Board that would have impacted the financial position of the Authority. To date the requested documents have not been presented.

Further requests were made for access to the findings of the accounting review conducted by the private consultant hired by the Board. Up to the date of this report the Board has refused to furnish the audit team with the information. The lack of cooperation from the Board shows total disregard for the importance of the duties and responsibilities of the Director of Audit and the Board's fiduciary responsibilities. It also draws attention to the possibility that the Board is hampering the audit in order to avoid scrutiny that would place the Board in disrepute.

AUDIT FINDINGS

Audit findings for each of the five areas of activities examined are presented in this report, along with recommendations to make the NSWMA more efficient and resourceful.

AUDIT CRITERIA

A. GOVERNANCE AND FINANCIAL MANAGEMENT

1. Senior management and oversight committees

The Authority is governed by a Board of Directors that comprises a Chairman who is appointed by the Minister of Health; the Deputy Chairman; the Town and Country Planner, and the Chief Health Inspector, both of whom are ex officio members; a senior representative from the Ministry of Finance; an environmental engineer; and two members from outside the public service who are appointed by the Minister.

The board meets bimonthly and, according to its business plan, it requires the dissemination of documented policies and procedures and other methods. However, the roles and responsibilities of the General Manager and senior management are not as defined as in other Statutory Corporations.

2. The purpose, authority, and roles and responsibilities of the Board

The business plan outlines the purpose, authority, roles and responsibilities of the Board, especially as they relate to the collective and individual responsibilities of each Board member. It further highlights the expectations for each Board member with regard to such criteria as confidentiality, conduct, attendance at meetings, and conflict of interest.

The other responsibilities of the Board are to:

- ⬆ Lay down the objectives and policies for the conduct of the Authority and to formulate policies on behalf of the Ministry of Health.
- ⬆ Establish broad guidelines for policies that include finance, collection, disposal, and recycling.
- ⬆ Ensure discharge of the Authority's legal obligations.
- ⬆ Maintain continuous control of affairs through periodic reports, accounts and statistics submitted through the General Manager.
- ⬆ Authorize capital investment.

The audit team found that in contradiction to what is stated above, there are indications of micromanagement by the Board. The audit team was unable to determine the rationalisation for the micromanagement of the Authority – whether it is due to the Authority's present financial position, the management style of all parties involved, or the Board's uncertainty about the

competency of the General Manager. Once the General Manager's competency is not in question, it is recommended that the Board focus on its responsibilities, as outlined in the business plan, to enable the General Manager to function effectively.

3. The organization's strategic objectives and mandate

The organization's strategic goals and objectives are as follows:

- ✧ Reduction – This is to be achieved through a public education campaign to reduce the waste that is generated locally in order to make solid waste more manageable for the Authority.
- ✧ Reuse – Reusing items by repairing and donating them to charity and community groups or selling them will reduce waste.
- ✧ Composting and the management of recyclables – Composting is nature's way of recycling organic waste into new soil, which can be used in vegetable and flower gardens, landscaping, and many other applications. Composting programs have been initiated or are ongoing with schools and hotels throughout Antigua and Barbuda.

A public education campaign will be designed to inform more sectors of the population (including community groups) of the benefits of composting. The Rotary Sundown Club recently launched such a recycling initiative. The Authority will work with Rotary Sundown Club and give it maximum support to make sure that this initiative reaches its fullest potential.

- ✧ Waste Treatment and Disposal – Each audience (residential rural, residential urban, industrial, commercial, and institutional) will be educated on the treatment and disposal of the waste they create. The Authority is committed to curtail and eliminate littering, which continues to be a national scourge, through the establishment of litter wardens and the enforcement of the Litter Act and its accompanying regulations.

4. Operational plans that support the strategic objectives

The audit team's interview with the General Manager revealed that one of the biggest challenges is that "there is no governmental priority for waste management at this time." Lack of finances and equipment are seen as two of the biggest obstacles that keep the NSWMA from achieving many of its strategic objectives. Examples include the lack of funding for public education campaigns and for a reliable fleet of compactor trucks that would facilitate the transportation of waste.

5. Financial management policies, authorities, and procedures

An Accounting Procedures and Control, Analytical Financial and Management Guideline was crafted in 2002. This governed the day-to-day activities of the Authority. The document highlighted the purpose, rights, and financial provisions of the Authority and laid out the responsibilities of the Board and management. Procedures were given for the handling of cash receipts and disbursements, procurement of goods and services, fixed assets, and staff services and payroll control.

However, as of 2009, with the establishment of a new Board of Directors, the procedures manual was suspended and nothing has been formally introduced to take its place. No viable reason was given for this. It is unacceptable and incomprehensible that the Authority has been operating for more than five years without any formal guidelines to govern its day-to-day activities. In addition, it was reported by the Waste Diversion and Recycling Manager that some newly implemented procedures have created a “bottleneck in the system.”

One such deficient procedure is the requisition of parts and supplies. In the current process it takes at least a week before the procurement requisition goes to the accountant, and then to the Chairman, for approval. The Chairman only comes in on Thursdays, so urgent requisitions must be delivered to him for approval. This causes additional delays and unnecessary machinery down-time, which is costly to the Authority.

Two examples illustrate how the purchase of small items had to be delayed because of the new process. One was for the purchase of two fan belts costing \$156 and the other was for a roll of duct tape. The 2002 manual, which was revoked, would have given the General Manager the authority to acquire these small items, valued below \$500. In addition, a petty cash float of \$500 that facilitated small transactions was discontinued. In an effort to avoid unnecessary and costly delays to the operations, the audit team recommends that the prior procedures manual be reviewed and reinstituted as soon as possible so that the day-to-day operations of the Authority can function smoothly.

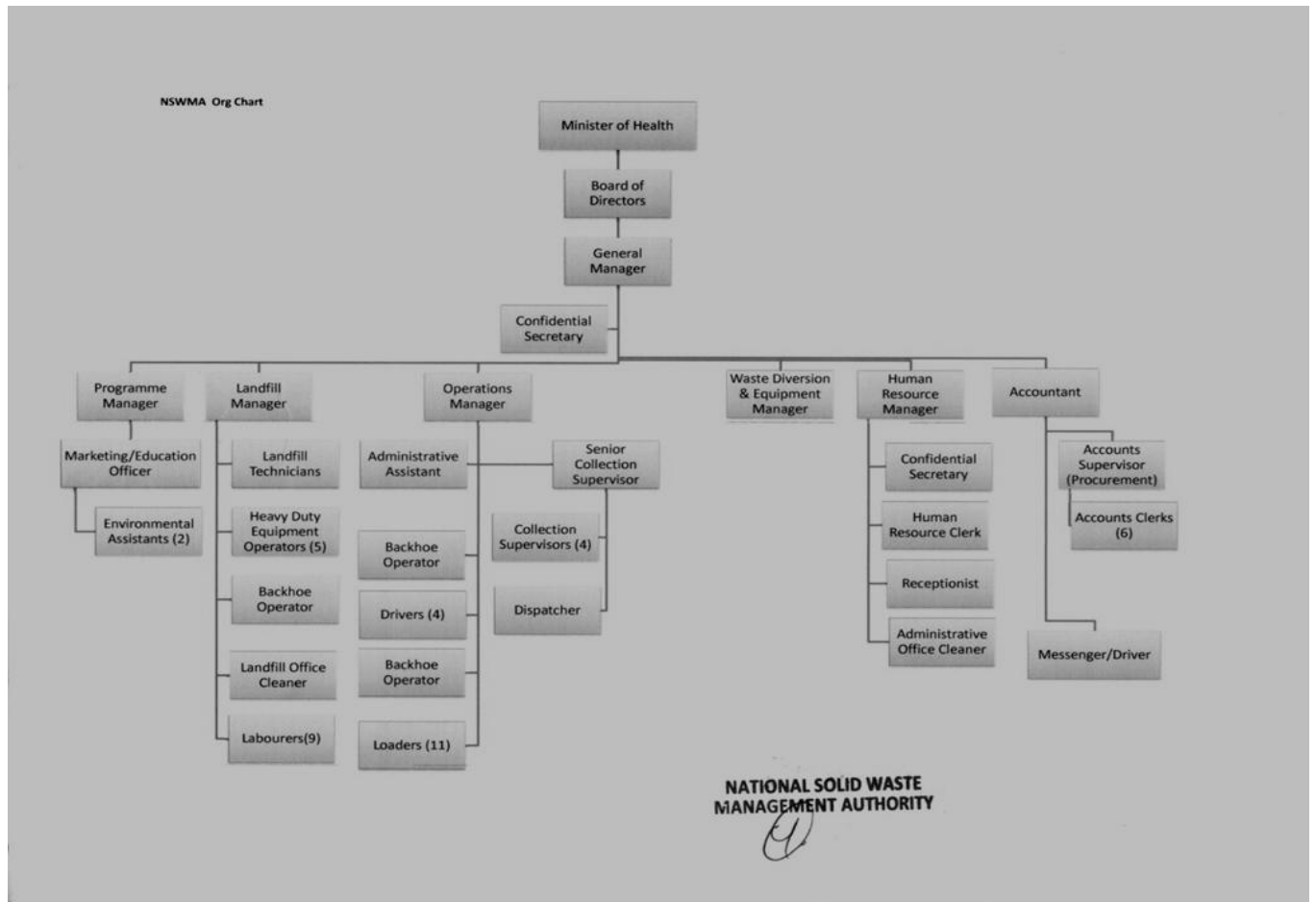
The audit team was informed that the Authority has draft regulation, not yet approved, that would outline procedures for the Authority to follow. The draft regulation would also give the NSWMA enforcement authority with respect to illegal dumping; at present only the Central Board of Health has this authority. It is recommended that every effort be to enact this regulation.

6. Segregation of duties

The Authority is divided into four major sections: Operations, Staff Services, Disposals, and Finance and Environmental Services. This structure was recommended to allow for proper segregation of duties, which is necessary for effective internal control.

According to the organizational chart there are clear lines of reporting. However, in our interview with managers of the Authority we were informed that they “take instructions from the Board.” This sheds some light as to why the General Manager has little or no knowledge about certain situations in the day-to-day activities of the Authority.

According to the Act, the General Manager is directly responsible for the day-to-day activities of the Authority, so nothing should take place without her direct knowledge. Therefore, we are recommending that all other managers report directly to the General Manager rather than to the Board. This would allow for information flow as mandated by the Act, so that the General Manager is held accountable for the daily operations.



7. Controls to safeguard and protect assets from waste, abuse, and fraud

There are controls outlined in the Accounting Procedures and Control Analytical Financial and Management Guidelines that was adopted by the Authority in 2002. However, as this policy document was abandoned in 2009 without any replacement, we are unsure as to what controls are currently in place at the Authority.

We wish to reiterate that a policy document needs to be formally adopted and circulated to all pertinent stakeholders, giving definitive guidelines for procedures and controls that govern the day-to-day operations of the Authority.

8. Financial transactions are accurately and completely recorded

The Authority utilizes QuickBooks as its accounting software to record all its financial data. We were able to scrutinise the cash flow statements, balance sheets, general ledgers, profit and loss statements, and trial balances for the years 2010–2012. We were unable to verify the accuracy and completeness of the records since they have not been audited at the time of this report.

However, based on the information received, it can be stated with a great level of surety that the recording of all financial transactions was performed in a timely and well-maintained manner.

However, the audit team concludes that the financial statements do not present a “real picture” (true figure) of the financial position of the Authority for the years under review. Loans interest, depreciation, fuel subvention, fixed assets, donated capital, and accounts payable are some of the items that are not recorded in the financial statements presented. It is recommended that the outstanding accounts be audited and presented to the Board for ratification.

9. Internal and external financial reporting requirement

The requirement as expressed in the NSWMA Act, Section 10 states:

"The Authority shall keep accounts of its transactions to the satisfaction of the Minister and such accounts shall be audited annually by such persons as the Authority, with the approval of the Minister, may appoint".

Additionally, Section 11 (1) states that:

"The Authority shall prepare and present an annual report to the Minister within four months after the expiration of its financial year",

while Section 11 (2) states that:

"The annual report shall contain the activities of the Authority during its last financial year and must include a statement of its audited account in accordance with the provisions of Section 10".

The accounting firm KPMG, which has been identified as the auditors of the Authority, is unable to complete the financial audit for the year 2005 because of certain issues. Work on the 2006 financials has started but has not been completed. The Authority is grossly derelict in its performance related to financial reporting, and is in complete violation of the Act.

B. GENERAL

Legislation and regulations provide authority for all solid waste management activities to the NSWMA. The NSWMA is governed by the ***The National Solid Waste Management***

Authority Act 1995, No. 10 of 1995, which states that the duties of the Authority are as follows:

1. To provide storage facilities for solid waste

The NSWMA has transformed the former Cooks Dump to operate as a sanitary landfill site. However, the evidence provided makes clear that the present landfill site is almost at capacity. A new landfill needs to be prepared to facilitate the continuous and proper disposal of solid waste.



Fig 1.1 Picture of present landfill

The new landfill should be properly designed, constructed, and managed to provide a safe alternative to uncontrolled dumping, as well as to protect groundwater from the liquids and chemicals that collect in landfills. The design of the new landfill should incorporate new disposal techniques and take into consideration the increasing population of Antigua and Barbuda.

The new landfill should be designed to incorporate liquid known as leachate into its physical environment. Leachate – a mixture of toxic and nontoxic liquid that is created in the landfill environment – may pose a threat to local groundwater supplies. A properly designed landfill also has to be equipped with an earthen or synthetic liner, as the decomposition of waste emits methane, a greenhouse gas that can also cause fire. To prevent such fires, the new landfill should have a way to vent, burn, or collect methane; at the Cooks landfill, a leachate pond was designed and implemented by the Authority to collect all liquid emitted from the landfill.



1.2 Picture of leachate pond at landfill site.

2. Storage of tyres

There are approximately more than one million tyres on private land at the entrance to the landfill. These tyres represent a serious fire hazard to the landfill and the surrounding environment.



1.3 Piles of the many tyres at landfill site.

The risks and hazards associated with this huge volume of tyres poses a challenge for the Authority. In October 2011, personnel from the Authority and the fire department battled a fire at the landfill for more than 14 hours.

In addition to being a fire hazard, the tyres present an ideal breeding ground for mosquitoes, which can lead to an outbreak of disease such as dengue. It was reported that in 2008–2009

there was a program in place to ship bales of tyres to Guadeloupe for recycling, but this has ceased. Some other measure needs to be put in place as soon as possible to alleviate the current situation and prevent a catastrophic event. It is recommended that either the recycling program be restarted, or the tyres put to some use – perhaps as a composite in the construction of roads, as in some countries.

3. Capping of the landfill

Maintaining the safety of the landfill is one of the critical priorities recognised by the Authority. Preventative actions must be undertaken to reduce the potential risk to employees and the public at large. According to the General Manager, the landfill is currently burning and needs to be capped. Capping the landfill within the next year would alleviate any potential environmental problem. It was suggested that it would cost more than \$2 million to equip and manage a new landfill.

The financial problems of the Authority are severely hampering its effectiveness and efficiency. The compactor trucks and other equipment needed for the Authority to complete its mandate would cost approximately \$2 million. At this time the Authority has only two compactor trucks to service the entire island of Antigua.



Fig 1.4 Parts of the landfill that are burning.

It was also reported by the General Manager that the government has not placed any priority on waste management. In fact, the General Manager stated that currently, the Authority focuses “more on cash management than waste management.” A balance is urgently needed.

4. To procure equipment for the collection, transportation, and disposal of solid waste

The NSWMA has many pieces of equipment, as reported by the Manager for Waste Diversion and Recycling. However, most of this equipment is not in working order. A review of the list of equipment owned by the NSWMA as at March 2013 highlighted that of the 38 pieces of equipment, only 16 are functional. Fifteen are nonfunctional, four have been cannibalized, and the remaining three are under repair.

Those under repair include the tyre baler, which is said to be partly functional but unsafe due to a brittle engine fan. An additional five pieces of equipment have been assessed and are only valuable to be sold as scrap metal.

The audit team was subsequently informed that five compactor trucks were purchased in 2008; however, only two of these trucks are currently working and both require extensive repairs. The audit team was also informed that the Authority is having a difficult time securing parts for these vehicles. The other three vehicles are being cannibalized, which makes it highly improbable that they will be fully operational again. The Authority has estimated that approximately \$2 million is required to acquire the much-needed compactor trucks to complement the two that are in working condition.



Fig. 1.5 & 1.6 Pictures of the cannibalized compactor trucks.



Other inventory of the Authority includes a truck loader that is not working and a track dozer; the latter is being abandoned to be cannibalized and used to repair the truck loader, and anything that can be salvaged will be sold as scrap metal. There is also an operating compactor; two good backhoes, one of which needs repair; and a third backhoe that has been scrapped. In addition, a blue Mitsubishi Nativia Jeep has been sold to an employee, and two other vehicles – a white Nissan Frontier and a white SUV Mitsubishi Jeep – are currently for sale. It is recommended that the Authority seek funding for the replacement of these vehicles.

Fig 1.7 Tyre baler



5. To provide collection and storage facilities at ports, harbours, and anchorages for the reception of ship-generated waste

In 2002 a barge was acquired as part of the OECS Ship and Solid Waste Project. The barge was a donation and was acquired as an integral part of the "cradle to the grave" collection, transportation, and disposal of solid waste regime that the Authority was planning to put in place.

The barge was placed at the port and is currently used to offload ship-generated waste onto compactor trucks destined for the landfill. A minimal rental fee of \$500 per day is charged for the use of the barge. However, the transportation of waste from the barge to the sanitary landfill is undertaken by a private contractor, who pays tipping fees. The audit team observed the operation of the barge during the collection and subsequent drop-off of ship waste at the Point Wharf. The team also observed a waste-picking operation at the wharf that diverted a substantial amount of the waste before the private contractors arrived to deliver it to the landfill.

We recommend that the Authority make every effort to take full control of the disposal of ship-generated waste to ensure its proper disposal. The financial benefits might be substantial, as we observed that some of the waste could be valuable as recyclables. If the Authority is not in a position to take over the operations of the barge, it should at least regulate the activities of waste pickers.

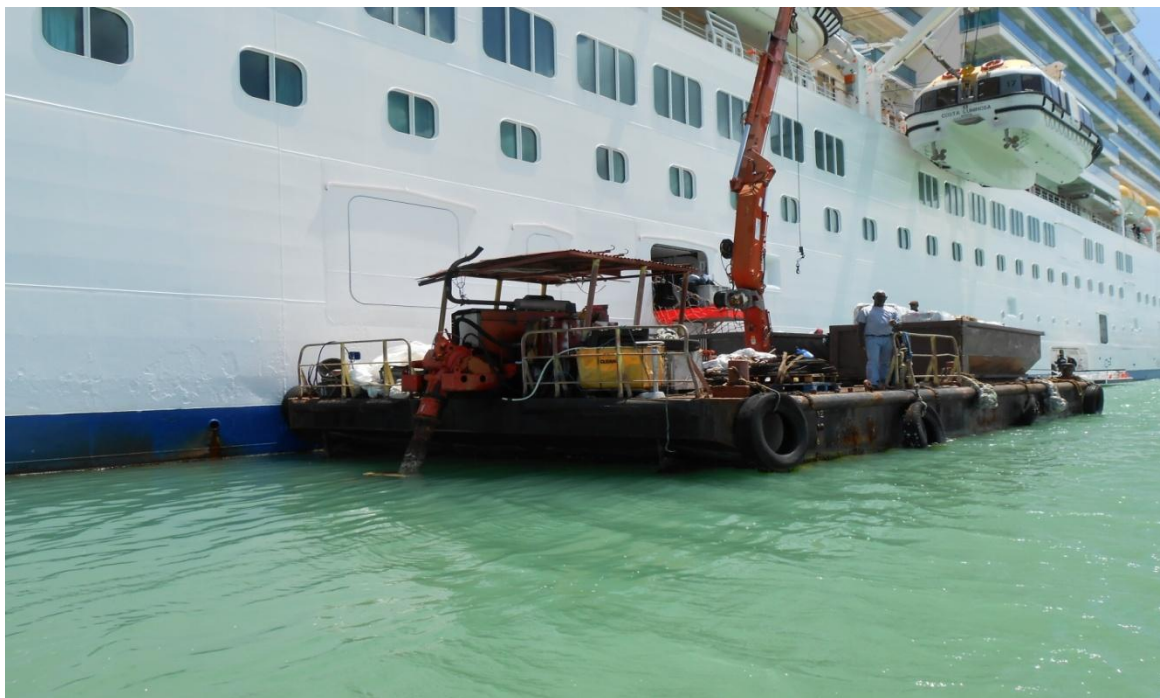


Fig 1.8 Barge off-loading ship waste.



Fig 1.9 Waste pickers in operation at the Barge.

During the audit period of 2010–2012 the following cruise ship revenue was generated.

Year	Cruise Ship Wastes Deposit (Tonnage)	Income from Cruise Ship
2010	457.08	\$ 49,364.64
2011	237.02	\$ 25,598.16
2012	310.50	\$ 33,354.00
Total	1,004.60	\$108,316.80

The Authority has participated in a meeting with the Department of Marine Services and Merchant Shipping (ADOMS). The purpose was to undertake a preliminary check and prepare for an audit of port reception facilities that was to be conducted in June 2012 by the International Maritime Organization. As a result of this meeting the Authority was challenged to:

- Review its plan for management of ship-generated waste.
- Develop/revise its written plan to ensure “cradle to the grave” custody of waste.
- Operationalize the plan.
- Review its compliance with the requisite governing legislation, Solid Waste Management Act, 1995 and 2005.
- Liaise with ADOMS and other key stakeholders.

6. Equipment necessary to transport ship-generated waste to the final disposal site

Currently the transportation of ship-generated waste is undertaken by a private contractor and, based on the figures in the above chart, it does not seem to be cost-effective for the Authority to purchase its own equipment to transport ship-generated waste to the landfill. However, this is one of the Authority’s mandates expressed in the Act. If the Authority has

any operational vehicles suitable to perform this task, it should address the situation so that the NSWMA is entirely responsible for the collection and transportation of ship-generated waste. The Authority would gain some additional revenue from the transportation of such waste.

7. To convert existing dumps into sanitary landfill sites

The former Cooks Dump has been transformed into a sanitary landfill site. However, as the present landfill is almost at capacity, a new one needs to be prepared to facilitate the continuous and proper disposal of solid waste.

8. To develop and manage new sanitary landfill sites and other disposal methods

- ⤴ The main method of waste disposal is the landfill.
- ⤴ Hazardous wastes like asbestos and medical waste, including sharps, are buried in pits at the landfill.
- ⤴ Sewage is dumped in pits at the top of the old dump adjacent to the landfill and it percolates through the dump.
- ⤴ Sewage is also used to put out fires at the old dump site.
- ⤴ Hot compost was made in the past using a chipper to chip or chew the material. The compost can be heated to 129 degrees Fahrenheit. However, as high moisture content has been a problem, efforts were made to improve the compost quality and maintain consistent water content.
Compost can sell for \$1 per kilogram and wood chips for \$0.50 per kilogram. Recycling and composting activities, if organized effectively by the NSWMA, can generate many environmental and economic benefits. For example, it can create jobs, increase incomes, supply valuable raw materials to industry, produce soil-enhancing compost for agriculture, reduce the need to site or build more landfills and combustors, and prevent or reduce greenhouse gas emissions. Progress has been hindered by equipment failure; the chipper was damaged last year and is just being fixed now.

9. Treatment and disposal of medical and hazardous wastes

Hazardous wastes like asbestos and medical waste, including sharps, are buried in pits at the landfill.

10. Encourage recovery of recyclable items from solid waste

During our visit to the landfill a waste-picking operation was observed.

Controlling activities at the landfill site is a serious challenge for the Authority. In 2011 a picker was covered in a dumping operation. This incident did not curtail the problem, and reports indicate that now there are more pickers, which puts the safety of workers, customers, and the pickers themselves at tremendous risk. Picking hampers the day-to-day activities of the Authority and weakens revenue-generating activities, as the pickers extract the most

valuable recyclables from the landfill. In an effort to reduce the physical risk to the landfill users, management has been collaborating with the police to resolve the problem by posting "No Trespassing Signs" at strategic points.

Discussions have been organized by management to determine ways to involve the pickers in meaningful, organized waste diversion activities driven by the Authority.



Fig 1.10 Waste pickers in operation at landfill.

There is a pilot program to encourage waste separation at source. Its objective is to target 6000 households (approximately one-fifth of the national total) in five communities to implement waste diversion at the residential level. Invoking the waste hierarchy "Reduce - Reuse - Recycle" is an effort to reduce municipal solid waste and the inherent cost of managing it. The idea is to divert as much of the waste stream as possible from the landfill. Initial estimates are that there is the potential to recycle at least 80% of the waste that is generated, which could reap significant financial and practical benefits to the Authority. Even if only a fraction of that figure is realized, the benefits would impact significantly on the day-to-day operations of the Authority.

The pilot program proposes to select five communities based on geographical factors, community organization structure, and present and past collaboration with the NSWMA. This proposed plan is outlined in a newsletter entitled "Waste Separation at Source Pilot Program 2012 Implementation Strategy and Resource Plan." This initiative will address the mandate to introduce measures that encourage recovery of recyclable items from solid waste.

11. Cost recovery methods for services provided by the Authority

Among several cost recovery methods introduced by the Authority is the sale of scrap metal to Caribbean Recovery Center, which was introduced in July 2011. The sale of woodchips and mulch is also operational.

There are ongoing discussions with Mr. Walter Watkins to assist the Authority in securing a more modern equipment in order to produce a recycled by-product via a Canadian company with no cost to the Authority. Additionally, tyre-shredding activity has been contracted to Marshall Tyres, but has not commenced because of the scrutiny given to the project by different government agencies that has caused delays to the proposed agreement. These two projects are currently on hold.

12. One agency is responsible for collection, transportation, and treatment/disposal activities

The NSWMA is the sole agency responsible for the collection, transportation, and treatment/disposal of waste; however, the Authority has many challenges in meeting this objective. First, as revealed by its financial position, the Authority is not able to fulfill this mandate independently, as there are insufficient resources to fund the fleet of trucks required to service the entire island. The lack of funding also impacts daily collections, as many of the private contractors/haulers are not being paid on a regular basis.

To address the magnitude of waste generated within and around Antigua and Barbuda, the Authority in 2006 issued four-year contracts to some 30 private haulers. This measure was taken to guarantee that all waste would be collected in accordance with the Authority's pick-up schedule. At the end of January 2009, when the haulers' contracts expired, no further contracts were issued. To date all haulers working for the Authority operate under an implied verbal agreement in which all the conditions from the expired contract remain. Information indicates that there are instances where, because of non-payment of bills, haulers breach certain conditions of their contract. However, the Authority cannot enforce the penalties because there is no signed contract in effect. In addition, trained and competent staff is required to facilitate the collection process, especially of ship-generated waste, which appears to be entirely outside the ambit of the Authority at this time.

Finally, the audit team determined that the National Parks and the Central Board of Health also collect waste in Antigua and Barbuda.

13. Sufficient funding is available for efficient and effective collection, transportation, and treatment/disposal activities

Examination of the Newman's financial records determined that the Authority was able to utilize several sources – including Bottle & Can Levy, Cruise Tax, Government Contribution and Embarkation Tax – to generate income. During the years under review [2010–2012] the total income generated by the authority was \$31,071,116.36 while expenses incurred for the same period were \$34,737,868.87, resulting in a deficit of \$3,666,752.51 for the period. Given this dismal view of the financial standing of the NSWMA, along with the expressed sentiment of the General Manager that the Authority is more into cash management than waste management, the conclusion can be drawn that there are not sufficient resources to effectively manage the Authority. [See Table 1]

Table 1

	INCOME	EXPENSES	DIFFERENCES
2010	\$10,249,424.66	\$11,946,139.37	(\$1,696,714.71)
2011	\$10,173,939.98	\$11,942,509.05	(\$1,768,569.07)
2012	\$10,647,751.72	\$10,849,220.45	(\$ 201,468.73)
TOTAL	\$31,071,116.36	\$34,737,868.87	(\$3,666,752.51)

The main expense areas identified were for contract services (SW Collections), equipment rentals, and salaries and wages, which seem to have been rising as income was decreasing over the three-year span. Given this situation, the Authority is hard-pressed to find the funds needed to implement programmes that will educate the public on the importance of recycling and the impact of illegal dumping on the environment; to meet the critical need for the new landfill facility; to provide the necessary maintenance and improvements to infrastructure (e.g., buildings in need of repair/replacement); or to acquire equipment required for the day-to-day operations.

14. Collection, transportation, and treatment/disposal activities are in compliance with regulations and policies

The financial challenges do not allow the Authority to be fully compliant with all collection, transportation, and treatment/ disposal activities. The Act outlines these duties of the Authority:

- a. Procure equipment for the collection, transportation, and disposal of solid waste.
- b. Provide collection and storage facilities at ports, harbours, and anchorages for the reception of ship-generated wastes.
- c. Procure the equipment necessary to transport the ship-generated waste to the final disposal site.

At this time the NSWMA does not have a full fleet of vehicles – or staff, for that matter – to meet its collection mandate. Therefore, much of the collection is outsourced to private contractors. Collection of ship-generated waste is basically privatized; the only part NSWMA plays in the process is ownership of the barge that is currently being used. This operation is not totally beneficial to the Authority, since it realizes only the minimal rental fee of \$500 per day for the use of the barge and the tipping fees paid at the landfill. It is therefore recommended that the process, especially in regard to the collection, transportation, and disposal of ship-generated waste, be taken over by the Authority so that it can be in compliance with the Act and the “cradle to the grave” initiative. The audit team also observed that there is no storage facility at the ports and or harbours to receive the ship-generated waste; the barge owned by the Authority not only collects waste from the cruise ships but also acts as a storage facility until the waste is collected by the private contractors. Since the Authority does not own the necessary equipment to transport the ship-generated waste to the landfill, the NSWMA cannot comply with the Act.

The audit team determined that other agencies in Antigua also collect waste, namely the National Parks and the Central Board of Health. The collaboration between these institutions must remain strong in order to be beneficial to the entire nation of Antigua and Barbuda.

15. Waste management activities are monitored, and complete accurate reports are produced monthly and annually

Waste management activities appear to be very well monitored, as evident by the monthly and annual reports that were presented to the Board from the General Manager. There are activity reports that highlight the monthly status of all vehicles; collection schedules and contract performance; waste received at the landfill; planned activities; and staff-related matters. The day-to-day activities are reasonably reported and the audit team was able to understand the operations and challenges the Authority encounters.

COLLECTION

1. Types and amounts of residential, commercial, and industrial solid waste generated

The type and amount of waste is known and documented in the General Manager's monthly and annual reports. Waste is categorized under the following headings; Household, Clean Bulk, Bulk, Medical, Tyres, Street Sweepings, ICI, Industrial, Commercial, Institutional, Cruise Ship, Sewage and COD. The report shows monthly totals in tons and the variances between monthly collections.

1.1 Collection equipment and employees are matched to collection requirements

Due to financial constraints the NSWMA does not have a full fleet of vehicles or staff complement to match its collection requirements, so much of the collection is outsourced to private contractors. There are 13 private contractors scheduled on various routes across the island. These private contractors are responsible for the collection of medical waste, bulk waste, school meals, recyclables, dead animals, government offices, beaches, and the barge.

Private contractors are generally paid through the Treasury Department, Ministry of Finance, the Economy and Public Administration, Government of Antigua and Barbuda and this is the greatest threat to the national waste collection program. The availability and reliability of the private contractors are tenuous for a variety of reasons, but mostly because of delayed payments from the Treasury Department. Some private contractors, according to the General Manager's report, have stopped in the middle of the collection schedule because they ran out of fuel and were unable to pay the service station. The uncertainty of timely payments, coupled with the inability to meet their financial responsibilities, has resulted in a depressed level of commitment to waste collection. This has led the Authority to lobby the Minister of Finance to alleviate the fiscal bottleneck.

2. Residential and Commercial Wastes

Residential and solid wastes are to be collected on a weekly basis, according to the islands' solid waste collection schedule, which is divided into four zones. The schedule is further divided into 16 service areas, each of which has a weekly collection day. However, because of issues associated with payments to private contractors, some service areas were significantly impacted in August 2012, according to the General Manager's report. Service area 14, which comprises the York's, Gambles, Fort Road area, had significant challenges due to the non-performance of the primary contractor, resulting in the Authority having to deploy its already-stretched work teams to do damage control.

The chronic challenge of fleet reliability continues to plague the collection of waste. These problems can only be remedied by timely payments to private contractors, which would allow the Authority to hold the contractors to their service level agreement, and a new fleet of compactor trucks that can adequately service the amount of waste generated.

3. Collection options

Residents and businesses can use a hotline to make complaints or request waste collection outside of the regularly scheduled pick-ups. From January to August 2012 there were 782 requests for bulk waste removal, of which 621 were completed within the reported time period. The large number of requests has become daunting, as there is only one contractor assigned to the removal of bulk waste. A further complication is that the crane truck and backhoe used for this process are also deployed in derelict vehicle collections and illegal dump remediation.

C. **TRANSPORTATION**

1. Transportation of equipment and employees

The NSWMA does not have the transportation equipment necessary to meet this requirement. At present more than half of the 30 vehicles owned by the Authority are non-functional. Of the 15 dump and compactor trucks owned by the Authority, only four are operational; of the remaining 11, six are said to be cannibalized and only fit to be sold as scrap.

These statistics reveal the plight of the Authority in terms of the collection process and explain why the Authority has to enter into contract for the majority of its waste collection. Contracting is more costly and not as effective in terms of reliability and efficiency. The Authority is unable to implement measures of control that would guarantee a reliable and adequate fleet of vehicles to meet the demands.

2. Transportation of solid waste

The Authority is doing a reasonable job related to timing of the collection of waste. Most services have a weekly collection schedule that, for the most part, is fulfilled.

However, the manner in which some of the waste is transported needs to be addressed and improved. The General Manager's report for December 2011 stated that "twice weekly the Authority has to dispatch (1) backhoe, an open-back truck and two labourers to collect and dispose of waste that drop off from vehicles transporting uncovered and unsecured waste along the main access road to the landfill." It is therefore recommended that issuance of future contracts be contingent on the use of proper transportation that is covered; if it is an open-back vehicle, the waste should be properly secured at all times.

Fig 1.12 Delivery of waste to the landfill in open-back truck



TREATMENT AND DISPOSAL

1. Treatment and disposal at the sanitary landfill sites

The main method of disposal in Antigua and Barbuda is the landfill. Hazardous wastes like asbestos and medical waste, including sharps, are buried in pits at the landfill. Sewage is dumped in pits at the top of the old dump adjacent to the landfill and it percolates through the dump. Sewage was also used to put out fires at the old dump site.

At the landfill, refrigerants such as Freon are not removed from refrigerators and liquids such as oil and anti-freeze are not removed from cars. This situation has created an environmental problem that has contributed to the contamination of the landfill.

2. Operators of the landfill site

Within the NSWMA 64 employees were identified. An undisclosed number of the landfill staff lacked the required technical training and verification as stipulated by international standards. Such standard requires that all employees complete training in the proper handling and disposal of waste of all types that pass through the landfill. However, we were unable to identify the specific standard that is being used by the Authority and the conclusion drawn at the time of this audit was that this aspect of the Act was not being enforced. Workers run the risk of operating within a hazardous environment without possessing the necessary education, skills, and training to protect themselves from imminent danger.

3. The release of leachate and methane gas

As mentioned by the Environmental Protection Agency (EPA), landfills that are properly designed, constructed, and managed prevent or minimize health and environmental impacts. They have liners and leachate collection systems that protect groundwater, and gas collection systems that contain or safely burn methane.

As observed in our site visit, that process appears to be in place; the landfill was lined and the audit team also saw the leachate pond. The Waste Diversion and Recycling Manager said there may be possibilities for methane generation at the landfill, although more research is needed to identify the levels and determine what action can be taken to capitalize on its use.

Fig. 1.14 Leachate pond at landfill



4. The expected life of landfill

According to the General Manager, the present landfill has an operational life expectancy of one more year. Plans are already in place for a new landfill in Antigua. However, finances are a major concern as the cost would be in excess of \$7 million and for the past three years the Authority has been operating in a deficit. This means every revenue-generating venture available to the Authority needs to be explored in order to make the NSWMA more self-sufficient.

Audit Conclusion

After weeks of interviews, site visits, document review and research, we were able to formulate this report based solely on our findings and observations. It can be clearly stated that the operations of the National Solid Waste Management Authority (NSWMA) are for the most part in violation of the stipulation of the Act and the organisational chart. Our Audit Objective was to determine whether the Government's solid waste activities effectively protect citizens, residents, and the environment from all potentially harmful effects. We have concluded that a number of the criteria mentioned earlier in this report were not met by the Authority. Finally, it is imperative that the Authority use all means necessary in order to maximise revenue generation.

The following recommendations are based on the audit findings.

No.	RECOMMENDATIONS	MANAGEMENT RESPONSE
	Governance and Financial Management	
1.	A new procedures and accounting manual should be adopted by the Authority.	
2.	A hierarchy reporting structure should be followed in which the General Manager is knowledgeable of all day-to-day operations of the Authority.	
3.	The Board should not be micromanaging the Authority.	
4.	An environmental engineer should be assigned to the Board.	
	General	
5.	The Authority should control and operate the collection and disposal of ship-generated waste.	
	Toxic material should be removed before it is dumped in the landfill.	
6.	The Authority should take over the operation of the barge.	
7.	A recycle program for tyres should be implemented and tyres currently stored on private lands should be removed forthwith.	
8.	The Authority should regulate all waste pickers and reduce the risk to individuals conducting business at the landfill.	
9.	The Authority should seek funding for the acquisition of the necessary equipment and vehicles.	
10.	The Authority should seek to increase their public awareness campaign.	
	Transportation	
11.	The issuance of future contracts should be contingent on the contractor's use of proper transportation to transport waste.	
12.	The Authority should adopt one of the international	

	standards and train staff in accordance with that standard.	
	Collection	
13.	All Ship generated waste should be inspected by inspectors before it is disposed off in the landfill.	
14.	All ship generated waste that are not disposed off on any particular day, should be under the control of the Antigua and Barbuda Coast Guard.	
	Treatment and Disposal	
15.	A Truck wasting facility could be established at the landfill which could reduce the amount of pollutants coming back out into the general environment and it could also be a revenue generated measure for the Authority.	

Director of Audit

APPENDIX I

Audit Criteria

General

1. Legislation and regulations provide authority for all solid waste management activities.
2. One agency is responsible for collection, transportation, and treatment/disposal activities. The National Solid Waste Management Authority is solely responsible for the collection, transportation, and treatment/disposal of all solid waste.
3. Sufficient funding is available for efficient and effective collection, transportation, and treatment/disposal activities.
4. Collection, transportation, and treatment/disposal activities are in compliance with regulations and policies.
5. Waste management activities are monitored, and complete accurate reports are produced monthly and annually.

Governance and Financial Management

1. Senior management and oversight committees exist.
2. The purpose, authority, and roles and responsibilities of the Board are documented.
3. The organization has strategic objectives consistent with its mandate.
4. There are operational plans that support achievement of the strategic objectives.
5. The activities and resources needed to achieve objectives are included in the budget.
6. Financial management policies, authorities, and procedures are established and complied with.
7. There is appropriate segregation of duties.
8. There are controls to safeguard and protect assets from waste, abuse, and fraud.
9. Financial transactions are accurately and completely recorded in a timely manner.
10. Internal and external financial reporting is completed accurately and on time, in accordance with requirements.

Collection

1. Types and amounts of residential, commercial, and industrial solid waste generated are known.
2. Collection equipment and employees are matched to collection requirements.
3. Residential and commercial waste is collected on a scheduled basis that keeps risks to public health and the environment at an acceptable level.
4. Collection options are available to residents and businesses for waste not suitable for scheduled pick-up.

Transportation

1. Transportation equipment and employees are matched to transportation requirements.
2. Solid waste is transported in a manner (e.g., containment, timing) that keeps risks to public health and the environment at an acceptable level.

Treatment and Disposal

1. Solid waste is treated and disposed of at sanitary landfill sites.
2. The landfill sites are operated by trained and certified staff in accordance with industry standards.
3. The release of leachate and methane gas is controlled and monitored.
4. The expected life of landfill sites is known and plans for new sites are established.

APPENDIX II

Criteria Matrix

Criteria	Met	Partially Met	Not Met
GENERAL			
1. Legislation and regulations provide authority for all solid waste management activities.		X	
2. One agency is responsible for collection, transportation, and treatment/disposal activities.		X	
3. Sufficient funding is available for efficient and effective collection, transportation, and treatment/disposal activities.			X
4. Collection, transportation, and treatment/disposal activities are in compliance with regulations and policies.		X	
5. Waste management activities are monitored, and complete accurate reports are produced monthly and annually.		X	
GOVERNANCE AND FINANCIAL MANAGEMENT			
1. Senior management and oversight committees exist.			X
2. The purpose, authority, and roles and responsibilities of the Board are documented.	X		
3. The organization has strategic objectives consistent with its mandate.	X		
4. There are operational plans that support achievement of the strategic objectives.		X	
5. The activities and resources needed to achieve objectives are included in the budget.		X	
6. Financial management policies, authorities, and procedures are established and complied with.			X

Criteria	Met	Partially Met	Not Met
7. There is appropriate segregation of duties.			X
8. There are controls to safeguard and protect assets from waste, abuse, and fraud.			
9. Financial transactions are accurately and completely recorded in a timely manner.		X	
10. Internal and external financial reporting is completed accurately and on time, in accordance with requirements.			X
COLLECTION			
1. Types and amounts of residential, commercial, and industrial solid waste generated are known.		X	
2. Collection equipment and employees are matched to collection requirements.		X	
3. Residential and commercial waste is collected on a scheduled basis that keeps risks to public health and the environment at an acceptable level.		X	
4. Collection options are available to residents and businesses for waste not suitable for scheduled pick-up.		X	

TRANSPORTATION			
1. Transportation equipment and employees are matched to transportation requirements.		X	
2. Solid waste is transported in a manner (e.g., containment, timing) that keeps risks to public health and the environment at an acceptable level.		X	
TREATMENT AND DISPOSAL			
1. Solid waste is treated and disposed of at sanitary landfill sites.		X	X
2. The landfill sites are operated by trained and certified staff in accordance with industry standards.			X
3. The release of leachate and methane gas is controlled		X	

and monitored.			
4. The expected life of landfill sites is known and plans for new sites are established.	X		