AUDITOR GENERAL'S DEPARTMENT
PERFORMANCE AUDIT REPORT

NATIONAL WORKS AGENCY (NWA)

REVIEW OF THE NWA'S QUALITY MANAGEMENT FUNCTION

The Auditor General is appointed by the Governor General and is required by the Constitution, Financial Administration and Audit Act, other sundry acts and letters of engagement, to conduct audits at least once per year of the accounts, financial transactions, operations and financial statements of central government ministries and departments, local government agencies, statutory bodies and government companies.

The Department is headed by the Auditor General, Pamela Monroe Ellis, who submits her reports to the Speaker of the House of Representatives in accordance with Section 122 of the Constitution of Jamaica and Section 29 of the Financial Administration and Audit Act.

This report was prepared by the Auditor General's Department of Jamaica for presentation to the House of Representatives.

Auditor General of Jamaica
Auditor General's Department
40 Knutsford Boulevard
Kingston 5, Jamaica, W.I.
www.auditorgeneral.gov.jm

Vision

Promoting a better country through effective audit scrutiny of Government operations.

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Summary

NWA plays a key role in implementing road rehabilitation and construction projects in Jamaica. The Agency is directly responsible for the maintenance of approximately 5,000 kilometres of main road network islandwide; including approximately 740 bridges and other infrastructure. The Agency's vision is to *"create a world class, safe, quality main road network, meeting the needs of our clients in the towns, communities and districts where they vacation, work and live."* Quality Management is vital to NWA as this ensures that road construction and rehabilitation projects are completed based on established quality standards.

The audit aimed to determine whether NWA has an effective Quality Management System to provide assurance that the country's main road network and related infrastructure are being constructed and maintained based on quality standards to benefit users. The key findings are outlined below.

Key Findings

NWA's Quality Management System needs improvements to provide adequate assurance that road construction and rehabilitation projects are completed based on prescribed quality standards and procedures.

Quality Management Framework

1. **NWA established a quality assurance mechanism in recognition of the necessity of this function to its quest to ensure that quality control requirements are met by all contractors.** This is to ensure that road users benefit from a reliable and safe main road network. Unfortunately, despite its attempt to institute quality control practices, which are ISO compliant, NWA was not able to achieve the targets and recommendations emanating from an ISO review. Consequently, in October 2006, NWA decided not to pursue the ISO certification; instead a decision was taken to adopt a Total Quality Management (TQM) approach, to govern its quality management function. NWA also took a decision to discontinue the internal quality audits as *"a trend analysis revealed that the audits were generating recurring/repetitive opportunities for improvements."* Internal Quality Audit is an independent examination of the effectiveness of an organization's quality management system and the results that have been achieved through its implementation. The absence of such audits not only breached NWA's Quality Manual, but also denied NWA the opportunity to systematically identify weaknesses and non-conformance with the Quality Management Systems; so that corrective and preventative actions can be taken. Further, unlike the ISO standards that are externally driven and force compliance with international standards and practices; the TQM principles are internally driven - though the entity may ensure conformity with best practices.

   Given the critical importance of NWA's role in maintaining the nation's road infrastructure, the Agency should ensure that the related quality manuals and standard operating procedures are compatible with internationally accepted and accredited standards. We found that while 13 of NWA's 15 Quality Assurance Department manuals were up to date; two critical manuals, the Quality and Standard Operating Procedures

(SOPs) manuals have not been reviewed since September 2005 to reflect emerging technological and operational development and associated risks relevant to the Agency.

Quality Monitoring and Assessment

2. **NWA did not conduct timely calibration of critical testing equipment to assess and monitor their operational efficiency, which increases the risk that the standard specifications for the quality of the road network may not be met.** NWA's laboratory plays a vital role in the quality assurance mechanism, as it conducts quality assurance tests to ensure that materials used in road infrastructure works meet the required quality control standards. However, we found that NWA did not conduct the independent calibrations on a timely basis. For example, the ELE Compressive Strength Machine, used to test the strength of concrete and the Marshall Stability Flow machine used for testing asphaltic concrete were not calibrated annually as required. Further, the two pieces of equipment failed the calibration tests on the both occasions that the assessments were conducted. The Compressive Strength Machine failed the calibration test in December 2012 and three years later in April 2015, while the Marshall Stability Flow machine also failed calibration tests conducted in February 2013 and April 2015. In December 2015, we were advised by NWA that the Marshall Stability Flow machine was eventually replaced in October 2015.

3. **NWA did not have a mechanism to independently obtain the material tests conducted by the labs.** This test, based on contractual provision is initiated by the contractor; the contractor is required to provide NWA with the result. This arrangement increased the risk of contractors submitting false tests results, which had indeed materialized. For example, NWA records revealed that it had been impacted by this weakness as 36 sub-contractors submitted unauthentic tests results on contracts amounting to $813 million.

Recommendations

We strongly suggest that NWA considers the following recommendations to strengthen its Quality Management System. NWA needs to ensure that it devotes the necessary time and resources to address the issues in a timely manner.

1. NWA need to obtain international independent quality certification to provide greater assurance that the Agency's Quality Management System is adequate. Such certification would also build public confidence that the system is consistent with internationally recognised standards in providing a safe road network. NWA would also benefit from continuing independent audits to assess compliance with its Quality Management System and ensure continued improvements.

2. The quality of the Nation's road infrastructure could be compromised if NWA does not immediately implement changes to its Quality Management System to prevent contractors from submitting falsified material test results. Even though the payments for material tests conducted by private laboratories are the responsibility of the contractors, NWA should consider having a direct arrangement with the laboratories to conduct the tests and submit the tests directly to its Quality Assurance Directorate. This cost would be borne by the contractor as a component of the overall contract sum.

Part One

Introduction

NWA's functions and responsibilities

1.1 NWA was created as an Executive Agency under the Ministry of Transport, Works and Housing, with effect from April 1, 2001. NWA is responsible for implementing capital projects for road rehabilitation and construction.

1.2 NWA's mission statement: "to plan, build and maintain a reliable, safe and efficient main road network and flood control system, which: Protect life and property; Support the movement of people, goods and services; Reduce the cost of transportation; Promote economic growth and quality of life; Protect the environment."

1.3 The Agency is directly responsible for approximately 5,000 kilometres of main road network islandwide, including bridges and other structures. There are approximately 740 bridges on NWA's main road network. There are 14,895 kilometres of parochial roads, 1,500 kilometres of farm roads and 4,200 kilometres of community roads. Parochial roads are the responsibility of the local authorities – Parish Councils and the Kingston and St. Andrew Corporation; while the Ministry of Agriculture is responsible for farm roads. However, NWA can be requested to repair and maintain these roads.

1.4 NWA established a Quality Assurance Directorate (QAD), which is responsible to establish and maintain quality management systems to ensure that road projects are completed at the desired quality standards. The Directorate comprises a Quality Assurance Unit and a laboratory - Material Testing and Evaluation Unit. The main function of the Directorate is to ensure that procedures are in place to achieve the desired outcome of the projects based on agreed criteria. The Quality Assurance Unit is responsible to monitor work-in-progress of all major and special projects Island wide. The Unit consists of four Quality Assurance Officers, one assigned to each of the four regions – North Eastern, Western, Central and South Eastern. The Material Testing and Evaluation Unit plays a vital role in NWA's quality assurance mechanism. The Unit has offices based at the head office in Kingston and a branch office in Montego Bay, Saint James.

Capital Project Spending

1.5 Over the period, 2009-10 to 2013-14, NWA revenues from GOJ's subsidy, management fees, inflows from projects and other income amounted to $23.6 billion **(Figure 1)**. Over the last five years, 2009-10 to 2013-14, NWA spent approximately JA$16.9 billion on capital projects to rehabilitate the road network. In addition, between 2010 and 2015, GOJ spent US$400 million, under the Jamaica Development Infrastructure Programme (JDIP), to improve the island's road network.

Figure 1 NWA's Revenue 2009-10 to 2013-14

Revenue	Total $'000	2013-14 $'000	2012-13 $'000	2011-12 $'000	2010-11 $'000	2009-10 $'000
Management fees	3,493,618	480,478	1,048,337	1,115,691	426,958	422,154
Government subsidy	2,532,660	544,141	552,702	510,771	463,056	461,990
Other income	654,109	127,793	72,839	67,720	307,729	78,028
Inflows from projects	16,925,743	2,112,461	4,407,716	2,982,492	2,404,851	5,018,223
Total	**23,606,130**	**3,264,873**	**6,081,594**	**4,676,674**	**3,602,594**	**5,980,395**

Source: NWA's audited Financial Statements

Purpose of quality management

1.6 Quality management is a basic requirement for organisations irrespective of their size and type. Quality management focuses on the work processes organizations follow to produce goods and services that meet satisfactory requirements; and, is essential for organisations to achieve their objectives. Quality management should be supported by a Quality Management Framework (QMF), which outlines the strategy, advice, guidance and tools necessary to attaining quality objectives. Quality management processes should be efficient and continually monitored, evaluated and improved upon.

Key terms	ISO Quality Definitions[1]
Quality Management System (QMS):	A quality management system (QMS) is a set of interrelated or interacting elements that organizations use to formulate quality policies and quality objectives and to establish the processes that are needed to ensure that policies are followed and objectives are achieved.
Quality Policy:	A quality policy should express top management's commitment to the quality management system (QMS) and should allow managers to set quality objectives. It should be compatible with organization's other policies and be consistent with its vision and mission.
Quality:	This refers to the degree to which a set of inherent characteristics fulfils a set of requirements.
Quality Objectives:	A quality objective is a quality result that you intend to achieve. Quality objectives are based on or derived from an organization's quality policy and must be consistent with it. They are usually formulated at all relevant levels within the organization and for all relevant functions.
Quality - Management:	Quality management includes all the activities that organizations use to direct, control, and coordinate quality. These activities include formulating a quality policy and setting quality objectives. They also include quality planning, quality control, quality assurance, and quality improvement.

[1] http://praxiom.com/iso-definition.htm

Why is quality assurance important for NWA?

1.7 NWA is the body established in Jamaica to manage the construction and rehabilitation[2] of the main road infrastructure islandwide. NWA operates as the engineer for all capital projects – including road repairs, rehabilitation and construction. As the Engineer, NWA contracts capital works to contractors, who may further sub-contract these works to sub-contractors. Quality assurance is that part of quality management, which focused on providing confidence that quality requirements are fulfilled. The onus is on NWA to ensure that the quality requirements of projects are fulfilled, by the contractors, based on the agreed quality control plans and contracts through the implementation of effective quality assurance systems. Therefore, NWA should establish a robust quality assurance mechanism to provide confidence that all quality requirements have been met, to ensure that the people of Jamaica benefit from a reliable and safe main road network.

Audit scope and methodology

1.8 We conducted a performance audit to determine the adequacy of NWA's Quality Management System to provide assurance that quality requirements are met in the construction and rehabilitation of the country's road network. Our audit was planned and conducted in accordance with the Government Auditing Standards, which are applicable to Performance Audit and issued by the International Organization of Supreme Audit Institutions (INTOSAI). Our assessment is based on the review of internal and external documents, interviews with senior management and staff, observations and analysis of information provided by NWA.

[2] Works which restore the elements of the road section so that they can provide their original function.

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Part Two

Quality Management Framework

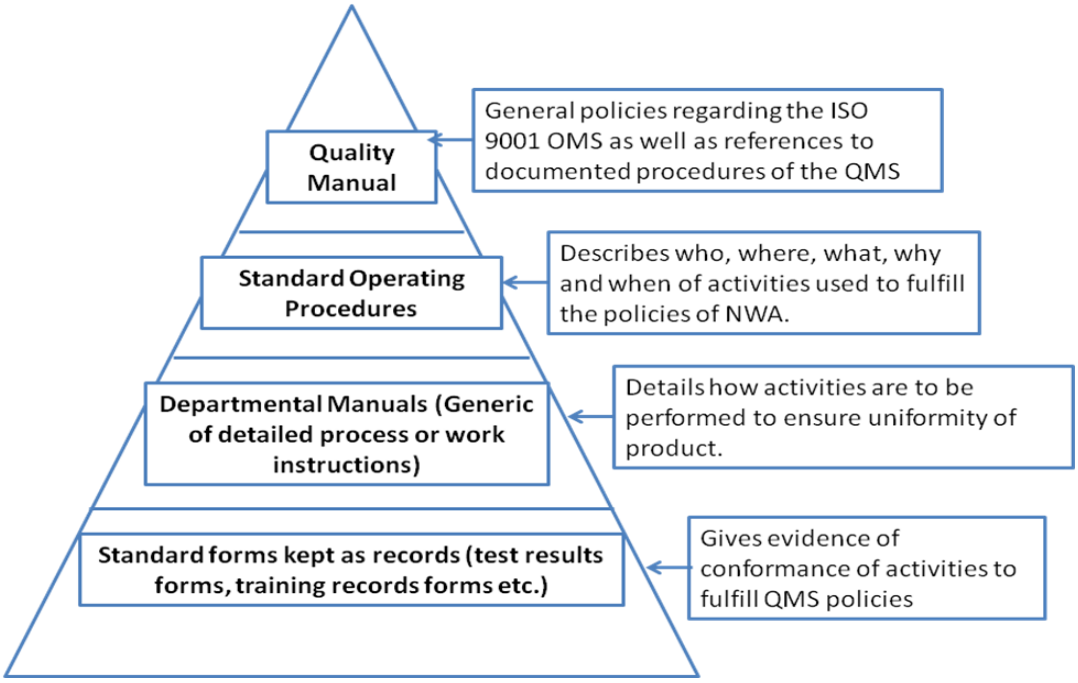
Audit Expectation

We expected NWA to have a Quality Management Framework (QMF) to provide the guidance necessary to achieve its mission *"to plan, build and maintain a reliable, safe and efficient main road network."* The QMF should be supported by an operational arm with responsibility for quality management; a quality policy; quality objectives; quality manuals and Standard Operating Procedures (SOPs). All of which should comprise the overall Quality Management System (QMS). The QMS should be subjected to constant reviews and assessment to determine its adequacy and effectiveness.

NWA has a documented Quality Management Framework

2.1 NWA developed a Quality Management Framework to support its Quality Management System. The Framework's hierarchy is shown in **Figure 2**.

Figure 2 Hierarchy of NWA's Documented Quality Management System



Source: Extracts from NWA's Quality Manual

2.2 The Quality Management System is supported by 15 manuals that guide NWA's project management, human resource management, planning and research and other administrative functions. It is a requirement that NWA periodically reviews the quality manuals to reflect changes in technology, operational development and associated risks relevant to the Agency. However, we found that two manuals, the Quality and the Standard Operating Procedures manuals, which NWA categorised as upper level manuals, were not updated since September 2005.

Quality Manual

2.3 NWA's Quality Manual was produced to:

a. Communicate the company's policies and requirements to customers/clients;
b. Provide the management and staff of NWA with a clear understanding of their company's policies, procedures, and practices so that the Company can continue to be successful in the international market place;
c. Provide the documented basis for auditing it's quality system;
d. Demonstrate compliance of our company's quality system with the ISO 9001 Quality Management System; and
e. Provide a basis for training.

2.4 We found that the Quality Manual was last reviewed in August 2005, contrary to Section 3.2.3 of the NWA's Quality Manual, which states, *"The Quality Manual shall be reviewed periodically to reaffirm its adequacy and conformance to current requirements of NWA." The review shall be done at least once per year."* The Quality Manual informs the strategic objectives of the Quality Assurance Directorate, and outlines the Quality Management System (QMS).

Standard Operating Procedures (SOPs) Manual

2.5 NWA did not conduct the required review of its Standard Operating Procedures (SOPs) Manual. Section IV(3) of the Manual requires that a review be conducted every three years. However, we found that the SOP Manual was last updated in September 2005. The Standard Operating Procedures (SOPs) Manual was developed in February 2004. The Manual details the various procedures that should be followed during its project management process and the steps by which the Quality Management System, quality policy and quality objectives would be reviewed for continuing suitability, adequacy and effectiveness.

2.6 NWA's failure to conduct timely reviews of the manuals and procedural guidelines would prevent the Agency from achieving its commitment to develop strong quality principles; and, to continually improve the effectiveness of the Quality Management System, as indicated in Section 5.3 (b) of the Quality Manual. Consequently, we were not certain how NWA satisfied itself that its Quality Management System is consistent with changes in technology and other circumstances – including risks facing the Agency.

2.7 NWA acknowledged that updates to the Quality and Standard Operating Manuals are outstanding and committed to review these manuals "*by the end of the calendar year*[3]*, to reflect our current business practices and provide a more accurate canopy under which work instructions operate."*

NWA did not implement corrective actions to complete ISO Certification process

2.8 NWA did not implement the necessary actions to obtain ISO certification of its Quality Management System. Given the critical importance of NWA's role in maintaining the nation's road infrastructure, the Agency should ensure that the related quality manuals and standard operating procedures are in keeping with internationally accepted and accredited standards, such as ISO. This certification would build public confidence that the system is consistent with internationally recognised standards in providing a safe road network. NWA would also benefit from continuing independent audits to assess compliance with its Quality Management System and ensure continued improvements.

2.9 In 2001, NWA undertook a voluntary process to prepare its quality manuals based on ISO standards. NWA adopted ISO quality requirements on the basis of advancing the Agency's efforts towards attaining ISO 9001 certification. In 2004, NWA contracted a company for $494,190 to review the Agency's Quality Management System in order to assess its readiness to becoming ISO certified. However, since the review, NWA has not been able to achieve key targets emanating from the ISO review. Consequently, its Quality Management Framework is not ISO certified.

2.10 The review revealed that NWA failed to achieve satisfactory results for 80 per cent of the requirements needed for ISO certification. The pre-assessment audit assessed the status of 50 requirements and found that 29 were unacceptable, 11 needed improvement and *'no unacceptable finding'* were given for the other 10. For example, NWA infrastructure (asset management), control of monitoring and measurement devices and monitoring and measurement of processes were not ISO compliant. To date, NWA has not implemented the corrective actions arising from the pre-assessment report.

2.11 NWA subsequently indicated that the Agency has adopted the Total Quality Management (TQM) Framework; instead of pursuing ISO certification, to govern its quality management function. However, NWA did not present any approval for the change of policy from the Chief Executive Officer and the portfolio Ministry. In November 2009, NWA indicated that a position paper was prepared for submission to the portfolio Ministry to sanction the Agency's decision to abandon the ISO protocol. However, the requisite portfolio Ministry approval and/or non-objection for such a change in policy to adopting TQM[4] principles were not presented, despite our requests. Further, NWA has not presented the TQM Framework for review, despite our requests.

[3] December 31, 2015

[4] The basic elements of TQM, as expounded by the American Society for Quality Control, are 1) policy, planning, and administration; 2) product design and design change control; 3) control of purchased material; 4) production quality control; 5) user contact and field performance; 6) corrective action; and 7) employee selection, training, and motivation.

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Part Three

Quality Monitoring and Assessment

Audit Expectation

We expected NWA's quality management activities to be documented to facilitate adequate monitoring and assessment of its effectiveness. Monitoring is necessary to ensure that activities conform to the QMS. The QMS should be results oriented and aid in bringing benefits to road users. Outcomes should be assessed and compared with quality targets.

NWA not assessing conformity with its Quality Management System

3.1 NWA was not able to demonstrate that it is assessing conformity with established Quality Management Systems. Internal Quality Audit is an independent examination of the effectiveness of an organisation's quality management system and the results that have been achieved through its implementation. This involves assessing the processes to ensure that various QMS procedures are followed and objectives are achieved. This is done by examining elements of the Quality Management System in order to evaluate compliance with established quality system requirements.

3.2 In October 2006, NWA took the decision *"to discontinue the Internal Quality Audits for the period 2007 January to June, as trend analysis revealed that the audits were generating recurring/repetitive opportunities for improvements."* However, in April 2015, NWA responded that the requirement for internal quality audits was discontinued when the ISO certification was aborted. The absence of such audits not only breached NWA's Quality Manual but also denies NWA the opportunity to systematically identify weaknesses and non-conformance with the Quality Management Systems; so that corrective and preventative actions can be taken. Further, the failure to conduct the required internal quality audits prevented NWA from assessing its level of compliance with the quality assurance procedures and guidelines.

3.3 Internal Quality Audit also formed part of NWA's Quality Management System. In 2001, NWA co-opted personnel from various departments to conduct internal quality audits of its Quality Management System. Over the period January 2003 to December 2006, NWA conducted 40 audit reviews of its QMS. Section 8.2.2 of the Quality Manual requires NWA to conduct internal quality audits, at planned intervals, as per Standard Operating Procedures No.16 - Internal Quality Audits. NWA's Quality Assurance Unit conducts audits of major road construction and rehabilitation projects in accordance with the Quality Assurance Manual - Guidelines for Conducting Project Audits.[5] These project audits aim to identify any deviation of project administration activities from contractual requirements based on FIDIC[6], inclusive of

[5] Reviewed and updated in September 2014

[6] International Federation of Consulting Engineer - Its members are national associations of consulting engineers - See more at: http://fidic.org/about-fidic#sthash.K2xBOP5S.dpuf

technical specifications and organizational best practices. In April 2015, NWA noted that *"the Agency has decided to reintroduce a revised internal quality audit regime to enhance current compliance reporting. This measure is in support of the newly formed joint Internal Audit/QA Review Committee. However, it is expected that the frequency and scope of such audits will be different from those of 2004 to better reflect the new purpose*."

Quality assurance of road infrastructure compromised by unauthentic QC test results

3.4 NWA vision statement, in part, refers to the creation of a "world class, safe, quality primary road network." To assist in achieving this vision, NWA requires contractors to conduct quality control tests to ensure that materials such as concrete and asphalt mixtures, used in road repair contracts meet the required standards. To conduct these tests, contactors may either utilize the services of NWA's Material Testing and Evaluation laboratory or use any of the five private laboratories approved by NWA.

3.5 We determined that NWA did not make it a requirement to obtain independently, the results of material tests conducted. Where private laboratories are used, the contractors would submit the test results to NWA. This provided an opportunity for the contractors to falsify the results and this risk had indeed materialized. For example, NWA records revealed that 36 sub-contractors submitted unauthentic tests results. NWA deducted one per cent from the total contract sum, amounting to $94 million, from the retention amounts due to the 36 contractors that purportedly submitted unauthentic tests results. Further, between June 2013 and June 2014, NWA detected 15 instances whereby contractors submitted false quality control test results, for material used in road construction and rehabilitation works. The unauthentic test results were related to projects with total project costs of $813 million. The unauthentic test results were only detected during the projects' taking-over exercise; at this stage, the work would have been completed. In one such case, NWA detected that the test result was falsified when it contacted the laboratory to confirm elements of the results.

3.6 NWA responded that the Agency had:

> *"took the decision to exercise its authority, pursuant to the special conditions of contracts under FIDIC, to apply a penalty that in this instant case is equivalent to 1 per cent of the contract sum on occasion where the contractor has failed, to the Engineer's satisfaction, to provide the full quantum of tests contractually required. This penalty was applied via a deliberative process undertaken by the Engineer with due consideration given to the expected design life of the works, and the extent to which the contractor failed to comply with the prescribed testing regiment on a case by case basis."*

3.7 While NWA indicated that due consideration was given "*with respect to the design life of the works and the extent to which the contractor failed to comply with the prescribed testing regiment"*, NWA could not provide any evidence regarding its determination of the one per cent penalty that was applied to all the affected contractors.

3.8 To date, NWA has not conducted any technical analysis to determine whether the roads were constructed with the correct quality materials. In December 2015, NWA indicated that while a decision has been taken to avoid harmful and destructive tests on the roadways referenced, the Agency continues to undertake routine inspection of the condition of the entire main road network. The report, dated April 2015, indicated that the observed damage is largely

attributed to localized flooding events and the presence of leaking pipes and incomplete restoration by a utility provider.

3.9 Further, NWA has not sought legal advice regarding the application of the one per cent penalty, or assessed the impact the imposition of the penalty could have on any steps to recover damages for any deterioration directly attributable to the contractors delivering road works below the accepted standards.

3.10 The presentation of unauthentic test results not only represents a breach of the contractors' quality control obligations; but could also compromise the quality and longevity of the country's road infrastructure. Contractors may continue to falsify the required test results if NWA does not implement changes to its quality management system to address this issue. In December 2015, NWA reported that the Agency has taken steps to engage the testing houses on agreeing an enhanced protocol regime for the reporting of their test results and findings. NWA further indicated that a "Guidelines for Conducting Third Party Laboratory Inspection" was developed in February 2014, subsequent to the incidence of alleged fraudulent results in 2013. The Guidelines include provision of authorized signatures from each lab, sample of authentication mark - whether company stamp or embossed seal, templates of test reports and establishment of sample logs to facilitate traceability of tests conducted.

Material testing equipment not always calibrated to ensure accuracy of test results

3.11 NWA did not monitor the operational efficiency of its critical QM testing equipment to allow for an effective assessment of their performance. We found that NWA did not have a system to record the history of repairs and maintenance undertaken on each of the 23 pieces of material testing equipment. This failure also breached the Government's guidelines on management of fixed assets, which requires public bodies to maintain an 'Office Machines and Equipment Record' for each equipment detailing their "life record". Failure to prepare the stipulated record prevented NWA from providing a history of repairs and servicing to particular equipment to determine whether it is economical to retain or discontinue use of particular equipment. NWA responded in December 2015 stating that these records existed; however, at the time of our report, the evidence was not presented.

3.12 NWA's laboratory plays a vital role in the quality assurance mechanism, as it conducts quality assurance tests to ensure that materials used in road infrastructure works meet the required quality control standards. NWA rely on a government entity to conduct independent calibration of the equipment used by its laboratory, usually on a six month or annual basis, to ensure that the results generated by the equipment are accurate.

3.13 NWA's Material Testing and Evaluation Unit maintain 23 pieces of equipment of which nine require periodic calibration in order to provide accurate readings for any sample tested. However, we found that NWA did not conduct the independent calibrations on a timely basis. For example, we found that the Marshall Stability Flow Machine, used for testing the asphaltic concrete, failed two calibration tests conducted in February 2013 and April 2015; three years apart. The reports noted that the machine *"was found not to conform to the accuracy requirements"*. NWA retested the machine in April 2015, the result of which indicated that the machine failed the calibration test and the machine *"is not recommended for use and should be repaired or replaced".* NWA also advised that the machine was eventually replaced in October

2015. NWA also operates a Compressive Strength Testing Machine, used to test the strength of concrete. NWA conducted calibration test in March 2015, which indicated that machine was found not to conform to the accuracy requirements **(Figure 3)**. Further, NWA submitted copies of test results (dated February 2015), which revealed that the scales[7] were mechanically defective and therefore not fit for its intended use until repaired, calibrated and re-verified. NWA reported that the scales were subsequently re-calibrated in April 2015. In December 2015, NWA submitted updated calibration reports for eight pieces of equipment. As shown in **Figure 3**, two other equipment were not calibrated within the required timeframe; while the calibration due dates for another two were not recorded.

Figure 3 Analysis of testing equipment calibration

Name of Machine	Calibration Frequency	Last Calibration Date	Result of Calibration	Due Calibration Date	NWA Latest Response (December 2015)
Marshall Stability Flow Machine*	Annually	08/02/13	Fail*	15/1/15	Calibration report dated April 2015 seen.
ELE Compressive Strength Machine	Annually	19/12/12	Fail	14/2/12	Calibration report dated April 2015 seen.
CBR Machine - Proving Ring 50KG**	Annually	18/09/13	No results provided	Not given	Certificate not issued
CBR Machine – Proving Ring 50KG	Annually	12/01/15	No results provided	Not given	NWA reported that equipment last calibrated in April 2015
Proving Ring 28KG	Annually	18/09/12	No results provided	18/09/13	NWA reported that equipment last calibrated in April 2015
-Proving Ring 7KG**	Annually	18/09/12	No results provided	18/09/13	Certificate outstanding
AE Balance 1500KG	6 months	08/05/14	No results provided	08/01/14	NWA reported that equipment was calibrated in April 2015
Shinko Densi Balance (Vibra)	6 months	08/05/14	No results provided	08/11/14	NWA reported that equipment was calibrated in April 2015
Metler Toledo	6 months	08/05/14	No results provided	08/11/14	NWA reported that equipment was calibrated in April 2015

Note: NWA noted that the CBR Machine - Proving Ring 50KG was calibrated in January 2015; however, calibration certificate was not presented

*- In December 2015, NWA reported that the equipment was replaced in October 2015

** - In December 2015, NWA reported that equipment has been withdrawn from service due to mechanical fault

Source: AuGD analysis of NWA records

3.14 Failure to conduct timely calibrations tests provided no independent assurance that the equipment utilized to measure critical quality measures were meeting the standard quality measures. Timely calibration testing is even more crucial given the age of the equipment. The laboratory is equipped with 23 pieces of material testing equipment; of which 11 were found to be over 14 years old.

NWA paid retention of $5.3 million without ensuring contractors fulfilled their obligations

3.15 The failure of NWA to close out projects, on a timely basis, resulted in the Agency having to honour claims made by six contractors, for retention payment of $5.3 million, without

[7] AE Balance 1500KG, Shinko Densi Balance (Vibra) and Metler Toledo scales

verifying that the contractors satisfactorily completed the activities required of them (**Appendix 1**). The claims were made between 2010 and 2014, to recover the retention payment on projects valuing $91.5 million. The practical completion certificates were prepared after the projects were completed. The elapsed time between the date the projects were completed and the date the practical completion certificates were signed ranged between 14 months and eight years. We observed that NWA prepared the practical completion certificates for these projects, at the time the contractors made their claims, to facilitate the payment of the full retention amounts to the contractors.

3.16 The failure to conduct the taking-over inspection and prepare the practical completion certificates immediately after the completion of the projects prevented NWA from identifying any defects and outstanding deliverables; and communicating these to the contractors for corrective actions to be taken. Consequently, the Agency had not undertaken the requisite steps to ensure that contractors completed the project in keeping with the deliverables of the contracts before releasing the retention to the contractors.

3.17 NWA withheld ten per cent of each payment certificate, as retention; up to a maximum of five per cent of the contract sum. Payments are made to contractors based on a number of interim certificates during the execution phase of each project based on the percentage portion of the work completed. Prior to each interim certificate being paid, the Project Manager would sign the certificate attesting that the related proportion of the work has been completed to quality standard. These interim payments are made up until 95 per cent of the works are completed to the agreed specification and satisfaction. At this stage, substantial/practical completion is achieved. The purpose of five per cent retention is to safeguard taxpayers' investment and to ensure that the Contractor satisfactorily completes the activities required of them under the contract. NWA is required to release to the Contractor 50 per cent of the retention sum upon issuing the practical completion certificate. The remaining 50 per cent is paid at the end of the defects liability period; if no further defects are detected to which the Contractor can be held responsible. If the Contractor fails to rectify the defects satisfactorily, NWA can use the retention to remedy the defects.

3.18 Up to January 2015, NWA still has unpaid retention sums totalling $321 million **(Figure 4)**. These sums, which were withheld between April 2001 and January 2015, were not returned to contractors due to, among other reasons, the failure of NWA to properly close out and take-over all projects. NWA informed us that some of these projects are yet to be closed out; but, could not say what portion represents closed projects. We requested the files for 29 projects with unpaid retention; however 10 files were not presented. Consequently, we were not able to determine whether the practical completion certificates were prepared for these 10 projects, with unpaid retention of $18.2 million. Of the 19 project files reviewed, the practical completion certificates were seen for 13. No certificates were seen for the other six projects; five of which have unpaid retention of $17.6 million. These six projects were completed up to five years ago; five of which cost $232 million. At the time of our report, NWA was unable to provide up to date figures for unpaid retention.

Figure 4 Unclaimed retention - April 2001 to January 2014

Year	Amount ($)
2001-02	6,411,845
2002-03	50,311,497
2003-04	16,892,384
2004-05	23,203,933
2005-06	23,121,936
2006-07	18,769,297
2007-08	12,954,059
2008-09	34,129,142
2009-10	46,901,964
2010-11	16,948,436
2011-12	1,230,038
2012-13	2,741,898
2013-14	32,023,628
April-14 to Jan-15	35,713,055
TOTAL	**321,353,112**

Source: NWA's Finance and Accounts Records

Appendices

Appendix 1 NWA honoured claims made by contractors

Project	Date Project Completed	Date TOC[8] signed	Lapse of Time	Date Retention Paid	Retention Paid ($)	Value of work taken over ($)
TC 713-Special Flood damage: Church Lane in St. Thomas (Special Flood Damage rehab. Programme 2006/2007)	January 23, 2007	TOC not signed and dated	Not Determined	26-Aug-14	260,989	3,398,490
TC 594-Papine to Red-light (Road repairs)	October 2, 2006	October 23, 2014	8 years	11-Nov-14	1,016,321	10,163,210
TC 681-Special Flood damage: Copper Lane in St Thomas (Special Flood damage rehabilitation programme 2006/2007)	January 03, 2007	August 8, 2014	7 years and 7 months	26-Aug-14	339,849	35,654,100
TC933-Construction of reinforced concrete box culvert – Exchange, St Ann	June 20, 2009	September 3, 2010	1 year and 2 months	10-Jan-12	1,484,787	34,991,725
TC1085-Capital A Emergency Repairs prog. Duncans Pen, Windsor Road	October 27, 2013	September 10, 2014	10 months	3-Oct-14	1,782,705	2,609,890
FAC 28582-Constituency Development Fund Pgm. Armour Heights, Oakridge, Stillwell	January 13, 2009	January 6, 2008	Conflicting dates observed	7-Jan-10	465,500	4,705,000
Grand Total					**5,350,151**	**91,522,415**

[8] Taking Over Certificate