



AfCAP
Africa Community Access Partnership

**Development of Low Volume Road Design Manuals
and update of standard specifications and detailed
drawings for three AfCAP member countries in West
Africa**

First Progress Report (Draft V2)



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Cover Image: Low Volume Road Sierra Leone

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Abstract

The Africa Community Access Partnership (AfCAP) is funding the preparation of manuals for Low Volume Roads (LVRs) for three AfCAP member countries in the West Africa sub-region. These are Liberia, Sierra Leone and Ghana. The new manuals will draw on documentation recently developed in other AfCAP participating countries. The preparation of the manuals includes a high level of local stakeholder participation. The manuals are expected to be published by the end of 2018.

Inputs by local experts are being supplemented by inputs by international experts with experience in the development of rural roads documentation in the Africa region. Following a series of country visits in July 2017, a 1-day stakeholder workshop was held in each country during the second half of September. These workshops served to consolidate stakeholder engagement in determining, for each manual, the most appropriate scope and style.

In all three countries, the basic structure of the manual will be as follows:

- Volume A: Geometric Design and Road Safety;
- Volume B: Materials, Pavement Design and Construction;
- Volume C: Hydrology, Drainage and Roadside Stabilisation; and
- Volume D: Complementary Interventions

In Liberia and Sierra Leone only there will be a further:

- Volume E: Maintenance.

For each of these Volumes there is within the CDS team a designated lead author. These authors have now started the process of drawing material from relevant source material as detailed in the 1st Workshop Report.

For Volumes A, B, C and D, the initial focus is on preparing the relatively detailed Ghana manual, which will then be adapted as appropriate to suit the expressed requirements of Liberia and Sierra Leone.

Since the workshops, it has taken longer than expected to establish the lines of ready communication necessary to ensure effective ongoing dialogue between lead authors and key practitioners in each of the countries. However, all three countries have agreed to a WhatsApp group through which lead authors can ask questions in a relatively informal manner, and these are already established for Liberia and Ghana. To facilitate such communication, protocols have been developed that will help ensure that it is conducted in as structured and coordinated manner as possible.

The target date for preparing text for an initial incomplete draft of the Ghana Manual is 30th November, with 15th December the target date for text for preliminary drafts of all 3 manuals. Initial drafts of each of the manuals will then be ready by approximately mid-January, or at least 2 weeks before the start of the second round of workshops. Dates for these workshops are will be agreed by late November, but are currently expected to be in late January and early February 2018.

Key Words

*Development of Low Volume Road Design Manuals and update of standard specifications and detailed drawings
for three AfCAP member countries in West Africa*

Manuals, Low Volume Roads, Capacity Building, West Africa

Acronyms and Initialisms

AADT	Annual Average Daily Traffic
AASHTO	American Association of State Highway and Transport Officials
AfCAP	Africa Community Access Partnership
ALCC	Association of Liberian Construction Contractors
ALVRS	Alternative Low Volume Road Surfacing
ASTM	American Standard Test Method
AWARE	A West Africa Response to Ebola
BRRRI	Building and Roads Research Institute
BS	British Standard
CBC	Community Benefit Clause
CBO	Community Based Organisation
CBR	California Bearing Ratio
CCCS	Contractor Classification and Certification System
CoST	Construction Sector Transparency Initiative
CDS	Civil Design Solutions
CRIG	Cocoa Research Institute of Ghana
CSIR	Council for Scientific and Industrial Research (R&D group, Ghana)
CSIR	Council for Scientific and Industrial Research (R&D organisation, South Africa)
DC	District Council
DCP	Dynamic Cone Penetrometer
DFID	Department for International Development
DFR	Department of Feeder Roads (Ghana)
DN	DCP Number (mm/blow)
DUR	Department of Urban Roads (Ghana)
ECOWAS	Economic Community of West African States
EN	European Standard
EPA	Environmental Protection Authority
ESA	Equivalent Standard Axles
ESOL	Engineering Society of Liberia
EU	European Union
FR	Feeder Road / Forest Reserve
FRAMP	Feeder Roads Alternative and Maintenance Programme
FRP	Feeder Roads Programme
GASIP	Ghana Agricultural Sector Investment Programme
GCEA	Ghana Consulting Engineers Association
GDP	Gross Domestic Product
GHA	Ghana Highways Authority
GhIE	Ghana Institution of Engineers
GIZ	Gesellschaft für Internationale Zusammenarbeit – German Development Agency
GPS	Global positioning system
GRF	Ghana Road Fund
GRFS	Ghana Road Fund Secretariat
IDS	Infrastructure Data Standard
ILO	International Labour Organization
JICA	Japanese International Cooperation Agency
KFW	Kreditanstalt für Wiederaufbau - German Development Bank
KTC	Koforidua Training Centre

L-B	Labour-Based
LSFRP	Liberian Swedish Feeder Roads Project
LVR	Low Volume Road
LVSR	Low Volume Sealed Road
LWD	Lightweight Deflection Testing
M&E	Monitoring and Evaluation
MCC	Millennium Challenge Corporation
MDD	Maximum Dry Density
MoFA	Ministry of Food and Agriculture
MLG	Ministry of Local Government
MPBS	Maintenance Performance Budgeting System (Ghana)
MPW	Ministry of Public Works
MRH	Ministry of Roads and Highways
NRSC	National Road Safety Commission (Ghana)
OPRC	Output and Performance based Road Contract
ORN	Overseas Road Note
PI	Plasticity Index
PM	Plasticity Modulus
PIT	Project Implementation Team
PMU	Project Management Unit
PUA	Public Utility Authority (Liberia)
RAI	Rural Access Index
ReCAP	Research for Community Access Partnership
RMFA	Road Maintenance Fund Administration
RMTC	Road Maintenance Training Center
RPM	Road Prioritisation Methodology
RSC	Road Safety Commission
SC	Steering Committee
SCADeP	Smallholder Commercialization and Agribusiness Development Project
SI	Site Investigation
Sida	Swedish International Development Agency
SL	Sierra Leone
SLRA	Sierra Leone Roads Authority
SMTDP	Sector Medium Term Development Plan (Ghana)
SN	Structural Number
SRI	Soils Research Institute
SSD	Single Surface Dressing
TA	Technical Assistance
ToT	Training of Trainers
TRH	Technical Recommendations for Highways
TRL	Transport Research Laboratory (UK)
TRT	Targeted Recruitment and Training
UK	United Kingdom (of Great Britain and Northern Ireland)
UL	University of Liberia
UN	United Nations
USAID	United States Agency for International Development
WAFEO	West African Federation of Engineering Organisations
WB	World Bank
WHH	Welthungerhilfe (Liberia)

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1 Introduction

1.1 Background to the Project

The Africa Community Access Partnership (AfCAP) is seeking to influence future policy in the roads sector by helping ensure that recommendations arising from high quality research established under AfCAP Phase 1 are put into practice. As part of this approach, new design manuals specifically for Low Volume¹Roads (LVRs) customised to national needs and practice have been, and are being, developed. Such manuals have so far been published under AfCAP in Ethiopia, South Sudan, Malawi, Kenya and Tanzania. These are based on the results of over 30 years of research on low volume rural roads, both paved and unpaved. Development of an LVR manual is in progress in Mozambique.

1.2 Objectives

The objective of the project is to prepare manuals for low volume roads in Ghana, Sierra Leone and Liberia based on a review, adaption and expansion of previous AfCAP LVR manuals and local manuals that are available in these countries.

The objective of the manuals is to provide, in each country, a relevant resource, based on recognised good practice, that will help build capacity and contribute to improved sector performance.

1.3 Approach

The approach to the development of manuals has been extended beyond the original scope, which focussed mainly on road design standards. It is accepted that the sustainable provision of low volume rural roads depends on a holistic approach that also recognises the importance of other considerations including design procedures, works specifications, procurement of works and supervision services, construction methods, and quality management. Increasing emphasis is being given to road maintenance as part of rural roads asset management. The approach is providing opportunities for local stakeholders to provide their input to the manuals preparation process to ensure that they are relevant to the local context.

1.4 Structure of this report

Chapter 2 starts with a brief overview of progress previously detailed in:

- The draft Inception Report issued on 12 August 2017; and
- The final 1st Workshop Report issued on 5 October 2017

A description then follows of further progress made, since the workshops, in developing the various chapters of the manuals. Using the generic structure of the manuals as developed through the country workshops, particular attention is drawn, for each volume, to:

¹Under AfCAP, Low Volume Roads are defined as roads that, over their design life, are required to carry an average of up to about 300 vehicles per day, and are subjected to less than about 1million equivalent standard axles.

- *An overview of progress made;*
- *Reference material sources being drawn on;*
- *Anticipated departures from reference material sources;*
- *The approach adopted to the development of these chapters; and*
- *Associated emerging issues, constraints and opportunities.*

Chapter 3 then summarises the way forward, including the anticipated timetable for achieving future milestones.

2 Progress to date

2.1 Timeline to date

Immediately following an official start date of 1st July 2017, the expert team visited Liberia, Sierra Leone and Ghana between the 2nd and 21st July 2017, participating in consultative workshops, and undertaking associated field visits to rural roads sites that illustrated the challenges being faced.

The draft Inception Report issued on 12th August was followed by the first round of country workshops between 19th and 26th September.

An updated summary Workplan is presented as Annex A. For each of the tasks being undertaken this shows:

- Timing as presented in the Workplan associated with the draft Inception Report;
- Actual timing of tasks already under way or completed; and
- Anticipated timing of future activities

2.2 Progress as previously reported

2.2.1 Inception Report

Issued in draft form on 12th August, this 86-page document provided details of:

- The background to the project, its objectives, and the importance of effective stakeholder engagement in each of the countries;
- The approach being adopted and the expertise being brought to bear;
- The differing context in each the three countries in terms of institutional arrangement, capacity, demands, priorities, challenges being faced and existing resources;
- Findings and Recommendations from a Literature Review and Stakeholder consultations;
- An initial assessment of the likely contents for each of the country manuals; and
- Comprehensive associated Annexes.

Comments on the draft report were received from AfCAP management on 9th November 2017.

2.2.2 First Workshop Report

This 114-page document provided details of the first round of workshops in each of the three countries, with a particular focus on discussions leading to broad agreement in each case concerning the structure, contents and style of each manual. The associated annexes included details of the 143 individual stakeholders who participated in those workshops, and of the presentations made, both by the lead authors and by government experts presenting their perspective on expectations from the manuals. Comments were received from AfCAP management on the First Workshop Report, but none from the participating countries.

2.3 Further progress not previously reported

2.3.1 General

In the time that has elapsed since the series of country workshops was completed on schedule on 26th September 2017, key activities have included:

- a) Preparing the workshop reports. The draft report was issued on 2nd October. In light of comments received, minor adjustments were made, and the final version was issued on 5th October.
- b) Seeking official feedback from the lead agency in each country on the draft Inception Report. As yet, no comments have been received, though the need for such feedback has to some extent been overtaken by the detailed discussions that took place in each country during the first round of workshops.
- c) Seeking agreement from the lead roads agency in each country on the composition of the WhatsApp group to which the lead author for each chapter of the manuals will be able to make informal reference when drafting material over the coming 2 to 3 months. Details of the membership of these Groups is presented in Annex A.
- d) Each lead author starting the process of preparing the chapters for which they are responsible. This process is described in more detail in sections 2.4 to 2.9 below, looking respectively at:
 - Volume A: Geometric Design and Road Safety;
 - Volume B: Materials, Pavement Design and Construction;
 - Volume C: Hydrology, Drainage and Roadside Stabilisation;
 - Volume D: Complementary Interventions; and, except for Ghana
 - Volume E: Maintenance.

2.4 Volume A: Geometric Design and Road Safety;

2.4.1 Overview of progress in compiling Volume A

General

At this stage, little progress has been made in compiling the manuals, though progress has been made in finalising the approach to be adopted in developing the manual and giving further consideration to related queries and comments raised by the participants at the first round of workshops. The recent establishment of the Ghana consultative WhatsApp Group is expected to result in an increased pace of resolution of such issues.

Route selection

It was agreed at the stakeholder meetings in Liberia and Sierra Leone that some guidance on route selection is required as part of Volume A. In Ghana the rural road network in Ghana is already largely established. During the first stakeholder workshop held in Freetown in September 2017, it was determined that guidance was required on the route selection for roads in hilly terrain. In Liberia, difficulties were experienced with route selection in both mountainous and lowland terrain, due to the different factors involved.

2.4.2 Reference material sources being used for Volume A

Geometric Design and Road Safety

Source documents to which reference is currently being made by the lead author responsible for Part A include:

- **Ethiopia Roads Authority Manual for Low Volume Roads (2016)**
- **Ghana Highways Authority Traffic Calming Design Guideline (2007)**
- **Ghana DFR Design Standards (2009)**
- **Liberia Best Practice Guidelines** - Developed by LSFRP
- **Liberia MoPW Feeder Road Design Manual (2012)**
- **Liberia MoPW Feeder Roads Design Manual and Specifications (2016)**
- **Liberia MoPW Geometric and Pavement Design Standards (2017)**
- **Sierra Leone MoWHI National Rural Feeder Roads Policy Document (2011)²**

Route Selection

There appears to be little written guidance on the selection of corridors and alignments for new roads in either Liberia or Sierra Leone. Usually, new roads *tend* to follow existing walking tracks and agricultural accesses. These do not always follow the optimum terrain from an engineering perspective. Where there are no existing accesses, there appears to be little information available to assist the route planner in selecting an alignment, and therefore some guidance is required.

The Route Selection Manual in Ethiopia provides comprehensive guidance on the subject of Route Section and the various issues covered in that document will be outlined as far as they apply to the West African countries. Although route selection issues and criteria are being outlined for each country as a whole, areas of hilly and mountainous terrain are being given greater emphasis, as it is in these areas where engineering difficulties and costs can escalate if incorrect decision-making is applied. This will be illustrated in the manual using the case study of the Yuelliton haul road in Nimba County, Liberia.

2.4.3 Anticipated departures from reference material sources for Volume A

In **Ghana** the design standards presented in the 1st Workshop came from the GHA 1991 Manual, which is no longer considered as definitive. It is now known that, in practice, subsequent adjustments have been made, but that these are not contained in a single reference document. Close consultation with both DFR and GHA is being sought in preparing the new manual. Such consultation will initially take place through the informal WhatsApp group.

²Although not a design manual the policies contained in this document will where appropriate be incorporated into the new manual.

2.4.4 Approach to development of Volume A

Part A of the new LVR manual will draw on relevant material from the Ethiopia LVR Manual with some adjustments being required, either to meet the individual country's local conditions and standards, or to make use of existing guidance that is still considered relevant in the national context. In the case of Ghana, DFR has made some specific observations in this regard.

More generally in **Ghana**, there is considerable resource material for low volume roads, however consideration is being taken of the fact that the practical application of some such standards has in practice been modified over time.

In **Liberia** there is an existing manual and specification for feeder roads as well as other relevant documentation for feeder roads. However, none of these contain information pertaining to the design of sealed LVRs which is being included.

In **Sierra Leone** there are no manuals for LVRs or feeder roads and therefore, unlike for the other two countries, the new manual relies on regional and international standards. The new manual will include some guidance on Planning and Prioritisation of LVRs and Route Selection for LVRs.

2.4.5 Issues, constraints and opportunities related to Volume A

Though sharing much core content, Volume A of the Manual will differ between countries, both in its content, and in the degree to which it signals an adjustment to current practices. The team's response to such issues, which were described in more detail in the 1st Workshop Report, is summarised below:

Ghana:

- As suggested in the workshop, the manual will include, where possible:
 - Process diagrams providing a ready overview for the reader; and
 - Summary tables, charts and formulae to serve as ready reference resources.
- The team has taken note of specific comments from some workshop participants suggesting the potential relevance of some further manuals, including from Bangladesh. The Geometric Design Manual from Bangladesh has now been obtained, and discussion with DFR initiated concerning specific features of that manual that they considered to be relevant.
- DFR uses a 6m minimum carriageway width, even when current and potential future anticipated traffic is very low. In such cases there may be a case for the inner slopes of the side drain to be shaped to include part of a nominally 6m wide carriageway. The team will make a proposal regarding the appropriate standards to be used for very low traffic roads.
- The manual will include guidance on appropriate adjustment to standards when low volume roads pass through villages.
- Full provision will be included for road signs on LVRs

Liberia:

- The Liberia manual will incorporate geometric design standards already adopted by the country under the Liberia-Swedish Feeder Road Project.

- Conversion tables will be provided for users who may prefer to work in the Imperial system.
- American-English spellings will be used throughout.

Sierra Leone:

- Sierra Leone needs its own standards appropriate to local conditions. These conditions are highly variable in terms of soil type, rainfall, and topography.
- Road signs will include warning at locations where there is considered to be a high risk of vehicles encountering animals on unfenced roads.

2.5 Volume B: Materials, Pavement Design and Construction;

2.5.1 Overview of progress in compiling Volume B

As described in the draft Inception Report and the 1st Workshop Report, the structure and proposed content of Part B of the manual is now broadly established, though remains subject to adjustment in the light of ongoing consultations.

Evaluation of the functional road network classification has been completed and was presented during the first round of workshops. Section 1.2 of Part B is now being prepared on this basis. While in terms of content there will be different nuances between the three countries, the structure of the manual and the chapters will be similar.

The flow diagram indicating the relationship between the various input parameters, the processes to be followed and the outputs for the selection of materials and structural design of pavements was presented to stakeholders and can be adopted for all three countries.

In addition, the Pavement & Materials Expert on the project team obtained access to the AfCAP LVR-DCP discussion Forum and a license for the AfCAP LVR-DCP software for Low Volume Road (LVR) design and analysis. This software was evaluated and referenced at the first round of workshops to sensitise stakeholder to the use of the DCP-DN design method.

The development and drafting of the text for the above sections has now commenced.

2.5.2 Reference material sources for Volume B

Pavement design and materials

The primary source of reference material in the three countries are as follows:

- Ghana:
 - Ministry of Roads and Highways: Design Standards for DFR
 - Ministry of Roads and Highways: Standard Specifications
- Liberia:
 - Ministry of Public Works: Geometric and Pavement Design Standards
 - Ministry of Public Works: Feeder Roads Design Manual and Specifications
 - Ministry of Public Works: Technical Specifications for Contracted Rural Roads Projects
- Sierra Leone:

- National Rural Feeder Roads Policy
- “Standard” specifications (materials) various feeder road projects in Sierra Leone (IDA & EU)

Existing international reference material relevant for the pavement design and materials sections which have been evaluated in depth during the reporting period include:

- Overseas Road Note 31; and
- LVR manuals for Tanzania and Ethiopia.

Site Investigations

Regarding Site Investigations, the ERA LVR Manual (2017) will be the primary source, though there are some useful illustrations contained in the Tanzanian LVR Manual (2016) that will assist. Much of that which is contained in these manuals is generally relevant to the three West African countries. None of the West African countries has a Site Investigation Manual as such, and the ERA manual contains some useful background that can be modified to be applicable to West Africa.

As far as home-grown documentation is concerned, there is very little available guidance in Sierra Leone or Liberia on methods of site investigation for low volume roads. The Ghana Practitioner’s Guide to Rural Road Improvement and Maintenance contains some relevant reference material and this is being utilised wherever appropriate. In Liberia, the Feeder Road Design Manual contains some useful pointers that are being used as reference. But the bulk of the material in the West Africa LVR Manuals will be drawn from the ERA 2017 LVR Manual and other regional sources.

2.5.3 Anticipated departures from reference material sources for Volume B

Following a recommendation made by a DFR participant at the Ghana workshop, a copy of the Bangladesh Pavement Design manual has been obtained, and its potential relevance to the West Africa context is now being evaluated.

2.5.4 Approach to development of Volume B

The following topics will receive increased attention in the coming period, as these are deemed critical for the performance of low volume roads in the project area:

- **Site physiography:** The West African Region is characterised by very high annual rainfall in comparison to the rest of Africa. Liberia and Sierra Leone receive the highest annual rainfall. This has a profound effect on the performance of roads in general and unpaved roads in particular. The identification and characterisation of rainfall patterns in West Africa is therefore of importance. For the purpose of pavement design, this will be facilitated through the introduction of a climatic indicator such as the Thornthwaite Moisture Index;
- **Subgrade characterisation:** Traditionally, subgrade material is characterised by taking materials samples from the field and testing these in the laboratory. Testing facilities and resources are limited in the three member-countries and the use of the DCP as testing methods to characterise pavement layers and subgrade material is promoted by AfCAP, alongside conventional methods. As an extension of other AfCAP funded manuals, this will be continued for the three West African countries. In addition, the

use of Light Weight Deflectometer (LWD) is currently receiving attention in Ghana and comparative testing between DCP and LWD is underway. The potential of LWD testing as a method to characterise subgrade response will be evaluated and incorporated in the manual to the extent that it is relevant.

2.5.5 Issues, constraints and opportunities related to Volume B

Feedback and consultation

No significant problems have been encountered to date in the development of Volume B of the manuals. The most serious constraint for the drafting of the chapter is the time limitation. This is, however, being managed by the project team and is not envisaged to impact on the project deliverables.

A challenge faced by the project team in the drafting of the chapter following the workshops has been the pace and extent of active ongoing stakeholder participation in the three member countries. Communication platforms and channels have been put in place to mitigate this. The recent establishment of consultative WhatsApp Groups in Ghana and Liberia is a key development in this regard.

Classification of Traffic, and of Subgrades

At the workshops, a proposal for rationalising the traffic classes and subgrade classes for pavement design was presented and discussed. The proposed traffic classes will ensure uniformity across the three member countries in West Africa and optimisation of the number of traffic classes. Likewise, subgrade classes were presented and discussed. The adopted traffic and subgrade classes provide a balance between a sufficient number necessary to appropriately capture design inputs and a practical number of output standard pavement structures. The rationalised traffic and subgrade classes will be an improvement on existing manuals and facilitate wide adoption of the manuals by practitioners.

2.6 Volume C: Hydrology, Drainage and Roadside Stabilisation;

2.6.1 Overview of progress in compiling Volume C

Preparation

As described in detail in the previous reports, the Hydrologist/Drainage Expert has compiled a library of both hard and electronic copies of a range of existing design manuals, specifications and standard drawings for design of drainage structures on low volume roads used by the road agencies in the three countries. These have been evaluated for relevance to the development and updating the existing manuals. Reference has also been made where appropriate to similar resources from other countries mainly under the AfCAP Phase 1 Project to serve as a guide in the development and updating the existing manuals. Discussions associated with the three country workshops has further helped to shape the approach adopted.

Drafting

Preliminary text has been prepared covering the following major topics related to hydrology and drainage in Part C of the manual:

- *General Introduction;*
- *Classification of Low Volume Road Drainage;*
- *Hydrological and Drainage Studies;*
- *Selection of Drainage Structures;*
- *Hydraulic Analysis; and*
- *Sedimentation and Erosion Control.*

2.6.2 Reference material sources for Volume C

The primary sources of material being used in developing Volume C of the Ghana manual are the existing Department of Feeder Roads (DFR) Guidance Notes for Drainage Design on Rural Feeder Roads and its accompanying CD, DFR Guidance Notes for Rural Feeder Roads design and DFR Site Supervision Pocketbook. The Ethiopian and Tanzania Design Manuals for LVR that were developed under AfCAP 1 are being used where appropriate as a significant supplementary source of material.

For Liberia, the primary sources of material being used in developing manual are the existing Feeder Roads Design Manual 9thMarch2012 and Typical Design Drawings of Drainage Structures, 6thMarch 2012. The Ethiopian and Tanzania Design Manuals for LVR are also being used as supplementary sources of material to augment sections which are not well covered in the existing manual.

The Ethiopian Design Manuals for LVR is being used as the primary source of material for development of the drainage manual for Sierra Leone since there is no existing documented manual. The Liberian Feeder Roads Design Manual (March 2012), Tanzania Design Manuals for LVR and the Department of Feeder Roads (DFR) Guidance Notes for Drainage Design on Rural Feeder Roads, Ghana are some of the supplementary materials being used to develop the drainage manual for Sierra Leone.

In all cases, emphasis is being placed on the estimation of peak flows as a key input for estimating the size and determining the adequacy of existing and new drainage structures. A flow chart has been developed to help the user understand the processes to follow in estimating the maximum discharge and size of side drains and culverts. Similarly, a flow chart for estimating the flow velocity has been developed to assist the user make a decision on provision for siltation, scour and erosion checks. Simple computer based software for carrying out both hydrological and hydraulic analysis has been suggested. It is proposed that a CD that explains the processes to follow will be included as part of the manual for each country, to complement what is already being used in Ghana.

Guidance will be included in the manual on drainage design in response to climate change. Reference will be made to the Guideline and Handbook developed under the AfCAP Regional Climate Adaptation Project.

2.6.3 Anticipated departures from reference material sources for Volume C

Established sources of data will be used in each case. However, the marked differences in both current and projected rainfall patterns between countries will have a bearing on associated risk assessments and hence some aspects of the design approach.

2.6.4 Issues, constraints and opportunities related to Volume C

The main challenge faced in developing the drainage-related aspects of Volume C of the manual has been the slow pace of communication with stakeholders who offered in the first round of workshops to make relevant information available to the lead author. The recent establishment of a WhatsApp Group is expected to improve such communications. Meanwhile some, but not all, such information has already been identified through other sources.

2.7 Volume D: Complementary Interventions

2.7.1 Overview of progress in compiling Volume D

Complementary interventions are about creating opportunities through road project contracts to further enhance the positive impacts, and reduce potential negative effects of low volume roads. As such they extend beyond the normal scope of road-related contracts.

Though stakeholders in all three countries expressed an interest in including complimentary interventions within the scope of the manual, there was only limited specific discussion at the time about the likely scope of such a volume. Pending the establishment of a WhatsApp Group in each country to facilitate ready ongoing consultation, the focus since the workshop has therefore been on considering which such interventions are most likely to be considered important in each of the countries. Consideration is also being given to how Volume D could add value not only to road projects being prepared through the use of the manual, but also potentially to the manual itself.

2.7.2 Reference material sources used for Volume D

As agreed in the workshops, the primary reference document adopted is Part C of the Ethiopia LVR Manual Part C. However, further relevant source material to which reference is being made includes:

- Elements of Ghana's Road Prioritisation Methodology (RPM), which includes some proven mechanisms for stakeholder engagement in rural access planning;
- Established mechanisms in each of the 3 countries for including contract provisions that promote policy imperatives such as the development of small contractors, that are not necessarily directly related to the primary scope of the works.
- Elements of ISO 10845, the international standard for construction procurement, Parts 5, 6, 7 and 8 of which potentially relate to complementary interventions regarding, for instance, the promotion of SMEs, or the choice of technology.
- Established good practice in both the proactive and reactive public disclosure of information related to public works contracts. The Infrastructure Data Standard developed under the DFID-supported CoST initiative for transparency in the public procurement of infrastructure could potentially be relevant in this regard.
- International papers concerning the relevance and applicability of Community Benefit Clauses (CNC) in general, and Targeted Recruitment and Training (TRT) in particular.

2.7.3 Anticipated departures from reference material sources for Volume D

Part C of the Ethiopia LVR manual provides a sound and concise basis for the structure and basic scope of Volume D. However, significant adjustments will be required to make this

relevant for each of the 3 countries. This is because it entails consideration of the entire procurement cycle, and therefore needs to be adjusted to make sense in relation to the very different institutional context pertaining in each of the 3 countries.

In addition, some adjustments will be made in order to take advantage of:

- a) Additional potential source material as presented above; and
- b) The potential for this concise volume to serve as a useful point of reference to the broader institutional context for LVRs in each of the 3 countries.

2.7.4 Approach to development of Volume D

The proposed approach to the development of this Volume is to:

- Start with Part C of the Ethiopia Manual;
- Identify and highlight the (many) elements that will need to be adjusted to reflect the different institutional context in Ghana;
- In consultation with Ghana-based team members, adjust the text accordingly, while also extending the scope to include, in outline form, reference to the RPM, and the Construction Sector Transparency Initiative (CoST), Infrastructure Data Standard (IDS) which defines established good practice in transparency in the procurement of public infrastructure;
- Consult with Ghana stakeholders. Because of the concise nature of this volume, this need not be an onerous exercise;
- Adjust the draft text for Ghana in response to feedback; then
- Follow a similar process to reflect the contexts in Liberia and Sierra Leone

2.7.5 Issues, constraints and opportunities related to Volume D

The most significant constraint is likely to be one of time. Following the delay in establishing strong mechanisms for ongoing communication with stakeholders in each country, the remaining time available is now limited, and there will be an understandable tendency to focus first on what are considered to be core Volumes of the manuals.

That said, the relative brevity of this volume, and the opportunity that it potentially offers to provide an overview of the institutional landscape in each country, opens the possibility that the preparation of Volume D will facilitate and complement, rather than hinder, the development of the other volumes.

2.8 Volume E: Maintenance (in Liberia and Sierra Leone).

2.8.1 Overview of progress in compiling Volume E

Volume E for road maintenance is required only for Liberia and Sierra Leone. Ghana already has sufficient guidance documentation for rural road maintenance. Initial progress on the maintenance manual has included conceptualising appropriate modifications to the Ethiopia LVR Manual Part G, which will be the basis for the new manuals. In particular, it has been decided to modify and improve many of the illustrations in the Ethiopia Part G, though this will depend on the sufficiency of the budget provision for new illustrations.

2.8.2 Reference material sources used for Volume E

Volume E for Liberia and Sierra Leone will be based on, and very similar to, Part G of the ERA LVR Manual.

2.8.3 Anticipated departures from reference material sources for Volume E

Where possible the images (drawings and photographs) in the Ethiopia manual will be replaced with unique images more directly relevant to West Africa. However, the text and layout are expected to replicate the Ethiopia manual.

2.8.4 Approach to development of Volume E

The initial approach to Volume E for Liberia and Sierra Leone is similar to the approach used to develop the Ethiopia maintenance manual. In Ethiopia it was recognised that generic guidelines for maintenance were required which would be relevant under different implementation modalities. The manual identifies typical defects found on rural roads and describes the maintenance activities required to address the defects. Labour-based and equipment-based alternatives are given. An important component of the Ethiopia manual, which will be included in Volume E for Liberia and Sierra Leone, are the Standard Specifications for maintenance and method of measurement. The coding system for bill items used in Ethiopia will be retained, at least for the first draft of the new manuals.

2.8.5 Issues, constraints and opportunities related to Volume E

The key issue for the development of Volume E is that it should provide general guidance on rural road maintenance without being tied to any particular maintenance implementation system. Neither Liberia nor Sierra Leone currently has in place a national system for maintaining rural roads, though both countries are starting to develop such arrangements. However, it is noted that the provision of specifications and method of measurement in the maintenance manual assumes that the works will be carried out through commercial contracting rather than force account. There is currently no intention to establish force account maintenance operations for rural roads in Liberia and Sierra Leone.

3 Way Forward

3.1 Immediate next steps

As set out in the updated Work Plan in Annex A, the bulk of the drafting of the manuals will take place during the month of November. This will establish the core content of the Ghana manual, clarify where gaps remain and generate a detailed list of requirements for:

- High quality country-specific photographs that serve to facilitate the communication of key concepts or recommendations; and
- Clear charts and diagrams, some of which will be generic, and others country-specific.

From early December, the separate country manuals will start to take shape, leading to a preliminary draft of each of the manuals. This could potentially be ready before Christmas, but more realistically by early to mid-January. This will ensure that the drafts can be made available to stakeholders in each country at least 2 weeks, and if possible 3 weeks, before the 2nd round of workshops.

The dates of the second round of workshops have been discussed informally with the host agencies prior to official communications, and are proposed as follows:

Liberia	25 th and 26 th January 2018
Sierra Leone	29 th and 30 th January 2018
Ghana	1 st and 2 nd February 2018

The workshop dates are slightly earlier than envisaged in the workplan. This is due to other commitments of the CDS team in early February.

It is expected that the second workshops will include smaller groups of participants than the first workshops. The participants will be mainly technical staff from the agencies, universities and private sector. The intention is to conduct exercises in small groups, with the participants being required to use sections of the new draft manuals. Consideration is being given to including a site visit in the workshop programme, but the logistics of such an exercise are onerous, in particular the travel time to reach an appropriate site from the workshop venues.

It is noted that the contract dates for key deliverables have been superseded by a more informed planning of the project process. The revised dates were included in the Inception Report, but they have not yet been formalised through a contract addendum.

3.2 Peer Review

The first workshops in September enabled the project team to identify individuals who could act as local peer reviewers for the draft manuals. These were individuals who showed significant understanding of issues around the provision of low volume roads during the workshop discussions. The individuals that were identified will be approached in due course and contracted if they are available.

It has been agreed with the ReCAP management that Eng. Charles Bopoto from Zimbabwe will act as the International Peer Reviewer. This input will likely be provided mainly from his home base as there is insufficient budget to enable Eng. Bopoto to visit the participating

countries. He is, however, currently participating in the AfCAP GEM project, which involves periodic visits to Sierra Leone. By appropriate scheduling of these visits it is expected that Eng Bopoto may be able to attend the second workshops in Sierra Leone and possibly Ghana.

Annex A. Workplan

ACTIVITY	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	
Task 1: Desk Study		■	■	■																
Task 2: Initial consultations		■	■																	
Task 3: Site Visits		■	■																	
Task 4: Evaluation		■	■	■																
Task 5: 1st Workshops					■	■														
Task 6: Verify Scope					■	■														
Task 7: 2nd Workshops										■	■									
Task 8a: Manuals (WORD)				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Task 8b: Manuals (DTP)														■	■	■	■	■	■	■
Task 10: Peer Review										■	■	■	■							
Task 11: 3rd Workshops																			■	■
Task 12: Final Report																				■
WAM Project Milestones		NOTE: These formal Milestone dates have not yet been amended to reflect the CDS proposal, and the slightly modified workplan as presented in the draft Inception Report																		
Inception Report	14-Aug	▲																		
1st Workshop Report	25-Sep			▲	■															
1st Progress Report	23-Oct				▲	■														
2nd Workshop Report	11-Dec						▲			■										
Draft Final Manuals etc	05-Mar									▲										
Peer Review Report	16-Apr										▲									
Print-ready Manuals WORD	14-May											▲								
Print-ready Manuals DTP	19-Nov																		▲	■
3rd Workshop Report	17-Dec																			▲
Final Project Report	17-Dec																			▲

Annex B. Membership of Consultative WhatsApp Groups

Ghana

Name	Position	Organisation*
Ing. Peter Yawson	Chief Engineer	Department of Feeder Roads
Ing. Herbert Koranteng	Chief Engineer	Department of Feeder Roads
Ing. Akosah-Koduah	Chief Engineer	Department of Feeder Roads
Ing. Sarpei-Nunoo	Chief Engineer	Department of Feeder Roads
Surv. Joseph Idun	Chief Quantity Surveyor	Department of Feeder Roads
Ing. Akwasi Asamoah	Principal Engineer	Department of Feeder Roads
Ing. Samuel Banini	Principal Engineer	Department of Feeder Roads
Ing. Dr Patrick Bekoe	Principal Engineer	Department of Feeder Roads

*DFR will serve as a conduit for communication with other stakeholders

Liberia

Name	Position	Organisation
1. Sumoiwuo Z. Harris	Assistant Minister Rural Development	Ministry of Public Works
2. Alibaba K. Kpakolo	Head of Feeder Roads	Ministry of Public Works
3. Christopher Blamo	Engineer, Feeder Roads	Ministry of Public Works
4. Dave Lormie	Engineer, Feeder Roads	Ministry of Public Works
5. Amos Barclay	Lecturer	University of Liberia

Sierra Leone

Name	Position	Organisation*
<i>To be advised</i>		
<i>To be advised</i>		
<i>To be advised</i>		
<i>To be advised</i>		
<i>To be advised</i>		