Support to the Transport Sector Development Programme

Lot 1. Support to the AUC Department of Infrastructure & Energy in transport policy harmonization & transport sector services development & Support to PIDA PAP for the start-up of smart corridor activities

Maintenance of Road Corridors; Performance Based Contract Experience and Private Sector Involvement

-September 2016-

NTU International A/S in consortium with Louis Berger S.A.S.

REPORT COVER PAGE

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Country:	Sub-Saharan Africa
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Maintenance of Road Corridors; Performance Based Contract Experience & Private Sector Involvement

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LIST OF ACRONYMS	
AASHTO	American Association of State Highway and Transportation Officials
ACP	The African, Caribbean and Pacific Group of States
AfDB	African Development Bank
ALCO	Abidjan-Lagos Corridor Organization
AM	Asset Management
ANE	National Road Administration of Mozambique
AU	African Union
AUC	African Union Commission
BoQ	Bill of Quantities
CC	Central Corridor
CCTTFA	Central Corridor Transit Traffic Facilitation Agency
CEMAC	Central African Economic and Monetary Community
CMI	Corridor Management Institution
COMESA	Common Market for East and Southern Africa
DBMOT	Design, build Maintain, Operate, Transfer
DCE	Centre pour le Développement des Entreprises
EAC	East African Community
ECCAS -	Economic Community of Central African States
ECOWAS -	Economic Community Of West African States
EMP	Environmental Management Plan
EU	European Union
FIDIC	International Federation of Consulting Engineers
HSMP	Health & Safety Management Plan
ICT	Information and Communications Technologies
LB	Louis Berger
NC	Northern Corridor
NEPAD	New Partnership for Africa's Development
OPRC	Output-and Performance-based Road Contracts
PBC	Performance Based Contract
PMMR	Performance-based Maintenance and Management of Roads
PPDA	Public Procurement and Disposal of Public Assets Authority
PPP	Public – private partnership
PIDA PAP	Programme for Infrastructure Development in Africa, Priority Action Plan
QAP	Quality Assurance Plan
RECs	Regional Economic Community(ies)

SADC	Southern African Development Community
SANRAL	South African National Roads Agency
SC	Smart Corridor
SLC	Service Level Criteria
SSA	Sub-Saharan Africa
SSATP	Sub-Saharan Africa Transport Policy Program
STE	Short Term Expert
ToR	Terms of Reference
TMP	Traffic Management Plan
TTFE	Trade and Transport Facilitation Expert
UNRA	Uganda National Roads Authority
WAEMU	West African Economic and Monetary Union

Contents

Executive Summary

Aim

This report forms part of the "SUPPORT TO THE TRANSPORT SECTOR DEVELOPMENT PROGRAMME" which aims to strengthen Africa-wide capacity to achieve improved inter-regional and continental transport infrastructure and services. Specific aims of the report are:

- Define and describe Performance Based Contracts;
- Identify and discuss potential strengths and weaknesses of Performance Based Contracts and against these findings assess the experiences of Performance Based Contracts on road maintenance in Africa and elsewhere;
- Examine the lessons learnt from Performance Based Contracting case studies and recommend solutions for the improvement of maintenance along corridors;
- Define a possible framework for the involvement of the private sector in road maintenance along corridors.

Definition and Description

A Performance Based Contract is a type of contract in which **payment for the deliverable is explicitly linked to the Contracting Entity's successful meeting or exceeding certain clearly defined performance indicators.**

Put another way a Performance Based Contract is a contract where the Contracting Entity is paid a specified sum for producing a detailed output or outcome, sometimes referred to as meeting Service Level Criteria.

It is important to understand the fundamental differences between a 'traditional' civil engineering contract, such as those following FIDIC procedures and a Performance Based Contract.

The World Bank has been an advocate of Performance Based Contracts for the road sector for over 15 years and has produced sample bidding documents and a web based Resource Guide. The World Bank refers to Performance Based Contracts of road maintenance as Output and Performance Based Road Contracting, which is just one type of Performance Based Contract.

A key characteristic of Performance Based Contracts is the unique risk profile associated with this type of contract. It is very important that this risk profile is understood not just by the parties to the contract but all project stakeholders.

Under a Performance Based Contract the Contracting Entity is able to establish his own best business and engineering practice, possibly involving innovative techniques and methods of working. What may be lacking and is a potential drawback in the early stages of Performance Based Contract use is the availability of quality information. This can be addressed to a degree by carful drafting of bidding documents but a long term view may have to taken of economies to be gained through use of Performance Based Contracts.

Strengths and Weaknesses

It is difficult to separate the strengths and weaknesses of Performance Based Contracts from those of good Asset Management generally. There are four consistent themes:

1. **Improved workmanship.**
2. **Delivery of consistent Levels of Service on the road and road users becoming aware of what is reasonable to expect.**
3. **Less corruption through far fewer financial transactions and commitment to levels of service.**
4. **Focus on innovation and sharing of risk.**

Potential reduction in cost is a theoretical advantage of Performance Based Contracts but no data exists from any of the projects examined to show this in practice. Different levels of service before and after project implementation and the cost of any initial work to bring the road to maintainable standard make any straightforward cost comparison impossible.

It is certain that initial prices for any new form of contract will be higher than they can be expected to be once all parties are familiar with the risks and rewards.

Further identified benefits of Output and Performance Based Road Contracting are:

A. **Guarantees workload for consultants and Contracting Entities over longer period**

B. **Opens opportunities for business growth**

C. **Reduces road rehabilitation**

Performance Based Contract implementation can be defined on three stages, each with it is own challenges:

Phase 1 – Institutional Change

Performance Based Contracts require a step change in thinking by all stakeholders in the Asset Management equation. Contracts which fail usually don't make it to the delivery phase because of a lack of understanding or will to implement change within the funding agencies and public sector institutions.

Public sector institutions involved in the financing and management of road maintenance, such as the Ministry of Finance, road funds, and road agencies need to be convinced that Performance Based Contracts have the potential to be more effective and efficient than conventional road maintenance contracts.

Consultants and contractors also need to understand the concept of Performance Based Contracts and the role they play in this new contracting scheme and what skills and management systems they need to deal with the new requirements.

Phase 2 – Promotion

Donors need to promote the use of Performance Based Contracts and to highlight their potential advantages. This is a role AUC can very usefully play.

Sector related associations, most notably SSATP should also play a key role in promoting Performance Based Contracts. Countries need to enter into the use of Performance Based Contracts with a full understanding of the implications of their use and the SSATP could provide this platform

Hard evidence should be presented (when it is available) to show the costs savings that can accrue over time with the use of Performance Based Contracts. This must be based on African experience and deal with whole life costs. It should not discuss Performance Based Contracts as a panacea but as an alternative which given the right conditions could dramatically reduce the long term costs of sustaining the road network and improve its condition.

The above recommendations and conclusion highlight the work that needs to be done in order to provide convincing evidence of the worth of Performance Based Contracts. This will require the faith of organisations prepared to invest in promotion and implementation.

Phase 3 – Management and Monitoring

There are six recommended steps to Performance Based Contract implementation:

1. Design

   Often referred to as the Conceptual Design this should consist of basic parameters which define the finished product. The Contracting Entity is then required to carry out a detailed design as part of the PBC to meet these parameters.

2. Pre-qualification of Contracting Entities (and Consultants)

   This step is not essential but is highly recommended; particularly where/when the concept of PBC is new.

3. Tendering and award of contract for works

   This step is not too dissimilar to the process of tender traditional forms of contract but again there is an opportunity to educate the bidders.

4. Tendering for contract supervision (Monitoring)

   It may be possible or even preferable to employ the same consultant through the process from Conceptual Design and production of bidding documents to implementation and project completion.

5. Implementation

   It is recommended, particularly where there is little or no experience of implementing Performance Based Contracts within the employers organisation, that a consultant be appointed to assist with the process and to provide training to the employers staff.

6. Monitoring and evaluation.

   A qualified consulting firm should assist the implementing agency (employer), in implementing these six steps. A separate consultancy from that to Monitor the implementation could operate as a Technical Assistance contract to the client and allow for the formulation of multiple PBC, drawing on experience gained with each contract.

Analysis of the Strengths, Weaknesses, Opportunities and Threats of PBCs for road rehabilitation and maintenance are presented in the figure below:

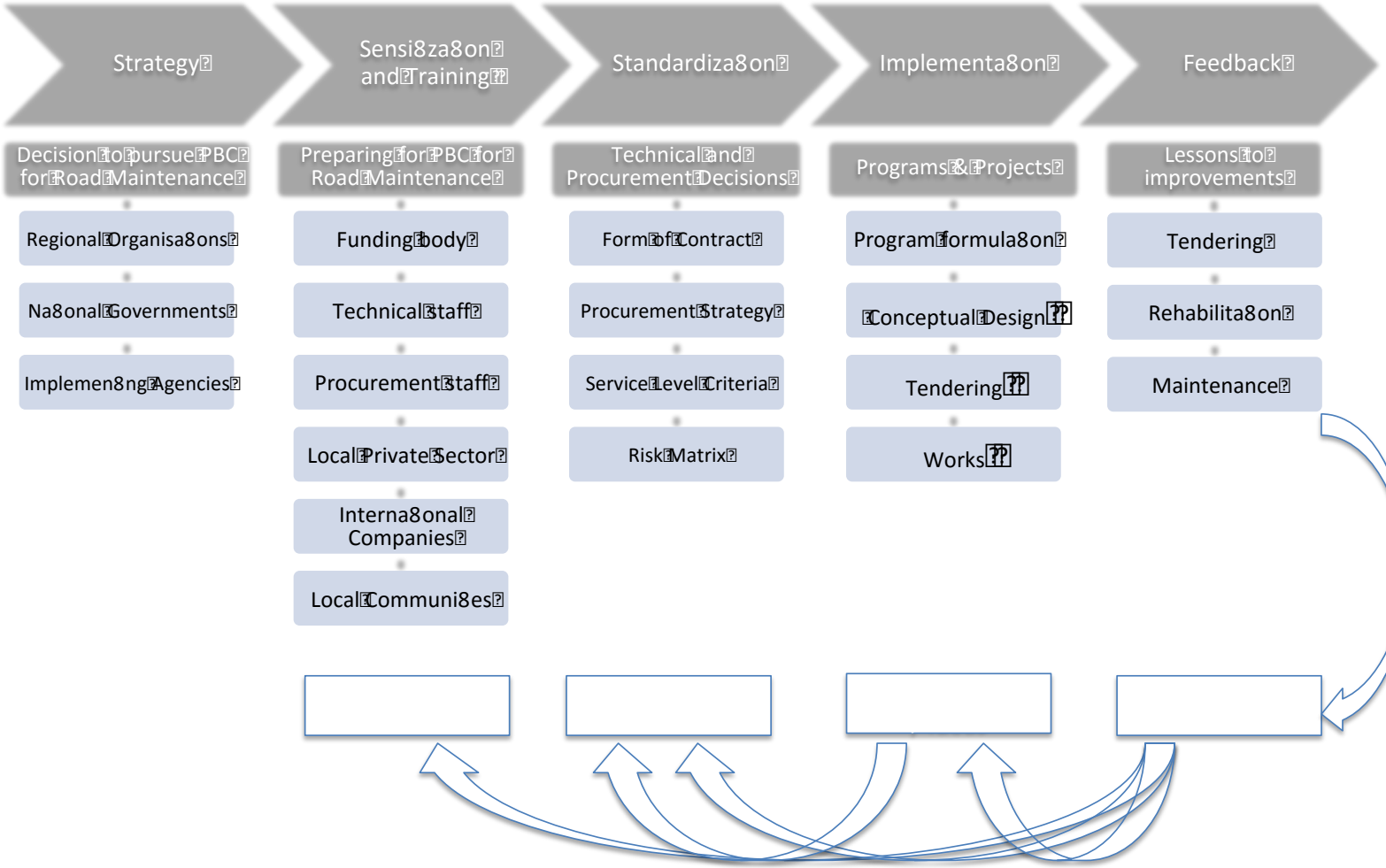
Strengths	**W**eaknesses
Improved levels of service on the road; long term maintenance to a consistent standard**.** **Reduced corruption;** through fewer transactions and local oversight. **Preservation of asset value;** no need for future rehabilitation works. **Reduction in whole life cost;** regular maintenance means less maintenance. **Guaranteed long term workloads;** local & international contractors will be attracted and retained.	**New form of contract;** training required for all stakeholders. **Absence of legislation;** new laws may be required to allow for multiyear funding and/or new form of contract. **World Bank Contact Template is poor;** contains inconsistencies and omissions, requires careful use when drafting a contract, possible updating.
Opportunities	**T**hreats
Growth of local contracting industry; regular guaranteed income allows for investment and growth. **Local Employment;** many maintenance tasks can be labour based. **Ring-fencing of maintenance budget;** multi-year contract commitments may make it harder of politicians to divert funds from maintenance.	**Resistance to change;** vested interests perceived to be under threat. **Lack of local contracting capacity;** possibly no responsive tenders received or prices above estimates. **Poor performance by Contractors;** leading to erosion of advantages gained through PBC. **Inconsistent assessment of Service Level Criteria;** Monitoring Consultants unfamiliar with maintenance requirements or in collusion with Contractor.

Lessons Learnt and Recommendations

Throughout the case studies examined there are consistent themes, which closely align with the experience of the author in implementing PBC on roads in Sub-Saharan Africa (SSA).

- At all levels the client agency MUST fully understand Performance Based Contracts and all the implications this entails.
- The client agency and all other government stakeholders MUST be committed to the implementation of Performance Based Contracts for road maintenance.
- Performance Based Contracts CAN be effectively used on both rural gravel and major asphalt roads requiring initial rehabilitation and improvement which may constitute a significant proportion, more than 50%, of the total contract price. In these instances the contract should be written such that significant profit is not realised until the maintenance phase to ensure that the Contracting Entity does not walk away from the maintenance phase.
- Performance Based Contracts MUST be very carefully written by people with experience who fully understand the needs of the client and the capabilities of the expected/desired Contracting Entities.
- The allocation of risk should be clearly defined and the contract must include conditions and specifications which account for this allocation.
- Appropriately experienced Monitoring Consultants should be engaged before the works contract is awarded.
- Contracting Entities need to be continually educated about the Performance Based Contracting philosophy and senior management kept informed of failings at site level which will have an impact on future maintenance costs.
- Contracting Entities designers should have an element of responsibility for ensuring that their designs are implemented in accordance with a well defined Quality Assurance procedure.
- It is in the Contracting Entities interests that designs are carried out with maintenance in mind.
- It is too early within the African context to say what cost savings are likely to accrue from the use of PBC, although experience from other regions suggests that 25% over traditional forms of maintenance contract could be expected.
- Costs will be higher initially due to an absence of data upon which a Contracting Entity can base their bid.
- Costs will fall as all stakeholders gain experience in this form of contract and CEs innovate in terms methods of working and maintenance orientated design.

Framework for Introduction of PBC and Private Sector Involvement



1. Project Background and Introduction

1.1 The project

"Support to the African Union Commission Department of Infrastructure and Energy in transport policy harmonization and transport sector services development & Support to PIDA PAP for the start-up of smart corridor activities" is part of the larger intervention, "SUPPORT TO THE TRANSPORT SECTOR DEVELOPMENT PROGRAMME" which is financed by the EU under the 10th European Development Fund Intra-ACP – Envelope. The African Union Commission in Addis Ababa (Ethiopia), as a privileged partner of the European Union, is the Contracting Authority for the Project, which is being implemented by NTU in consortium with Louis Berger, hereinafter referred to as the "Consultant".

The programme is set to contribute to strengthening of Africa-wide capacity to achieve improved inter-regional and continental transport infrastructure and services through "*interconnectivity*" across regions by "*promoting safe, environmentally friendly, affordable, reliable and secure trans-boundary transport corridors and harmonized transport policies*".

Support to the Transport Sector Development Programme aims at supporting the transport sector development in the ACP group of states with a focus on sub-Saharan Africa. African leaders widely acknowledge that, if Africa is to realize its growth potential and participate in the global economy, it must develop the infrastructure system necessary for a more integrated transport network that supports regional integration.

The Implementation of the Support to the Transport Sector Development Programme includes two contract lots:

- Lot 1: "Support to the Department of Infrastructure and Energy of the African Union Commission in the fields of transport policy harmonization and transport sector and services development; and PIDA PAP for the start-up of smart corridor activities";
- Lot 2: Editing and publishing of comprehensive transport sector guidelines for ACP countries.

Both lots are being implemented by the same consortium. The present report relates to Lot 1.

The activities to be conducted under lot 1 aim at enabling the AUC Department of Infrastructure and Energy to increase its sector management capacities and at facilitating the implementation of PIDA PAP projects.

1.2 The aim of this report

The objectives of the Short Term Expert in Road Maintenance, as part of this Technical Support Programme, are:

- Define and describe Performance Based Contracts (PBC);
- Identify and discuss potential strengths and weaknesses of Performance Based Contracts and against these findings assess the experiences of PBC including Output and Performance-based Road Contracts (OPRC) on road maintenance in Africa and elsewhere;
- Examine the lessons learnt from Performance Based Contracting case studies and recommend solutions for the improvement of maintenance along corridors, considering both the Smart Corridors (SC), as detailed elsewhere in the Technical Support output, and road corridors within Africa in general;
- Define a possible framework for the involvement of the private sector in road maintenance along corridors.

1.3 The approach

This report has been prepared to fulfil the Terms of Reference (TOR) of the Short Term Expert in Road Maintenance, which are included as Appendix A. These TOR were further clarified by meetings between the Expert and Dr Maurice Niaty-Mouamba, Transport Engineering Consultant AUC, Mr. Hachemi Briki, Road Engineer NTU/LB and Mr. Godwin Punungwe, Trade and Transport Facilitation Expert NTU/LB on 20th May 2016 at the AUC in Addis Ababa. Following the meetings the STE prepared Notes on the Terms of Reference, which are included as Appendix B.

This report is based on a literature review of papers and reports focusing on performance based road maintenance contracts. These documents include project reviews of specific PCBs, desk studies of numerous PBC reports, World Bank (WB) published guides to the use and best practice of PBC and WB sample contract documents. In addition the STEs own opinions are expressed based on experience in both preparing PBC documents and implementing PBC road rehabilitation and maintenance.

2. What are Performance Based Contracts?

2.1 Definition of a Performance Based Contract (PBC)?

A PBC is defined as "a type of contract in which payment for the deliverable is explicitly linked to the Contracting Entity's successfully meeting or exceeding certain clearly defined performance indicators" (Stankavich, Qureshi, & Queiroz, 2005).

To expand on this definition a PBC can simply be described as one where the Contracting Entity is paid a specified sum for producing a detailed output or outcome, sometimes referred to as meeting Service Level Criteria (SLC). Examples of service level criteria are given in **Appendix A**. This differs from a traditional Civil Engineering contract where the Contracting Entity is paid for his specific inputs based on a Bill of Quantities derived from a design.

It is important to understand the fundamental differences between a 'traditional' civil engineering contract, such as those following FIDIC procedures and a PBC. These are detailed in the table below which includes aspects of a contract for both initial rehabilitation/improvement works and subsequent maintenance.

PARTIES TO THE CONTRACT	
FIDIC Type Contract	**Performance Based Contract**
The Employer; Signs the contract, pays the Contracting Entity. **The Contractor;** Constructs the works in accordance with the detailed design and specifications. **The Engineer (Supervision Consultant);** Supervises the Contractors work, issues instructions, certifies payments.	**The Employer;** Signs the contract, pays the Contracting Entity. **The Contracting Entity;** Carries out the tasks of design, construction and asset management. **The Project Manager (Monitoring Consultant)**; Monitors the CEs work, highlights areas of concern and recommends actions for improvement. Reports to the Employer, recommends approval of designs, procedures and reports, certifies payments.
DESIGN (FOR REHABILITATION / IMPROVEMENT)	
FIDIC Type Contract	**Performance Based Contract**
The Contractor is provided with a design, carried out usually by a third party or the employer himself, which prescribes in detail what is to be constructed.	The Contracting Entity is provided with a **Conceptual Design** and design guides / standards to be followed and is required to carry out the detailed design. The design must be approved by the Employer, based on the Monitoring Consultants recommendation. This provides opportunity for the CE to take into account his own maintenance requirements / procedures during the design stage.

CONSTRUCTION (REHABILITATION / IMPROVEMENT)	
FIDIC Type Contract	**Performance Based Contract**
The Contractor carries out his construction activities under the **constant observation** of the Supervision Consultants experienced staff. Testing is carried out as detailed in the specifications by the Contractor for his own quality control AND by the Consultant for the purpose of certifying the works. Any deficiencies observed are communicated to the Contractor along with a Contractually binding Instruction to remedy the deficiency / defect. Any work not carried out to the correct specification is not paid for.	The Contracting Entity carries out construction activities in accordance with his own Quality Assurance Plan (QAP), Traffic Management Plan (TMP), Environmental Management Plan (EMP) and Heath & Safety Management Plan (HSMP), which are all approved by the employer on the recommendation of the MC. The QAP must clearly describe the systems, procedures and methods that will be used to deliver and monitor compliance to the SLC. Testing is carried out ONLY by the CE, again following the QAP. The Monitoring Consultant carries out random checking of the CE's work methods and testing procedures / results. Any deviation from the design, QAP, TMP, EMP or HSMP are reported to the employer and the CE for rectification.
PAYMENT FOR CONSTRUCTION	
FIDIC Type Contract	**Performance Based Contract**
The Contractor is paid, usually monthly, based on the amount of work carried out. This is measured and agreed jointly by the Supervision Consultant and the Contractor using the rates in the Bill of Quantities.	The Contracting Entity is paid upon completion, usual of a pre-defined section of the road, to the required Service Level Criteria. The amount paid is a proportion of the lump sum price for Rehabilitation / Improvement as defined in the Contract. This is NOT necessarily the CEs price for Rehabilitation / Improvement but a prescribed percentage of the total project price.
DEFECTS LIABILITY	
FIDIC Type Contract	**Performance Based Contract**
A Defects Liability Period is stipulated in the Contract, usually of 12 months. During this period any defects in the works which become apparent must be remedied by the Contractor before release of the retention money, commonly 5% of the contract price.	The World Bank template for OPRC still includes a Defects Liability Period and a retention amount for this purpose but it can be argued that in this type of contract it is irrelevant as the CE is already responsible for maintaining Service Levels. There is cost to the employer of this retention.

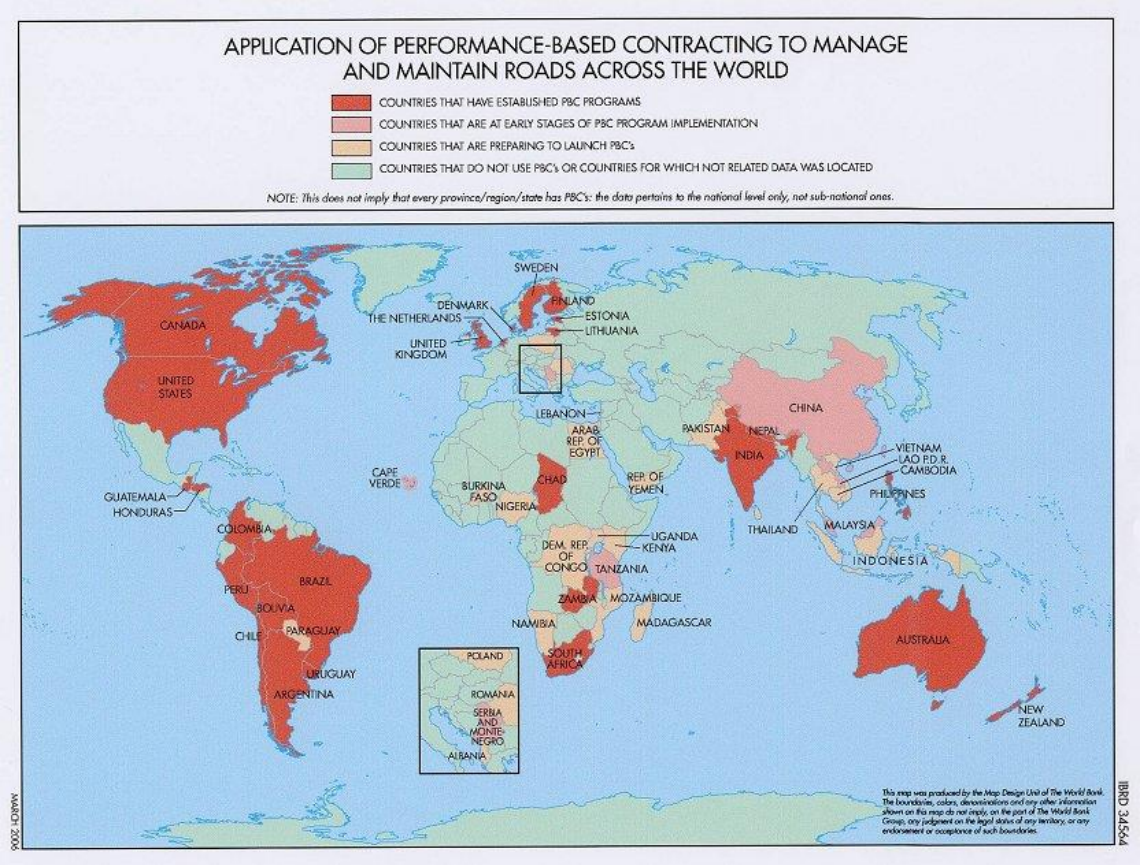
MAINTENANCE	
FIDIC Type Contract	**Performance Based Contract**
Maintenance is not usually combined with construction (rehabilitation or improvement) works under FIDIC contracts. This is because they require a completely different set of specifications, conditions of contract and bill of quantities. This would make a combined contract large and cumbersome to administer. Maintenance only contracts under FIDIC procedures are not uncommon and follow the same format as construction, using specifications for performing the work and testing, under constant supervision. A maintenance contract includes provision for emergency work, routine and periodic maintenance. Any type of maintenance works requires a formal instructions from the Supervision / Management Consultant who constantly monitors the condition of the asset against specifications.	The Contracting Entity carries out Routine Maintenance ensure the asset always meets the specified Service Level Criteria. He does this by following his own procedures for scheduling and performing any work needed. The Monitoring Consultant observes the condition of the road and notes non-compliances with the SLC. For Routine Maintenance the results of Informal inspections by the MC during the course of a maintenance period are communicated to the CE for his information / action on non-compliances. Any non-compliances observed during joint Formal Inspection at the end of each period result in reductions to the routine maintenance payment. Emergency works are instructed by the MC as required and must be performed by the CE in accordance with the specifications and his own approved procedures. The CE has to design the Periodic Maintenance intervention to provide the asset with a specified residual life at end of the contract. The design is approved by the employer on the recommendation of the MC.
PAYMENT FOR MAINTENANCE	
FIDIC Type Contract	**Performance Based Contract**
The Contractor is paid, usually monthly, for all items of work instructed by the Supervision Consultant and satisfactorily carried out by the Contractor. Measurement of the work is done jointly and paid at rates in the BoQ.	The Contractor is paid quarterly for Routine Maintenance. The lump sum included in the contract for Routine Maintenance, which is a specified percentage of the overall lump sum, is divided by the number of quarters in the maintenance phase. Based on a table of unit rates for non-compliances in the specification, see **Appendix B** for an example, deductions are made to each payment in accordance the results of the Formal Inspection. Emergency Works are measured jointly paid at rates included in an Emergency Works BoQ. Routine Maintenance is paid in a similar manner to Construction, when specified sections are completed to the relevant SLC payment is made.

The World Bank (WB) has been an advocate of PBC for the road sector for over 15 years and has produced sample bidding documents (in 2002 and 2006) and a web based Resource Guide (in 2005) to promote and facilitate their use (Gericke, Henning, & Greenwood, A Guide to Delivering Good Asset Management in the Road Sector through Performance Based Contracting, 2014).

The WB refers to PBC of road maintenance as Output and Performance Based Road Contracting (OPRC), which is just one type of PBC.

This report will examine and analyse the theoretical literature relating to PBC as it applies to Africa in general and documented experiences of the formulation and implementation of PBC for road maintenance.

Performance-based Contracting to Manage and Maintain Roads Across the World (World Bank 2006)



2.2 Types of Performance Based Contract for Road Maintenance

There are several types of PBC which have differing names and acronyms, slightly varying contract documentation and which are applicable in a variety of situations. The WB defines three types of PBC applicable to road maintenance in different situations: (Gericke, Henning, & Greenwood, Review of Performance Based Contracting in the Road Sector - Phase 1, 2014)

- Network Management

  For roads in stable conditions with sections in varying stages of the life cycle. The contract will involve delivery of maintenance services approximately evenly across the network with no initial rehabilitation required.

- Design, Build, Maintain, Operate and Transfer (DBMOT)

  For road corridors which are currently in poor condition and are therefor not economically maintainable. These roads require initial rehabilitation before, still done on an output basis to a set of performance criteria, before a maintenance stage using the same or similar criteria.

- Unpaved Roads

  Unpaved roads are given their own category of PBC by the WB due to the different risk models involved and the lower cost of entering the market for Contracting Entities. These contracts can be of a Network Management or DBMOT type.

This report considers all types of PBC applicable to Road Maintenance but focuses on those most likely to be applicable to the maintenance of the Smart Corridors and the types of situation likely to be encountered.

3. Why Performance Based Contracts?

Performance Based Contracts have been around for a number of decades in various forms in both developed and developing countries. They are often associated with and referred to at the same time as Asset Management (AM).

AM is defined by the American Association of State Highway and Transportation Officials (AASHTO):

"Transportation Asset Management is a strategic process of operating, maintaining, upgrading and expanding physical assets effectively throughout their lifecycle. It focuses on business and engineering practices for resource allocation and utilization, with the objective of better decision making based upon quality information and well defined objectives" (AASHTO, 2011)

This definition is very useful in highlighting certain fundamental principles which are often overlooked by Road Authorities. These are:

1. Asset Management is a **process** which encompasses **operation** and **maintenance** but also **upgrading** and **expansion** when required. No mention is made of **rehabilitation** although for the purposes of PBC this may be included and will be discussed further in other sections of this report. The process should be effective throughout the lifecycle of the asset.
2. Asset Management involves both **business** and **engineering** practices, both of which must be effective to achieve the required objectives.
3. Asset Management requires **well defined objectives** and **quality information** to allow for effective decision making.

The three principals discussed above **must** be central pillars of any road maintenance policy. This policy should dictate contract formulation and operation and PBC are a good route to ensuring this is the case. PBC contracts allow a Road Authority to define objectives (service level criteria) that will dictate the operation, maintenance and even upgrading and expansion requirements.

A key characteristic of PBC is the unique risk profile associated with this type of contract. It is very important that this risk profile is understood not just by the parties to the contract but all project stakeholders.

Under a PBC the Contracting Entity is able to establish his own best business and engineering practice, possibly involving innovative techniques and methods of working. What may be lacking and is a potential drawback in the early stages of PBC use is the availability of quality information. This can be addressed to a degree by carful drafting of bidding documents but a long term view may have to taken of economies to be gained through use of PBC.

3.1 Theoretical Advantages of Performance Based Contracts

In a review of PBC implementation (Gericke, Henning, & Greenwood, Review of Performance Based Contracting in the Road Sector - Phase 1, 2014) the authors reviewed the performance, good and bad, of 35 PBC in 13 different countries. Seven of these projects were in Africa, in six different countries; Botswana, Chad, Nigeria, Tanzania, Liberia and Zambia. Of the 35 projects examined 5 never reached the implementation stage and the reasons for this are examined. All seven of the African projects had reached the implementation stage, five being on-going at the time of the study. Six of the African projects were/are World Bank funded.

The authors of the report noted that it was difficult to separate the strengths and weaknesses of PBCs from those of good Asset Management generally. However they noted that the review highlighted four consistent themes:

1. **Improved workmanship.**

   This was noted as being due to the Contracting Entity being financially liable for defects, over an extended period of time. This would be a theoretical advantage but for it to be born out in practice requires a number of caveats;

   - The Contracting Entity must have a full understanding of the workings of the PBC and know what the financial implications are. This is not necessarily the case when PBCs are first introduced and the experience all parties involved is very limited.
   - The Contracting Entity's management must be able to communicate the importance of maintaining a high level of workmanship to those on site (foremen) and implement their own effective Quality Control. This can be difficult when foreman, and management, are used to the usual contractual arrangement of independent supervision ensuring quality. A complete cultural change is required within contracting organisations.

2. **Delivery of consistent Levels of Service on the road and road users becoming aware of what is reasonable to expect.**

   Contacts should be structured such that a proportion any rehabilitation costs are only recouped during the extended maintenance phase. This ensures that the Contracting Entity must remain committed to meeting the SLC consistently in order to recover costs as well as maximising profits. Where rehabilitation works are not required penalties for filing to meet SLC should be set at level at which the incentive to the Contracting Entity to meet SLC is high without imposing undue risk which will increase cost.

   It is useful to a road authority for road users to be aware of what level of service it is reasonable for them to expect. The Contracting Entity should be monitored by an independent consultant but feedback from road users can also be useful and contribute to a sense of ownership. In addition road users should be aware of the limits to what the Contracting Entity is expected to provide.

   However, this does take time to achieve and a road user education programme may be required. It is also desirable that road users, and all stakeholders, understand their responsibilities and the contribution they can make to the project. Responsible use of the road will lead to reduced maintenance costs and a longer overall life of the project.

3. **Less corruption through far fewer financial transactions and commitment to levels of service.**

   Whilst fewer transactions minimize the opportunity for corruption they are not reduced to zero. However, the commitment to levels of service mean that it is much more difficult, if not impossible to carry out sub-standard work and 'get away with it'. The results of poor quality work are there for everyone to see and documented financial penalties will result. A commitment to eradicating corruption is however still required from senior executives, PBC are not a panacea for corruption but a tool which can help.

4. **Focus on innovation and sharing of risk.**

   The sharing of risk between the road authority and Contracting Entity, whilst desirable does come at a financial cost. PBCs should reduce cost overruns and the need for variation orders, giving the client greater surety of cost. However, a Contracting Entity will price any risk into his bid and the more uncertain about or unfamiliar with the risk he is the higher the price will be. Inevitable with a new form of contract with more risk sharing between client and Contracting Entity, that is more risk being placed with the Contracting Entity than in traditional contracts, the price of these contracts will be greater, at least in the short-term. As all parties become more familiar with the concepts and practicalities involved prices will come down.

   The focus on innovation which the PBC allows will be to the advantage of the Contracting Entity and allow him to reduce costs. Although again this will require some time for Contracting Entities, used to traditional forms of contract and operating procedures, to realise and implement. This could be accelerated by education and training programmes and by producing tender and contract documents which are clear and unambiguous.

The Gericke et al review did not consider cost as either a strength or weakness of PBC. It was noted that the potential reduction in cost is a theoretical advantage but no data exists from any of the projects examined show this in practice. It was also rightly noted that different levels of service before and after project implementation and the cost of any initial work to bring the road to maintainable standard make any straightforward cost comparison impossible. Despite this most of the projects reviewed claimed objectives of reducing life-cycle costs or increasing value-for-money, although none provided data to support this or that could be used in future comparisons.

It is certain that initial prices for any new form of contract will be higher than they can be expected to be once all parties are familiar with the risks and rewards.

In a study of PBC commissioned by the European Commission (Zietlow & Edmonds, Study of Performance Based Contracts (PBC) for Road Maintenance, 2008) the authors examined how PBC could to contribute to the development of the domestic construction industry in Africa. The specific objective of the study was to develop guidelines for the EU Commission to promote PBC in its support of the maintenance of the roads sector.

The study listed potential advantages of PBC which fall into the 4 themes identified above but additionally worth considering separately, focussing on the potential of PBC to contribute to the domestic construction industry, are:

D. Guarantees workload for consultants and Contracting Entities over longer period

This is undoubtedly the case as PBC run for multi-year cycles, although as noted above the risks associated with a new type of contract mean that this will lead to higher initial prices. Therefore, especially at the introduction of PBC, contract duration should be carefully considered so as to not 'tie-in' the client to high priced contracts for longer than necessary. Consideration should also be given, where a works PBC is ending and a new contract is to be let to stagger the renewal of the consultants monitoring contract to create a continuity of institutional knowledge within the project.

E. Opens opportunities for business growth

A new type of contract, for both Contracting Entities and consultants, provides opportunity for domestic industries to learn and grow. However, the scale and duration of such projects will initially be beyond their current experience and expertise. This was born out by the study teams findings on country visits.

Therefore there will be a preliminary focus on the use of international experience and efforts will be needed to ensure skills transfer to local industries, possibly through a preference for sub-contracting and joint ventures and the use of internships for client personnel and other local staff.

One additional potential advantage listed in the study report but not specifically related to growing the domestic industry or falling neatly into one of the four categories is:

F. Reduces road rehabilitation

This is quite a general statement but comes from experience of the current state of road maintenance practice in Africa.

In their study the authors describe the conventional approach to road maintenance as divided into three components – routine, periodic and emergency maintenance.

Routine maintenance is carried out regularly throughout the year and is intended to ensure that the effect of traffic and water is minimised. It consists of relatively simple tasks and conventionally is carried out either by small or petty contractors or under a lengthman system. Most of the tasks do not require the use of equipment. Periodic maintenance is carried out at set intervals, depending on the type of road being maintained. For an unpaved road this would be every 3-5 years, whereas for a paved road the periodicity would be 5-7 years. The work is more complex and will require the use of equipment. Emergency maintenance cannot be planned for as its name implies. It is executed whenever there is an

unforeseen damage to the road caused by landslides, storms or by the damaging action of a vehicle.

Furthermore the authors state that *conventionally the three elements are carried out independently of each other. That is to say that the petty contractor which is responsible for routine maintenance is unlikely to be involved in periodic maintenance and vice versa. Emergency maintenance by its nature is often carried out by the local road agency if they still have the capacity to do so. This is because arranging a contract for emergency works would take time and the need to solve the problem is immediate*.

Stemming from a lack of available funding in many countries the current practice can be generalised as carrying out a minimum of routine maintenance when funding is available and very little if any periodic maintenance. Thus roads tend to deteriorate relatively quickly to a point where rehabilitation is required for even routine maintenance to be possible.

Whilst performance based contracts vary in their application it is normal for the contractor to be responsible for both routine and periodic maintenance on the section of road for which he is contracted. In fact in this authors experience, in Liberia, the Contracting Entity is also responsible for emergency (maintenance) works, which have a separate budget line within the contract and covers response to and dealing with accidents (removing damaged vehicles and clearing debris, cleaning carriageway) and all associated repair works (guardrail, signs, embankments, drains, carriageway etc). This allows timely response to emergencies as the Contracting Entity is located along the road and has resources readily available. Response time to accidents is one of the service level criteria.

From a technical point of view this has the advantage that the amount of work required for periodic maintenance is related to the efficiency with which the contractor carries out the routine maintenance. As he is paid on a performance basis it is in his interest to establish an effective routine maintenance schedule.

As the PBC includes for routine and periodic maintenance and funding should be available for the extended duration of the contract when the contract ends the road will be in the same condition as it was when any rehabilitation was completed, or when the Contracting Entity took over responsibility for the asset in the case of a road already in good condition. At the end of one PBC, in order to preserve the road, another PBC should be tendered and let to take over management of the asset immediately.

Zietlow and Edmonds did examine the claimed costs savings from the use of PBC outside of Africa and this is worth looking at to assess potential savings.

Cost savings have been achieved in developed as well as other, non-African, developing countries.

Cost savings of different countries under PBC over conventional contracts	
Country	*Cost savings (%)*
Norway	**~ 20-40%**
Sweden	**~ 30%**
Finland	**~ 30%**
Holland	**~ 30-40%**
Estonia	**20-40%**
England	**> 10%**
Australia	**10-40%**
New Zealand	**~ 20-30%**
USA	**10-15%**
Canada	**~ 10-20%**
Argentina	**~ 15%**
Uruguay	**12%**
Source: (Pakkala, 2005) (Zietlow & Edmonds, Study of Performance Based Contracts (PBC) for Road Maintenance, 2008)**.**	

Considerable cost savings of between 10 and 40% have been reported by road agencies that have adopted PBC. However, these savings were reported by applying PBC in developed countries which have a well developed road agencies and contractors, good competition and well documented cost databases. The main drives for reducing cost were incentives, competition, competence, application of new technologies and work procedures, and long-term management.

In Africa such cost savings have not yet been verified. This is not surprising since the history of PBCs in Africa is very short and most of the PBCs are pure routine maintenance contracts and capacity for innovation by the contractors is more limited and contractors face less competition which means that the driving factors for cost savings are less in evidence.

The figures above provide a target for potential future cost savings to be obtained through the use of PBC over conventional road maintenance contracts and methodologies. It is realistic to expect in the region of a 25% discount in the long term, however short term costs are currently unknown, even for carrying out maintenance through traditional methods effectively.

The study did however find some PBC maintenance cost data from two countries of interest, albeit for unpaved roads:

> *Figures for the cost of maintenance from two on-going PBCs that have been studied relate to one contract in Chad and the ten contracts in Zambia all of which are for unpaved roads. This shows a cost per kilometre for routine maintenance of around $2000 per km. This is fairly high if compared with the Roughton study (African Development Bank. 2008) which suggested, based on updating the World Bank's ROCKs data, that an average figure for routine maintenance was of the order of $1300 per km. The ROCKs data are referring to conventional routine maintenance contracts with roads having a lower maintenance standard.*

Routine Maintenance w/o grading $/km	
Zambia	2240
Chad	2005
ROCKs	1300

> *The current application of PBCs in Zambia and Chad exemplifies the difficulty in drawing general conclusions from the on-going work in Africa.*
>
> *In Chad, PBC has been applied on one un-surfaced road, albeit of 441 km length. It was initiated and supported financially by the World Bank which also provided significant technical assistance. The first phase was implemented by an international contractor and monitored by an international consultant. The second phase is being implemented on the same road under two separate contracts by local contractors. The two are financed not from the road fund or from the Road Agency budget but from oil revenues.*
>
> *In Zambia the road agency let 10 contracts for a total of some 3,500 km of un-surfaced roads. Funds were provided from the road fund. Very limited technical assistance was provided either to the Road Agency or the contractors and consultants. There was no prequalification of the contractors.*

The study did also attempted to compare the data above with that available for traditional maintenance regimes but by there own admission there were numerous problems with this approach. There is just not enough like for like data currently available. They did however make the following recommendations:

> *In general roads which should be selected for PBCs should not require major rehabilitation and the contract duration should be long enough to cover at least one maintenance cycle of periodic maintenance. Clearly, funding needs to be assured for the duration of the contract. In addition, initially support needs to be provided to the government agency in relation to the procurement process. Moreover the supervision of the contract should be linked with the start-up of the contract.*

Experience with PBCs which include a significant proportion of rehabilitation works, over 50% of the contract value, have shown that there are no serious problems with this approach. Although the World Bank did at one time not recommended, this that advice has since been withdrawn. The inclusion of significant rehabilitation work, it is usual for the whole of the road to require rehabilitating for reasons discussed above, can actually help to attract Contracting Entities with the resources and experience required to be able to efficiently carry out the maintenance phase.

The danger is that a Contracting Entity will carry out the rehabilitation and then walk away from the maintenance or not perform well enough to meet the Service Level Criteria. This can be mitigated against by stipulating the proportion of the contract price which will be paid during each phase, ensuring that the maintenance phase payments only just allow for cost recovery, or are even below cost, ensuring that the Contracting Entity carries out the maintenance in order to realise his profit.

There is still a possible problem with this approach whereby the site team engaged in the rehabilitation phase will not be responsible for the extended maintenance. This requires the management of the contracting entity to be fully involved and to put in place the required Quality Assurance protocols. This cannot be left to the Monitoring Consultant to ensure unless there is adequate penalty provision in the contract, something which is not addressed in the World Bank standard template for OPRC.

Once there is a history of PBC use within a country and a knowledge base capable of filling Contracting Entity and consultant roles then PBC solely for maintenance of roads is the ideal situation. Where the road network is not in a maintainable condition and where local skill levels are low PBC should be considered for rehabilitation and maintenance.

Practical issues with implementing PBCs in are discussed in the next chapter.

3.2 Practical Issues with Performance Based Contracts

In their study report (Zietlow & Edmonds, Study of Performance Based Contracts (PBC) for Road Maintenance, 2008) the authors defined 3 stages of PBC implementation:

Phase 1 – Institutional Change

Phase 2 – Promotion

Phase 3 – Management and Monitoring

3.2.1 Phase 1 – Institutional Change

The report rightly highlights the fact that the concept of PBC requires a step change in thinking by all stakeholders in the Asset Management equation.

> *The introduction of PBC requires changes within the key stakeholder institutions such as the* [funding agency]*, the public sector institutions in the road sector, and the consulting and construction industry. They need to understand the concept of PBC, the benefits and challenges, and the conditions necessary for the introduction of PBCs, to identify any regulatory and management changes that are needed and to be able to appraise the skills and systems necessary for implementing PBC.*

This was also a key finding of the World Bank review (Gericke, Henning, & Greenwood, Review of Performance Based Contracting in the Road Sector - Phase 1, 2014) which discovered that of the PBC contracts which failed usually they never made it to the start line. That is never making it to the delivery phase because of a lack of understanding or will to implement change within the funding agencies and public sector institutions, rather than with consultants and Contracting Entities charged with implementing the projects.

Zietlow and Edmunds conclude that:

> *To create this understanding in the* [funding agency]*, it is necessary to disseminate and discuss these issues with members ……. which are dealing with road projects.*
>
> *The same principles applies to other aid organisations dealing with road projects in Africa, such as the AfDB, the World Bank and other bilateral donors as well as the "Centre pour le Développement des Entreprises (DCE)", the Association of European International Contractors and other professional associations in Africa, such as AGEPAR, ARMFA, and ASANRA.*
>
> *The public sector institutions involved in the financing and management of road maintenance, such as the Ministry of Finance, road funds, and road agencies also need to be convinced that PBCs have the potential to be more effective and efficient than conventional road maintenance contracts.*
>
> *Consultants and contractors as well need to understand the concept of PBCs and the role they will have to play in this new contracting scheme and what skills and management systems they would need to deal with the new requirements.*

and recommend training courses of varying lengths, between one and three days for the various stakeholders.

3.2.2 Phase 2 – Promotion

The report highlights the need for donors, specifically the EU in their case, to promote the use of PBCs and to highlight their potential advantages. This is a role AUC can very usefully play.

> *The EU Commission as well as other donors and professional road related associations shall continue to take a leading role in conducting seminars and workshops on PBC in Africa.*

The report also recommends sector related associations, most notably SSATP should play a key role in promoting PBCs.

> *What is clear is that countries need to enter into the use of PBCs with a full understanding of the implications of their use. The SSATP could provide this platform.*
>
> *Finally ……, it is important that hard evidence is presented to show the costs savings that can accrue over time with the use of PBCs. This must be based on African experience and deal with whole life costs. It should not discuss PBCs as a panacea but as an alternative which given the right conditions could dramatically reduce the long term costs of sustaining the road network and improve its condition.*

The above recommendations and conclusion are correct and highlight the work that needs to be done in order to provide convincing evidence of the worth of PBC. This will require the faith of organisations prepared to invest in promotion and implementation of PBCs.

3.2.3 Phase 3 – Management and Monitoring

The report (Zietlow & Edmonds, Study of Performance Based Contracts (PBC) for Road Maintenance, 2008) recommends 6 steps to PBC implementation. These steps and the recommendations regarding their execution are examined and expanded upon.

1. Design

   Often referred to as the Conceptual Design this should consist of basic parameters which define the finished product. The Contracting Entity is then required to carry out a detailed design as part of the PBC to meet these parameters.

   Design could also refer to the design of the contract as a whole as a significant amount of important decision making (design) is required when setting Service Level Criteria amongst other aspect of PBCs.

2. Pre-qualification of Contracting Entities (and Consultants)

   This step is not essential but is highly recommended; particularly where/when the concept of PBC is new. This can be done in conjunction with compulsory training whereby the PBC concepts can be carefully explained to those intending to bid.

   It is also recommended that consultants with the relevant experience be employed to assist the implementing agency throughout the whole process. The same consultants can be used to produce the Conceptual Design and tender documents as will assists with all subsequent stages, therefore this would require a prequalification and tender/award prior to step 1.

3. Tendering and award of contract for works

   This step is not too dissimilar to the process of tender traditional forms of contract but again there is an opportunity to educate the bidders. Every effort should be made to make the

tender document as clear and concise as possible but it is inevitable that questions will be raised by bidders. Again these need to be answered clearly and concisely with no ambiguity, which will likely require the assistance of a qualified consultant at least until the agency is familiar with and experienced in the management of PBC.

4. Tendering for contract supervision (Monitoring)

   It may be possible or even preferable to employ the same consultant through the process from Conceptual Design and production of bidding documents to implementation and project completion. The consultant under the World Bank form of PBC is referred to as the Monitoring Consultant as there is no direct supervision of the Contracting Entity. The CE is responsible for self supervision through the application of his Quality Assurance procedures.

   For continuation of PBC on a specific corridor after the initial works contract it is recommended that renewal of the Monitoring contract be staggered with the renewal of the Works contract to allow for continuity of institutional knowledge.

5. Implementation

   It is recommended, particularly where there is little or no experience of implementing PBCs within the employers organisation, that a consultant be appointed to assist with the process and to provide training to the employers staff.

6. Monitoring and evaluation.

Zietlow and Edmunds recommend a qualified consulting firm should assist the implementing agency (client), in implementing these six steps. That is taken as meaning a separate consultancy from that to Monitor the implementation. This is one option, which would operate as a Technical Assistance contract to the client and allow for the formulation of multiple PBC, drawing on experience gained with each contract. It would also for a structured transfer of knowledge to the client. It would also be possible to employ one consultant to take the PBC from formulation to implementation.

For each step Zietlow and Edmunds make recommendations based on the experiences from their examination of projects in South Africa, Zambia, Tanzania and Chad summerised as follows:

Step 1: Design

The following tasks are necessary to design a PBC:

- *Analyzing the legal and financial framework in order to see whether there is a restriction on the length of the contracts that can be let and that enough financial resources are available.*
- *Assessing the capacity and experiences of the road administration and the local contracting and consulting industry to undertake PBC.*
- *Analyzing to what extend foreign consultants and contractors might be necessary to fill a possible capacity gap.*
- *Defining the kind and duration of PBCs and the roads to be included..*
- *Carrying out a detailed technical evaluation, that includes an initial road condition survey, detailed engineering surveys, traffic surveys, materials surveys, etc.*
- *Designing the Tender Documents by:*
  - ❖ *Determining the scope of services and works and the scope of performance criteria of the PBCs.*

- ❖ *Determining and defining adequate management and operational service levels and response times.*
- ❖ *Determining the monitoring, evaluation, payment and incentive system.*
- ❖ *Determining Data Management and Ownership*
- ❖ *Determining Dispute Resolution Mechanism*

- *Estimating the likely costs*
- *Determining the financing and implementation arrangements*
- *Designing the implementation schedule*

Step 2: Prequalification of Contractors

Prequalification of contractors is recommended, except for simple routine maintenance contracts.

The following tasks are necessary for the prequalification of contractors:

- *Determining the prequalification criteria*
- *Organizing workshop for potential bidders.*
- *Carrying out prequalification process and establishing a list of potential bidders*

Step 3: Tendering and Award of Contract for Works and Services

The following tasks are necessary for the tendering and award of the contract for works and services:

- *Preparing and launching Tender Documents*
- *Organizing pre-bid seminar for prequalified bidders*
- *Answering queries / issuing addenda*

***Step 4: Tendering and Award of Contract for Contract Supervision* (Monitoring)**

If it has been decided to employ a consultant for the contract supervision (Monitoring), *a tendering procedure is required. The following tasks are necessary for the tendering for the supervision of contract:*

- *Preparing the Terms of Reference for the contract supervision*
- *Select and hire supervision consultants*

Step 5: Implementation

For countries that have no or little experiences with PBCs it is recommended to employ a coaching and training consultant, except for off road routine maintenance PBCs.

The following tasks are necessary for hiring a coaching and training consultant:

- *Preparing Terms of Reference for a coaching and training consultant.*
- *Selecting and hiring a coaching and training consultant.*

Step 6: Monitoring and Evaluation

Monitoring and evaluation (of) *pilot PBCs is important not only to make sure that the contractors and consultants are performing in accordance with the contract but to learn from the implementation experiences. To give the necessary weight to this task, it is recommended to establish a monitoring and evaluation unit within the client's organization exclusively for PBCs. Coaching and training of the staff of this unit should be undertaken by the coaching and training consultant as well.*

3.2.4 Role of stakeholders in the managing and monitoring of PBCs

Zietlow and Edmunds make some useful points about the role of all stakeholders in PBC road maintenance. Whilst they refer to the European Union Commission all the points made are equally applicable to any donor or funding agency who are interested in promoting PBCs.

The roles of the road agencies, the consultants and the contractors are outlined above while the role of other stakeholders needs to be defined further.

During the implementation the funding agencies shall, besides providing funding, play an active role in monitoring the progress of PBCs as well to make sure that funds are used effectively and efficiently. Especially, in the case of pilot projects the funding agencies too have to be convinced of the benefits of PBCs. Therefore, financial audits shall be supplemented by technical audits with the aim of determining how effective and efficient PBC are with regard to conventional road maintenance contracts. In addition it is recommended that international and national donors should not just help finance pilot projects but if necessary to assist countries for a prolonged period of time until PBCs have been successfully implemented and are sustainable based on local resources only.

Particularly in the case of rural roads, setting up some form of road users committee should be seriously considered. This provides not only a means for the local community to bring its concerns to the contractor but also provides forum for the contractor to explain to the community his plans and expectations. Issues for instance of hiring labourers from the local community rather than from labour brought in from elsewhere, land issues, HIV/AIDS could all be discussed through such fora.

The EU Commission as well as other donors and professional road related associations may also play a role in promoting dialog and exchange of information on the implementation of PBCs in Africa.

3.3 SWOT Analysis of Performance Based Contracts for Road Rehabilitation and Maintenance

Based on the above findings and experience of the author an analysis of the Strengths, Weaknesses, Opportunities and Threats of PBCs for road rehabilitation and maintenance are presented in the figure below:

Strengths	**W**eaknesses
Improved levels of service on the road; long term maintenance to a consistent standard**.** **Reduced corruption;** through fewer transactions and local oversight. **Preservation of asset value;** no need for future rehabilitation works. **Reduction in whole life cost;** regular maintenance means less maintenance. **Guaranteed long term workloads;** local & international contractors will be attracted and retained.	**New form of contract;** training required for all stakeholders. **Absence of legislation;** new laws may be required to allow for multiyear funding and/or new form of contract. **World Bank Contact Template is poor;** contains inconsistencies and omissions, requires careful use when drafting a contract, possible updating.
Opportunities	**T**hreats
Growth of local contracting industry; regular guaranteed income allows for investment and growth. **Local Employment;** many maintenance tasks can be labour based. **Ring-fencing of maintenance budget;** multi-year contract commitments may make it harder of politicians to divert funds from maintenance.	**Resistance to change;** vested interests perceived to be under threat. **Lack of local contracting capacity;** possibly no responsive tenders received or prices above estimates. **Poor performance by Contractors;** leading to erosion of advantages gained through PBC. **Inconsistent assessment of Service Level Criteria;** Monitoring Consultants unfamiliar with maintenance requirements or in collusion with Contractor.

4. Case Studies of the use of PBC for Road Maintenance in Africa

For this examination of the experience and lessons learnt from PBC implementation in Chad, Liberia, Uganda and Zambia the authors participation as Project Manager on two projects in Liberia will be drawn upon. In addition the report (Zietlow & Edmonds, Study of Performance Based Contracts (PBC) for Road Maintenance, 2008) looked at data and experience from PBC projects in Zambia and Chad, amongst others and (Gericke, Henning, & Greenwood, Review of Performance Based Contracting in the Road Sector - Phase 1, 2014) contains information on projects in Zambia, Chad and Liberia. For the Mozambican information (BCEOM, 2007) was referenced.

4.1 Chad

Chad has experience of PBC dating back to 2000, when the term used was Performance-based Maintenance and Management of Roads (PMMR) (hartwig, Mumssen, & Schliessler, 2005) details the experience. In 2000 Chad already had six years experience of private sector involvement in road maintenance through traditional input-based contracts. In early 2001 a 4 year PMMR contract was let for 441 km of unpaved primary roads. The brief paper is very positive in its assessment of the contract (being published by the World Bank as part of a series on Output-based aid this is to be expected) which had not yet been completed. The conclusions reached however are of interest:

- Expected cost savings. This is based on experience in developed countries.
- The possibility of long term sustainability. As is noted elsewhere the output based model and longer term contracts should provide for a more sustainable maintenance policy. However it is noted that donor funding is still likely to be required in the immediately future.
- Donor funding has give the Contractors confidence that they will be paid (presumable leading to a willingness to carryout investment)
- The contracts were let for roads already in fair condition. It is noted that where roads need rehabilitation costing more than 40-45% of the contract value they should first be rehabilitated with a traditional input-based contract (this we certainly the World Bank view at the time but this has since changed, as discussed elsewhere).
- The bidding process included pre-qualification to eliminate the need to evaluate poor quality bids.

The paper further states that the success of the project was encourage the government to consider either retendering the contract or extending the current contract and bringing more roads under PMMR maintenance.

Later documented experience in Chad (Gericke, Henning, & Greenwood, Review of Performance Based Contracting in the Road Sector - Phase 1, 2014) relates to the maintenance of 440km of unpaved roads. A first phase PBC with a value of around US$ 12 million was completed with an international Contracting Entity (French) and a Consultant from Cameroon. A second phase is being undertaken by local Contracting Entities.

It was noted that in the first phase the Contracting Entity did not know how PBC worked. It is presumed this is despite having read the contract document and possible undergone some kind of pre-bid workshop. This is surprising considering that Chad has been using a form of PBC for over 10 years and further highlights the need for some form of training / workshop for all PBC stakeholders.

Despite this the Contracting Entity was reported to have delivered the required Levels of Service on the roads, which were an improvement on those on adjacent roads not subject to PBC. This is not necessarily a direct result on PBC as the adjacent roads may not have had the same level of investment in maintenance but this is not reported.

It is reported that the Contracting Entity was able to solve problems of rain damage in specific areas by the use of localised surface protection, an example of innovation not prescribed in the contract but implemented at the Contracting Entity's own expense as he could see this would save money in the long run. Presumably this even extends into any subsequent contracts not necessarily executed by this contactor. It was also noted that this helped to demonstrate that sealing of gravel roads was not necessary for the level of traffic.

The fact that the Contracting Entity did not know how PBC worked, but did learn during the course of the contract, was noted as indicating that a strong change management process is required. This is certainly true within the implementing agency who must manage their own change as well as that of Contracting Entities and consultants whom they will be engaging.

A further issue noted from the Chad experience was the use of local communities to monitor the performance of the Contracting Entity which reduces the chances of corruption. It is not noted how this was effected, either formally or informally, but is certainly an interesting idea for consideration.

The funding of the first phase was 100% by the World Bank but it is noted that the second phase is being funded by local oil revenues. Interestingly this is separate from the Road Fund, presumably to ensure funding for a multi-year project, although this is not stated. Also the second phase has been split between 2 local Contracting Entities, presumably due to resource or capital constraints. The size of contracts does have to be carefully considered, understanding the capacity of the Contracting Entities the client would like to engage.

Lessons learnt

- All stakeholders, but particularly Contractors / Contracting Entities need to be fully aware of the implications of the PBC form of contract. This may require training / workshops.
- Prequalification of Contractors / Contracting Entities will reduce the time needed for evaluation and can be used as a mechanism for ensure that the understanding of PBC exists.
- A strong change management process is required.
- Innovation by the Contracting Entity during the execution of PBC is feasible, which will have long term benefits for the asset management process.
- Involvement of local communities was perceived to reduce the chances of corruption.

4.2 Liberia

Liberia's experience with PBC started in 2010 with the 80km Cotton Tree - Buchanan highway now called the Diahanblah - Gberzohn highway. This paved road was rehabilitated and then limited maintenance carried out by the Contracting Entity. This was followed up with two contracts of 180km and 70km covering the Red Light to Guinea Border Road, for rehabilitation and then maintenance over a total of 10 years. The Cotton Tree to Buchanan highway was executed by the Contracting Entity who subsequently won the 70km section of the Red Light to guinea Border Road. The author has been employed in monitoring this CE and also the CE currently working on the first 180km stretch.

Funding for the Red Light to Guinea Border Road is through the Liberia Reconstruction and Development Fund which is partly a World Bank loan and partly a multi-donor grant.

The study by Gericke et al was produced too early to draw any conclusions from the PBC experience in Liberia as the Red Light to Guinea Border project was only just commencing so only project data is given. Although the Cotton Tree to Buchanan highway was listed as a PBC the maintenance phase was limited and no information is given in the study as to how the contract was executed.

The two Contracting Entities awarded the contracts on the Red Light to Guinea Border road are Chinese, both of which already worked in Liberia. The CE for the Lot 2 70km stretch having previously completed the Cotton Tree to Buchanan highway which was supposed to be a PBC.

Despite this neither CE actually had a good understanding of PBC at the start of the Red Light to Guinea Border projects. Rather they understood the contract to be design and build and employed independent consultants to carry out their designs. Although unlike Design and build contracts the designers bore not responsibility for the designs, which once they were approved by the client were the responsibility of the CE.

The Rehabilitation Phases then commenced (not at the same time for each Lot) without adequate Monitoring in place. Partly as a result of this and partly because they did not understand the importance of it the CEs paid only lip service to the need for Quality Assurance procedures. As a result construction has been below the standard which would produce the most robust finished road and subsequently maintenance costs, born by the CE, are higher than they might have been. Despite this the CE on Lot 2 (Lot 1 is still in the rehabilitation phase due to problems with possession of site and the Ebola crisis) is meeting the Service Level Criteria.

Implementation of the Rehabilitation Phase, which is a significant proportion, over 60%, of the project value has had numerous issues. The main one being difficulty of the Government of Liberia in implementing Resettlement Action Plans to move illegal construction from the road reserve in order to give the CEs possession of site. Although this is now fully complete on both lots it did cause significant delays to the rehabilitation phases and this was exaggerated by the Ebola crisis. The structuring of the contracts, because of the high rehabilitation costs, is such that full cost recovery only happens during the maintenance phase. This has further increased the financial pressure on the CEs. Despite this, because of the strong financial position of the CEs, they have remained on the projects. This may not have been the case with smaller, less financially robust companies.

It also became apparent during the Rehabilitation Phase that there were a number of inconsistencies with and omissions from the contract document, affecting all phases of the project. This can perhaps be attributed to the unfamiliarity of all parties with this type of contract and to weaknesses with the World Bank template for OPRC which was use in this case. This emphasises the need for experienced assistance to be provided to client agencies in order to formulate PBCs. However, with the concept being so new this experience may be in short supply.

The on-going maintenance of the road, particularly routine vegetation control and drain cleaning being carried out by labour-based methods, is creating much needed employment opportunities in communities along the route. It is hoped that this will help foster a sense of ownership of the road within communities who currently use the drains as dumping grounds and damage road furniture, signs, guardrails etc, either deliberately or through carelessness.

In addition to providing consistent levels of service to road users for an extended period the project will hand over an asset in 'as new' condition, ready for a subsequent maintenance regime. The project will also collect and collate data on the inputs required to maintain an asset of this nature under these particular socio-economic and environmental conditions. Something which has previously been totally absent, making budgeting and bidding for such projects very difficult and full of risk.

Lessons learnt

- The client agency should understand the workings of PBCs and what they can and cannot deliver. They must also be committed, at all levels of the organisation, to Asset Management through PBC and all that that entails.
- PBC contracts need to be very carefully written by people with experience who fully understand the needs of the client and the capabilities of the expected/desired Contracting Entities.
- Monitoring consultants, who may or may not have been responsible for the tender documents, should be equally experienced in PBC and be in place before the PBC is awarded.
- Contracting Entities need to be continually educated about the PBC philosophy and senior management kept informed of failings at site level which will have an impact on future maintenance costs.
- Contracting Entities designers should have an element of responsibility for ensure that their design are implemented in accordance with a Quality Assurance procedure.

4.3 Uganda

In his MSc thesis Outsourcing Maintenance of Road infrastructure in Uganda – Performance-Based Contracting in Sub-Saharan African Context (van Ham, 2015) examines the current state of road maintenance via input based FIDIC red-book contracts and a pilot OPRC project.

Uganda has a quite sophisticated Road Agency (UNRA) with a mission statement '*to develop and maintain a national road network that is responsive to the economic development needs of Uganda, to the safety of all road users and to the environmental sustainability of the national road corridors*'. The agency has to follow regulations from the Public Procurement and Disposal of Public Assets Authority (PPDA) when tendering any works or service contracts.

UNRA currently outsources about 90% of it's road maintenance, the other 10% being done through forced account. However the time it takes for the procurement process means that roads deteriorate further and costs are often higher than the engineers estimates. This leads to further delay and possibly failure of the tender altogether. In theory multi-year PBC for maintenance (possibly with a rehabilitation element) would help to eliminate this problem, having far fewer tenders and roads at consistent service levels when re-tendering is due. In fact UNRA are piloting such PBCs on approximately 340km of highway, split into 3 Lots.

Being the first time PBCs have been used in Uganda the first obstacle was the absence of provision for such a contract form in the PPDA regulations. This has required special dispensation, which may be an issue elsewhere, especially where governments are attempting to regulate procurement to reduce corruption. However, once the benefits of PBC can be realised the relevant regulations can be put in place.

UNRA employed international consultants to assist with the OPRC process who identified the following to be taken into account:

- World Bank OPRC Guidelines;
- International OPRC experience;
- Special conditions applicable to the project road (on-going rehabilitation works);
- Fair allocation of risks;
- Provision of sufficient information.

It was also noted that UNRA, their technical assistance and the World Bank doubted that there was a local contractor capable of carrying out any of the proposed PBCs, with lengths ranging from 66km to 152km.

UNRA do have the advantage of using HDM4 for highway management, which allows for levels of service to the set appropriate to the finding available. This is already done for traditional maintenance and has been used to set the Service Level Criteria for the PBCs.

The allocation of risk for the PBCs follows a logical framework which is borne out by the authors experience in Liberia. The points worth highlighting are:

- Expropriations / Ground Delivery / New Development by Government of Uganda, this was a major issue in Liberia, causing significant delay and associated cost. All this risk is shown as being with the employer, which is not strictly correct as under the WB form of contract the Contracting Entity is expected to take mitigation measures.
- Unplanned Routine Maintenance Activities, described as repair of crash damage, graffiti, vandalism and theft. This is shown as the employers risk. In the standard World Bank for of contract this is not clear.
- Changes in Traffic Volumes. Perhaps the most important risk for such a type of contract, it is noted that the risk is shared. Volumes up to a certain level the Contracting Entity is required to design for. Above these figures should trigger an increased payment, which would appear to be the employers risk. It is unclear exactly how this may be shared in this case.
- Overloading. This is noted as the employers risk but stated that monitoring must be by the Contracting Entity.

Interestingly the UNRA OPRC include for a new weighbridge to be constructed and operated by the OPRC Contracting Entity. This is a good initiative but only with real enforcement will it have the desired affect. This requires facilities for overloaded vehicles to be offloaded and enforcement officers with the powers to ensure that it is done. Provision must also be made to prevent bypassing of the weighing facility and corruption of enforcement officers.

4.4 Zambia

(Gericke, Henning, & Greenwood, A Guide to Delivering Good Asset Management in the Road Sector through Performance Based Contracting, 2014) reports on four contracts of between 160km and 450km total length, mostly rural roads initially in poor condition. (Zietlow & Edmonds, Study of Performance Based Contracts (PBC) for Road Maintenance, 2008) note that 10 PBC contracts have been let totalling 3,445km, again of rural roads.

Funding was from the European Union and an independent asset management consultant employed by the client to administer the contracts. The total cost for four contracts was US$ 36 million.

It is stated by Gericke et al that no maintenance is included in the four contracts, only rehabilitation and improvements taking the previously neglected roads to improved design standards. Despite this the contracts run of 5 years. It is not understood who service level criteria can be maintained without maintenance.

It was noted that there was no traffic data nor historical records of maintenance or renewal work. The impact of this is not noted but it can be assumed that this lead to more risk in pricing the contract and therefore a higher contract price. This highlights the importance of collecting and collating this data over the course of the contract to assist future tendering, thus reducing maintenance costs in the longer term.

It was also noted that PBCs do not eliminate corruption but do minimize it, although no details are given to support the claim.

Most risks were noted as being transferred to the Contracting Entity except legislative changes, accident and vandalism damage. This is in keeping with experience other PBCs and is an area where further data collection can help. Traffic volumes increased significantly upon improvement of the roads and it is stated that this risk was shared between Contracting Entity and client although again no details were given. Contracts need to cover this situation clearly, stating at what level traffic volumes trigger cost increases and who is responsible for collecting and verifying the traffic data.

Zietlow and Edmonds note that a technical audit by the European Union in 2007 noted a general lack of experience and knowledge of PBCs by both the local consultants and Contracting Entitys engaged. Despite this the overall outcome of the projects was considered positive.

Other issues identified in the report include:

- Poor project preparation, which was carried out in house by the Road Agency. Packaging of roads was not well thought through and insufficient investigations were carried out to provide tenderers with the information required to bid appropriately. No traffic surveys were carried out or predictions made.
- Larger Contracting Entities are performing better than smaller ones, being able to mobilise more equipment for rehabilitation and having better Quality Assurance procedures.

- Only one Contracting Entity included a consultant as part of the team and in this case it has lead to benefits to the CEs performance.
- Contracts were let where more than 50% of the price was for rehabilitation. It is noted that this is against World Bank guidelines, although these guidelines have since changed and larger percentages of rehabilitation costs are not seen as prohibitive. However as discussed previously steps should be taken to prevent the CE neglecting the maintenance element of the contract and it is not clear in this case if that was done.
- It was noted that the interpretation of compliance varied between supervision [monitoring] consultants and recommended clearer definitions.

4.5 Summary of Lessons Learned

Throughout the case studies examined there are consistent themes, which closely align with the experience of the author in implementing PBC on roads in Sub-Saharan Africa. These can be summaries as follows:

- At all levels the client agency MUST fully understand Performance Based Contracts and all the implications this entails.
- The client agency and all other government stakeholders MUST be committed to the implementation of Performance Based Contracts for road maintenance.
- Performance Based Contracts CAN be effectively used on both rural gravel and major asphalt roads requiring initial rehabilitation and improvement which may constitute a significant proportion, more than 50%, of the total contract price. In these instances the contract should be written such that significant profit is not realised until the maintenance phase to ensure that the Contracting Entity does not walk away from the maintenance phase.
- Performance Based Contracts MUST be very carefully written by people with experience who fully understand the needs of the client and the capabilities of the expected/desired Contracting Entities. Areas requiring particular attention are:
    - Levels of Service which should be appropriate to the road environment and available funding and clear and unambiguous enough that they can be interpreted uniformly by different Monitoring Consultants.
    - Penalties for none compliance which sufficiently incentivise the Contracting Entity without being too onerous and that are in proportion with the importance of the Service Level Criteria.
- The allocation of risk should be clearly defined and the contract must include conditions and specifications which account for this allocation. Examples include:
    - Specific details of who is responsible, financially and physically, for repairing accident damage, theft and vandalism and the mechanisms for addressing these.
    - Specify who is responsible for collection and verification of traffic level data and what implications this has on the Levels of Service.
- Appropriately experienced Monitoring Consultants should be engaged before the works contract is awarded.

- Contracting Entities need to be continually educated about the Performance Based Contracting philosophy and senior management kept informed of failings at site level which will have an impact on future maintenance costs.
- Contracting Entities designers should have an element of responsibility for ensuring that their designs are implemented in accordance with a well defined Quality Assurance procedure.
- It is in the Contracting Entities interests that designs are carried out with maintenance in mind. Particularly with regards to such details as drains, which may need regular cleaning or road furniture which may be subject to theft or vandalism. Designs which have inherent maintenance liabilities should be rejected.
- It is too early within the African context to say what cost savings are likely to accrue from the use of PBC, although experience from other regions suggests that 25% over traditional forms of maintenance contract could be expected.
- Costs will be higher initially due to an absence of data upon which a Contracting Entity can base their bid. Also experience of PBCs is low within all stakeholder organisations. The use of experienced consultants to draft good contract documents and implement the contracts can help keep initial costs as low as possible.
- Costs will fall as all stakeholders gain experience in this form of contract and CEs innovate in terms methods of working and maintenance orientated design.

5. Framework for Introduction of PBC and Inclusion of the Private Sector in Road Maintenance

In Sub-Saharan Africa the move away from force account road maintenance has been in progress for a number of decades, with varying degrees of success. Problems have been encountered which include:

- Low level of private sector capacity;
- Inconsistent funding arrangement and diverted funds;
- Inappropriate / inefficient forms of contract;
- Inadequate oversight / supervision;
- Corruption.

It has been shown, through theory and practical experiences described above that the use of Performance Based Contracts for multi-year maintenance, and possibly rehabilitation, projects is a solution which can address all of the above issues to some degree, whilst at the same time delivering further benefits in terms of whole life cost savings.

However, it is clear that in order to implement PBC at a meaningful level certain factors need to be addressed. The World Bank template and guidelines for OPRC are a good starting point but a number of areas need to be improved. The following section discusses the issues in more detail and concludes with a framework for the inclusion of the private sector in road maintenance in Sub-Saharan Africa.

5.1 Form of Contract

The World Bank OPRC template sets out the theoretical approach and provides a sample contract for implementing a PBC contract for rehabilitation and/or maintenance of roads (and possibly, with certain modifications, other infrastructure assets). Other forms of contract, either specifically aimed at PBC or appropriately modifiable are also in use. The OPRC template is quite straightforward and relatively simple to understand, but does have areas of weakness where ambiguity and contradiction need to be recognised and addressed when creating an actual contract document. These areas should be remedied and a new template created by any agency wishing to implement a PBC strategy.

Areas in particular which require careful consideration include:

- An appropriate Conceptual design which meets the agency's particular requirements;
- Service Level criteria which are appropriate and sustainable;
- The percentage of the lump sum price which will be applied to rehabilitation and to maintenance;
- The level of financial provision for contingencies and Emergency Works;
- The coverage and application of Emergency Works;
- The allocation and mitigation of risks, of particular concern are traffic levels and axle loading;

A well drafted PBC tender document / contract can provide for efficient and effective management of an agency's asset(s). A PBC strategy should be considered as a means to fulfil the agency's

network development and maintenance objectives as well as developing local contracting and consulting capacity and employment generation.

5.2 Use of the Private Sector

The use of the private sector in road maintenance is often taken to mean the domestic civil engineering contracting industry. In Sub-Saharan Africa the level of development of this industry is general quite low, with the exception of South or Southern Africa. That is not to say that there is not the capability available to carry out routine and periodic road maintenance, or even major rehabilitation projects. Rather the amount of competition at top end of the scale and the ability to handle multiple long term contracts may not necessarily be available locally, at all times.

Given that to derive maximum benefit from a shift to PBC for road maintenance the maximum percentage of any network should be brought into the program the requirement for high quality contracting resources would be great.

PBC also requires an element of design and quality management capacity that any contractor, local or international, may not necessarily possess in house. This would therefore input of a consultant will the relevant experience, possibly in the short term international also.

Experience with PBC so far in SSA has shown that larger contracts attract international contractors, although their level of experience with, or understanding of, PBC is not necessarily any greater than smaller local contractors. International consultants employed either by the agency for project preparation, tendering and monitoring or by the Contracting Entity for design and possibly quality management are also inevitably on a steep learning curve.

If an agency is serious about a shift to PBC for maintenance of a significant proportion, if not all, of it's road network then consideration of a strategy for creation of a contacting base capable of implementing this is essential. This would likely require an initial phase of employing international Contractors / Consultants, at an inevitable greater cost, particularly where significant rehabilitation may be required before a road is actually maintainable. The strategy can however include for capacity building and knowledge transfer so that local enterprises can be involved, especially in the maintenance phase, with the aim of being able to tender for, win and successfully implement a future, possibly maintenance only, contract.

Costs will inevitably higher in the early stages of PBC implementation as familiarity with the form of contract is low and therefore perceived risks higher. Also any initial rehabilitation / improvements works will be greater. To gain maximum benefits from a PBC strategy for road maintenance, both for the asset management agency and the local private sector a long term view is needed along with a commitment from all stakeholders to gain the knowledge and understanding required to make the approach a success.

5.3 Risk Allocation and Management

Key to effectively implementing a PBC strategy is an understanding, allocation and management of the risks involved. These are communicated to all parties via the Risk Matrix included in the tender documents / contract. This matrix forms an essential part of the document which ties together the technical aspects and dictates their form and content.

The sample below shows a possible form and example content for such a matrix, but should be used for illustrative purposes only. The reason for having a risk matrix is that it requires careful thought and analysis of the risks involved and how they will be allocated and addressed. This then dictates other technical aspects of the contact. There is not a 'one size fits all' approach and each contract and risk matrix should be drafted according to the prevailing requirements and conditions.

It should also be noted that to tender efficiently for a PBC for maintenance of a road certain data abut the road needs to be available. In many SSA countries this data

Example Risk Matrix

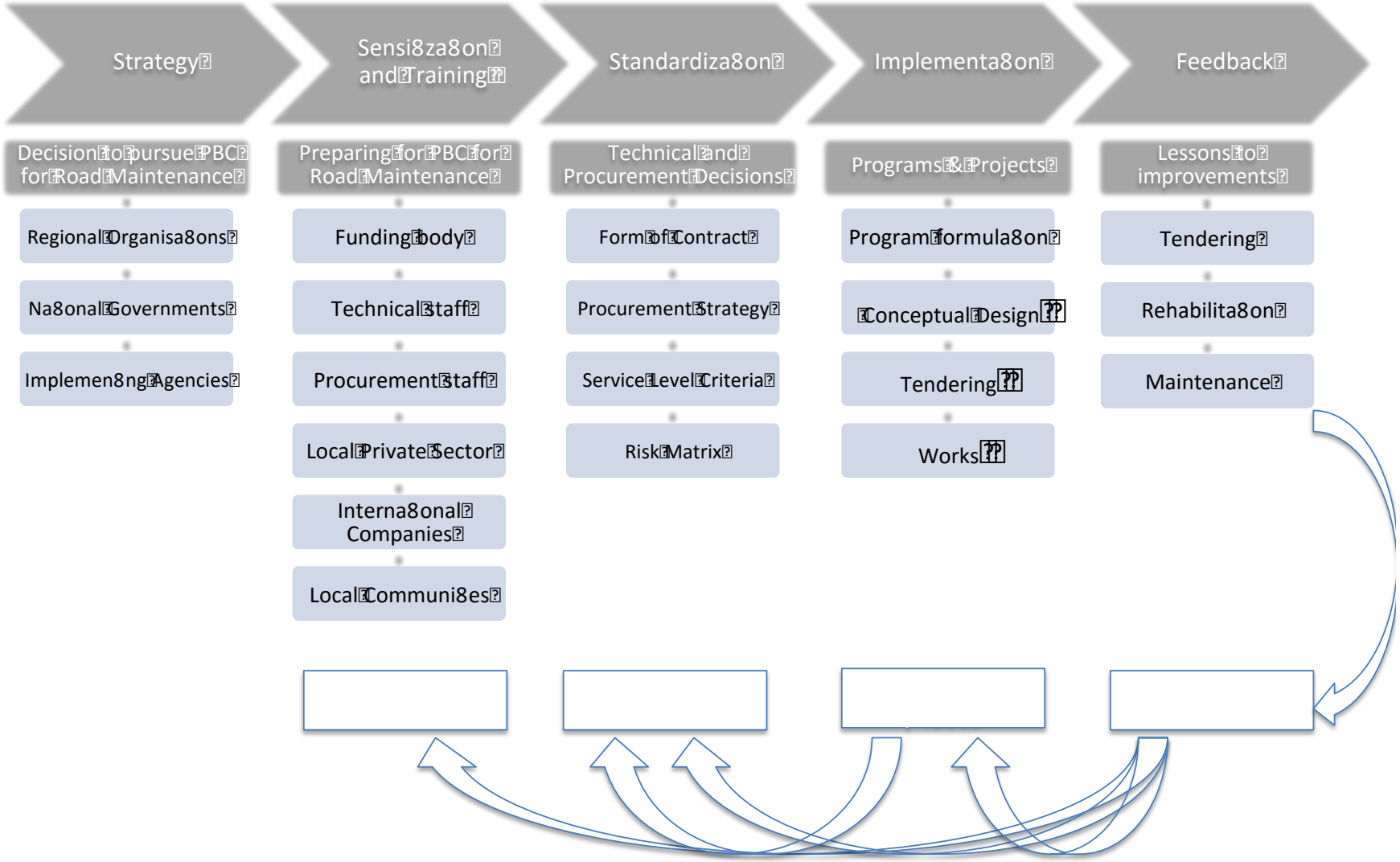
The following table represents a non binding risk matrix table which summarized the major risks associated with the Project, the allocation and method of mitigation. This table is a descriptive nature only and in any discrepancy between the table and the Particular Conditions the wording of the Particular Conditions will prevail.

Risk	Employer	Contracting Entity	Shared	Mitigation measures
Design defects		Design CE fault		• Check tender specifications by external auditor nominated in advance by Donors (ensure TOR and tender process is promoted prior to tender publication) • Ensure construction standards are clear and suitable for the envisaged performance of the road • Ensure reputable monitoring authority (nominated and approved in advance by Donors) to Monitor design work • Ensure contractors designers acquired sufficient professional liability insurance
Cost overrun	• Change orders • Payments to authorities • Change in law	• Poor performance of design/ construction • Poor assessment of cost • CE's default	Force majeure	• Monitor and inspect construction work (see above). • Provide for early warning mechanisms in the contract which will include specific drafting provisions for change orders scope and payment with no additional financial exposure to contractor.
Delays in project completion	• Statutory approvals • Utilities evacuations. • Expropriations/ Ground delivery • Government works delivery • Hazardous materials (including bomb remaining) • First of a kind building permits • Political risk during construction	• Poor performance of design/ construction • Poor Assessment of timetable • Usual building permits/ licensing	• Force majeure events (flood, fire etc) • Antiquities	• Obtain approvals in advance • Monitor and inspect construction work • Provide for early warning mechanisms in the contract including grace periods, direct cost payments and termination clauses in case the delay is too long. • Provide incentives to contractor to meet time table (liquidated damages for delay, guarantees regime) • Ensure sufficient insurance coverage is available (and if not Donors will cover excess exposure based on commercial terms)

Risk	Employer	Contracting Entity	Shared	Mitigation measures
Failure to meet performance criteria	• Quality shortfall. • Defects in construction.			• Monitor and inspect construction work (see above for monitoring entity). • Provide for early warning mechanisms in the contract. • Guaranteeregime • Ensure professional liability and product liability insurance coverage is available
Cost overrun	• Change orders • Change in Law • Cost of major cost items increases (for predefined indices) • improper usage of the road (not enforcing axle load) • higher level of traffic than predicted	• Changes in specs at project company's request • Labor issues • Exchange rates on imported resources • Latent construction defects	Force majeure	• Build flexibility into contract to accommodate currency risks • Define acceptable reasons for changes and a price tag to them including payment terms which will not impose additional financial exposure • Apply reputable international Monitoring entity • Long-term fixed price supply contracts that support the projected profit margins • Provide mechanism in contract for Donors participation in cost overrun due to higher loads
Delays in obtaining maintenance approval	• Failure or delay in obtaining permissions, consents and approvals (where there is public sector discretion)	• Failure or delay in obtaining permissions, consents and approvals (where there is no public sector discretion) • labor issues		• Obtain approvals in advance where possible • Ensure clear division of responsibilities in the contract • Implementing employee- labor policies (e.g. training, personal advancement, equity interest in project) • Long-term labor contracts that are acceptable to all parties • Liquidated damages
Failure to meet quality standards		• Contractor's fault • Project company's fault		• Monitor and inspect operating practices • Accurate KPI's definition and penalty regime
Interest Rates risks			• Fluctuation of "Benchmark" base interest rates in the period between bid submission and each draw down	• Payment linked to interest rates fluctuations (through the tender process) • Setting of an adequate milestone system to minimize financial exposure

Risk	Employer	Contracting Entity	Shared	Mitigation measures
Currency Fluctuations risks			• Devaluation of local currency • Fluctuations in foreign currencies • Non-convertibility or non-transferability	• Maximizing foreign Currency Content in Project Financing Packages • Quoting payments in US$ or Euro (one currency) • Hedging –transactions undertaken by contractor • Payment is done outside of Liberia
Inflation and indices risk			• Unexpected growth / reduction in indices	• Including an actual index, • Entering into long-term supply contracts with fixed prices denominated in Euro or US$
Tendering Risks	• Lack of competition	• Poor bid quality		• Benchmark of potential bidders • Compliant tendering processes • International standards tendering documents
Political Risks	• War and terror or nationalization • Expropriation • Failure to obtain approvals • Import restriction			• External proper Political risk insurance • External guarantees
Regulatory risk	• Changes in tax regime • Changes in customs practices • Changes in environmental standards			• Compensation mechanism • Partial risk guarantees
Force Majeure & Special risks			• Flood • Earthquake • Riot • Strike	• Use insurance and guarantees • Clearly define Force Majeure in contract/ insurable & non insurable and compensation mechanism covered by insurance • Special insurance coverage for in sufficient commercial insurance
Early Termination risks	• Termination events due to breach by the PA, for example: • Failure to provide the site in planned time • Failure to pay	• Termination events due to breach by the PS, for example: • Liquidation of the PS • Breach of the Finance Agreements	• Termination for convenience	• Compensation mechanism with the main goal to address the financiers situation at the date of termination

5.4 Framework for Introduction of PBC and inclusion of the Private Sector



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Appendix A: Example Service Level Criteria for a paved road.

Appendix B: Example Determination of Payment Reductions