

Preparation of a Road Design Manual and Standard Bidding Documents for Low Volume Sealed Roads in Malawi



Workshop Report

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LIST OF ABBREVIATIONS

AFCAP	African Community Access Programme
BDS	Bid Data Sheet
CBR	California Bearing Ratio
CML	Central Materials Laboratory
DCP	Dynamic Cone Penetrometer
GC	General Conditions
ITB	Instruction to Bidders
LVSR	Low Volume Sealed Road
MDD	Maximum Dry Density
MK	Malawi Kwacha
OMC	Optimum Moisture Content
OWT	Outer Wheel Track
PC	Particular Conditions
RA	Roads Authority
SADC	Southern African Development Community
SBD	Standard Bidding Documents
ToC	Table of Contents
ToR	Terms of Reference
TWG	Technical Working Group

EXECUTIVE SUMMARY

As part of the AFCAP-supported project on the development of a Road Design Manual for Low Volume Sealed Roads (LVSRs) and related Standard Bidding Documents (SBDs) for Malawi, a Technical Working Group (TWG) workshop was held at the Capital Hotel, Lilongwe on 20th and 21st March 2012. The key objectives of the workshop were to:

- Present the first draft of the Road Design Manual and Standard Bidding Documents for Low Volume Sealed Roads, and
- Obtain feedback on the draft documents from the workshop participants as input for revising them.

The workshop was attended by members of the TWG comprising representatives from both the public and private sectors.

At wrap-up meetings that were held with the Roads Authority after the workshop on Thursday 22nd March and Friday 23rd March, 2012, the official comments on the draft documents were presented to the consultants to assist them in finalizing these documents. These comments which are elaborated upon in the report may be summarized as follows:

- The Design Manual should be prepared in two parts, as follows:
 - Part A: Design process
 - Part B: Design Philosophy and Guidelines
 - Preliminaries (Foreword, Preface, etc.) should precede parts A and B of the manual
- Standard Bidding Documents
 - The documentation should follow the format of the documents currently being used in Malawi
 - The principle of using global activities must be fully embraced in the documents
- The feedback received from the workshop should be incorporated in the next version of the documents.
- The workshop facilitator would be funded to assist the Roads Authority in undertaking various fieldwork activities that are required as inputs to the training component of the project.

It was agreed that the updated Road Design Manual and Standard Bidding Documents would be submitted to the RA by the end of May 2012 and, after acceptance by the RA, would be followed by the training component of the project which is scheduled to be held before the end of June 2012.

1. INTRODUCTION

1.1 Background

At the request of the Roads Authority (RA), the Africa Community Access Programme (AFCAP) is assisting the organisation in undertaking a project aimed at gaining official acceptance of appropriate low volume sealed roads (LVSR) standards to ensure their application on a wider scale. Following completion of Phase 1 of the project which focused on *Performance Review of Design Standards and Technical Specifications for Low Volume Sealed Roads*, Phase 2 involves the preparation of a *Design Manual for LVSRs* and *Standard Bidding Documents (SBD) for LVSRs*.

At the inception stage of Phase 2, an outline Table of Contents for the Design Manual and SBDs was discussed and provided the basis on which the draft documents were to be developed by the consultants for subsequent consideration by a Technical Working Group (TWG) at a workshop

1.2 Technical Working Group Workshop

1.2.1 Objectives

The main objectives of the workshop were to:

- Present the first draft of the Design Manual for Low Volume Sealed Roads and the Low Volume Sealed Roads Standard Bidding Documents, and
- Obtain feedback from the workshop participants as input for revising the two documents.

1.2.2 Venue, programme and attendance

The workshop was held on the 20th and 21st March 2012 at the Capitol Hotel Conference Centre, Lilongwe. The programme included Welcome Remarks by the RA, remarks by the AFCAP Technical Manager and PowerPoint presentations by the consultants on the draft LVSR Design Manual and SBDs. A copy of the programme is provided in Annex A.

The workshop was attended by 18 members of the TWG comprising representatives from the Ministry of Transport, Roads Authority, Roads Fund Administration, University of Malawi, National Construction Industry Council, Consultants and Contractors. All participants had been provided with copies of the draft documents prior to the workshop. The list of participants is included provided in Annex B.

The organisation of the workshop and its facilitation, were undertaken by Mr. Jeptah Chagunda of Pamodzi Consulting Engineers, on behalf of AFCAP.

1.2.3 Outputs

The major output of the workshop is a consolidated list of comments that was discussed at wrap-up meetings with the RA and subsequently conveyed in writing to the consultants. These comments will provide the basis for updating the first draft documents.

1.2.4 Report

This Workshop Report documents the outcome of the workshop proceedings and subsequent meetings with the RA and is structured as follows:

Section 1 (this section): Provides the background to the project and the details of the TWG workshop.

Section 2: Presents a summary of the workshop preliminaries, including the welcome remarks by the RA and remarks by the AFCAP Technical Services Manager.

Section 3: Presents an overview of the consultant's presentations and summarises the main issues arising.

Section 4: Summarises the outcome of the wrap-up meetings with the RA.

Annexes: Annex A presents the workshop programme whilst Annex B provides the list of workshop participants.

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2. WORKSHOP PRELIMINARIES

2.1 Opening Remarks

The opening remarks were made Eng. Placid Kasakatira of the RA. He welcomed all participants to the TWG workshop and highlighted the importance of the project in light of the large number of unpaved low volume roads that the Government of Malawi is responsible for maintaining and the problems faced in doing so in a sustainable and cost-effective manner.

Eng. Kasakatira went on to emphasise the important role the TWG had to play in terms of guiding the development of the Design Manual and SBDs as a basis for taking ownership of them. He then stated that the TWG looked forward to the consultants' presentations which would facilitate a better appreciation of the issues involved and would provide a good basis for providing feedback to them on the documents.

In concluding his remarks, Eng. Kasakatira exhorted the TWG members to engage fully in discussions of the documents so that the final product would be acceptable to all stakeholders.

2.2 Remarks by AFCAP

The AFCAP Technical Services Manager, Mr. Rob Geddes, provided an update on recent developments in AFCAP and the organisation's achievements in the African region as follows:

- New members: Two new countries has joined AFCAP, namely South Sudan and the Democratic Republic of the Congo;
- Achievements:
 - Ethiopia: Design Manuals for Low Volume Roads
 - Tanzania: Demonstration of various surfacing options for which the final report was being produced;
 - Mozambique: Demonstration of various surfacing options
New research projects including:
 - mapping of calcretes and development of specifications
 - back analysis of old low volume roads with laterite bases
 - establishment of a research unit
 - South Sudan: Customisation of the Ethiopian Design Manuals to the local environment
 - ASANRA: Guideline for Use of Sands in Road Construction
Peer review of Road Asset Management Systems

He concluded his remarks by stating the 2nd AFCAP Practitioner's Conference would be held in Maputo, Mozambique from 3 – 5 July 2012. He informed the workshop participants that a limited number of places were available for sponsorship, that delegates should register early to avoid disappointment and that a registration form could be downloaded at <https://www.afcap.org>.

3. WORKSHOP PRESENTATIONS AND DELIBERATIONS

3.1 Introduction

The main objective of this aspect of the workshop was for the consultants to present the details of the draft Road Design Manual (RDM) and the Standard Bidding Documents (SBDs) as a basis for plenary discussion and comments by the TWG. To this end, PowerPoint presentations were made to the participants as summarised below.

3.2 Presentation of Draft Documents

3.2.1 Road Design Manual

The consultant's presentation focussed on each chapter of the RDM as contained in the hard copy provided in advance to each member of the TWG and as summarised below.

- Chapter 1: Introduction
- Chapter 2: Design Considerations
- Chapter 3: Environment
- Chapter 4: Unpaved Road Evaluation
- Chapter 5: Materials
- Chapter 6: Traffic
- Chapter 7: Pavement Design
- Chapter 8: Surfacing
- Chapter 9 : Cross Section and Drainage
- Chapter 10: Practical Considerations
- Chapter 11: Cost Analysis
- Chapter 12: Implementation

Details of the PowerPoint presentation are included as Annex C of this report.

3.2.2 Standard Bidding Documents

The consultant's presentation focussed on each chapter of the SBDs as contained in the hard copy provided in advance to each member of the TWG and as summarised below:

- Section A – 01 - Foreword (by the CEO) and Preface
02 - Procedure for Document Change (QA)
03 - Instructions to Bidders
04 - Bid Data Sheet
- Section B – 05 - Forms
06 - General Conditions of Contract
07 - Particular Conditions of Contract
- Section C – 08 - Specification
09 - Drawings
10 - Bill of Quantities

3.3 Workshop Deliberations

The presentations provoked wide-ranging discussions and comments from participants on a number of issues which are summarised below:

3.3.1 Road Design Manual

The following is a summary of the comments made and issues raised during the presentation of the various chapters of the RDM.

Preliminaries

- Foreword – written by whom? Ministry?
- Need for Preface? Written by whom? RA?

Chapter 1

- Logo to be used on front cover?
- Placement of Cost Analysis chapter? Initially mention as part of Chapter 7 – preliminary analysis - and also keep as Chapter 11.
- Limited treatment of non-core subjects such geometric design, traffic surveys, and DCP surveys, borrow pit investigations, etc.

Chapter 2

- Need to amend Design Framework (Fig 2-4) w.r.t placement of cost analysis?

Chapter 3

- Include N-value map for Malawi if available
- If possible, correct mis-match between Fig 3-1 and Table 3-1.

Chapter 4

- Define moisture sensitivity
- Define sampling frequency

Chapter 5

- Remove maintenance reliability from Table 5-1.
- Mention durability requirements
- Mention need for careful stockpiling
- Specify requirements to ensure reliable materials availability
- Check Table 5-4 – some classes missing. Layer thickness to be clarified
- Table numbering to be corrected

Chapter 6

- Replace Table 6-2 with classes used in Malawi (RA to provide)
- Forecast of different classes for LVSRs very rare.
- Growth rates typically for two classes only
- Mention durability requirements

Chapter 7

- Clarify terminology for subbase/subgrade in Glossary of Terms.
- Include additional figures to explain DCP design principles.
- Produce companion document containing DCP design example based on use of manual as applied to an actual road

Chapter 8

- Include Cold Mix Asphalt
- Include design for non-bituminous surfacings?

Chapter 10

- Include reference on PIARC Road Safety Manual

3.3.2 Standard Bidding Documents

The following is a summary of the comments made and issues raised during the presentation of the various sections of the SBDs.

(a) Standard Bidding Documents

- The order and numbering of the sections of the document should be as the template currently in use and agreed with the government procurement agency:

Section	Title		File
<i>i</i>	<i>Foreword and Preface</i>	<i>At a later wrap up meeting with the Roads Authority it was proposed to remove these sections from the SBD and put them in the User Guide.</i>	
<i>ii</i>	<i>Procedure for Document Change</i>		
1	Instruction to Bidders		
2	Bid Data Sheet		
3	Evaluation Criteria		
4	Bidding Forms		
5	Non-eligible Countries		
6.1	Description of works & location		
6.2	Bill of Quantities		
6.3	Drawings		
6.4	General Specification		
6.5	Particular Specification		
7	General Conditions of Contract		
8	Special Conditions of Contract		
9	Contract Forms		

Instructions to Bidders (ITB):

- The Qualifications of bidders should be detailed in the Bid Data Sheet rather than be 'set in stone' in the ITB. The Procurement Entity (PE) can then tailor these to suit the bid.
- Current workload of contractors should form part of the qualification criteria as in World Bank bids.
- As a suggestion, to be explained in the user guide, the experience of Contractors should look at work over a 5 year period recently there has been less work of this nature available in Malawi.
- The staff positions to be evaluated and therefore requiring CVS to be submitted should be stated in the ITB.

Bid Data Sheet (BDS)

- Only data referred to in the ITB should be included in the BDS. All other data should be removed, including that provided as information from the special conditions of contract.

Forms

- The forms should be split between those for the Bid and those for the Contract as above.
- On the Form of Bid, item 2.6, the bid validity should be 90 days and not 110.
- On the Agreement, item 4.2, as part of the list include minutes of pre-contract meeting.
- On schedule VI the experience of staff should be:
 - Site Agent; Diploma + 5yrs experience OR BSc + 2 years experience
 - Foreman; Certificate + 10 years experience
- On Schedule X the description is wrong and will be re-written to match the schedule.

Conditions of Contract

- 8. Sub-contracting should be limited to 25% of the contract value, this overrides the decision made at the previous TWG meeting
- 10. Personnel, it should be the Employer who can ask for a member of the contractors staff to be removed, on advise from the Engineer
- 15. Site investigation reports should be stated as for information purposes only and not forming part of the contract.
- 29. Extension of time; there should be more detail of how any extension of the completion date due to rain will be calculated and it should be made clearer that only this date changes and there is no additional compensation to be paid to the contractor.
- 47. Currencies; the exchange rate should be changed to be that of the reserve bank of Malawi.
- 48. Price Adjustment; the Roads Authority will advise on what formula should be included and when the calculations should begin.
- 51. Bonus; this should be removed.

Technical Specifications and BoQ

- The Specifications should include the method of Measurement and Payment for each bill item, rather than having this in the bill
- The specification should be comprehensive enough to allow for all possible road works required for these types of contracts.
- The Roads Authority is to provide a comprehensive BOQ for use as a template.
- Surfacing should include some non-bituminous as described in the design manual as well as Otta Seals and thin bituminous surfaces in addition to those already there.
- Road safety should be included in the form of road humps and rumble strips.

3.4 Workshop Closure

In his closing remarks, Eng. Kasakatira thanked AFCAP for their support of the LVSR project. He also thanked the participants for their constructive contributions to the workshop deliberations and mentioned that only through such participation would there be ownership of the RDM and SBDs. Finally, he thanked the consultants for their presentations which he felt had provided a platform for feedback from the TWG and commended the workshop facilitator for the organisation of the event.

In terms of the way forward, he informed the participants that the RA would deliberate further on the comments made during the workshop and would then hold a wrap-up meeting with the consultants to brief them on how to proceed with the updating of the documents.

4. WRAP-UP MEETINGS

4.1 Discussion of Draft Documents

Following the workshop, wrap-up meetings were held at the offices of the RA on 22nd and 23 March 2012 at which the direction for the way forward was clarified as follows:

4.1.1 Road Design Manual

In general, the draft design manual covered the philosophy and guidelines upon which the design manual is premised. However, the real design procedure has not come out as per the expectations of the TWG in general and the Roads Authority on behalf of the Ministry of Transport and Public Infrastructure. Hence, the following comments are made for the consultants' action:

- i. The title for the design manual should remain as 'Design Manual for Low Volume Sealed Roads'.
- ii. The cover of the manual should depict the Malawi Government logo.
- iii. The manual should be prepared in two parts with Part A dealing with the design process and Part B dealing with design philosophy and guidelines.
- iv. The document that has been submitted and discussed by the TWG in principle forms Part B of the design manual. All applicable comments from the TWG workshop should be taken into account in this part.
- v. The following should precede Parts A and B of the Manual:-
 - Foreword by the Ministry of Transport and Public Infrastructure covering policy and administrative elements of the manual
 - Preface by the Roads Authority essentially summarizing technical elements of the manual
 - List of abbreviations
 - Table of contents
 - List of design tables and figures
 - Appendix (essentially sample design process examples)
 - Introduction to the design manual
- vi. Part A of the manual which should be a "Step by Step" design process taking more or less the format of the current Ministry of Works and Supplies "Highway Design Manual" as supplied to the consultants. As a general guide, Part A of the manual should include the following:-
 - Traffic data collection
 - Horizontal alignment approach methodology
 - Vertical alignment and drainage considerations for purposes of formation requirements
 - Road safety considerations (to be combined with geometric design in separate chapter)
 - Major drainage structures approach (refer to Malawi Bridge Design manual if major structures required).

-
- Production of strip maps would be acceptable and horizontal and vertical profiles can be obtained by GPS. However, cross sections will be required using survey instruments where drainage may be problematic.
 - Pavement DCP assessment
 - Borrow materials
 - Pavement design
 - Surfacing
 - Drawings

The above design steps should be presented in a logical format and each process should have a brief introduction of what it is and what is its intended purpose within the design process.

4.1.2 Standard Bidding Documents

The submitted documentation has made a reasonable attempt to take into consideration documentation elements that will ensure realization of the anticipated goal. However, the following issues require further consideration if the documentation is to lead to the desired results:

- i. The documentation should follow the format of the document currently being used in Malawi a copy of which was provided to the consultants.
- ii. The general conditions of contract, general technical specifications and particular specifications in the RA's current standard bidding documentation should then be reviewed to reflect the requirements for LVSR bidding documentation.
- iii. The documentation should ensure that it covers all other possible work activities associated including drainage structures such as bridges (refer to the collected standard bidding documentation).
- iv. Preambles should cover all possible work activities (refer to the collected standard bidding documentation).
- v. Since the intention is to deliver paved roads at reasonably low cost, standard activities under general items must be seriously considered.
- vi. The principle of usage of global activities must be fully embraced in the entire documentation and preambles should clearly cover what is involved in each global activity.
- vii. There is need for a clear flow in the documentation. This can easily be achieved by following the standard bidding documentation format advised to the consultants.
- viii. As the consultants re-align the SBDs with the standard bidding documentation provided by the RA, the consultant should ensure that all the other technical elements that were agreed during our workshop as facilitating practical usability of the document are taken into consideration.

4.2 Fieldwork

It was agreed that the AFCAP-supported workshop facilitator would assist the Roads Authority in undertaking the following fieldwork activities that are required as inputs to the training component of the project.

- DCP survey
- Axle load survey
- Traffic counts
- Production of strip maps in plan and profile showing the following features:
 - Traffic bands
 - Vertical gradient
 - Pavement strength from (DCP survey)
 - Drainage features

4.3 Training

4.3.1 Outline programme

Training in the use of the RDM and the SBDs would be undertaken subsequent to the presentation of version 2 of these documents. The details of the training programme will be finalised with the RA but at this preliminary stage the following activities are envisaged:

(a) Day 1 – Use of Road Design Manual:

- a. Introduction to training exercise
- b. Site visit
 - i. Recording of road environment features
 - ii. Undertaking demonstration DCP measurements

(b) Day 2 - Use of Road Design Manual (Cont'd):

- a. Group undertaking of a road design based on the information collected from the demonstration project and including:
 - i. Determination of design traffic
 - ii. Horizontal and vertical design considerations
 - iii. Road safety considerations
 - iv. Assessment of drainage requirements
 - v. Pavement DCP assessment
 - vi. Materials utilisation
 - vii. DCP-based pavement design
 - viii. Choice of surfacing
 - ix. Typical drawing requirements

(c) Day 3 – Use of Standard Bidding Documents

- a. Highlight of differences between LVSR and traditional SBDs

4.3.2 Training report

At the end of the training programme, a Training Report will be produced which will capture the main outputs of the training activities.

ANNEXES

ANNEX A – WORKSHOP PROGRAMME

Day 1 – Tuesday 20 March, 2012

08.00 – 8.30	Registration of Participants
08.30 – 08.40	Welcome Remarks by Eng. Placid Kasakatira, Director Design and Planning for Roads Authority.
08.40 – 08: 45	Remarks by Mr Rob Geddes , Technical Manager, AFCAP
08.45 – 09.00	Opening Remarks by En g. Paul Kulemeka, Chief Executive Officer for Roads Authority and National Coordinator, AFCAP
09.00 – 10.00	Session 1: Presentation on the Draft Design Manual for Low Volume Sealed Roads – Mike Pinard
10.00 – 10:30	Plenary Discussion 1 - Facilitator
10.30 – 10.50	Coffee/Tea Break/Group Photograph
10.50 – 12.00	Session 2: Presentation Continued...
12.00 – 12.30	Plenary Discussion 2 - Facilitator
12.30 – 13.30	Lunch Break
13.30 – 15.00	Session 3: Presentation Continued...
15.00 – 15.30	Plenary Discussion 3 - Facilitator
15.30 – 16.00	Coffee/Tea Break/Group Photograph
16:00 - 17:00	Session 4: Presentation Continued....
17:00 – 17.30	Plenary Discussion 4 Close Day 1

Day 2 – Wednesday 21 march, 2012

08.00 – 9.00	Recap Day 1 – any comments
09.00 – 10.00	Session 1: Presentation of Standard Bidding Documents for Low Volume Sealed Roads– Richard Smith
10.00 – 10.30	Plenary Discussion 1 - Facilitator
10.30 – 10.50	Coffee/Tea Break
10.50 – 12.00	Session 2: Presentation Continued...
12.00 – 12.30	Plenary Discussion 2 - Facilitator
12.30 – 13.30	Lunch Break
13.30 – 15.00	Session 3: Presentation Continued...
15.00 -15.30	Plenary Discussion 3 - Facilitator
15.30 – 15.50	Coffee/Tea Break/Group Photograph
15:50 - 16:30	Session 4: Presentation Continued...
16: 30 – 17.00	Plenary Session 4 - Facilitator
17.:00 – 17:15	Way Forward - Facilitator
17:15 – 17:30	Closing Remarks by Roads Authority

ANNEX B – LIST OF WORKSHOP PARTICIPANTS: DAY 1

No	Name	Designation	Address	Phone	E-Mail Address
1	Eng. Jephitar Chagunda	Facilitator	P.O Box 265, LL	0999832092	ichagunda@yahoo.co.uk
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List of Workshop Participants- Day 2

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