

REPORT

OF THE

AUDITOR GENERAL

ON THE

ROAD DEVELOPMENT AGENCY

FOR THE PERIOD

JANUARY 2006 TO SEPTEMBER 2009

Executive Summary

The audit of the Road Development Agency (RDA) for the years 2006 and 2009 was conducted in accordance with the provisions of Article 121 of the Constitution of Zambia, Cap 378 of the Laws of Zambia and Public Finance Act No. 15 of 2004.

The objectives of the audit were among others to ascertain whether:

- Procurement procedures were followed in the award of contracts;
- Roads projects were administered in accordance with contract agreements; and
- Expenditure was in conformity with the Laws of Zambia.

The following were observed:

a. Annual Plan and Budget

i. Over commitment

The Agency committed Government to expenditure in excess of money appropriated by Parliament contrary to section 7(3) of the Public Finance Act No.15 of 2004. The over commitment amounted to K1,015,817,097,718 in 2008. This resulted in serious cash flow problems in 2009.

ii. Inadequate Provisions for Contracts

Adequate funds were not provided in the budget to cover the contracts. This resulted in delayed payments and completion of works.

b. Procurement Stage

i. Lack of Drawings and Condition Survey

Drawings for the contracts were in most cases either delayed or not prepared and condition surveys were not conducted leading to inadequate interventions and unnecessary variations.

ii. Engineers' Estimates

Contrary to common practice the engineer's estimates were not used when carrying out evaluations. It was therefore difficult to ascertain the reasonableness of the bid sums.

iii. Late Engagement of Supervising Consultants.

Consultants were mostly engaged later than the starting date of the works contract. In this regard part of the contract period were running without supervision.

iv. Negotiation Meetings

RDA did not usually hold contract negotiation meetings despite the inconsistencies in the evaluation and poor contract documents.

v. Poor Quality Contract Documents

- Form of agreement in the contract are at times not signed and have no date.
- Sections indicated as forming part of the contract such as drawings were missing in some cases.
- Contracts for unpaved roads would have drawings for a paved road.

c. Execution Stage

i. Poor contract Administration

There were considerable delays in decision making relating to issues raised by consultants/contractors which in some cases led to extension of time and additional costs.

ii. Non Submission of Performance Bonds

The clause on performance bond was not always respected thereby failing to penalize the contractor in case of none performance.

iii. Delayed Payments to Contractors and Consultants

Some Payments to contractors were delayed resulting in interest charges and standing time.

iv. Irregular Payments

In some cases payments were made for works not done

v. Irregular Instructions to the Contractors

In some cases the Agency issued instructions directly to the contractors disregarding the consultants. The instructions were mostly related to payments to RDA staff and service of RDA motor vehicles.

vi. Delayed Works

There were very few projects which were completed on time. In most cases the contracts had to be extended and in some cases more than once. There were also cases where RDA instructed the contractors to slow down or stop works because of lack of funds.

vii. Progress Reports

Progress reports were in a number of cases not prepared by the supervisors.

viii. Variations

Decisions on variations were in some cases not justified by the contractor and therefore un reasonable.

ix. Supervision Funds

In cases where the supervision of the contracts was done by RDA, supervision funds were paid through the contractor thereby raising issues of objectivity.

x. Poor Quality Works

Poor quality works were observed on most of the contracts reviewed.

d. Analysis and Comments on the Test Results

Analysis of results for road test samples that were collected from eighteen (18) projects as part of the audit for Road Work carried out by the RDA in 2007/2008 revealed the following results;

- 1 **44%** of samples tested did not meet gradation requirements as soil/aggregate particles were either too large or too small than required by specifications. The consequence is the poor bondage, compaction and washing away of particles.
- 2 **75%** of samples tested were too plastic in that the samples had too much clay than required . This would lead to rapid expansion and cracking of the road.
- 3 **67%** of aggregates did not meet the requirements of crushing strength. Poor aggregates easily get crushed by moving loads and leads to fast deterioration of roads
- 4 **81%** of base thickness were thinner than what was specified
- 5 **39%** of surface dressing samples stripped off from the base course
- 6 **82%** of Surface dressing layers were thinner than specified
- 7 **100%** of stabilized samples taken had cement content less than specified
- 8 **50%** of concrete samples tested were weaker than what was specified

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Introduction

1. This report on the audit of the Road Development Agency (RDA) for the years 2006 to 2009 is submitted to the President for tabling in the National Assembly in accordance with the provisions of Article 121 of the Constitution of Zambia and Cap 378 of the Laws of Zambia.

Audit Objective

2. The objectives of the audit were among others to ascertain whether procurement procedures were followed in the award of contracts, roads projects were administered in accordance with contract agreements and whether the expenditure was in conformity with the Laws of Zambia.

Scope and Methodology

3. The report is a result of an audit carried out at the Road Development Agency. The audit was planned and performed such that sufficient evidence, explanations and all necessary information were obtained to reach reasonable conclusions. In conducting the audit, tests of accounting records maintained at the Agency, the National Roads Fund Agency and the Ministry of Works and Supply such as accounting documents, tender documents, contracts, certificates of completed works, progress reports and other relevant records were reviewed.

In the course of preparing this report the Controlling Officer in the Ministry of Works and Supply was required to confirm the correctness of the facts presented. Where comments were received and varied materially with the facts presented, the relevant items were amended appropriately.

Background

4. The Government of the Republic of Zambia (GRZ), with assistance from its Cooperating Partners (CPs) that comprised the World Bank (WB), European Commission (EC), Danish Development Assistance (Danida), Japanese International Cooperation Agency (JICA), Nordic Development Fund (NDF), Africa Development Bank (AfDB) and German Development Bank (KfW) developed a Road Sector Investment Programme (ROADSIP). The goal of the programme was to systematically maintain and rehabilitate a core road network and to bring it to a maintainable standard by the year 2013. ROADSIP I covered the period from 1997 to 2007 and was extended to 2013 under ROADSIP II.

In 2002, three (3) new road sector agencies namely the National Road Fund Agency (NRFA), the Road Development Agency (RDA), the Road Transport and Safety Agency (RTSA) were created through the enactment of the Public Roads Acts Nos. 11, 12 and 13. The Agencies which became operational in 2005 have the following functions among others:

- National Road Fund Agency (NRFA) – responsible for mobilizing resources for funding the road sector and administering the Road Fund.
- Road Development Agency (RDA) – responsible for planning, maintaining and managing the core road network which was previously the responsibility of the Roads Department under the Ministry of Works and Supply.
- Road Transport and Safety Agency (RTSA) – responsible for road safety, traffic management, motor vehicle registration and drivers licensing.

The total core road network is 40,113 km comprising 3,088 km of Trunk roads, 3,691 km of Main roads, 13,707 km of District roads, 5,294 km of Urban roads and 14,333 km of Primary Feeder roads.

Administration

5. The Public Roads Act No 12 of 2002 provides among other things that the composition of RDA shall consist of part time members appointed by the Minister as follows:
 - i. A representative of the National Council for Construction,
 - ii. A representative of the Zambia National Farmers Union,
 - iii. A representative of the National Science and Technology Council,
 - iv. A representative of the Engineering Institute of Zambia,
 - v. A representative of the Chartered Institute of Transport
 - vi. A representative of:
 - the ministry responsible for works and supply;
 - the ministry responsible for communication and transport,
 - the ministry responsible for local government and housing,

- the ministry responsible for finance;
 - the ministry responsible for tourism;
 - the ministry responsible for agriculture; and
 - the Attorney General;
- vii.** the Director of the Road Transport and Safety Agency (ex-officio);
- viii.** the Director of the National Road Fund Agency (ex-officio); and
- ix.** one other person.

The Chairperson shall be appointed by the Minister responsible for Works and Supply while the Vice Chairperson shall be elected by the members of the Agency from among their number.

The Agency shall report to the Committee of Ministers on the Road Maintenance Initiative at such times and such places as the Minister may determine.

The Agency appoints the Director and Chief Executive Officer who is responsible for the day-to-day administration of the Agency and is assisted by the Managers for Corporate Services, Construction and Maintenance, Planning and Design; and Heads of Departments. The Director and Chief Executive Officer, Managers and Heads of Departments are appointed on three-year renewable contracts while the rest of staff is appointed on a permanent and pensionable basis.

The current board was appointed in 2004 for a term of three (3) years and then reappointed in 2007 for another three year term.

Review of Operations

An examination of financial and other records maintained at headquarters for the financial years ended 31st December 2006 to 2009 revealed the following:

6. Finance and Administration

a. Questionable Composition of Committees

In order to enhance the quality and efficiency of decisions made by the board, three committees were established; administration and finance, technical and audit committees.

It was observed that the chairperson of the finance and administration committee was also the chairperson of the board. In addition, it was observed that the full sitting of the finance and administration committee also constituted a quorum of the board.

Although in his response dated 9th March 2010, the Controlling Officer stated that “the Board however at its meeting of 20th meeting held on 7th May 2009 resolved to reduce the size of the Administration and Finance Committee with the Chairperson different from the Board Chairperson. As of 9th March 2010, the resolution had not been implemented.

b. Irregular Payment of Internet Bills for the Chairman

Although the Agency provided the Chairman with an office with internet services, it was observed that in January 2007 and March 2008, the Agency paid K1,416,743 and K1,273,000 respectively for the provision of internet services at the Board Chairman’s private premises.

The payments of amounts totalling K2,689,743 in respect of internet services at the Board Chairman’s private premises was irregular.

c. Irregular Payment of Insurance Premiums for Board Members

In June 2007 and August 2008, the Agency paid K17,390,625 and K20,446,875 respectively to NICO Insurance for group personal accident policy for board members without authority from the Minister. It was further noted that the facility was not available to staff who were fully involved in the day to day operations of the Agency.

Although in his response dated 9th March 2010, the Controlling Officer stated that the correspondence from the Board Chairman and the response from the Minister Works and Supply was submitted to the auditors, the authority had not been availed as of 10th March 2010.

d. Irregular Sale of Personal to Holder Motor Vehicles

Contrary to Management Conditions of Service, in March 2009, management sold five (5) motor vehicles to five (5) officers without obtaining authority from the Board as shown in the table below:

Name	Price K	Mileage	Registration No.
Director & CEO	33,593,967	87,738	ABF 3303
Former Director & CEO	57,079,500	87,738	ABH 1878
Commercial & Technical Services - Senior Manager	40,390,359	85,535	ABH 725
Former Corporate Services Manager	39,302,910	55,000	ABH 3279
Construction & Maintenance - Senior Manager	40,722,159	95,233	ABH 723

Further, as can be seen from the table above, the motor vehicles' tachometers had not clocked 100,000 km as stipulated in the Management Condition of Services.

Although in December 2009, management sought for retrospective Board authority to have the sale approved, the Board rejected the proposal. It was observed however that out of the five (5) motor vehicles sold, three (3) had been returned to the Agency while two (2) were still in the custody of the two employees who were no longer with the Agency.

e. Irregular Use of Fuel

The Agency maintained a fuel account with Total (Z) Ltd. The fuel was drawn using tom cards allocated to the Agency. An examination of records and inquiries made with management relating to the purchase and usage of fuel revealed the following:

- The account was not reconciled during the period under review. In this regard, it was observed that during the period March 2007 to April 2008, fuel costing K70,306,610 had been charged to the Agency using tom cards not registered to the Agency.
- In May and June 2009, fuel in amounts totalling K28,262,205 was drawn without requisitions.
- The Agency did not maintain a fuel register and relied on information from the supplier statements. The statements from the supplier only indicated the card numbers and did not indicate the vehicle registration numbers. In this regard, it could not be ascertained whether all drawings reflecting in the statements were made by the Agency.

Although in his response dated 9th March 2010, the Controlling Officer stated that the records which showed that the card was allocated to the pool were availed to the auditors for inspection, the documents had not been availed .

f. Irregular Drawing of Fuel

- i. Although the contract of employment for the manager corporate services expired on 1 July 2009, the Agency did not withdraw his tom card. In this regard, it was observed that during the period from July to August 2009, the former manager drew fuel costing K6,099,038. As of December 2009, only an amount of K4,181,112 had been recovered leaving a balance of K1,917,926 outstanding. It is not clear how the Agency will recover the balance since the former manager had since been paid his benefits.
- ii. During the period from April 2007 to 1st February 2009, the former Director and CEO, whilst on forced leave irregularly drew fuel costing

K86,914,219 from an RDA account despite having being paid amounts totalling K37,960,000 as fuel allowance for the same period.

g. Unretired Imprest

Contrary to Financial Regulation No. 96, imprests in amounts totalling K19,118,705,403 issued to the Agency by NRFA for various road activities during the period 2004 to 31st December 2009 had not been retired.

7. Procurement of Contracts

a. Adequacy of Bid Period

The Public Procurement Regulations of 2005, require that the bidding period must be between four (4) and eight (8) weeks. It was observed that the majority of bidding periods had been twenty five (25) days irrespective of project size.

b. Appointment of Evaluation Committee

There were no criteria for the appointment/composition of the evaluation committee. In this regard, it was observed that the members of the committee were mainly appointed from the planning and design department. In most cases, the evaluation committee comprised three (3) engineers from planning and design department namely, the principal engineer and two (2) engineers, thereby casting doubt on the objectivity and effectiveness of the committee.

It was further observed that the procedure for appointment and approval of the evaluation committee was not formalised as only handwritten notes were used to nominate the members of the evaluation committee.

c. Bids Responsiveness

There was a high percentage of submissions which were judged to be non-responsive at the administrative stage and thus eliminated from further evaluation. An analysis of fourteen (14) small contracts, where the bidders tended to be more inexperienced revealed that the average rejection rate was 41%. In some cases the rejection rate was as high as 65%.

This high percentage indicated that either the bidders had not understood the bidding documents or that the evaluators were being too restrictive in their judgment, especially for the smaller bidders.

d. Consistency in Application of the Evaluation Criteria

The evaluation committees were on a number of occasions inconsistent in their application of the evaluation criteria. For instance during the evaluation of the Nakatindi Road M10 project, a bidder was eliminated because his wages were lower than the legal minimum, while another committee for the construction of Muombe culverts project, a bidder who stated that his wages were lower than the legal minimum, was allowed to proceed, on the basis that he would be forced to obey the law if he won the contract.

e. Over Procurement

A provision of K1.2 trillion was provided in the 2008 budget comprising K685 billion from local sources and K515 billion from external sources. A total of K670.4 billion was released from the treasury while the Cooperating Partners funded a total of K264.199 billion bringing total releases to K934.59. A total sum of K842.42 billion was spent in 2008 and a sum of K92.17 billion was carried forward to 2009.

In 2009, a provision of K1,356.84 billion comprising of K715.45 billion local resources and K641.396 billion external resources was provided in the annual work plan. As of September 2009, Government had released a sum of K693.34 billion whilst the cooperating partners had released a total of K88.06 billion.

2008	Budget K'Billion	Releases K'Billion	Expenditure K'Billion	Balance K'Billion
GRZ	685.00	670.40	675.11	
Donor	515.00	264.19	167.31	
Total	1,200.00	934.59	842.42	92.17
As at August 2009 the following were the releases and expenditure:				
GRZ	715.45	693.34	753.90	
Donor	641.39	88.06	137.51	
Total	1,356.84	781.40	891.41	

According to the Public Finance Act of 2004 7(3), every controlling officer shall be charged with the duty of planning and controlling the expenditure of public funds under the controlling officers control so that not committing Government to expenditures in excess of money appropriated by Parliament.

The following were observed;

i. Over Commitment of Funds

Contrary to the Appropriation Act of 2008 and the Public Finance Act No. 15 of 2004, it was observed that the Agency committed Government to expenditures in excess of money appropriated by Parliament. The approved budget provision for

the year 2008 on local resources was K685 billion while the Agency committed Government to contracts in the sum of K1.643 trillion, resulting in an over commitment of K1,015 trillion.

It was also observed that five (5) road projects in amounts totalling K182,455,297,524 were procured outside the 2008 work plan and authority to procure these projects was not availed for audit.

ii. Unauthorised Budget Variations

Contrary to Financial Regulation No.31, which states that Controlling Officers should obtain authority from the Secretary to the Treasury to vary funds, the Agency varied funds in amounts totalling K10,000,000,000 from M18 (Sakala via Lufwanyama to Ingwe) to other projects without authority.

Further, it was observed that the Agency varied funds in amounts totalling K43,069,310,029 relating to six (6) projects without approval from the Board.

iii. Inadequate Budget Provision

Whereas certified works in respect of thirty eight (38) projects rolled over from previous years amounted to K207,368,650,817, only K113,600,288,000 was provided for in the 2009 budget resulting in an overrun of K93,768,362,817 as shown in the table below:

Contract	Name of Contractor	Contract Period	Contract price K	Provision K	Variance K
Bauleni Turn off to State Lodge and Selected Roads primary in Nyumba Yanga	Raven works Construction	Six (6) months commencing 1 July 2008	18,199,114,715	10,000,000,000	8,199,114,715
By pass road from Kafue to Chilumbulu Road	Rankin Engineering Consultants	Nine (9) months commencing 25 February 2008	14,637,211,088	8,000,000,000	6,637,211,088
Selected Chalala Road, Mosi-o-Tunya, part of Shantumbu Road	Brian Colquhoun, Hugh O'Donnell and Partners (BCHOD)	Eight (8) months commencing 7 November 2008	36,896,223,626	14,500,000,000	22,396,223,626
D176 Ngwerere to Chisamba and D573 Ngwerere to Lusaka Int. Airport	Raubex Construction Ltd	Six (6) months commencing 15 July 2008	13,037,826,849	7,000,000,000	6,037,826,849
Twin Palm, Ibex Hill-Kabulonga, Avondale-Kabulonga Roads	Ng'andu UWP Consulting	Twelve (12) months commencing 9 September 2009	57,545,581,878	16,500,000,000	41,045,581,878
Lusaka Int. Airport Turn off to Luangwa Bridge	Raubex Construction Ltd	Eighteen (18) months commencing 10 July 2008	80,168,600,476	38,030,000,000	42,138,600,476
45km of Selected City Roads in Lusaka Province	Road and Paving Zambia Ltd	Eight (8) months commencing 10 September 2008	77,741,065,600	20,500,000,000	57,241,065,600
Luansobe-Mpongwe Road 50km	China Henan Int. Cooperation Ltd	Twelve (12) months commencing 27 October 2009	90,097,344,487	20,000,000,000	70,097,344,487
Limba Lamba Road	China Geo Engineering	Four (4) months Commencing 30 September 2008	9,487,974,892	7,500,000,000	1,987,974,892

iv. Cash Flows Projections

Although the cash flow statement showed a deficit of K33.576 million, an analysis of the 2009 work plan revealed that the projections were not realistic in that:

- The cash flow did not take into account two hundred and ten (210) new projects costing K194.839 billion approved in the 2009 work plan. It was noted that out the new projects planned for 2009, contracts costing K55.022 billion had been signed as of August 2009.
- Projects with a completion date of earlier than July 2010 were projected to be paid in 2011 e.g. Luwingu – Kasama road, Choma – Chitongo road, Serenje – Samfya- Mansa road, and Luansobe Mpongwe road.

8. Management of Contracts

a. Omission of Auditor General’s Clause

Contrary to section 8 of the Public Audit Act, which requires all contracts that involve expenditure of the public funds to have a provision empowering the Auditor General to have access to and examine all books, records, papers relating to the contract, the Agency did not make a provision in the contract.

The contracts involved are detailed below:

Contract	Contract Price K
Bauleni Turn off to State Lodge and Selected Roads primary in Nyumba Yanga	18,199,144,715
By pass road from Kafue to Chilumbulu Road	14,637,211,088
Mpongwe District:St.Antony Road, Lot 7	569,927,875
Kemuz-Teka Farm to Silangwa Road	1,932,202,140

b. Non-availability of Designs / Drawings during Tendering

The purpose of designs/drawings is to comprehensively identify the scope and cost of the project and eliminate inappropriateness, inefficiency, error, omission, fault or other defects during implementation and in use. The designs are the major input in the preparation of the engineer’s estimates and the Bill of Quantities (BoQs).

The absence of designs/drawings leads to preparation of inaccurate BoQs which in turn lead to variations in the contract, re-scoping of works and extensions of time thereby delaying completion of projects.

It was observed that there were sixteen (16) contracts with a total contract sum of K644,062,439,475 for which designs/drawings were not prepared at the time of tendering the works. The contracts involved are detailed below:

Contract	Contract Price K
By pass Rd from Kafue/Lumumba to Chilumbulu Rd	14,637,211,088
Ngwerere to Chisamba (D176) & Ngwerere to Intl Airport(D753)	13,037,826,849
Palabana Rd (D153) & state Lodge (D156)	2,848,430,750
Lusaka Intl Airport to Luangwa Bridge (T004)	80,168,600,476
Selected city Rds in Lusaka Province	77,741,065,600
Luansobe to Mpongwe Rd	90,097,344,487
St Anthony Rd, Mpongwe District	569,927,875
Town centre-Roan Mpatamatu Rd	24,328,222,699
Kamfinsa Rd(D249)	14,215,874,275
Lusitu Bridge along M15	7,786,786,786
Monze-Niko-Chitongo & Hamusonde-Maala Rd	24,670,539,465
Choma -Chitongo Rd	164,572,767,310
Chipata Townships Rd	34,379,087,318
Petauke to Chilongozi Rd & Ukwimi Sonja	26,933,372,884
Lumwana to Mwinilunga	67,907,796,063
Mansa to Fiyongoli Farm Block	167,585,550
Total	644,062,439,475

9. Lusaka Province

a. Design and Construction of Selected Chalala Roads, Mosi-O-Tunya Road Extension, Part of Shatumbu Road and South of Chilenje South Newly Constructed Road Parallel to Zesco Pylons Based on Integrated Construction Unit (ICU) Method of Works

In September 2008, the Zambia National Tender Board (ZNTB) conveyed its authority to the Roads Development Agency (RDA) for the award of a contract to

Brian Colquhoun, Hugh O'Donnell and Partners (Z) (BCHOD) for the design, supervision and construction/upgrading of selected Chalala roads, Mosi-o-tunya road extension and part of Shantumbu road and south of Chilenje South based on Integrated Construction Unit (ICU) method of works. The contract price was K36,896,223,626 inclusive of VAT and the contract was expected to be completed within period of eight (8) months. The contract was signed on 21st October 2008 and was to start on 7th November 2008 and end on 3rd August 2009.

The scope of works included consulting services for the design, supervision, and construction/upgrading of 15.3km selected roads in Lusaka Province.

The following were observed:

i. Poor Contract Management

As of June 2009, 15.4km earthworks had been done and an amount of K14,143,540,178 had been certified. According to the minutes for the project management meeting held on 19th June 2008, RDA informed the Consultant that payments on the project would be delayed because the paying agency had no resources. The RDA's CEO therefore, instructed that the project would be funded only up to K10 billion and works to be done to this extent only. Further, RDA requested the contractor for a price for maintenance works.

To this effect the contractor (BCHOD) informed the meeting that the maintenance would not completely protect the works from deterioration and that there will be additional costs to remedy the damage that will be occasioned to the incomplete road sections.

On 18th September, 2009, a variation order No 2, was submitted for the extension of time as a result of the order to suspend the works. The application for extension of time was with cost, time related costs, maintenance or gravel re-dumping costs and re-mobilisation totalling to K5,941,011,000 for a period of three months (94 days).

ii. Delayed Implementation

Although the duration of the project was eight (8) months commencing 7th November 2008 and ending on 3rd August 2009, as of October 2009, only 37% of the works had been done and the contractor had been paid K14,143,540,178.

iii. Physical Inspection

A physical inspection revealed that the sub base layer was constructed and was not protected from traffic. This led to damaging of the surface and loss of

material. The work will have to be made good at unnecessary additional cost resulting into wasteful expenditure of public funds. See pictures below:



Steep embankment slope



Steep embankment slope

b. Periodic Maintenance of Road D176 Ngwerere to Chisamba and D753 Ngwerere to Lusaka International Airport In Lusaka (TB/CE/031/07)

On 4th March 2008, the Zambia National Tender Board conveyed its authority to the Roads Development Agency (RDA) for the award of a contract to Raubex Construction Limited for the Periodic maintenance of D176 Ngwerere to Chisamba and D753 Ngwerere to Lusaka International Airport at a contract price of K13,037,826,848.75 with a completion period of six (6) months. The contract was signed on 1st June 2008 and was to start on 15th June 2008 and end on 15th November 2008.

The Scope of works comprised clearing and grabbing-88km, drainage clearing, repairs and installations, road formation-88Km, gravelling-73,000m³, installations of road signs-29No, landscaping and grassing(Planting grass)

The project was supervised by the Road Development Agency -Lusaka Regional Office.

As of October 2009, a total of K8,515,183,464 had been paid to the contractor representing 65% of the contract sum.

The following were observed:

i. Delayed Completion of Works

- As of September 2009, the works had not been completed despite the contractor having been awarded an extension of time.

- RDA did not claim liquidated damages resulting from the delay in completing the works as stated in the contract which would have amounted to a maximum of K1,303,782,683 (10% of value of contract price).

ii. Physical Inspections and Test of Materials

- **Quality of materials used**

The quality of gravel used was varying. In some cases big stones were found on the road indicating that some of the selected material had much bigger stones resulting in the quality of the road being compromised. See pictures below:



Stones on the Gravel Material

Plasticity and gradation tests carried out on a borrow pit sample revealed that the plasticity of gravel sample was too high (PI>6%) and the gradation did not fit in SATCC grading envelope.

The road structures at some places were not provided with erosion control measures as noted in some areas along the road. The erosion has also affected part of the road as shown in the pictures below:



Eroded Road Side Drains and Culvert Wing Walls

- **Drainage structures**

A test of the strength of the concrete using the Schmidt Hammer revealed that there was a significant variation when compared with what was specified i.e. 25 N/sq.mm (Newtons per square millimetre). Results ranged from less than 10 to as high as 42 N/sq.mm.

An inspection of culverts revealed that there were various damages on the structures such as cracks and breakages. Some culverts had silted while others had not been provided with headwalls as shown in the pictures below:



Broken Headwalls



Cracked and Silted Culvert (l) & Without Headwall (r)

c. Emergency Periodic Maintenance of Palabana and State Lodge Roads in Chongwe District of Lusaka Province, Tender No.RDA/SP/0011/08

In June 2008, the Agency awarded a contract to Mango Tree Construction Company for the emergency periodic maintenance of Palabana (D153) road (12Km) and State Lodge (D156) road (8Km) at a contract price of K2,848,430,750 for a period of two and half (2.5) months. The contract was signed on 12th June 2008 and was to start on 2nd July and end on 17th September 2008. The scope of works included road formation, gravelling, drainage and installation of roads signs and the project was supervised by Chongwe District Council.

Though the works had been completed and the contractor had been paid in full as of October 2009, the following were observed:

i. Variations

On 25th August 2008, a certificate of practical completion of the works was handed over to RDA by Chongwe District Council as the supervisor of the works. During the period of the defect liability, stone pitching which had been constructed on the downstream side of the road was washed away. In this regard, a variation order No.2 amounting to K64,500,000 was approved on 6th February 2009 making use of the contingency amount in the bill of quantities. However, there was no report done by the supervising engineer to establish whether the wash away was as a result of poor workmanship by the contractor or an act of God.

It was also observed that the variations were made after the completion date of the contract (17th September 2008) and after a practical completion certificate had been issued. This was contrary to standard contract management practices as variation orders are issued during the period of the contract before the certificate of practical completion is issued.

ii. Overpayment on Certificate Claims

Although the amount due to the contractor's in respect of fixed obligations was K385,000,000, the Agency paid K393,000,000 resulting in an overpayment of K8,000,000.

It was also observed that there was no evidence of approval that the contractor obtained for four (4) extra prefabricated culverts at a cost of K69,300,000 bringing the total billed amount on this item to K277,200,000. The original billed quantity for the 900mm diameter was twelve (12) units costing K207,900,000.

Furthermore, it was observed that included in the contractor's claim of K2,848,430,750 was an amount of K23,375,000 in respect of employer's representative allowances, accommodation and maintenance of the supervisors vehicle. However, there was no evidence that the funds were remitted to RDA.

Physical Inspections

A physical inspection of the road revealed the following:

iii. Gravel Quality

The overall quality of gravel used on State Lodge road was poor as it contained big particles and the binding effect was missing. The small particles were worn out leaving behind the rough surface with ruts and corrugations as shown in the picture below:



*Poor/Rough Road Surface on State Lodge at
chainage 0+100 to 0+400*

iv. Payment of Work Not Done

Included in the amount paid to the contractor was an amount of K23,100,000 in respect of the installation 20 new standard road signs. However, it was observed that only seven (7) signs costing K8,085,000 were installed by the contractor leaving a balance of thirteen (13) signs costing K15,015,000 outstanding.

d. Periodic Maintenance of Road T004 from Lusaka International Airport Turn off to Luangwa Bridge

In June 2008, the Agency engaged Raubex Construction Limited for the periodic maintenance of road T004 from Lusaka International Airport turnoff of to Luangwa Bridge at a contract price of K80,168,600,476. The contract was for a duration of eighteen (18) months commencing 10th July 2008. The scope of works comprised pothole patching and edge break repairs, reinstatement of existing drainage facilities, rehabilitation of existing shoulders, reconstruction of selected sections of the existing pavement, double seal surface dressing, road marking and permanent signage. The project was supervised by Messrs Brian Colquhoun Hung O'Donnell and Partners. As of October 2009, 65% of works had been completed and the contractor had been paid K25,652,398,499.

i. Late Recruitment of the Supervising Consultant

It was observed that whereas the commencement of the works contractor was 10th July 2008 the supervising consulting engineer for this project was recruited on 17th September 2008 , two (2) months after the contract had commenced.

ii. Physical verification.

A physical verification of the road revealed the following:

▪ **Peeling off of Surface Dressing**

Peeling off of aggregates on the first seal of surface dressing was observed along the Airport Luangwa road.



Peeling off of surface dressing layer from the base course

▪ **Peeling off of Surface Dressing on Shoulders**

The surface dressing on the shoulders had peeled off at various locations as shown in the pictures below. It was observed that there was no bond between the surface dressing and the base course.



Peeling off of shoulder layer of surface



Lack of bond between the base and surface dressing on the shoulders

▪ Use of Wrong Size of Aggregates

The specifications of Particular Application had specified the size of aggregates for the second layer to be between 6-13.5mm while in the bill of quantities it was defined to be 6-10mm. It was however observed during the site visit that the contractor at some points had provided aggregates of more than 13.5mm. According to the engineer on site, the redesign had recommended the second layer to be between 5-9.5mm but since the consultant was employed late, his recommendation was given when the contractor had already prepared a substantial amount of aggregate of 13.5mm. The pictures below show various sizes of aggregates used for the surface dressing.



Second layer aggregates sizes

iii. Test Results

Tests carried out are as follows:

- Base course thickness tests on three samples
- Surface dressing thickness measurement on three samples
- Bonding tests on one section
- Visual assessment of aggregate sizes

- Content of cement for stabilization on two samples
- Gradation on one samples

Results for the above tests were as follows:

- Two base course thickness tests failed. They both measured 140 mm against 150 mm specified. The third sample measured 155 mm
- All three surface dressing thickness tests measured 10 mm against 14 mm expected.
- Wearing course was easily stripped from the base course
- Aggregates were observed to be bigger than aggregates required for similar activities.
- Samples had 1.5% and 1.7% cement content respectively against 3% specified
- Gradation fitted in a corresponding SATCC grading envelope.

e. Periodic Maintenance and Rehabilitation of 45km of Selected City Roads in Lusaka Province

In May 2008, the Agency engaged Road and Paving Zambia Ltd for the periodic maintenance and rehabilitation of 45km of selected city roads in Lusaka Province at a contract price of K77,741,065,600 with a contract period of eight (8) months commencing 10th September 2008. The scope of work comprised pothole patching and edge break repairs, major milling of some sections, reconstruction, asphalt levelling course, asphalt wearing course, surface dressing, drainage and road marking.

The road network under this project had the following roads:

- i.** Mungwi Road
- ii.** Twikatane/Zingalume Road
- iii.** Kasupe Road
- iv.** Airport Road
- v.** Njolwe Road leading into Lumumba

The project was supervised by Messrs ASCO Consulting Engineers.

As of October 2009, 52% of the works had been completed and the contractor had been paid K26,635,303,863.

The following were observed:

i. Late Recruitment of the Supervising Consultant

The supervising consultant was engaged on 29th October 2008 while the works contract commenced on 10th September 2008 resulting in a delay of over one (1) month.

ii. Physical Verification

A physical inspection of the road revealed that there was no embankment constructed at Chainage 1.6 to 2.6 of Zingalume road and the level of the road was below the adjacent ground levels as seen in the picture below;



Road section at chainage 1.6 to 2.6

f. Periodic Maintenance of Namalundu Road Off T2 Kafue Gorge (D396) in Lusaka Province

In October 2007, the Agency engaged China Geo- Engineering Corporation for the periodic maintenance of Namalundu Road off T2 Kafue Gorge (D396) in Lusaka Province at a contract sum of K14,762,834,185 with a contract duration of four (4) months commencing 30th October 2007. The scope of works included drainage works, pothole and edge repairs and crack sealing ,bituminous courses /pavement repairs among others and the project was supervised by RDA.

Below is a list of contractors who submitted bids:

Bidder	Bid Sum	Completion Period
	K	
Roads & Paving (z)	8,012,224,119	158 days
China Geo Eng. Corp	14,762,834,185	4 months
Landmark Construction Ltd	7,935,423,425	4 months
Raubex Construction (Z) Ltd	6,255,459,595	110 days

The following were observed;

i. Questionable Composition of Evaluation Committee

The composition of the evaluation committee was not well balanced in that it constituted of three (3) officers from the same department namely a Principal Engineer Planning and Design and two (2) Planning and Design Engineers.

ii. Preliminary Evaluation Results

The report revealed that Messrs Roads and Paving Zambia Limited which was the second highest bidder was found to be non responsive because the bid security was for eighty nine (89) days as opposed to one hundred and twenty (120) days.

Further, Landmark Construction Limited which was the lowest second bidder at K7,935,423,425 was found to be none responsive because for the following reasons:

- No National Council for Construction Registration Certificate was attached
- The bid did not state whether the firm was free from corrupt and fraudulent practices
- The bid did not state whether the firm had associated in the past with the consultant or any other entity that had prepared the design, specifications and other documents for the contract.

From the above, it can be noted that these reasons advanced could have been considered to be minor deviations which the client could have requested for clarification, for example, to disqualify a bidder on the basis of third bullet point raises a lot of concern as there were no drawings or consultant and the bid document was prepared by the Agency.

iii. Technical Evaluation Results

Raubex Construction (Z) Ltd and China Geo Engineering Corporation were technically evaluated.

The evaluation committee found the bid from Messers Raubex Construction non responsive because it did not propose qualified surveyor for the project. In this regard, the Agency through the Zambia National Tender Board awarded the contract to the highest bidder at a tender sum of K14,762,834,185 for a period of four (4) months.

The basis of disqualifying Raubex Construction (Z) Ltd is a minor deviation as staff on contract are replaceable at the any point in the project life. Had the committee acted in the best interest of the Agency and Government at large, a sum of K8,507,374,490 would have been saved.

iv. Irregular Payment of General Obligations

The Contract agreement provided the following among other clauses under specifications of particular application.

Item B1.1-1 of the contract, Contractor's General obligations, states that the payment shall be made in two (2) instalments , that is, first instalment 60% of the lump sum after contractor has met all his obligations under the section and has made a substantial start with construction in accordance with approved programme.

The second and final instalment of 40% of the lump sum will be paid when the works have been completed and the contractor has fulfilled all the requirements of this section (demobilisation)

Contrary to the provisions of the contract, the General Obligations were paid in each interim payment certificate. The final payment certificate issued before the substantial completion certificate indicated that 100% of the general obligations had been paid.

It could not be ascertained as to why the Agency paid the contractor the full amount before fulfilling the contractual obligations.

v. Irregular Contract Document

The contract form of agreement had no date of signing. The cover to the contract document indicated October 2007. The contract data revealed that the start date would be fourteen (14) days after signing of the agreement. In the absence of the date of signing it was difficult to determine the contract commencement date.

However, a review of the progress report indicated that the contract commenced on 14th December 2007, forty five (45) days after the award of the contract. It was also observed that the section IX for the drawings / maps was blank. Consequently , the scope of works changed after commencement of the works with a section of 6.5 KM requiring reconstruction.

vi. Lack of Material Testing on Site

There was no provision for material testing on site. A review of the minutes of the third site meeting held on 10th March 2008 revealed that the contractor had been taking his materials for testing in Livingstone. However, a review of the minutes of the fifth site meeting held on 9th May 2008 revealed that an independent test to check the quality of workmanship on the reconstruction that the contractor had done indicated that the whole section had failed.

10. Copperbelt Province

a. Upgrading of the Luansobe – Mpongwe Road (50km)-Contract No. TB/CE/043/08

In August 2008, the Agency engaged China Henan International Cooperation Ltd for the upgrading of Luansobe-Mpongwe Road at a contract price of K90,097,344,487 with a completion period of twelve (12) months commencing 27th October 2008. The scope of works comprised; off carriageway clearing, construction of road embankment, base, surface dressing, installation of new road signs and any other ancillary works. The project was supervised by Besmear Associates in association with Bari Zambia Limited.

As of October 2009, a total of K22,199,665,638 had been paid to the contractor and the project was 62% complete.

A physical inspection of the road revealed the following:

i. Quality aspects

The overall quality of the road as observed during the site visit is summarized below:

▪ Poor Quality of Materials

Contrary to the specifications in the bill of quantities which specified that the first and second chip seals were to be 13.2mm and 6.7mm nominal sizes of aggregate respectively, the size of the aggregates for the first layer were on average found to be 6.5mm. See picture below:



Surface dressing 1st layer



Aggregate for 1st layer

▪ **Sequence of Activities**

Priming work as observed during the site visit had been done to chainage 34+900 on one side and was in progress. It was also observed that the contractor did not provide the diversions while doing the work, as such the primed area was open to traffic despite the contract having a provision of K1,344,414,350 for diversions.



Damaged primed road surface



Primed road used for traffic

ii. Test Results

Tests carried out are s follows:

- Base course thickness measurements for three samples
- Surface dressing thickness for three samples
- Surface dressing bonding assessment on three sections
- Evaluation of cement content on a cement stabilized base
- Gradation of three samples

- Aggregate crushing test for a sample of aggregates
- Plasticity test for a sample of gravel.

The results for the above tests are as follows:

- All three base thickness measured were lower than specified. They measure 72 mm, 81 mm and 95 mm against 150 mm specified.
- On surface dressing thickness it was observed that out of three samples measured only one met the specifications while two did not. Incidentally the ones that did not meet the specification also were the same with poor bonding.
- Of the three sections where surface dressing bonding was evaluated one was found to have an adequate bonding while two were inadequate and stripped.
- Cement content in stabilized base was lower than what was specified. Results showed cement content of 1.6 % against 4% specified.
- Of three samples subjected to gradation non matched with the corresponding SATCC specification
- Aggregate crushing value recorded was 23 which is less than 25. The aggregates were therefore of appropriate crushing strength.
- Material was non plastic hence within acceptable limits of plasticity i.e. PI < 6%.

b. Periodic Maintenance of T3 Kemuz - Teka Farm - Silangwa

In October 2008, RDA awarded a contract to GABMAN (Z) limited for the periodic maintenance of road T3 Kemuz - Teka Farm - Silangwa at a contract price of K1,932,202,140 with a completion period of four (4) months. The contract was to start on 28th October 2008 and end on 28th February 2009. The scope of work included clearing and grabbing reshaping/ re-grading, re-gravelling of selected section of the road section, drainage improvement and installation of road signs.

As of October 2009 a total of K387,574,560 had been paid to the contractor and the works were 31% complete. The contract has since been recommended for termination.

The following were observed:

i. Failure to Provide Performance Guarantee/ Bond

Contrary to clause 52, RDA signed the contract with the contractor without any performance security being provided by the contractor.

ii. Irregular Extension of Contract Period

Despite the of extension of time on the contract to 16th June 2009, the contractor still failed to execute the contract and applied for a further extension of time of 6 weeks. However, the Regional Engineer rejected the extension of time and informed the contractor that liquidated damages of 0.5% would be claimed for any day's delay of work up to a maximum of 10% of the contract value.

A review of Interim Payment Certificate (IPC) No. 2 revealed that 10% liquidated damages of K151,278,000 were claimed on the IPC which in turn resulted in the contractor owing RDA an amount of K12,219,440.

In the absence of the performance bond, it is not clear how RDA would recover the amount owed by the contractor as the contract was recommended for termination on 8th September 2009.

iii. Physical Inspection

Road Surface Condition

During the inspection it was observed that the condition of the road bed that had been left uncovered with the gravel fill had weakened and the top soil had become very loose generating dust.



Road Bed with dust (l) and Road bed formed without gravel fill(r)

Formation work on the Wengwe access was not completed as of September 2009. The first kilometre had been partially completed.



Heaps of gravel fill not spread

Poor Drainage Structures

The culverts installed had either not been completed or not provided with proper inlets and outlets to allow water to flow smoothly into and away from the culverts. The quality of concrete used was also considered to be of low strength as some of the edges could break easily.



Culvert Headwall With Some Breakages Culvert Without Headwall



Culvert without inflow/outflow drains Culvert pipes awaiting installations

c. Periodic Maintenance Works of the Town Center - Roan Mpatamatu Road (13km) in Luanshya on the Copperbelt Province (RDA/CE/04/008)

In September 2008, the Agency (RDA) awarded a contract to China-Geo Corporation for the periodic maintenance works of the Town Center-Roan Mpatamatu Road at a contract price of K24,328,222,699 with a completion period of five (5) months commencing 30th September 2008. The scope of works consisted of pothole patching and edge repairs, reconstruction, Asphalt leveling course, asphalt wearing course, surface dressings, and drainage and road markings. The project was supervised by RDA Copperbelt Provincial Engineer.

As of October 2009 a total of K20,731,858,988 had been paid to contractor and works were 100% complete.

The following were observed:

i. Overstatement of Contract Sum

A scrutiny of the contract document revealed that whereas the contractor's overheads were supposed to be K10,056,000 (8% of K125,700,000), these were stated at K1,005,600,000 resulting in an overstatement of K995,544,000. Consequently, the contract sum was K24,328,222,699 instead of K23,332,678,699.

ii. Physical Verifications

A physical inspection of the road revealed the following:

▪ **Road Surface Quality**

The road surface had developed corrugations. This was more pronounced for the entire road section. It was also observed that there was an indication of early bleeding.



*Signs of early bleeding on the surface
KM 7+ 100*



Corrugations on the surface KM7.1

11. Southern Province

a. **Rehabilitation of A34.7 Km Portion of T2 between Chirundu and Lusaka Km75.0 to km109**

In July 2005, the Agency awarded a contract to China Henan International Cooperation Group Company limited for the rehabilitation and maintenance of 34.7 km section of road T2 between Lusaka and Chirundu KM75.0 to KM109.7 at contract price of K110,655,185,204 for a duration of eighteen (18) months commencing 1st November 2005. The scope of works included widening the existing road formation, construction of auxiliary / climbing lanes where required, reduction of steep grades, reconstruct road pavement layers and reconstruction of some bridges and improvements to the vertical geometry. The project was supervised by AFRICON.

A review of scanty records availed for audit revealed the following among others:

i. **Questionable Quality Control by Consultants**

A review of the letter dated 8th June 2007 addressed to AFRICON from RDA revealed that during site inspections, the consultant's inspectors were not found on site. In particular, the consultant's inspectors were not on site during critical activities such as laying of the sub base, road base and asphalt concrete as well as on culvert construction, thus raising concern of quality.

In same letter, RDA also observed that the contractor around KM83 + 400 was illegally mixing stabilization material with bulldozer, raising concern on the role and effectiveness of the inspectorate.

ii. **Failure to Adhere to Consultants Advice**

A review of two (2) letters dated 24th and 28th August 2007 addressed to the Director RDA from the consultants relating to the design review revealed the following:

- The pavement structure with a 150mm sub base was inadequate .
- The design life of the structure with 150mm sub base had an expected lifetime of nine (9) years. Consultants recommended that increasing the sub base to 250mm would increase the road expected life from nine(9) years to twenty(20) years at an additional cost of K3.7 billion.
- In another letter dated 28th August 2007,the consultants indicated that there was an omission of the base from KM104 + 240 which substantially compromised design life of the road to only three (3) years. The consultants indicated that the life of the road could be

increased to fifteen (15) years with the addition of cement stabilised base at a cost of K764,000,000.

There was no documentation to indicate that the RDA rescinded its instruction of 27th July 2007 in which it warned the consultants to maintain a base of 150mm and not 250mm.

iii. Failure of a Section of the Road

A review of the consultants letter of 10th January 2008 to RDA revealed that a flood occurred on 29th and 30th December 2007 causing extensive damage to the works. The consultants indicated that the flood was caused by extremely high rainfall and that he would propose mitigation measures to prevent or limit damage in case of a re-occurrence of a similar flood in future. The consultant further stated that rainfall throughout December 2007 was above normal. In this regard, the consultant issued instructions on 25th February 2008 to the contractor relating to repair of damage or defective work and also for further protective measures that were required which would include the following among others:

KM	Problem	Causes of Problem
99 + 775	Water ponding	No downshute at low point
99 + 800	Longitudinal cracks	Defective benching and compaction
100 + 450	Longitudinal cracks on Left Hand Side	likely that benching & compaction defective
100 +500	Longitudinal cracks Left hand side	likely that benching & compaction defective
101 +300	fill subsidence on Left hand side	Inadequate benching and compaction
101 + 400	fill subsidence on Left hand side	Probable cause inadequate benching Compaction.

On 20th March 2009, the reconstructed portion of road T2 collapsed at chainage 100 +900KM location from Lusaka. In the letter dated 21st May 2009 and addressed to the World Bank, the Director- RDA indicated that preliminary assessment revealed that the fill embankment was eroded and weakened by seepage of runoff water from the surrounding high ground that found its way across and underneath the road. The director emphasized that the landslide was as a result of natural causes and that the initial design did not include re-alignment or provision of (increased) drainage structures at the location.

However, it was observed that the section of the road failure was within the chainages where the consultant had observed longitudinal cracks as result of defective work. There was no evidence to indicate that the defective work noticed at time of construction had been remedied.

Although the failure occurred during the defects liability period which ended on 28th June 2009, there was no evidence to indicate that the Agency had taken steps to establish whether the failure was caused by negligence on the party of the consultants or the contractor.

In this regard, despite the failure having taken place during the defect liability period, the contractor was not called to site. Instead a new contractor, Messrs Sable Transport Ltd, was engaged to carry out temporal works at a contract sum of K3.5 billion.



Failure of the road at 100 + 900 KM from Lusaka

iv. Failure to Carry Out Permanent Works

A site inspection conducted in October 2009 revealed that the temporal works were showing signs of failure as evidenced by the longitudinal cracks.

The culvert provided at the wash away point was not functional as it did not have a provision for the inlet thereby defeating the purpose of the culvert.



Cracks and a culvert without an inlet on the temporal works

v. Provision of Motor Vehicles

The contract provided for K405,875,000 for procurement of five (5) motor vehicles for supervision. The motor vehicles were to be handed back to the Agency at the end of the contract. It was however observed that out of the five (5) motor vehicles procured, four (4) were handed over to the Agency while one (1) had not been handed over as of October 2009.

b. Contract for the Emergency Repairs of Lusitu Bridge Along M15

On 26th December 2008, RDA awarded the contract for the emergency repairs of Lusitu Bridge to Sable Transport and Construction at a contract sum of K7,786,786,786 for the duration of three (3) months. The works commenced on 20th January 2009.

The supervision was conducted by RDA Lusaka Region.

The Scope of works at the bridge were as follows:

- Drainage works
- Pothole patching
- Base/sub base courses/pavement repairs
- Bituminous course/pavement repairs
- Erosional protection/lean concrete
- Railings repairs and kerb stone installation.

Other works included pothole patching, reinforced concrete retaining wall for slope protection, lined mitre drains and gabion construction for slope protection.

As of October, 2009 a total of K6, 319,801,251 had been paid to the contractor and works were 81% complete.

However, the following were observed:

i. Irregular Change in the Scope of Works

On 30th December 2008, the contractor, without authority from the Agency changed the scope of works by changing the design of the agreed interventions.

A review of the letter dated 2nd February 2009, addressed to the contractor from the Regional Engineer in Lusaka revealed that the contractor had diverted from the original bill of quantities in the execution of works without the authority of the Project Manager.

ii. Bill of Quantities (BoQ)

In the Report No. 02/09 of March 2009, the Monitoring and Evaluation Unit revealed that the standard SATCC BOQ was not used by the Contractor making it difficult to understand the scope of works from the BOQ. The following errors in the BOQ were observed:

- The BOQ included trees which did not exist at the site (contract item 17.02). This had a costing of K1,400,000.
- The thickness of continuous graded asphalt surfacing included in BOQ item 42.01 (a) with costing K195,000,000 had not been specified.
- The concrete casting, reinforcement and formwork in BOQ should have been billed separately according to standard practice.
- The size of the conforce wire costing K56,000,000 in BOQ was not specified (contract item 23.01(c))
- The works to be carried out on different sites were lumped under the same quantities, thus resulting in difficulties in measuring the actual works done.
- The rates for concrete were not consistent since the conversion from square meters to cubic meters was giving very high figures. In addition, the thickness for the concrete priced in square meters was not indicated which could be a source of disputes when measuring the actual value of work done (item 2.4.3)

iii. Lack of Work Programme

It was observed that after changing the scope of works, the contractor did not submit a revised work plan. In this regard it was not possible to ascertain the

progress made by the contractor. As of October 2009, the contractor was still on site.

iv. Questionable and Uncompetitive Rates

A review of the Monitoring and Evaluation report revealed that there were inconsistencies in the rates of concrete in the BOQs and no proper rate analysis was carried during evaluation, the rate of lean concrete (stipulated in BOQs) should not have exceeded K100, 000 per square meter.

In addition, the two rates for lean concrete were not only too high when converted from square meters and cubic meters but also different (one was K450,000 per square and the other was K720,000 per square) The rate for reinforced concrete should have been used as a basis to renegotiate the rates for lean concrete and approximately K870 million could have been saved.

v. Lack of Quality Assurance

Concrete Works

According to the Monitoring and Evaluation Report of March, 2009, the contractor was casting concrete based on the mix design which was not agreed upon with the project manager's representative (PMR). It was also revealed that the Contractor had been carrying out concrete casting in the absence of the PMR. The quality of the concrete therefore could not be guaranteed since the PMR had not been involved in the whole process of concrete casting. This represents a flaw in the management of the contracts.

It was also observed that contract records such as daily log sheets and monthly progress reports were not available . Further, no site meetings were held during the course of this project and there was no permanent site supervisor. In this regard the contract had been executed without supervision from the Agency.

vi. Delayed Works

Although the duration of the contract was extended for a period of ninety (90) days to 2nd July 2009, it was observed that as of October 2009 the works had not been completed and no liquidated damages had been claimed by the Agency.

vii. Quantities, Measurements and Certification

A review of the monitoring and evaluation report on measurements jointly carried out on site by the Monitoring and Evaluation Unit, the Contractor and technical staff from the Regional Engineer's office revealed that most of the quantities in the BOQ were higher than the actual on the ground. Measurements in the contract

should have cost K6,319,801,257 instead of K 7,786,786,786 resulting in RDA incurring extra costs of K799,285,786

viii. Physical Inspection

An inspection of the bridge carried out on 29th August 2009 to assess the quality and scope of works done by the Contractor revealed the following:

Gabions

- Gabion stones were not neatly packed in gabion baskets.
- Some stones in baskets were larger than the allowable maximum size. (See pictures below).



Oversize stones used in gabion baskets

- Visible gabion cells are not even faced. Stones used in visible faces were not of selected size and shape.
- Gabion baskets were not fully packed. Stones are loosely filled. (See photograph below).



Loosely packed stones in gabion baskets

- Vertical sides of visible cells were bulged and deformed. Connecting wires between vertical sides of visible cells were insufficient or missing altogether. Normally a minimum of four connecting wires would be provided and tensioned in each 1m visible cell to prevent the deformation of gabion boxes.
- Baskets were not properly line-up.
- The site foreman did not have drawings for the four gabion.
- Although the contractor claimed for construction of 500m³ gabions, a physical count of gabions revealed that only 320 m³ had been constructed. However, the BoQ provided for 1,200m³ of gabions.

Concrete Lined Drains

Concrete lined drains were of poor quality and workmanship as:

- Drains were wavy and not properly aligned.
- The concrete drains were not constructed to specifications set in the contract in that they did not discharge water into the river.
- Poor quality concrete was used. Lumps of concrete taken from the drain were easily crushed by hand.

ix. Test Results

An assessment of the strength of four (4) concrete strength samples using the Schmidt Hammer revealed that all four samples had weaker than specified. Results were 12 N/mm sq for three samples and one measured 15 N/mm sq compared to 25 N/mm sq specified in the contract.

c. Contract for the Periodic Maintenance of Road D347, Kalomo to Kabanga Mission in Southern Province 70.1km

In April 2008, the Agency awarded a contract to Messrs China Jiangxi Corporation for the periodic maintenance of Road D347 Kalomo to Kabanga mission at a contract price of K12,347,730,725 for a duration of six (6) months commencing 13th June 2008. The scope of works comprised gravelling and drainage, grading, re-gravelling, reshaping, embankments maintenance and vegetation control. The project was supervised by Bari Zambia Consulting Engineers Ltd.

As of October 2009, the works had been completed and the contractor had been paid amounts totalling K12,315,592,891.

The following were observed:

i. Delay in Engaging Consultant

The supervising consultant was engaged three (3) months after the contractor had commenced works. In this regard, the contractor executed works without supervision.

ii. Questionable Award of Tender

The Director RDA recommended to the Director General of the ZNTB in a letter dated 23rd April 2008 to award China Jiangxi Corporation for International Economical and Technical Cooperation at their corrected tender sum of K12,347,730,725. The letter further stated that Reubex Zambia Limited one of the bidders at a sum of K9,714,227,724 was found to be non responsive for proposing a surveyor with a grade twelve (12) qualification instead of a diploma in surveying or civil engineering. It could not be comprehended as to why management did not award the contract to Reubex Construction subject to the contractor providing a qualified surveyor and thereby saving an amount of K2,633,503,000 of the public funds. It must be noted that staff can be replaced at commencement or during the implementation of the contract.

iii. Non Submission of Performance Bond by the Contractor

According to the terms of the contract the contractor was required to submit a performance security bond within twenty eight (28) days of signing the contract. Contrary to this condition, the contractor did not submit the performance security bond.

iv. Contractor's Equipment

A review of the contract documents revealed that the contractor's major equipment at the time of bidding was located in China and Botswana. There was no evidence to show that the contractor had brought in his equipment from the two countries for the project. In this regard, in the Regional Engineer's letter dated 5th August 2008 to the contractor revealed that plant mobilised was all in relatively bad condition. The letter further stated that clearing and grubbing were done using slashers and axes.

A review of minutes of the second site meeting of 11th September, 2008 revealed that works were behind schedule.

v. Delayed Mobilisation

Although the contract was to commence on 13th June 2008, it was observed that as of 3rd July 2008, the contractor had not mobilised.

vi. Physical Inspection

A physical inspection of the road carried out in September 2008 revealed that all existing culverts were damaged and in some cases were blocked without outflow channels. See pictures below;



Damaged culvert at Km 62.7 and a blocked culvert

It was also observed that in some sections of the road the gravel contained stones larger than the recommended size.



Over sized stones contained in the gravel at KM2.4



Culverts without head walls at km 41.7, and 58.2 kgalomo to Kabanga Mission road.

d. Kafue – Mazabuka Road T1- Periodic Maintenance (TB/CE/005/08)

In May 2008, the Agency awarded a contract to Messrs Raubex Construction Zambia Ltd for the periodic maintenance of road T1 from Kafue to Mazabuka at a contract price of K10,017,359,687 with a duration of eight (8) months. The contract was signed on 28th May 2008 and was to start on 17th June 2008 and end on 16th February 2009. The scope of work comprised pothole patching; crack sealing, surface dressing in some sections, cleaning of drains and shoulder repairs. The project was supervised by ASCO Consulting Engineers Ltd.

As of October 2009, a total sum of K8,241,733,008 had been paid to the contractor representing 82% of the contract sum and the contract had been completed.

The following were observed:

i. Tender evaluation

The contract for the periodic maintenance of Kafue-Mazabuka road was awarded to Raubex Construction Zambia Ltd at a revised bid price for K10,017,359,688 against a competitive cheaper bid for Raven Works construction for K9,857,517,699. Raven works Construction's bid was considered non responsive on the basis that curriculum

vitae for its site agent, foreman and surveyor did not indicate qualifications and that the company only provided audited financial statement for ten(10) months instead of five (5) years. The public procurement act number 12 of 2008 in section 50 (4) states that a procuring entity may ask a bidder to clarify their bid in order to assist in the evaluation, but no changes in the substance of bid, including changes in price, shall be permitted after the date and time of the closing of the bid, unless otherwise provided for in this act. The institution would have saved K159,841,989 if the evaluation committee had followed the provisions of the public procurement act No.12 of 2008.

ii. Delayed Engagement of Supervisor

It was observed that there was a delay of four (4) months in engaging a supervising engineer for the works. Consequently, the contractor executed the works during the period without supervision.

iii. Questionable Certification

In July 2007, the Agency awarded a contract (RDA/007/07) to Raubex Construction Zambia Ltd for emergency repair of the road at a contract sum of K1,599,585,476. The contract commenced on 5th July 2007 and was to be completed on 5th August 2007. However, this contract was only certified complete on 22nd December 2008 which was sixteen (16) months after the scheduled completion date. At this time, works under the new contract (TB/CE/005/08) for periodic maintenance of the same road had been going on for six (6) months.

iv. Poor Workmanship

A review of documents revealed that execution of the works were poorly executed in that potholes continued opening up. There were also delays in completing the project resulting in requests for extension. In addition, the contractor failed to follow the contract specifications regarding edge repair and use of poor cold premix.

A physical inspection of the road carried out on 20th September 2009 confirmed the poor workmanship in that potholes had reappeared barely four (4) months after completion of the project as shown below:



Pothole at Km 33.6 on the Kafue – Mazabuka Road



Cracks and potholes near Chikankata turn off

e. Zimba – Livingstone Road TB/CE/019/08, 30KM

Government with the financial assistance from the European Union through the 9th European Development Fund (EDF), embarked on a project to rehabilitate 72.8km of the Zimba to Livingstone T1 road. Government funded the rehabilitation of the first 30km through budget support and the remaining 42.8km was funded by both the European Union and Government. On 14th July 2008, Government through RDA awarded a contract to China Geo- Corporation Ltd to rehabilitate the first 30km of the Zimba – Livingstone road at a contract sum of K105,196,183,649 for a duration of nine (9) months. The contract price was later revised to K120, 630,364,245.

The works commenced on 25th July 2008 and were due for completion on 24th April 2009 but the completion date was later revised to 18th October 2009.

The scope of work included reaping off old asphalt material, designing and reconstruction of the base. The project was supervised by Zulu Burrow Integrated Engineering and Development Consultants.

As of September 2009, a total of K69,426,309,585 had been paid to the contractor and 5km out of a total of 30Km had been completed.

The following were observed:

i. Delayed Works

A visit to project site carried out in September 2009 revealed that fourteen (14) months into the contract the contractor had only completed 5km out of a total of 30km.

ii. Misapplication of Funds

In March 2009, the Manager Construction and Maintenance (RDA) on four (4) occasions irregularly instructed the contractor to pay for maintenance of four (4)

RDA motor vehicles which were not part of the project at a cost K48,657,379. In this regard, review of IPC number 9 for the month of August 2009 showed that the maintenance budget for project vehicles had been overrun by K114,791,600.

It was also noted that contrary to the agreed mode of communication, the Manager bypassed the supervising consultant.

f. Zimba – Livingstone Road T1 Km 30.00 to km 72.80 TB/CE/096/08

The rehabilitation of the last 42.8 km was split into two (2) contracts ie contract A and B. The European Union financed bill items 1 to 12 in the BOQ which were identified as contract A of the last 42.8 km at a cost of €11,570,229 while Government funded bill items 13.1 to 28.2 in contract B at a cost of €23,950,019.09. The total contract sum for the KM 30 to 72.80 of the Zimba – Livingstone road, totalled €35,520,248.58 after allowing for a 5.5% discount. Both contracts (A & B) were awarded to China Geo Corporation and were signed on 8th April 2009.

The contract commenced on 11th May 2009 for eighteen (18) months.

The scope of works included reaping off old asphalt material, designing and reconstruction of the base and application of asphalt concrete. The project was supervised by Nicholas O’ Dwyer & Co. Ltd who was engaged on 24th December 2007 to first conduct feasibility studies, design the road and subsequent supervision of works at a contract sum of €857,796.00. Supervision component was for a period of nineteen (19) months. The supervision contract was to commence on 11th may 2009 and end on 11th December 2010.

As of October 2009, a total of €5,090,644.33 and €7,467,585.67 had been paid to the contractor for contract A and B respectively. The works were still on going.

The following were observed;

i. Irregular Award of Contract

The contract was awarded to China-Geo Engineering Corporation during the period when the contractor was suspended from participating in Government contracts in accordance with ZNTB Circular No. 1 of 2008.

ii. Abnormal BoQ Rates

An examination of the BoQs for the two (2) contracts for the Zimba- Livingstone road showed abnormal variances in the rates applied between GRZ and EU funded projects. The variance in the rates ranged from 86% to 1,648% despite the contracts being awarded to the same contractor and during the same period as shown in the table below:

Comparison of BOQ Rates Between GRZ Funded Contract and the EU Funded Contract						
BOQ Item	Description	Unit	1st 30Km GRZ funded Contract	30 -72.8Km EU funded Contract A		Percentage Increase %
				€ (Euro)	Kwacha	
			K			
1.3	Time related obligation	Lumpsum	255,055,000	115,384.62	807,692,340	216.67
1.4	HIV/AIDS awareness campaign	per month	770,000	384.62	2,692,340	249.65
2.4	Car ports at offices & laboratory	per month	1,925,000	769.23	5,384,610	179.72
2.41	Domestic & Sanitary Service	Lumpsum	11,550,000	7,692.31	53,846,170	366.20
2.46	Services at office & lab -Fixed Cost		57,750,000	15,384.62	107,692,340	86.48
2.47	Services at office & lab -Running Cost	per month	3,850,000	1,153.85	8,076,950	109.79
2.52	4 x 4 double cab,3.0 ltr Pick ups	Each	146,300,000	61,538.46	430,769,220	194.44
2.57	Desk top Computers	Each	4,620,000	3,307.69	23,153,830	401.17
2.59	Laptops	Each	5,775,000	3,692.31	25,846,170	347.55
2.64	Survey Equipment	Lumpsum	7,700,000	19,230.77	134,615,390	1,648.25
2.67	Digital Cameras	Each	1,925,000	615.38	4,307,660	123.77

A further comparison of rates charged to Government on contract No.TB/CE/019/08 (30km stretch) and the GRZ funded component of contract No. TB/CE/096/08 (42.8km stretch) revealed that the contractor increased the rate of most items by between 54% and 5,145% as outlined below:

Comparison of BOQ Rates Between Two (2) GRZ Funded Contracts						
BOQ Item	Description	Unit	1st 30Km GRZ funded Contract	30 -72.8Km GRZ funded Contract B		Percentage Increase %
				€ (Euro)	K	
			K			
15.2	Crushed stone base	m ³	231,000	69.23	484,610	109.79
18.1	Asphalt base and Surfacing	m ²	96,250	21.19	148,330	54.11
18.5	Tack coat 30% stable-grade emulsion	Litre	3,080	0.77	5,390	75.00
18.6	Trial Section 50mm surfacing	m ²	84,700	21.19	148,330	75.12
21.1	Galvinised Guardrails on Timber Posts	Per metre	192,500	57.69	403,830	109.78
21.3	Single guardrails ie,terminal section	Each	30,800	230.77	1,615,390	5,144.77

It is not clear from the foregoing how the Agency failed to detect such glaring anomalies during the evaluation of the bids such as the increase in unit costs of desktop computers from K4,620,000 under GRZ to K23,153,830 under EU per computer.

iii. Lack of Laboratory Equipment

Although the contract provided for a sum of K10,374,378,000 (€1,482,054.52) for housing, offices and laboratory for the engineer's site personnel. An inspection of the site carried out on 30th September 2009 showed that major laboratory supplies were

not available at the KM 42.8 laboratory site. Inquiries made with the consultant revealed that the contractor had resorted to borrowing laboratory supplies from another project. The unavailability of laboratory equipment was a major cause of the delays experienced in the completion of the project.

g. Contract for the Periodic Maintenance of Road D775 from Batoka to Maamba

On 29th April 2008, the Zambia National Tender Board (ZNTB) conveyed its authority to the Agency for the award of a contract for the periodic maintenance of Road D775 from Maamba to Batoka in Southern Province to Raubex Construction Zambia Limited at its bid sum of K26,686,115,665, with a completion period of eight (8) months. The contract was signed by both parties on 14th May 2008. The contract commenced on 28th May 2008 with a completion date of 27th January 2009.

The scope of works included cleaning and repair of existing culverts, installation of new culverts, pothole patching, edge break repairs and crack sealing, pavement reconstruction to limited sections, single seal surface dressing, line marking and permanent road signage.

As of June 2009, a total of K14,502,964,153 had been paid to the contractor representing 54% of the contract sum. The works were still ongoing.

The following were observed:

i. Poor Project Planning

Best practice provides that the consultancy services for supervision are engaged well before the works contract. This allows the consultant to review the entire project situation and enable a smooth management and efficient project start. The consultant is also charged with the supervision of the works and to approve the materials and workmanship of the works.

Contrary to best practice, the Agency commenced the tender process for the engagement of a supervising consultant in July 2008 as evidenced by the letter of invitation dated 17th July 2008. The consultancy agreement was signed on 20th October 2008, four and half months after the commencement of the works contract which the consultant was to supervise. In this regard, the works had been running from 28th May 2008 without the presence of supervisors on site.

A review of the consultants first and second progress reports issued in December 2008 and February 2009 revealed the following among other things:

- The quantities in the current bill of quantities were insufficient to cater for the respective work items.

- Work items critical to the protection of the investment to the extent that the investment is rendered meaningless without them had been omitted from the proposed intervention such as, erosion protection works, embankment protection works, major river crossing which had been previously washed away and are now bridged by temporal bailey bridging.
- The contractor was not sufficiently mobilized for the works on hand and could not therefore produce at the rate and standard required for timely completion.
- The pavement re construction were not acceptable for permanent works. There was no data as to how the contractor made his choice of materials. The contractor did not provide Unconfined Compressive Strength (UCS) tests to show how the quantity of cement was determined for stabilization purposes.
- Sections of pothole patching had failed. It was not clear whether the lower layers were done to the right standard.

From the above it can be seen that the failure by the Agency to engage a supervising consultant on time affected the quality of works.

ii. Delayed Completion

Although the revised completion date of the project was 30th June 2009, it was observed that as of 30th September 2009, there was no substantial completion certificate and the contract was still on going. It was also observed that there was no request for extension of time.

Inquiries made with consultants revealed that the substantial completion certificate was not issued because major sections of the reconstructed sections had failed. Despite the contractor not having completed the works successfully and on time, the Agency had not applied liquidated damages.

iii. Failure on Reconstructed Sections

It was observed that all the reconstructed sections had failed in that the surface layer of the pavement was peeling off. There was no bonding between the base and the surface dressing and no satisfactory explanation was provided by either the consultant or the contractor. See picture below:



Officers effortlessly peeling off the surface dressing (l) and Failure on reconstructed sections between KM2.4 and KM50 (r)

iv. Unauthorised Fog Spray

Although there was no provision in the contract for fog spray, it was observed that the contractor, without written instruction, sprayed the entire road.

In response to our inquiry, the contractor and consultants stated that a variation order would be requested for the fog spray. However, no satisfactory response was given by consultant and the contractor as to why the contractor insisted on applying the fog spray in the absence of an official instruction and an agreed pay rate.

v. Poor Intervention

It was observed that the reconstructed section at km10.2 had an embankment with six (6) corrugated metal pipe culverts which had shown serious scouring on the inlet side, corrosion of metal pipes and overtopping of water during heavy rains.



Erosion on newly re-constructed pavement(l) and Lack of protection works on new road (r)

vi. Lack of Permanent Structures

In January 2008, following heavy rains, there were two (2) wash away sections on the road and as a temporal measure two (2) bailey bridges were installed. At the

time of planning and tendering, the Agency did not include works to cater for the replacement of temporal bridges with permanent structures.

A physical inspection of the washed away portions of the road carried out in September 2009 revealed that the embankment upon which the temporal bridges were seated were showing signs of erosion and wide cracks in the supporting embankment. See pictures below:



Temporal bridge not included in permanent works (l) and Wide cracks including signs of erosion (r)

vii. Irregular Adjustment of Quotation

At the time of planning and tendering, the Agency did not include works to cater for the replacement of temporal bridges with permanent structures.

In this regard, in August 2008, the Manager Construction and Maintenance (RDA) requested the contractor to submit a quotation to construct permanent drainage structures, the dismantling of bailey bridges including transportation to Regional Engineers office, Lusaka province. In September 2008, the contractor submitted a quotation in the sum of K6,516,068,000.

Included in the quotation were amounts totalling K3,477,000,000 for Preliminary and General (K1,475,000,000) and for the supply of one hundred and forty three (143) 2.4 x 2.4m box culverts (K2,002,000,000). However, when submitting the documents for tender authority, the Construction and Maintenance Manager made adjustments to the contractor's quotation by reducing the Preliminary and General from K1,475,000,000 to K842,595,000 and increased on the supply of 2.4 x 2.4m box culverts from K2,002,000,000 to K2,634,346,000. See table below:

Description (A)	Unit (B)	Qty (C)	Rate (D)	Amount (E)	Revised by RDA (Rate) (F)	Amount (G)
P & G	L Sum	1	1,475,000.00	1,475,000,000	842,595,000	842,595,000
Accommodation of traffic by Building bypasses	NO	3	150,000,000	450,000,000	150,000,000	450,000,000
Supply of 2.4m *2.4m box culverts	No	143	14,000,000	2,002,000,000	18,422,000	2,634,346,000
Cut to spoil	M3	3,400	50,000	170,000,000	50,000	170,000,000
Borrow to fill of approved gravel	M3	1,500	100,000	150,000,000	100,000	150,000,000
30 MPa concrete	m3	244	3,750,000	915,000,000	3,750,000	915,000,000
Shuttering	m2	302	150,000	45,300,000	150,000	45,300,000
Steel reinforcement	Ton	10	15,000,000	150,000,000	15,000,000	150,000,000
Removal of bailey Bridges	No	2	130,000,000	<u>260,000,000</u>	<u>130,000,000</u>	<u>260,000,000</u>
Sub -Total				5,617,300,000		5,617,241,000
Vat				<u>898,768,000</u>		<u>898,758,560</u>
Total Incl Vat				<u>6,516,068,000</u>		<u>6,515,999,560</u>
Note: -Columns -A to E Contractor's Quotation						
-Column F - Revision by Manager - C&M						
-Column G - Revised Total						

It was not clear why the Agency accepted a quotation which included Preliminary and General despite the fact that this was a variation order on an existing contract and that the contractor was already on site.

viii. None Adherence to Contract Specifications

Base course is the main bearing layer of the pavement. In the tests carried out, the thickness of layers was significantly lower than what was specified. It was observed that all three (3) samples for base course thickness measurement did not meet the specified 150 mm. They measured 70mm (km2.4), 80mm (km38) and 110 mm (km18).



Sample reading 80mm as opposed to 150mm paid by the Government



Collection of samples on re constructed sections of Maamba Batoka Road witnessed by contractor.

It is evident from the results obtained from the tests that the contractor did not meet the specifications prescribed in the contract.

h. Periodic Maintenance of Road D365: Monze - Niko - Chitongo & Hamusonde - Maala Road

On 29th April, 2008 the Zambia National Tender Board (ZNTB) conveyed its authority to the Road Development Agency (RDA) to award a contract for the maintenance of road D365 to Messers China Jiangxi Corporation at total contract amount of K24,670,539,465 for the contract period of six (6) months. The start and completion dates were 14th June 2008 and 5th December 2008 respectively. The scope of works included gravel wearing course, clearing and grubbing, Repair of existing culverts, Installation of new culverts, road formation and road signs. The works were supervised by BCL Zambia Limited.

As of October 2009, a total sum of K14,215,935,453 had been paid to the contractor representing 60% of the contract sum. Works had been completed.

The following were observed.

i. Late recruitment of the Supervising Consultant

Although works commenced on 14 June 2008, the supervising consultant was engaged on 21st July 2008.

ii. Late Submission of Performance Bond by the Contractor

According to the terms of the contract, the contractor was supposed to furnish the performance security or bond within twenty eight (28) days of signing the contract. But contrary to the above requirement, the contractor did not submit the mandatory performance bond for the first five months of the six month contract.

iii. Absence of the Assistant Resident Engineer

Whereas the contract specified that the consultants team would include an Assistant Resident Engineer, the engineer was only available on site five (5) months after works had commenced.

iv. Substandard Road Signs

According to the contract, the contractor was to install several new road signs at specific locations along the road.

A physical verification of the road site conducted on 20th September 2009 revealed that more than five road signs installed by the Contractor were supported on thin metal pipe posts of 4.5cm outer while others were supported on posts of 5.5 cm outer diameter. No relevant drawings specifying the right diameter were found in the contract. However SATCC specifications require pipes of 7.5cm internal diameter.

The inspection further revealed that road signs provided were of questionable quality in terms of metal plate used, painting and workmanship as depicted in site photographs below:



Road sign of poor quality at Monze Junction



Road sign on a thin post (4.5cm external diameter) at KM 48.7

v. Culverts with no Proper Outfall Channels

The contract provided for installation of new culverts for ease of draining water across the road at various points.

A site inspection of the road site conducted on 20th September 2009 revealed that many culvert outfall channels excavated on the outlet side of culverts had an upward incline thus draining water towards the culvert instead of away from the culvert. The photographs below show an example of a culvert outfall having adverse incline.



Culvert at KM 33.6: Inlet (LHS) and outlet having adverse slope (RHS)

These culverts with adverse outfall slope will be water ponding places instead of being free draining. This defeats the purpose for which culverts were installed.

vi. Non Provision of Culvert Outfall Ditches

Clear outfall ditches are supposed to be provided at culvert outlets to allow for proper drainage of water out of a culvert. A physical verification on site revealed that outfall ditches were not provided at some culvert outlets, leaving culvert outlets looking like ‘drop inlets’. See photographs below:



Culvert at KM 41.1: Drop inlet (LHS) and outlet with no outfall ditch (RHS)

vii. Installation of Wrong Culvert Sizes

The Contract’s BOQ provided for installation of concrete pipe culverts of internal diameters 600mm, 900mm and 1200mm. Culverts of 600 mm diameter were meant for junctions at other access roads while culverts of 900 mm and 1200mm diameter were to be placed across the project road.

A physical verification of the culverts on site conducted on 20th September 2009 revealed that culverts with diameter of 830mm 840mm or 850 mm were installed at all locations specified for diameter 900mm contrary to the contract specifications and BOQ. Site measurements of culvert diameters are illustrated by photographs below:



Culvert diameter measurement at KM 41.1(l) and Internal diameter at 83cm instead of 90 cm (r)



Culvert diameter measurement at KM 43.1(l) Internal diameter is 83cm instead of 90cm (r)



Culvert diameter measurement at KM 53.9 (l) Internal diameter is 84cm instead of 90 cm (r)

viii. Use of Poor Quality Gravel

Gravel wearing course has to conform to the contract specifications. A physical inspection of the road conducted on 20th September 2009 revealed that gravel wearing course used on long stretches of the road (KM 5.1 – KM 41 and KM 50 – 65) was too stony, i.e. contain oversize stones larger than the allowable maximum size 37.5mm specified in the SATCC Specifications Clause 3402 (e).



Stony gravel layer at KM 6.7

The ride quality of the road was therefore poor, forcing some vehicles to avoid the road and use road side tracks parallel to the road as seen in the picture below:



Vehicles preferring roadside track due to poor riding quality of the roadway (KM 6.7)

A gradation (PSD) test carried out on a sample of gravel obtained at km7 revealed that the gravel did not meet SATCC specifications.

ix. Lack of Intervention on Bridges and Culverts

A physical inspection of drifts and culverts conducted on 20th September 2009 revealed that no intervention was done during the periodic maintenance contract to clear the inlets and outlets of drifts at KM 35.8 and 48.5 and silted concrete culverts at KM 41.1, 42.5, and 43.1 as illustrated in the photographs below:



Unattended vented drift inlets with vegetation partially blocking vent openings at KM 35.8 and 48.5. No edge marker posts for traffic safety during overflow situation



Unattended partially blocked culverts at KM 41.1 and 42.5

x. Cracked Culvert Headwall

A physical inspection of a six concrete pipe culvert constructed at km49.1 carried out on 20th September 2009 revealed that the concrete headwall on the downstream side had a vertical crack in the middle as shown in the picture below.



A six concrete culvert structure at KM 49.1 (LHS); A vertical crack in the middle (RHS)

The vertical crack indicates lack of proper reinforcement in the culvert headwall.

i. Contract for the Construction of the Choma to Chitongo Road

On 14th July 2008, the Zambia National Tender Board granted authority for the award of the contract for the construction of the Choma to Chitongo road in southern province to China Geo Engineering Corporation at a contract sum of K164, 572,767,310.36 with a completion period of twenty four (24) months. The contract was signed in July 2008 and commenced on 1st August 2008.

The scope of works included massive earth works, cleaning and repair of existing culverts and drainages, construction of new culverts, construction of pavement, repairs of bridges, bituminous surfacing, road markings.

The project was supervised by Messrs Rankin. The scope of works for the consultant included among other things reviewing and updating of contract documents, preparation of construction drawings including supervision services at a cost of K6,394,487,000. The contract was for a period of twenty four (24) months. As of October 2009 the project was still ongoing.

However, the following were observed:

i. Failure to Recruit Consultant on Time

Contrary to best practice and terms of reference for the consultant which stated among other things that the contract for the consultant would be awarded one (1) month before the engagement of the contractor, the Agency engaged the consultant a month after the commencement of the works contract.

The consultancy contract sum of K 6,394,487,000 was not revised downwards despite the fact that at the time the consultant was engaged' the reviewing and updating of the contract documents had been overtaken by events in that the contract for the works had already been signed.

ii. Irregular Allocation of Project vehicle to Consultants' Head office

Seven (7) motor vehicles were procured for the use by the consultants. One vehicle, a Toyota Prado, was handed over to the Agency as provided for in the contract while another Toyota Prado was allocated to the head office of the consultants firm. The remaining five vehicles were used on site. It was not clear why a motor vehicle meant for project supervision was allocated to the consultants head office as opposed to the project site.

iii. Attachment of Clients Staff to site for Training

The contract provided for the attachment of clients staff (RDA) for training purpose. An amount of K90,000,000 was provided in the contract for a period of twenty four (24) months.

The following were observed:

- The contract did not specify the kind of training to be provided to the clients staff.

- Inquiries made with the resident engineer revealed that he was not aware of the attachment. In this regard, no training program was prepared for the staff and no records were maintained for the number of days the trainee spent on the project.
- The contractor paid a sum of K22,330,000 as subsistence allowance direct to the client's staff Mr. Mubambe Shimete. There was no documentation to support the payment.
- The resident engineer had certified a claim of K49,000,000 under the budget line. However, the engineer failed to provide a basis in terms of supporting documents on how he had certified the claim.

iv. Irregular Instructions to the Contractor

- Contrary to laid down procedures, in March and April 2009, the contractor paid amounts totalling K9,465,000 direct to RDA staff as supervision allowances following instructions from the Construction and Maintenance Manager, who was one of the beneficiaries. There was however no evidence to indicate how the figure of K9,465,000 was arrived at. It was further observed that there was no evidence of authority from the RDA Director.
- The Agency was issuing instructions directly to the contractor to service motor vehicles not attached to the project (See details below).

Vehicle Reg	Amount K
ABH 5495 (Toyota Hilux)	3,217,158
ABF 2977 (Pajero)	3,385,300
ABC 406 (Nissan Hard Body)	921,592
ABH 723 (Toyota L/Cruiser)	6,227,922
ABR 6030 (Mitsubishi)	<u>3,568,029</u>
Total	<u>17,320,001</u>

In this regard, amounts totalling K17,320,001 were spent on motor vehicles not related to the project.

v. Non Adherence to Contract Provisions

Although the consultant had certified full payment to the contractor in the sum of K1,393,700,000 in relation to the provision of seven (7) motor vehicles, a physical verification of the vehicles revealed that the vehicles were not supplied

to specifications, for example, the vehicles did not have approved canopy, bull bar including protection for fenders and lights, tow hook and rope, first aid kit.



Vehicles supplied not to specifications

Although a sum of K 847,000,000 was certified and paid to the contractor for the provision and maintenance of project managers office and Laboratory, the Laboratory structure provided was not to the standard specified in the contract. For instance the structure lacked air conditioners, the external door and all windows were not fitted with fry screens, the concrete slab for sample drying was not to specifications and the external entrance had no double door but instead was made of corrugated iron sheets.

It could not be ascertained as why the consultant approved a sub standard laboratory structure contrary to the contract specifications.



Sub standard structure established as extension of the Laboratory contrary to specifications

Out of four (4) samples tested to assess the thickness of the base course, two (2) samples taken at km 27 and km 21 did not meet the specifications as they both measured 100 mm against the 150 mm specified.

12. Eastern Province

a. Contract for the Upgrading of Selected Chipata Township Roads LOT-1 (17.78Km) and LOT-2 (8.52Km) in Chipata District in Eastern Province

The contract for the upgrading of selected Chipata Township roads (17.78Km) under Phase II Lot 1 and phase II lot 2 in Chipata Eastern Province was awarded to Messrs Sable Transport Contractors Ltd at a contract price of K34,379,087,318. The contract commenced on 26th November 2008 and was scheduled to be completed in twelve (12) months on 25th November 2009. The scope of works in the contract comprised the following drainage works, road formation, mass earthworks, cape seal, shoulder construction, road markings, ancillary works that include erection of road signs, finishing of road and road reserve and construction of rumble strips and speed humps. The works were supervised by the Agency.

As of October 2009, a total of K8,255,614,788 had been paid to the contractor and 20% of works had been done.

The following were observed:

i. Inadequate Budget Provision

In 2008, a provision of K14,000,000,000 was made under the Accelerated Urban Roads Rehabilitation Programme to cater for rehabilitation of urban roads throughout the country.

It was observed however that the contract sum for the Chipata township roads was K20,379,087,318 above the provision allocated for the whole country.

ii. Questionable Variation

The bill of quantities did not have a provision for clearing and grubbing. In this regard, variation order to include clearing and grubbing was approved six (6) months into the Contract.

The introduction of the bill item is questionable in that the contractor had commenced works and done works on some roads in the absence of the bill item and instruction from the client. The quantities included in the revised bill of quantity on already done roads are questionable as they were based on the contractor's claims which were not supported by certified measurement sheets by the Project Manager.

A site inspection of some township roads where works had not yet been done revealed that the roads did not require clearing and grubbing as they were existing township roads as can be seen in the picture below:



*Existing township road earmarked
for clearing and grubbing*

iii. Delayed Completion

As of October 2009, a month before the contract completion date, only 20% of works had been completed. There was no evidence to indicate that the contractor had requested for an extension of time supported by a revised work programme.

iv. Irregular Certification

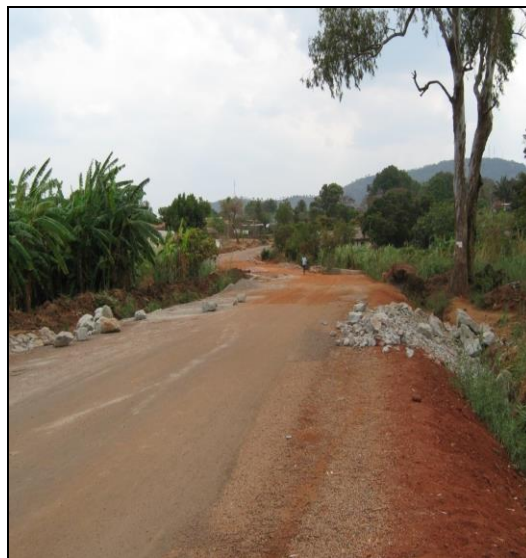
A review of the Interim Payment Certificate No.5 and physical verification revealed the following among others:

- Although an amount of K180,000,000 had been certified for the supply and maintenance of the Engineers vehicle, physical check and enquiries with the Project Managers team revealed that the vehicle had not been supplied as of 8th October 2009.
- An amount of K103,200,000 representing 96% of the billed item had been certified for work done on the construction of 150mm, 3% cement stabilized base including 1m wide shoulder on either side on Obote Road. However, a physical verification of the site revealed that the 150mm, 3% cement stabilized base had not been done as of 15th October 2009 . See picture below;



Obote road certified for 150mm, 3% cement stabilized base but not done

- Similarly works on Saint Anne Road relating to surfacing dressing (single seal with slurry) had been certified fully at K772,800,000 although a section of the road was found not to have been surfaced as shown in picture below:



Portion on Saint Anne Road with no surfacing dressing (single seal with slurry) but certified done.

The work item relating to the cut to spoil sub grade material on Saint Annes Road was certified at 7519.58 cubic meters worth K360,940,000. However, a physical count and inquiries made with the foreman from the council revealed that only 960 cubic meters worth K46,080,000 had been done resulting in an over payment of K314,860,000



Part of the cut to spoil material

It is not clear why the supervisor certified for activities that had not been executed.

Out of five (5) samples tested to assess the thickness of the base course on St. Annes Road, two (2) samples taken at km 0.3 and km 1.6 did not meet the specifications as they measured 95 mm and 140 mm respectively against the 150 mm specified. The base course thickness on a sample at km 0.2 on Katopola Road measured 130 mm against 150 mm.

b. Periodic Maintenance of the M12 Road Chipata to Lundazi Road

On 14th April 2008, the Zambia National Tender Board (ZNTB) conveyed its authority to the the Agency for the award of a contract to Messrs Raubex Construction Zambia Ltd for the periodic maintenance of road M12 from Chipata to Lundazi Road at a contract price of K79,680,838,118 with a completion period of twelve (12) months. The contract was signed on 6th May 2008 and was to start on 1st June 2008 and end on 31st May 2009. The road length to be worked on was 100 km. The scope of works included the following pothole patching and edge break repairs, reinstatement of existing drainage facilities, rehabilitation of existing shoulders, reconstruction of selected sections of the existing pavement, double seal surface dressing, road markings and permanent signage, accommodation of traffic and concrete works. The project was supervised by Bicon Zambia Ltd.

As of October 2009, a total of K17,756,179,000 had been paid to the contractor and works were 22% complete.

The following were observed;

i. Delayed Engagement of Supervising Consultant

The supervising consultant was engaged six (6) weeks after the contractor had been engaged.

A review of the progress reports from June to August 2008 and minutes of the site meeting No. 4 held on 22nd October 2008, revealed that the contractor could not proceed with the works as he was not certain of what works to carry out in the absence of the design drawings which were only submitted to the contractor on 8th December 2008.

ii. Delayed Final Design Report

The Consultant submitted the Final Design report, the book of drawings and a revised programme of works on 25th September 2008, four (4) months after engaging the Contractor. The RDA approved the Consultant's design report in a letter dated 28th October, 2008 addressed to the consultant.

Consequently, there were major variations to the scope of works from km 6+800 to 90+000 to include shoulder reconstruction, Pavement reconstruction including cement stabilizations and Double seal surface dressing.

iii. Wasteful Expenditure-Feasibility Study Report

In 2006, the Agency awarded a contract to Zulu Burrow Limited for the feasibility study of the rehabilitation of 186 km of road M12 between Chipata and Lundazi at a contract sum of US\$168,200.

The feasibility study report was submitted in November 2008 after the contractor (Raubex) had been contracted and had already mobilised. This brings into question whether the Agency used the findings of the feasibility study as the project commenced before the report was submitted. In this regard, a sum of US\$168,200 paid for the feasibility study was wasteful expenditure.

iv. Non Submission of the Performance Bond

According to Clause 52.1, Section IV of the contract, the contractor was required to submit a performance bond not later than the date specified in the letter of acceptance, twenty eight (28) days in this case. However, contrary to the contract provision, as of September 2009, the contractor had not submitted the performance bond.

v. Claims on Delayed Payments

As of September 2009, the contractor was claiming a sum of K5,200,000,000 due to delayed payments.

vi. Physical Inspection

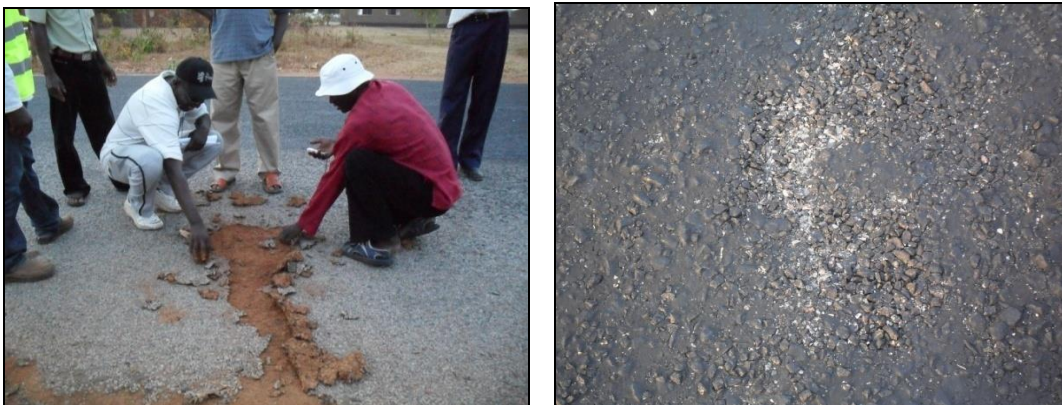
According to the contract, a sum of K1,712,128,000 was provided for shoulder reconstruction from km 6.8 to km 90 out of which K1,231,162,000 was paid as of 10th July 2009 on Interim Payment Certificate (IPC) 10.

However, a physical inspection revealed that there was no bond between the base and the surface dressing along the shoulders especially from km 20 to km 90. The audit team were able to easily lift the surface dressing using bare hands. The peeling off of the surface dressing was also observed on the Maamba Batoka Road and Lusaka International Airport junction to Luangwa bridge which was done by the same contractor.

In some areas, surface dressing has peeled off on the carriage way from the force of tyres of a turning vehicle. The pictures below refer:



Peeling off of surface dressing of the road shoulders on all the reconstructed sections of the shoulders of the Chipata Lundazi road.



Patched portion of the road after peeling off.

vii. Failed Second Sealing

An inspection of the road showed that the second seal had failed in most sections between km 10 and km 50. In most places the second seal was found to be worn out. It was also observed that the contractor had applied fog spray on the entire road without authority or instruction from the client. The decision by the contractor to apply the fog spray without instruction could not be explained by the consultant. Pictures below refers:



Worn out surface due to non holding of Second seal (l) Fog spray (r)

viii. None Adherence to Contract Specifications

Base course is the main bearing layer of the pavement. In the tests carried out, the thickness of layers were lower than what was specified. It was observed that all four (4) samples for base course thickness did not meet the specified 150 mm. They measured 105mm (km21.6), 125mm (km35.7), 130 mm (km64.7) and 120mm (km84).

It is evident from the results obtained from the tests that the contractor did not meet the specifications prescribed in the contract despite the Agency having engaged a supervising consultant at a cost of K1,692,916,922.

c. Emergency Repair of Road D134 (Petauke to Chilongozi Road) and Ukwimi Sonja, Including a Portion of (Ukwimi B)-114km in Eastern Province

On 19th September 2008, the Zambia National Tender Board (ZNTB) conveyed its authority to the Agency for the award of a contract to Messrs Sable Transport Ltd for the emergency repair of 114Km road (D134) from Petauke to Chilongozi at a contract price of K26,933,372,884 with a completion period of eight (8) months. The contract was signed on 21st October 2008 and was to start on 14th November 2008 with an end date of 13th July 2009. The scope of works consisted of earth works, grading, gravelling drainage works and vegetation control. The project was supervised by the Road Development Agency.

As of October 2009, a total of K15,980,561,100 less 10% retention had been paid to the contractor and the works were 84% complete.

The following were observed:

i. Non Remittance of Supervision Funds

A scrutiny of Interim Payment Certificate and enquiries made with management revealed that out of a provision of K240,000,000 for monitoring and supervision, a sum of K150, 000,000 had been certified. However, the contractor had not remitted the funds to the Agency.

Although an amount of K150,000,000 had been certified, in the letter dated 25th August 2009 addressed to the contractor, the Manager – Construction and Maintenance requested the contractor to remit only K44,717,500. It could not be ascertained as to why the Manager Construction and Maintenance only requested for K44,717,500 out of a certified amount of K150,000,000.

ii. Lack of Site Supervisors

It was observed that there was no permanent site supervisor on the project and in this regard the certification of works was questionable.

Consequently, the contractor did not apply gravel from km 8 to km 30. The contractor was found applying red soil on the road instead of gravel as shown in the picture below.



Uncompacted soil.



A scraper applying soil on the road

Plasticity test carried out revealed that the sample was too plastic PI 11% against 6% specified.

13. North Western Province

a. Upgrading to Class 1C Bituminous Standard of the Kasempa Turnoff to Kabompo Road (M8)

In September 2001, the Ministry of Works and Supply engaged Belga Construction and Trading (Z) Ltd for upgrading to class C1 Bituminous standard between Kasempa turn off to Kabompo at a contract price K171,691,912,150 (US\$46,403,219.50) with a completion period of forty five (45) months (3.5years). The contract was to start on 5th October 2001 and end on 6th June 2005. The scope of works included clearing and grubbing, earthworks fill, culverts construction, gravel sub base, stabilised base course bituminous surfacing and road furniture on a 225.5km stretch. The project was supervised by H.P. Gauff Ingenieure GmbH & Co KG Consulting Engineers.

The following were observed :

i. Payments Made to the Contractor

A review of IPCs Nos.1 to 48 for the project revealed that the contractor had been paid a total of US\$39,559,658.97 (K159,326,529,474) out of a contract price of US\$46,403,219.50 (K171,691,912,150) representing 85% of the contract price. A further analysis of the payment certificates revealed that out of US\$39,559,658.97 paid, US\$1,673,786.41(K5,951,354,500) was paid in respect of interest charged on the delays on settling claims.

ii. Extension Related Costs

A review of IPC No. 48 revealed that the contractor had claimed and was paid a total sum of US\$4,416,165 (K16,781,427,000) for extension of time with costs from July 2007- July 2009. There was no evidence of National Tender Board Authority for this additional cost.

iii. Failure to Follow Tender Procedures

In May 1995, H.P. Gauff Ingenieure GmbH & Co KG Consulting Engineers were engaged to supervise works on the Mutanda to Kasempa turn off. The contract was for a period of twenty six (26) months at a contract sum of US\$419,200 (K345,000,000).

On 15th September 2004, an addendum was signed to include the supervision of Kasempa turn off to Kabompo road for an additional sum of US\$264,385 (K1,255,830,100) without obtaining tender authority.

b. Periodic Maintenance of Kasempa to Lalafuta Bridge Road (D301)

In March 2008, Zambia National Tender Board (ZNTB) granted authority to the Agency to award a contract to Raubex Construction for the periodic maintenance of road D301 from

Kasempa to Lalafuta bridge at a contract price K16,525,184,431 with a completion period of seven (7) months. The contract was signed on 7th May 2008 and was to start on 30th May 2008 and end on 30th December 2008. The scope of works included vegetation control, reshaping, re-gravelling, drainage works, culvert construction and repair and installation of road signage. The project was supervised by E.G. Pettit and Partners in Association with Eastconsult Ltd.

As of August 2009, a total of K5,685,416,453 had been paid to the contractor and 65% of works had been completed.

On 6th June 2008, the contractor requested that the concrete pipe culverts specified in the contract be changed to corrugated steel pipe culverts as the contractor was having difficulties sourcing the concrete pipes. In July 2008, the Agency rejected this proposal citing vandalism and corrosion on the corrugated pipes.

However, in January 2009, the Director approved the change of design from concrete to corrugated pipes which resulted in an additional cost of K180,000,000. The approval, which was beyond the Director's threshold of K50,000,000 was based on the fact that the contractor had already bought the corrugated pipes.

c. Periodic Maintenance of Road T005 from Lumwana(km138+000) to Mwinilunga

The Zambia National Tender Board in a letter dated 14th July 2008 granted authority to award the contract for the periodic maintenance of Road T005 from Lumwana turnoff to Mwinilunga Road to Paving Zambia Ltd at a contract sum of K67,907,796,063 with a completion period of four (4) months. The contract was signed on 1st July 2008 and commenced on 11th December 2008. The scope of works included the following potholes patching and edge break repairs, reinstatement of existing drainage facilities, rehabilitation of the existing shoulders, reconstruction of selected section of existing pavement, double seal surface dressing, road marking and permanent signage. The project was supervised by Asco (Z) Ltd.

As of October 2009, a total of K43,244,174,145 had been paid to the contractor representing 63.7% of the contract sum and works had been suspended due to lack of funds.

The following were observed:

i. Late Engagement of Supervising Consultant

It was observed that whereas the actual works commenced on 1st July 2008, the supervising consultant was engaged on 29th August 2008, two (2) months after the project had commenced. Among the scope of the consultancy work was the following:

- Review the tender contract, specifications, drawings, bills of quantities, etc
- Supervising the construction works

The late recruitment of the supervising consultant meant that the review of tender contract, drawings and bills of quantities among others was not done prior to the engagement of the contractor.

ii. None Adherence to Contract Specifications

It was observed that the base course thickness was lower than what was specified in the contract. In this regard, all three (3) samples measured did not meet the specified 150 mm. They measured 102mm (km1.1), 80mm (km16) and 108 mm (km39.7).

It is evident from the results obtained from the tests that the contractor did not meet the specifications prescribed in the contract despite the Agency having engaged a supervising consultant at a cost of K1,638,200,000.

d. Periodic Maintenance of Road T005 from Solwezi via Mutanda to Mwinilunga (Lumwana 1st Gate)

On 14th May 2007, the Zambia National Tender Board(ZNTB) granted authority to the Agency to award a contract to Raubex Construction for the Periodic Maintenance of Road T005 from Solwezi via Mutanda to Mwinilunga (Lumwana 1st Gate) at a contract price K47,000,000,000 with a completion period of fourteen (14) months. The contract was signed on 6th June 2007 and was to start on 11th July 2007 with an end date of 20th September 2008. The completion period was later extended to 11th November 2008. The scope of works comprised pothole patching and edge repair, repair of shoulder with approved nature gravel, reconstruction of some road section, reshaping of sides and mitre drains, road line marking, vegetation removal and surface dressing with traffic accommodation where construction works are being carried out. The project was supervised by Messrs Brian Colquhoun Hugh O'Donnell and Partners.

As of October 2009, a total of K42,115,331,101 and K1,407,058,707 had been paid to the contractor and consultant respectively, and works were 100% complete.

The following were observed:

i. Financial Evaluation

Although the contract for the periodic maintenance of the Solwezi-Mutanda road was awarded to Messrs Raubex Construction Zambia Ltd, a review of the financial evaluation report revealed that the bid from Messrs Raubex Construction Zambia Ltd was non responsive in that it was outside $\pm 25\%$ of the

Engineer's Estimate. The analysis shows that this bid was too high, at 61% above the Engineer's Estimate. It was therefore not clear why the contract was awarded to Raubex at the contract price above the maximum of K36.5 billion.

ii. Delay in Engaging the Supervision Consultant for the Works Project.

Whereas the actual works commenced on 11th July 2007, the supervising consultant was engaged on 5th November 2007, four (4) months after works had commenced.

The consultant scope of works included:

- Field studies - familiarisation and mobilisation, road inventory data, conditional survey, material and testing, traffic surveys
- Engineering Analysis – detailed field reconnaissance ,designs and calculations, Budget and Cost estimates, work identification and classification
- Procurement of works - Contract documentation (working drawings, preparation of specifications of particular application, BOQs, progress report)
- Execution of works: quality control and assurance, progress monitoring, preparation of interim payment certificates, preparation of completion drawings and reports.

The late recruitment of the supervising consultant meant that the review of contract, drawings and bills of quantities among others was not done prior to the engagement of the contractor and the contractor worked without supervision during this period.

iii. Physical Inspection - Surface Condition

It was observed that some sections of the road were showing signs of early bleeding. In some instances the road markings were fading as a result of the bleeding as shown in the picture below:



Road marking fading due to bleeding (l) and Signs of bleeding Ch 42.6km (r)

The scope of patching work was also to include the edge repairs before the surface dressing was done. At chainage 50+900 from Lumwana there were edges that were not properly repaired before the surface dressing as shown in the pictures below:



Edges not repaired surface dressing properly prior to



Big aggregate particles used for surface dressing

The car park built in Solwezi business district was already showing signs of pot holes in a number of places as shown in the picture below:



Pothole on the car park in Solwezi

e. Rehabilitation, Spot Improvement and Drainage Work on the Kanyambila-Chifuwe Road

On 13th February 2008, the Agency awarded a contract to Roy grove (Z) Limited for the Rehabilitation, Spot Improvement and Drainage work on the Kanyambila- Chifuwe Road at a contract price of K480,099,125 with a completion period of four (4) months. The contract

was signed on 18th March 2008 and was to start on 14th April 2008 and end on 14th August 2008. The scope of works comprised; rehabilitation maintenance of the road, vegetation control, reshaping and grading, culvert construction and spot re-gravelling. The road works were supervised by the Kabompo District Council.

As of October 2009 a sum K230,486,490 had been paid by the contractor and the project had was still incomplete.

i. Questionable Extension of Contract Completion Date

Although the contract was initially for a period of four (4) months, it was observed that the it was extended by eleven (11) months and was to end on 14th June 2009. However, as of September 2009, eighteen (18) months after the commencement of contract, the road had not been completed.

ii. Failure to provide Performance Bond

Contrary to the provisions of the contract, which required the contractor to submit a performance bond valid for the duration of the contract, it was observed that the contractor did not submit a performance bond.

14. Western Province

a. Mongu -Kalabo Road

In paragraph 14 of the Auditor General's Report for 2005 on the administration of selected contracts in the Ministry of Works and Supply, mention was made of the construction of the Mongu-Kalabo road and in particular of payments to Messrs Consolidated Contractors Company (CCC) of amounts totalling K81,492,915,065 which were considered as a waste of public funds.

A review of the project in September 2009 revealed the following:

i. Wasteful Expenditure

In June 2007, RDA entered into an agreement with Consolidated Contractors Company (CCC) to purchase the contractor's camp site which included land, buildings and equipment at a cost of K1,698,300,000.

However, when the claim was forwarded to NRFA for payment in November 2007, NRFA declined to pay for the transaction as it involved the purchase of land, buildings and equipment of which NRFA had no mandate to finance. Consequently, CCC claimed and was paid K2,606,609,432 as costs for maintaining the camp in Mongu.

ii. Interest Expense

Inspection of documents indicated that RDA incurred cumulated interest expenses totalling K3,669,711,032 due to delayed liquidation of interim payment certificates as they fell due. This was an increment of K526,013,201 from K3,143,697,831 accumulated up to February 2006 mentioned in paragraph 14 of the Auditor General's Report for 2005 on the administration of selected contracts in the Ministry of Works and Supply.

iii. Supply of Forty (40) Bailey Bridges

On 23rd October 2007, RDA entered into a contract with Messrs China National Aero Import & Export Beijing Company for the supply of forty (40) sets of bailey bridges at a contract price of \$13,158,945. It was however observed that at the time of procuring the bridges, there was no design for the road to support the use of bailey bridges. It was therefore not clear how RDA arrived at the decision to procure the bridges in the absence of a design.



Bailey Bridge Materials in Mongu

iv. Unused Precast Concrete Beams

A physical verification of the camp site formally occupied by the CCC revealed that the Agency had pre cast – concrete beams meant for concrete bridge structures for the Mongu Kalabo road. It was not clear as to why the materials were not used by the previous contractor. In addition there was no explanation as to why management opted to buy bailey bridges when it could have designed the bridge to make use of existing pre cast concrete beams on which billions of Kwacha was spent.



Pre cast-concrete beams meant for construction of bridges along Mongu - Kalabo flood plains

v. Hire of Offloading Equipment

On 7th May 2008, RDA awarded a contract to Messrs Pacific Parts Zambia Limited for the hire of folk lifts and tractors at contract sum of K398,240,000. The equipment was for the off loading of bailey bridges.

vi. Wasteful Expenditure

The Road Development Agency procured three (3) folk lifts and a tractor for the off loading of bailey bridges meant for the Mongu - Kalabo Road. There were no records availed for audit to indicate the cost and date of purchase and delivery. However, despite the purchase of the off loading equipment, the Agency hired off loading equipment at a total cost of K1,293,740,000. Inquiries made with the Regional Office in Western province revealed that the RDA off loading equipment was only delivered after the bailey bridges had been delivered.



Part of the Folk Lifts Procured For Off Loading Equipment



Tractor procured for off loading

vii. Computation of Hours Worked

The contract rates were based on machine hours performed by each equipment. However, it was observed that the stock sheets did not have a provision to indicate

which particular offloading equipment was used on a particular container. In this regard, each hour worked was attributed to all four (4) equipment.

viii. Irregular Extension of Contract Hours and Lack of Time Sheets

Although the contract was for 250 hours, the contractor claimed a total of 850 hours. In this regard, the contractor was paid a total of K1,293,740,000 which was K895,500,000 in excess of the contract sum of K398,240,000, representing an increase of 225%. Contrary to tender regulations, there was no authority for the variation.

A review of schedules supporting the payment of K1,293,740,000 at the Regional Engineer’s office (Western Province) revealed the following:

- Out of the 427 hours claimed on invoice No. 3715, 171 hours worth K256,500,000 had time sheets to support the claim while 256 hours worth K384,000,000 relating to rearranging had no time sheets prepared.
- Although invoices for the balance of 423 hours for which the contractor was paid K653,240,000 were availed, these were not supported by time sheets.

b. Routine Maintenance by Performance Contract of the M10 Kalongola Pontoon-Sioma Road (70km) in Western Province

On 24th June 2008, the Road Development Agency and Samazuka General Contractors signed a contract for the routine maintenance by performance contract of the M10 Kalongola pontoon – Sioma Road (70KM) in Western Province at a contract sum of K237,349,994.13. The road is unpaved (gravel road).

The work schedule indicated the following characteristics of the section to be maintained:

Length	70	km
Verge Area	560,000	m ²
Drain length	140	km

Works commenced on 20th July 2008 and were due to be completed on 26th July 2009.

As of October 2009 a total of K163,919,698.31 had been paid to the contractor and works were completed on 31st July 2009.

The following were observed:

i. Fraudulent Certification of Work Items

▪ **Inclusion of Desilting of Culverts Without Authority**

The Regional Engineer Western Province certified the contractors' claim for de silting ten (10) culverts which were not in the contract without authority. The performance assessment by the Regional Engineer revealed that the ten (10) culverts were de silted (assessed at 10 out of 10 (100%). However, a physical inspection of the culverts on site carried out two months after the completion of works revealed that there were only six (6) culverts on the entire length of the road and all were not de silted contrary to the Engineer's report (*see pictures below*):



Fully silted culvert at KM 53 (l) and Culvert at KM 12.1 partially silted with overgrown vegetation (r)

▪ **False Work Items**

The Regional Engineer included and certified work items that were not physically on site as indicated below;

Work item	Assessed satisfactory
Mitre drains	50%
Lined drains & scour	100%
Road signs	100%
Guard rails	100%
Kerbs & junction marking	100%

▪ **Drainage and Vegetation**

Contrary to the Regional Engineer's certification that vegetation control had been done on 65 kms out of the 70km stretch of road, a physical verification of the road revealed that 47 kilometres had been done. There was no vegetation control done between KM 32 and KM 55.



Tall grass and evidence of shrubs close to the road

15. Luapula Province

a. Periodic Maintenance of Road D235 from T2 Junction in Serenje via Mukuku Bridge to Samfya, including Sections of Samfya to Mansa Road (D94)

On 6 November 2008, the Zambia National Tender Board (ZNTB) conveyed its authority to the Roads Development Agency (RDA) for the award of a contract to Messrs China Henan International Corporation Group Company Limited for the periodic maintenance of road D235 from T2 junction in Serenje via Mukuku bridge to Samfya, Samfya to Mansa (D94) in Luapula and Central provinces at a contract sum of K153,388,530,960.24 with a completion period of 18 months. The contract was signed on 28th November 2008 and was to start on 13 December 2008 and end on 13 June 2010.

The scope of work comprised the periodic maintenance of 323 Km of asphalt pavement and seals, 50 Road signs, Road makings, treatment of surface defects, patching, repairing edge breaks and crack sealing.

The project was supervised by Ng`andu Consulting Engineers who was engaged on 4th November 2008, for a period of 18 months at a contract sum of K434,480,000. The supervision contract was to commence on 18 February 2009 and end on 18 August 2010.

During the financial years ended 31st December 2008 and 2009, provisions of K 4,000,000,000.00 and K 13,500,000,000.00 were made in the RDA Annual Work Plan for the this project.

The following were observed:

i. Standing Time Cost

On 15th July 2009, Road Development Agency instructed the contractor to suspend the works on Periodic Maintenance of Road D235 including Sections of

Road D94 due to limitation of the budget as the K13,500,000,000 budgeted for 2009 had been exhausted. As of September 2009, the contractor was claiming for K28,906,776,484 as standing time cost for the suspension of the works from September to December 2009 as show below:

Item	Description	Amount (K)
1	Foreign Staff Repatriation to and back from China	248,040,000
2	Foreign Staff Remaining on Site	565,775,000
3	Local Staff Terminal Wages	38,400,000
4	Equipment Standing Time	27,699,264,000
5	Equipment Transport Charge from Site to Main Camp and Re-Transport to Site	144,690,000
6	Security for Materials, Equipment whilst on suspension	37,440,000
7	Payment for Services	100,440,000
8	Loss in Works Insurances and Bonds	72,727,484
	Total	28,906,776,484

RDA entered into an agreement to complete the materials that was on site which totalled K46.2 billion as per interim payment certificate number 8, RDA indicated to the contractor that they would pay K17 billion due to limitation of the budget. The contractor agreed to give RDA an interest free on delayed payments if they pay the pending payment certificates by 31 January 2010. Otherwise, failure would attract all the interests to be calculated from the date due.

ii. Physical verifications

A site inspection conducted in September 2009 revealed that the contractor had suspended the works as instructed by RDA as the contractor had performed more works than what was budgeted for in 2009.



The contractor's equipment idling

It was further observed that the contractor had opened the pot holes from Km 239.4 to Km245.4 . However, the Contractor was instructed to stop works and the pot holes were left opened. They are a hazard to traffic and will increase in size because of traffic.

b. Samfya Turn Through Lubwe Mission via Mwewa to Kasaba

On 6 March 2008, the Zambia National Tender Board (ZNTB) conveyed its authority to the Roads Development Agency (RDA) for the award of a contract to China Jiangxi corporation for International Economic and Technical cooperation for the periodic maintenance of the Samfya turn off through Lubwe mission via Mwewa to Kasaba in Luapula Province at a contract price of K8,849,818,587.50 with a completion period of 6 months. The contract was signed on 14 March 2008 and was to start on 21 June 2008 and end on 21 December 2008.

The scope of work comprised the periodic maintenance of 83.1 Km of clearing and grubbing; re gravelling and installation of road signs. The project was supervised by E.G. Pettit and Partners who was engaged on 23 May 2008, for a period of six (6) months at a contract sum of K515,624,545.

As of June 2009 a total of K5,709,056,893 had been paid to the contractor and works were completed on 21 June 2009.

The following were however observed:

i. Failure to Follow Specifications

According to the contract specifications, the road width was 5.5 metres. However, a physical inspection revealed that contrary to the specifications the average width of the road was 4.0 metres as shown in the table below:

Km	Km0	Km15.0	Km30.0	Km45.0	Km60.0	Km75.0	Km80.1	Km1.5
Width in Metres	5.0	4.0	3.4	3.9	4.1	4.0	3.8	3.8

ii. Poor Drainage

- There was soil erosion at km 31.4 on the Right Hand Side (RHS) and Left Hand Side (LHS) of the side drains which may affect the Road.



Erosion at Km 31.4 will affect the carriage way

- The road had cracks on the carriageway from Km 71.9 to Km80.0 as shown in the picture below:



Cracks on the carriage way. Starting from Km71.9 to Km80.0

- The mitre drain were not discharging water, which may affect the carriage way as shown below:



Mitre drain not discharging water at Km72.7

c. Rehabilitation and Maintenance of Boma/Nchelenge Harbour Road

On 1st January 2008 Roads Development Agency (RDA) Tender Committee awarded the contract to Messrs Kapwil Business Centre for the rehabilitation and maintenance of the Boma/Nchelenge/Kashikishi Harbour Road, lot 6 Luapula Province at a contract price of

K355,776,840.00 with a completion period of 6 months. The contract was signed on 13th February 2008 and was to start on 25th April 2008 and end on 6th June, 2008.

The works were supervised by Nchelenge District Council with Luapula Province Regional Engineer's office as the overall supervisor.

The scope of works included heavy grading; formation and compaction to restore camber, mitre drain, spot gravelling; provide, haul, drainage works; supply and install concrete pipes complete with headwalls, wing walls and apron among others.

As of October, 2009 a sum of K173,993,040 had been paid to the contractor.

The following were observed:

i. Progress claim no. 2

Due to poor workmanship, the Regional Engineer could not approve the contractor's final claim of K64,650,000 and instead requested the contractor to go back to site and redo the works.

The contractor refused to remobilize and redo the work on the grounds that ;

- The contractors works were assessed and certified by the director of works for Nchelenge District Council and RDA official and that all the volume of works done added up to 100% except for stone pitching
- The contractor claimed he had graveled the full length instead of spot gravelling

ii. Physical Inspection

Although the road had undergone the rehabilitation and maintenance, the following anomalies/defects were noted:

- The stretch from km 0.5 through km 1.8 was characterized by serious gullies.



The drift and the wash out at 0.5 km

- The quality of drifts were not as specified in the contract and consequently, the base concrete had been eroded at km 0.4, km 0.5, km 0.6 and km 1.9



Wash out at 0.6 Km

- The culverts installed had all been silted;
- Serious surface break at km 0.5. Half of the road had been washed out at km 0.6, km1.2, and at km 1.3 the wash out rendered the point of culvert installation impassable and forcing motorists to use the road sides.



No road formation at 1.3 Km could not be used because of a wash out

- There was no formation at Km 0.8 to Km1.1 and no gravel



Carriageway at 0.8 km



The carriageway eroded at 1.1km

- The stretch from km 0.7 to km 1.9 had poor side drains and had no mitre drains made for the all stretch.
- Contrary to the specifications of the contract which set the width of the carriageway at 4.5m, measurements taken at intervals of 0.5km between km 0.0 and km 5.5 revealed that the carriageways had an average width of 3.32 meters.

16. Central Province

a. D207-Picadilly Circus-D200/Kabwe Town Boundary to Old Mkushi

On 29th July 2008, the Zambia National Tender Board conveyed authority to Road Development Agency to award the contract for the rehabilitation of Road D207 Picadilly Circus to D200, Kabwe town boundary to old Mkushi to Messrs China Geo Engineering Corporation at its bid sum of K21,772,683,362, with a completion period of 8 months. The contract was signed on 25th August, 2008 and was to start on 9th September 2008 and end on 8th May 2009. The scope of works included but was not limited to clearing and grubbing, road formation, gravelling and drainage works and the contract was supervised by the Regional Engineer for Central Province.

As of October 2009, a total of K18,479,930,107 representing had been paid to the contractor and works were 100% complete.

The following were however observed:

i. Physical - Road D200 (117km)

A physical verification of the project revealed the following:

- The mitre drains were not properly done as they were sloping towards the road instead of away from the road which may result in water draining towards the road.
- There were corrugations at Km107.5 to Km 108.2 and from Km 39.8 to Km 67
- All the culverts were poorly done in that they had no aprons as shown in the picture below:



Poorly done culvert at Km 78.9 with no apron

- Although there was a variation order on fill material totaling 38,100m³ in compacted layer thickness of 200mm at localized low areas for which the contractor was paid K1,138,868,500 physical verification revealed that the fill was not done.

ii. Improper Handover of Assets

In April 2009, the contractor was instructed to purchase various office equipment which included 2 laptops, 1 printer and 2 digital cameras at a total cost of K38,500,000, laboratory equipment at a cost of K19,250,000 and radios at a total cost of K15,400,000 which were to be handed over to the Agency at the end of the Project. However, it was not possible to inspect the equipment as it was not available for audit scrutiny.

17. Northern Province

a. Periodic Maintenance of Kusefya Pang'wena Road

In August 2008, the Agency awarded a contract to Messrs Pacific Parts Zambia Limited for the periodic maintenance of the 25 km D18 Kusefya Pang'wena at the contract amount of K2,593,247,725 with a completion period of four (4) months. The contract was to commence on 13th October 2008 and end on 3rd February 2009. The scope of works involved, but not limited to 15.5m wide clearing and grubbing on the 25km stretch; excavation of mitre drains;

25km formation; installation of one 600mm diameter concrete pipe culvert; fill placing; and placing of 8,745m³ of gravel wearing course. It also involved construction of parking lots and arena section and installation of ten (10) road signs. The project was supervised by the Regional Engineer of Northern Province and the following were observed:

i. Poor Project Planning (Optimization of Intervention)

A separate contract on the same road was awarded to Messrs JB Carriers and General Supplies to carry out spot improvements / repairs within the same period at a contract amount of K291,650,100. The contract start and completion dates were 11th September 2008 and 25th September 2008 respectively. It was observed that less than a month after the completion of the spot improvements/repairs, the periodic intervention started on 13th October 2008.

ii. Monitoring Progress Against Programme

A review of progress report No.2 dated 28th April 2009 revealed that the works were 71% complete, two (2) months after the expiry of the completion date. There was no evidence of extension of time and the clause on liquidated damages had not been effected.

b. Rehabilitation and Maintenance of Hospital Road in Nakonde District

On 17th March 2008, Roads Development Agency (RDA) Tender Committee awarded a contract to Messrs Thosims Suppliers and Contractors for the rehabilitation and maintenance of hospital road in Nakonde District at a contract price of K226,360,788 with a completion period of 3 months.

The scope of works comprised 2.5 km of heavy grading and major reshaping to cover all potholes and restore camber, 1.9 Km re gravelling; construction of culverts 900mm, 9 culvert extension 600mm, 2. mitre and side drains and, vegetation control of 5m on either side of the edge of the road. It also consisted of activities to ensure that the road is all-weather accessible. The contract was signed on 2nd May 2008 and was to start on 16 May 2008 and end on 16 Aug 2008.

A variation order was made to allow for provision of insurance, maintenance of engineer's vehicle based on site and miscellaneous expenses for the Engineer supervision allowances amounting to K9,174,500. The variation further allowed for heavy grading and major reshaping to cover all potholes and correcting any irregularities and restores camber, mitre and side drains among others.

The project was supervised by Nakonde district Council with Northern Province Regional Engineer's office as the overall supervisor.

There were no provisions made in the RDA annual work Plan for the Nakonde hospital road during the financial year ended 31st December 2008.

As of October 2009, a total of K210,718,379 had been paid to the contractor and 100% of works had been done.

The following were observed:

i. Supervision Funds

Although a sum of K9,174,500 was certified for supervision under IPC No.1, the funds were not remitted by the contractor.

ii. Physical Verifications

A site inspection conducted in September 2009 revealed the following:

- Contrary to the variation order which provided for covering of potholes and restoration of camber, mitre and side drains, a site inspection revealed that the road was characterized by potholes. It was further observed that the road had no camber, mitre drains and side drains at 0.0km to 0.5km and from 2.6km to 3.0km as shown below:



The pothole at 0.9 Km Truck mark on the road at 1.7 Km

- All the drifts were poorly done and at the time of inspection concrete base had already been eroded e.g. at 0.9 km drift were not to the standard done and at 1.0km to 1.3km the stretch was characterized by surface breaks and serious gullies.



Poorly constructed drift at 1.6 Km (l)

- Culvert at 1.6 km had been poorly done and there was no back slope on the left hand side (LHS)



Poorly constructed culvert at 1.6 km With base a concrete washed out already silted

- There was no formation from 2.6 km to 3.0 km.



The wash out at 1.5 Km Part of the stretch with no formation at 2.6 Km to 3.0Km

c. Emergency Construction of Rosa Bridge in Mungwi

On 7th April 2008, the Manager Construction and Maintenance (RDA) instructed the contractor (Sable Transport Limited) to carry out works on the Rosa Bridge which had been washed away. According to the instruction, the Manager had indicated that the

works were part of the contract for the reconstruction of selected priority crossing in Northern Province which had been awarded to Sable Construction on 5th December 2007 at a contract sum of K13,927,378,383.

The following were observed:

i. Irregular Procurement

In a letter dated 12th April 2008, the contractor indicated that the bridge in question was not part of the contract and therefore requested for a variation. However the contractor went ahead to construct the bridge in the absence of a variation order.

In this regard, upon completion of works in January 2009, the contractor submitted a claim for K954,796,000 which was later negotiated downwards to K649,951,000.

The Manager Construction and Maintenance only presented the matter to the management tender committee in May 2009 after the works had been completed.

ii. Questionable Pricing

A review of correspondence between the contractor and the manager construction relating to the pricing of the Bill of Quantity for works revealed that the rates were to be based on the contract for the priority river crossings in Northern Province.

In unclear circumstances, the contractor reduced his rates and quantities claimed in the first claim to K649,951,000. The revised amount of K649,951,000 is therefore still questionable when compared with similar works in the contract for priority river crossing in northern province ranged between K250,000,000 and K280,000,000.

iii. Physical reports

The pictures below show the Rosa Bridge after reconstruction.



Completed Rosa Bridge (l) and Eroded Backfill on Newly Constructed Rosa Bridge (r)



Eroded Approaches on Newly Constructed Rosa Bridge

d. Periodic Maintenance of Kasama – Mbala – Mpulungu Road Lot 2

On 9th June 2008, Zambia National Tender Board (ZNTB) conveyed authority to RDA to award the contract for the periodic maintenance of Kasama via Mbala to Mpulungu Road Lot 2 to Messrs Raubex Construction Limited at a contract sum of K59,869,840,000 with a completion period of 15 months. The start and completion dates were on 20th July 2008 and 19th October 2009 respectively. The scope of the intervention involved, but not limited to, cleaning shoulders, side drains and mitre drains; construction and surfacing of the existing shoulders; scarifying and processing of existing pavement to form a new sub base; constructing cement-stabilized base along selected sections; pothole patching; drainage works; installation and erection / installation of road furniture; and ancillary operations.

The start point for lot 2 was Km110.00 at Senga Hills and the end point was at Km 210 in Mpulungu at the entrance of Mpulungu Harbour.

The works were supervised by Messrs Eastconsult in association with BNC Consulting.

As of October 2009, a total of K12,351,384,682 had been paid to the contractor and the works were 10% completed.

A review of progress reports revealed that whilst the project was scheduled to be completed on 19th December 2009, only 10% of the works had been executed of September 2009 at which time 84% of the contract period had elapsed.

e. Periodic Maintenance of Kasama – Mbala – Mpulungu Road, Lot 1

On 9th June 2008, Zambia National Tender Board (ZNTB) conveyed authority to RDA to award the contract for the periodic maintenance of Kasama via Mbala to Mpulungu Road Lot one (1) to Messrs Raubex Construction Limited at the contract sum of K61,847,541,867 with a completion period of 15 months. The start and completion dates were on 20th July 2008 and 19th October 2009 respectively.

The start point was Km 00 at Kasama Municipal Council Grain Levy Checkpoint and the end was at Km 110 at Senga Hills.

The authority was granted on 2nd July 2008 to engage Messrs Eastconsult in association with BNC Consulting as supervisor. The contract was signed on 21st July 2008 for a contract period of seventeen (17) months at the contract sum of K 3,938,200,000.

The scope of the intervention involved, but not limited to, cleaning shoulders, side drains and mitre drains; construction and surfacing of the existing shoulders; scarifying and processing of existing pavement to form a new sub base; constructing cement-stabilized base along selected sections; pothole patching; drainage works; installation and erection / installation of road furniture; and ancillary operations.

As of October 2009 a total of K13,874,396,034 had been paid to the contractor and the contract was 60% complete.

A physical verification revealed that progress was behind schedule. While the completion date was scheduled on 19th October 2009, the overall progress as of September 2009 was 60% compared to 94% of the contract period which had elapsed

Test Results

Tests carried out are s follows:

- i.** Surface dressing thickness for seven samples
- ii.** Surface dressing bonding assessment on seven sections
- iii.** Assessment of aggregate sizes on three sections.
- iv.** Aggregate crushing test and particle size distribution for sample of aggregates

The results for the above tests are as follows:

- i.** On surface dressing thickness it was noted that despite adding a new layer on top of the existing one there was a significant variation of results obtained with one

measuring 8 mm and the highest 30 mm. Others measured 16 mm, 18 mm (two samples) and 20 mm. This type of variation is possibly caused by inadequate surface preparation before the surface dressing layers were applied. This will cause an irregular performance of the pavement, consequently premature potholes.

- ii. Of the seven (7) sections where surface dressing bonding was assessed, four (4) were found to have adequate bonding while two (2) had bonding problems between the old and the new one and one (1) had problem of bonding in the shoulders.
- iii. Visual examination of aggregates shows that they are larger than usually used for surface dressing. Implication of size of aggregates is that binder coating will not be adequate and this will result into withdrawing of aggregates from road surface a phenomenon known as windrow.
- iv. The aggregates Gradation did not fit in a corresponding SATCC envelope.
- v. The PSD does not match SATCC specs. The ACV of 35 was too large, compared to <25% for a sound rock.

f. Reconstruction and Realignment of Luwingu to Kasama Road M3

In paragraph 10 of the Report of the Auditor General for 2005 on the Administration of selected contracts in the Ministry of Works and Supply, mention was made of the award of a contract to Messrs Sable Transport and Construction Ltd for the reconstruction and realignment to Class 1C Standard of the Luwingu to Kasama road.

On 25 February 2008, the Zambia National Tender Board (ZNTB) granted Roads Development Agency (RDA) authority to terminate the initial contract with Messrs Sable Transport and Construction Limited and negotiate a new contract for the works at a contract sum of K192,965,237,010 with a completion period of 18 months. The contract was signed on 14th September 2008 and was to start on 28 September 2008 and end on 22 March 2010. The new contract was designed to remove compound interest charged on delayed payments, provision of the Kwacha currency and the inclusion of the SATCC price adjustment formula.

The scope of work comprised the reconstruction and realignment to class 1C Standard of 96 Km of clearing and grubbing; clearing and grubbing; installation of 10, 40 and 53 numbers of 600mm, 750mm and 900mm diameter culverts respectively.

Messrs Brian Colquhoun Hung O'Donnell and Partners was engaged in January 2009 to supervise the project for a period of eighteen (18) months.

As of October, 2009 a total of K45,898,477,106 had been paid to the contractor and 30% of works had been completed.

The following were observed:

i. Delayed interest

Inspection of documents indicated that RDA incurred cumulated interest expenses totalling US\$13,699,279.94 due to delayed liquidation of interim payment certificates as they fell due. This was an increment of US\$5,323,672 from US\$8,375,608 accumulated up to June 2005 mentioned in paragraph 10 of the Auditor General's Report for 2005 on the administration of selected contracts in the Ministry of Works and Supply.

ii. Performance bond

Contrary to clause 52 of the contract which required the contractor to submit a performance bond covering the contract period of 18 months, the contractor submitted a bond covering 12 months.

iii. Late Engagement of the Consultant

Although the contractor commenced work in September 2008, the consultant was only engaged on 5 February 2009, five months after the works had commenced. In this regard, during this period, the contractor worked without adequate supervision and five (5) interim payment certificates (IPC) in the sum of K27,752,514,074 were processed without the involvement of the consultant.

iv. Failure to Surrender Project Assets

Contrary to the terms of the contract, the contractor failed to surrender project assets to the Agency upon termination of the initial contract. In particular, five (5) motor vehicles and survey and Laboratory equipment costing US\$229,500 had not been surrendered by the contractor as of September 2009.

v. None Adherence to Contract Specifications

Base course is the main bearing layer of the pavement. In the tests carried out, the thickness of layers were lower than what was specified in some cases. It was observed that all four (4) samples for base course thickness did not meet the specified 150 mm. They measured 120mm (km116.9), 110mm (km33.56RHS), 120 mm (km33.36) and 140mm (km23.6).

It is evident from the results obtained from the tests that the contractor did not meet the specifications prescribed in the contract despite the Agency having engaged a supervising consultant at a cost of K5,998,606,391.

g. Periodic Maintenance of Senga Hill to Chinakila Road

On 5th August 2008, the Zambia National Tender Board (ZNTB) conveyed its authority to the Agency for the award of a contract to China Geo Engineering Corporation Limited for a periodic maintenance of the Senga Hill to Chinakila Road at a contract sum K10,870,768,398 for a period of four (4) months. The Contract was signed on 12th August 2008 and was to start on 30th August 2008 and end on the 30th December 2008. The scope of works comprised the reshaping of the carriageway, re gravelling, and grading and vegetation control of the road of the Lot 9 with a length of 44.5kms. It also included the installation of 37 of 900mm diameter new culverts and 15 road signs. On 19th March 2009, the scope of works was varied to include a bypass stretch of 2km in amounts totalling K1,085,505,960 whilst the project period was extended by one (1) month. The project was supervised by the RDA Regional Engineer for Northern Province.

As of October 2009, a total of K10,569,505,830 had been paid to the contractor representing 97% of the contract sum.

The following were observed:

i. Lack of Completion Certificate

Although the contractor had demobilised, no certificate of completion had been issued as of September 2009.

ii. Physical verifications

A physical inspection of the road revealed that although the contract specified a width of 6.1m, measurements taken at km 2.95, km 10.00 and km 20.00 revealed that the contractor did not meet the specifications along the entire road in that at the sampled points, the road had a width of 4.9m, 6.4m and 5.5m respectively.

h. Periodic Maintenance of (D56) Safwa to Chinsali

On 5 August 2008, the Zambia National Tender Board (ZNTB) conveyed its authority to the Agency for the award of a contract to Messrs Sable Transport Limited for the Periodic Maintenance of the Safwa to Chinsali Road (125 km) at a contract price of K27,424,786,004 with a completion period of eight (8) months. The contract was signed on 20 August 2008 and was to start on 28th August 2008 and end on 25th April 2009. The scope of work comprised road formation; clearing and grubbing; gravelling and re-gravelling and installation of 900mm (46) and double pipe 900mm (3) culverts respectively. The project was supervised by the Northern Province Regional Engineer under RDA.

As of October 2009, K9,810,466,434 had been paid to the contractor and 64 km out of the 125km contracted had been done representing 44% of the total works.

The following were observed:

i. Variations and Extension of Time

According to the contract the completion date was 8th May 2009. On 6th May 2009, the contractor requested for an extension of 130 days due to heavy rainfall. However there was no evidence that RDA approved the extension. No liquidated damages had been charged on the contractor despite the delay.

ii. Unaccounted for Supervision Funds

Out of the K132,000,000 claimed by the contractor in respect of funds paid to the Agency for supervision allowances, maintenance and service of engineers vehicles, fuel and other miscellaneous expenses as provided in the contract, only K27,949,712 had supporting expenditure details leaving a balance of K104,050,288 unaccounted for.

**AUDIT HOUSE
HAILE SELASSIE AVENUE
LUSAKA
21 March 2010**

**ANNA O CHIFUNGULA FCCA, FZICA
AUDITOR GENERAL
REPUBLIC OF ZAMBIA**