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Training-of-Trainers in the use of the DCP-DN Pavement Design Method in Malawi

Inception Report

J. Hongve & E. Mukandila

AFCAP Project Reference Number MAL2007D

July 2017

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AFRICA COMMUNITY ACCESS PARTNERSHIP (AfCAP)

Safe and sustainable transport for rural communities

AfCAP is a research programme, funded by UK Aid, with the aim of promoting safe and sustainable transport for rural communities in Africa. The AfCAP partnership supports knowledge sharing between participating countries in order to enhance the uptake of low cost, proven solutions for rural access that maximise the use of local resources. AfCAP is brought together with the Asia Community Access Partnership (AsCAP) under the Research for Community Access Partnership (ReCAP), managed by Cardno Emerging Markets (UK) Ltd.

See www.afcap.org

Acronyms, Units and Currencies

AfCAP	Africa Community Access Partnership
DC	Design Consultant
DCP	Dynamic Cone Penetrometer
DN	DCP Number (mm/blow)
GoM	Government of Malawi
Km	Kilometre
LVSR	Low Volume Sealed Road(s)
M	Metre
RA	Roads Authority
ToT	Training of Trainers
UK	United Kingdom (of Great Britain and Northern Ireland)
UKAid	United Kingdom Aid (Department for International Development, UK)

Contents

1 Executive Summary

The Roads Authority (RA) wishes to expand and embed the use of the DCP-DN Design Method for cost-effective design of Low Volume Sealed Roads (LVSR) in Malawi building on the previous AfCAP technical support and training of RA staff and local consultants in the use of the method. To this end a project has been designed to undertake Training-of-trainers (ToT) for up to fifteen (15) candidates that have previously been trained up to an intermediate level of proficiency.

Upon the request by RA, AfCAP has engaged a team of LVSR Experts that have been involved in the previous training and technical support activities to Malawi to undertake the ToT project.

RA has over the last couple of years been implementing a yearly upgrading programme of selected unpaved roads to LVSR standard using recurrent maintenance funding. Up until now the upgrading works have been carried out without a proper design resulting in inadequate drainage provisions, which will eventually shorten the life span of the upgraded sections, as well as poor geometric design that impacts negatively on safety of road users. Realising the shortcomings of this approach, the RA has now contracted a Design Consultant (DC) to undertake design of three road sections, each approximately 5 km long, which are to be constructed in financial year 2017/18.

The ToT is expected to be combined with the design and construction of three identified road projects in order to elevate the national trainers to an advanced level of proficiency. This will enable them to sustain the mainstreaming and expansion of the application of the DCP-DN method in Malawi and other countries through training and mentorship, with diminishing support from the international trainers.

The road sections were intended to be designed as part of the ToT courses. However, due to the urgency of completing the designs to facilitate construction during the financial year 2017/18, the design will be completed by the DC and reviewed by the AfCAP Team, before end of August 2017. The practical training for the ToT project will instead be conducted on the extension of one of the project roads S126 Linthipe – Lobi, which will be part of the upgrading programme for 2018/19, thus maintaining one of the key elements of the ToT course. Revisions to the Milestones and Deliverables as shown in Table 1, are thus proposed.

Table 1: Proposed revisions to Milestones and Deliverables

Milestones & Deliverables	Original proposal	Revised Work Programme
Design Review (by AfCAP Team)	Weeks 12/13	Weeks 9/10
Final Design Report (by DC)	Week 16	Week 11
Training Courses	Weeks 18/19 Weeks 25/26 Weeks 30/31	Weeks 21/22 Weeks 30/31 Weeks 35/36
Final Report (end of Phase 1)	Week 35	Week 40

The trainees will be divided in two groups of 7-8 persons each and be trained in two separate courses in the beginning of November 2017 and January 2018 respectively. Based on experiences from a similar ToT project in Ghana, provisions have been made for a third course in February 2018 for those that need more training and practice as trainers before they can be accredited as Trainers.

At the end of Phase 1, in March 2018, a two-day workshop will be held to consolidate the training and recapitulate challenging aspects of the DCP-DN design method. Plans will also be worked out for Phases 2 and 3 of the project.

2 Introduction

2.1 Background

The Africa Community Access Partnership (AFCAP) is a programme funded by the UK government through the Department for International Development (DFID) to promote safe and sustainable rural access in Africa through research. The aim is to make vital contribution to the sustainable socio-economic development of remote regions, and in particular the disadvantaged groups, in terms of access to markets, schools, health facilities and employment opportunities. The first phase of AFCAP was implemented from June 2008 to July 2014 and the second phase of the programme commenced in 2014 and will cover a period of 6 years.

Previous AFCAP activities in Malawi have included the preparation of a new pavement design manual for low volume sealed roads which is based on the DCP DN design method. The manual was published as an official Malawi government document in September 2013 and laid the basis for the application of the DCP DN Design Method of Low Volume Sealed Roads (LVSR) in Malawi.

Upon request from the Roads Authority, further AfCAP support has been given as follows:

- A one-week training course on pavement design using the DCP-DN method conducted in April 2014. The training event was attended by 16 participants from the private sector and government road agencies in Malawi.
- Technical support for the design and implementation of 40 km of LVSR funded by the World Bank (WB) under the ASWAP-SP programme in 2015/16.
- A new training course for a further group of 29 trainees in the period 11-22 July 2016.

2.2 Project Context

The soaked California Bearing Ratio (CBR) procedure is a long established empirical strength test that historically has been used extensively for materials selection and in the design of pavement and earthwork layers. Though tested and tried, it is generally interpreted in a very conservative manner. In addition, the test procedure is time consuming, costly, and requires large samples for laboratory testing with poor reproducibility for non-homogenous materials.

The Dynamic Cone Penetrometer (DCP) has been an established tool for in-situ estimation of subgrade strength for more than 20 years and used as such extensively in Africa and other regions. Recently, an alternative method for DCP application has been developed for pavement structural design that avoids the use of direct correlation with the CBR test by utilising the cone penetration rate (DN value) obtained directly from DCP measurements to quantify the in situ strength of materials. This procedure is becoming popular because of its simplicity in the upgrading design of sealed roads. Under AFCAP 1, the DCP-DN pavement design procedure was trialled and undertaken in countries such as Kenya, Malawi, and DRC.

As a result of the successful implementation and completion of the road projects mentioned in section 1.1 above, the Government of Malawi (GoM), through the Roads Authority, now wishes to extend the application of the innovative DCP-DN method for the cost-effective provision of low volume sealed roads to the design and construction of a further 15km of LVSR spread across three new roads in the Southern, Central and Northern regions of the country.

In order to build on the momentum from the initial training, design and construction of the previous 40km of LVSR, this project is designed to identify up to fifteen (15) candidates to undergo a Training-

of-Trainers (ToT) course. These trainees will be selected from the groups that underwent initial training to an intermediate level and will include candidates from Tanzania and Zambia.

The RA will oversee the procurement of contractors and supervision consultants for the construction of the road sections. On completion of the construction, the trainees will be trained in the basics of establishment and monitoring of the road projects (baseline study only) for long term pavement performance (LTPP) in accordance with regional protocols. The actual implementation of the LTPP monitoring of the road sections is expected to be carried out by a local service provider through separate contractual arrangements with AfCAP as part of a wider monitoring programme.

An economic analysis (in initial construction costs and life-cycle terms) will be undertaken to compare this design method with a traditional CBR-based design. The project will be divided into three phases for management purposes. Phase 1 will involve the running of DCP-DN training courses and the design of road sections. Phases 2 and 3 will involve the construction and long-term performance monitoring of the trial sites respectively.

2.3 Objectives

2.3.1 Overall aim

The overall aim of the project is:

- To train a maximum of fifteen (15) trainers: four (4) from local consulting firms, four (4) from the RA and two (2) from the University of Malawi (T2 Centre) plus up to five (5) from Tanzania and Zambia as well as local training institutions to an advanced level to allow for widespread training in the DCP-DN design method throughout Malawi (and Zambia and Tanzania) using the AfCAP LVR DCP-DN design software.

  As part of the training, trainees will be expected to design actual road sections using the method (included in phase 1); monitor construction (incorporating technical audit exercises at the beginning, peak and end of construction) and use of the DCP for compaction quality control (phase 2); undertake an economic analysis of the method and monitor the section for LTPP (phase 3). The current assignment (phase 1 only) is aimed at the training of trainers in the DCP-DN method using the AfCAP LVR DCP-DN software together with preparation of the designs for the demonstration sections.

- To further demonstrate the effectiveness in technical and economic terms of the DCP-DN design methodology as a viable alternative to the CBR method for the design, construction and maintenance of low volume roads in Malawi.
- To design and construct road sections with subsequent performance monitoring.

2.3.2 Capacity Building

- Capacity building is an integral part of the AFCAP programme. This project is directly in line with the AfCAP capacity building strategy in that it will train ten (10) candidates from Malawi, who attended the initial intermediate level training courses, to an advanced level to enable them to undertake similar DCP-DN training interventions for practitioners in Malawi on an ongoing basis.
- The participation of national training institutions in the training will further enhance sustainability of the capacity building effort. The project will also explore the possibility of incorporating up to five (5) trainees from neighbouring Zambia and Tanzania who have already benefitted from initial training at intermediate level.

- The project will provide the opportunity for the practical application of the DCP-DN method for the trainee trainers.

2.3.3 Uptake and Embedment

- Uptake and embedment are key targets for AFCAP. The uptake of this project is based on the principle that the training of the expected fifteen (15) trainers will facilitate wider application and further embedment of the DCP-DN design method for the cost-effective construction of low volume roads in Malawi, Zambia and Tanzania.

  Training courses provided for the trainees with support from the appointed AfCAP experts will be part of the training programme and uptake strategy.

2.4 Project Phases

The project will be executed in three distinct phases as indicated below.

- Phase 1: Training the trainers including design of the road sections, design review of each project by the trainers;

- Phase 2: Procurement and construction of the road sections (by RA); monitor construction, supervision and quality control including technical audit exercises at start, peak and end of construction. Assist with preparation of Completion Reports by supervision consultants. This will include capturing and recording of actual construction costs.

- Phase 3: Training in establishment and monitoring of LTPP sections at the end of construction. Tasks will include actual establishment of monitoring sections, carrying out baseline surveys and preparation of the Baseline Survey Report in accordance with updated regional protocols.

2.5 Project Team

To implement the project, AfCAP has engaged a team of experienced International Trainers consisting of:

J. Hongve Team Leader / Trainer
E. Mukandila Design Engineer/Assistant Trainer

The team members have conducted and been involved in the delivery of similar training courses in Kenya, Malawi, Tanzania and Ghana and have been actively involved in the development of the AfCAP LVR DCP Software.

2.6 Purpose and Scope of the Report

The purpose of this report is to provide detailed feedback from the activities carried out in the Inception Phase of the project and agreements reached on the way forward.

3 Inception Activities

The Inception visit to Malawi took place from 19th to 28th June 2017 with the following itinerary:

Table 2: Inception visit itinerary

Mon 19th June	Arrival in Lilongwe, meeting at RA 14.30	Overnight in Lilongwe
Tue 20th June	Travel to Mzuzu	Overnight in Mzuzu
Wed 21st June	Site visit Rumphi – Nyika	Overnight in Mzuzu
Thu 22nd June	Travel to Lilongwe	Overnight in Lilongwe
Fri 23rd June	Travel to Blantyre, meeting at T2 Centre	Overnight in Blantyre
Sat 24th June	Site visit to Zaka-Neno-Kambale, return to Lilongwe	Overnight in Lilongwe
Sun 25th June	Site visit to Linthipe-Lobi	Overnight in Lilongwe
Mon 26th June	Meeting with DC, detailed Work Programme	Overnight in Lilongwe
Tue 27th June	Revision of specifications, meeting at RA	Overnight in Lilongwe
Wed 28th June	Reporting, departure to Joburg	Flight departure 13.05

3.1 Kick-off meeting

On arrival in Lilongwe, a project kick-off meeting was held at RA to agree on the way forward. From the discussions, the following key issues emerged:

- The AfCAP Consultants had no prior knowledge of the timeframes of the RA Construction programme and the progress with the design of the three roads when preparing the Technical Proposal. The meeting agreed that the proposed ToT Work Programme would therefore need to be revised in such a manner that the tasks and responsibilities of the AfCAP Team under their ToR are accommodated, both in terms of design review of the three road sections and the ToT.
- The meeting therefore proposed that the design of the three road sections should go ahead as planned in order not to delay the RA construction programme, and that the practical training under the ToT should be carried out on the remaining portion of S126 Linthipe – Lobi, which will be constructed during the financial year 2018-19.

The Minutes of the kick-off meeting is attached in Annex 1.

3.2 Site visits

The AfCAP Team visited the three project sites as per the planned itinerary together with the Highway Planning Engineer J. Chilongo from RA, who has been assigned as the RA Project Co-ordinator.

3.2.1 General observations

These road sections are part of the RA yearly construction programme using maintenance funding. Up until now, the previous sections of the same roads have been constructed without being properly designed, basically by just reshaping and adding a new subbase and/or base, as required, on top of the existing gravel wearing course, before sealing.

This has resulted in the finished road levels generally being too low and often below the surrounding ground as illustrated below. Little attention has also been paid on the provision of adequate drainage.

Figure 1: Examples of completed and ongoing works on the three project roads

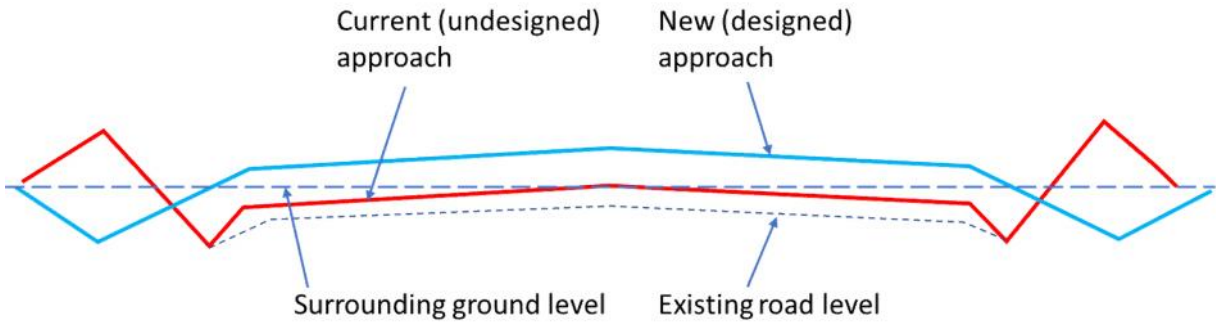


Figure 2: Illustration of current and new construction approach

3.2.2 M24/M9 Rumphi – Nyika

The team was meant to be accompanied by the Materials Engineer, Nelson Kachali, from the Design Consultant (DC), Pamodzi Consulting Engineers. However, due to family reasons he was unable to participate in the site visit. The location of proposed borrow pit was shown to the team by a driver from the DC.

Observations

- The section traverses through mostly flat terrain.
- No changes are required on the horizontal alignment, but the existing road level is generally well below the surrounding ground with high windrows of material on both sides.

- A potential borrow area for pavement material had been identified and some trial pits opened up. However, these had been dug manually and were quite shallow. From observations around the same area, it is assumed that good laterite for the pavement layer(s) can be found at a greater depth.

Recommendations

- The road levels generally need to be lifted quite substantially to ensure adequate drainage
- In-situ subgrade material from side borrow should be used as much as possible to raise the formation level.
- The geometric design must ensure adequate grades in the side drains and provision of outlets / turnouts. A drainage plan should be provided in the form of a strip map clearly showing the grades and location of outlets/turnouts.

Figure 3: Typical sections on the Rumphi – Nyika road

3.2.3 T397 Zaka – Neno

The team was accompanied on site by B. Malewa (Surveyor) and B. Massi (Materials Technician) from Pamodzi Consulting Engineers.

Observations

- The section winds through hilly terrain with many fairly sharp curves and crests.
- The alignment is generally acceptable and only minor adjustments will be required.
- Existing road level is generally at or below the surrounding ground and requires lifting to ensure adequate drainage.
- Potential sources of pavement material had been identified at two locations along the road, one with quartzitic gravel and the other with laterite.

Recommendations

- Further materials prospecting needs to be carried out to ensure the availability of the required quantity and quality of material for the pavement layer(s)
- Side borrow should be used as much as possible to lift the formation level.
- Warning signs and speed reducing measures must be installed in potentially hazardous sections.
- The geometric design must ensure adequate grades in the side drains and provision of outlets / turnouts. A drainage plan should be provided in the form of a strip map clearly showing the grades and location of outlets/turnouts.


Figure 4: Typical sections on the Zaka – Neno road

3.2.4 S126 Linthipe – Lobi

The team was accompanied on site by J. Chagunda (Team Leader) and N. Kachali (Materials Engineer) from Pamodzi Consulting Engineers.

Observations

- The section traverses through mostly flat terrain.
- No changes are required on the horizontal alignment, but the existing road level is generally well below the surrounding ground with windrows of material on both sides.
- A potential borrow area for pavement material had been identified close to the end of the section. Some trial pits had been dug showing the occurrence of what seemed like a good quality laterite.

Recommendations

- The road levels generally need to be lifted to ensure adequate drainage
- In-situ subgrade material from side borrow should be used as much as possible to raise the formation level.
- The geometric design must ensure adequate grades in the side drains and provision of outlets / turnouts. A drainage plan should be provided in the form of a strip map clearly showing the grades and location of outlets/turnouts.


Figure 5: Typical sections on the Linthipe – Lobi road

3.3 Materials prospecting and testing

The DC had identified potential borrow pits for pavement material on the three sites. However, more prospecting and excavation of deeper and/or new trial pits using a backhoe may be required to establish proper borrow pit plans and to estimate the quantities available of the various qualities of materials within the borrow pits.

From a visual inspection of the trial pits and assessment of the material samples collected from M24/M9 Rumphi – Nyika road, it is suggested that deeper trial pits may have to be excavated to reach better material at greater depth.

Reliable materials test results are key to the success of the DCP-DN design method. From past experience, the AfCAP Team expressed reservations during the kick-off meeting about the ability of the Central Materials Laboratory (CML) to conduct the required tests in a reliable manner, mainly due to the bad condition of some of their laboratory equipment.

Materials prospecting and testing is the responsibility of the DC, and they will have to find ways to ensure that pavement materials of the required quantity and quality is identified and that reliable test results are attained.

One option could be to conduct the tests, or parts thereof, at the Polytechnic in Blantyre. During the visit to the Polytechnic on 23rd June, it was confirmed that their laboratory was well equipped and that they would be able to carry out the required testing upon request by the DC.

The AfCAP Design Engineer will travel back to Malawi and spend three weeks from 10th to 28th July to support the DC with further materials prospecting, as required, and to ensure that the materials tests are being carried out as per the requirements.

3.4 The Work Programme

The updated Work Programme is shown in Annex 2.

The following changes have been made to the original proposal:

- The design period has been shortened so as not to delay the RA construction programme for 2017/18, with key deliverables as follows:
  - Design Review to be carried out in Weeks 9 and 10 (previously weeks 12 and 13).
  - Final Design Report to be submitted in Week 11 (previously week 16).
- The trainees will be divided in two equal groups of 7-8 persons instead of three groups of 5 persons as previously planned.
- Each group will be trained in courses over two weeks during weeks 21/22 and 30/31 respectively.
- Provision has been made for a third course during weeks 35/36 for those that require further training in order to be certified as trainers.
- The end of Phase 1 and submission of the Final Report will be in week 40 (previously week 35).

The revised Work Programme thus ensures the achievement of the project objectives and will ensure the capacity within RA and of local consultants to carry out designs for the 2018/19 construction programme.

3.5 Proposed Revision of specifications

The following revisions to the SATCC Specifications commonly used in Malawi, in aspects particular to the DCP-DN Design Method, are proposed:

Material specifications:

- CBR requirements to be replaced by DN requirements as per DCP-DN catalogue
- GM (grading modulus) range 1.0 - 2.3 for imported pavement materials

Compaction and compaction quality control:

- All layer works to be compacted to refusal (without degradation of the material)
- Compaction Trials and Compaction Quality Control to be carried out as per the "Guideline for Compaction Quality Control using the DCP", which should be made part of the contract.

Clauses to this effect should be included in the Particular Conditions of Contract.

3.6 Feed-back meeting at RA

A feed-back meeting was held at RA on Tuesday 27th June to:

- Report on the findings, as shown in Section 3.2 above, from the site visits;
- Reach agreement on the proposed adjustments to the Work Programme, as detailed in Section 3.4 above; and
- Finalise the selection of Trainees.

The revised Work Programme, as shown in Annex 2, was agreed to and adopted for the work up to the end of Phase 1.

The agreed list of Trainees is shown in Table 2 below. RA will consult with the selected candidates to ensure that all trainees that eventually report for the courses, are well motivated and prepared to put in the required time and effort to become certified trainers.

AfCAP will follow-up on the selection of trainees from Tanzania.

Table 3: List of trainees for the ToT project

Country	Organisation	Name
Malawi	Roads Authority	Sharmey Banda
	"	Elias Sisya
	"	Florence Ndenguma
	"	Jarrison Chilongo
	"	Charles Mtawali
	Pamodzi Consulting Engineers	Nelson Kachali
	MSCAT Consulting Engineers	Tamandani Kachiwala
	David Consulting Engineers	Wammie D.Mkumbira
	BMM/Infratech Joint Venture	Martin Chavula
	NCIC	Robert Mapemba
	Polytech/T2 Centre	Ashley Kanyoza
	Polytech/T2 Centre	Ignasio Ngoma
Tanzania	PMORALG	
	PMORALG	
Zambia	Roads Development Agency	Joseph Chibwe

4 Conclusion

The objectives of the Inception stage of the project have been achieved with the attainment of the following:

- Observation of the site conditions and general recommendations for the detailed design of the three project roads;
- Adjustment of the Work Programme for the design of the road sections to fit with the RA construction programme;
- Agreement on the extension of S126 Linthipe – Lobi as the most suitable training site for the ToT;
- Scheduling of the ToT courses to ensure that the design of the extension of S126 Linthipe – Lobi will be completed in time for the procurement of the works for the financial year 2018/19;
- Identification of contract specifications particular to the DCP-DN design method, which need to be incorporated in the works contracts through Particular Conditions of Contract;
- Final selection of Malawian candidates for the ToT. AfCAP will advise on the candidates to be selected from Tanzania.

Annex 1: Minutes of Kick-off meeting

MAL2007D – Training-of-trainers in the DCP-DN Method for design of LVSR

Minutes of Kick-off Meeting held at RA HQ at 14.30 on 19th June 2017

Present:

F. Dimu	Acting CEO, RA
E. Matapa	Dir. Of Maintenance, RA
S. Banda	Senior Engineer
J. Chilongo	Highway Planning Engineer
J. Chagunda	CEO Pamodzi Consulting Engineers
E. Mukandila	Design Engineer, AfCAP
J. Hongve	Team Leader, AfCAP
N. Leta	Regional Technical Manager, AfCAP

1. The project

The project involves upgrading of approximately 15 km of gravel roads to LVSR standard under the yearly RA upgrading programme using maintenance funding. The 15 km are distributed on three different roads, with approximately 5 km to be upgraded on each road:

- M24 - Rumphi – Nyika
- S126 - Linthipe – Lobi
- T397 - Zaka – Neno

The roads shall be designed using the DCP-DN Design method and the intention is to couple the design of the roads with Training-of-Trainers (ToT) in the DCP-DN Method of up to 15 candidates from RA, local Consultants and engineers from Tanzania and Zambia.

2. Design

RA has engaged Pamodzi Consulting Engineers (DC) on a three months contract for the design of the road sections and production of Tender Documents.
Site Investigations are already underway and the DC estimates that the design will be complete by the end of July 2017.

3. Procurement

RA has issued the Tenders with preliminary BoQs and Cost Estimates based on the similar ASWAP-SP projects that have just been completed, and are currently adjudicating the submitted tenders with the intention that the contractors shall be on site by end of July 2017.

4. The ToT Work Programme

The AfCAP Consultants had no prior knowledge of the timeframes of the RA Construction programme and the progress with the design of the three roads, as indicated above, when preparing the Technical Proposal. The meeting agreed that the proposed ToT Work Programme would therefore need to be revised in such a manner that the tasks and responsibilities of the AfCAP Team under their ToR are accommodated, both in terms of design review of the three road sections and the ToT.

The meeting therefore proposed that the design of the three road sections should go ahead as planned in order not to delay the RA construction programme, and that the ToT should be done on

the remaining portion of S126 Linthipe – Lobi, which will be constructed during the financial year 2018-19.

This will have the effect that all classroom training will be carried out in Lilongwe and not in Mzuzu, Lilongwe and Blantyre as originally planned.

The AfCAP Consultants will revise the ToT Work Programme accordingly.

5. AfCAP Team Itinerary

The AfCAP Team programme and itinerary during the Inception visit will be as follows:

Mon 19th June	Arrival in Lilongwe, meeting at RA 14.30	Overnight in Lilongwe
Tue 20th June	Travel to Mzuzu	Overnight in Mzuzu
Wed 21st June	Site visit M24 Rumphi – Nyika	Overnight in Mzuzu
Thu 22nd June	Travel to Lilongwe	Overnight in Lilongwe
Fri 23rd June	Travel to Blantyre, meeting at Polytech	Overnight in Blantyre
Sat 24th June	Site visit to T397 Zaka-Neno, return to Lilongwe	Overnight in Lilongwe
Sun 25th June	Site visit to S126 Linthipe-Lobi	Overnight in Lilongwe
Mon 26th June	Meeting with DC, detailed Work Programme	Overnight in Lilongwe
Tue 27th June	Revision of specifications, meeting at RA	Overnight in Lilongwe
Wed 28th June	Reporting, departure to Joburg	Flight departure 13.05

The DC informed the meeting that their Materials Engineers will accompany the AfCAP Team on the site visit to M24 Rumphi – Nyika, but that they would not have any representative in Blantyre to accompany the team to the meeting at the Polytechnic and the site visit to T397 Zaka – Neno. The DC will also accompany the AfCAP team on site visit to S126 - Linthipe – Lobi.

6. Materials testing

Reliable materials testing is key to the success of the DCP-DN Design Method. The AfCAP Team has recent experience from a similar ToT project in Ghana, where the test results from the local laboratory could not be trusted and the testing had to be re-done at an accredited and reliable laboratory in the capital.

The DC has planned to have the testing done at CML in Lilongwe.

From past experience, the AfCAP Team has strong reservations as to the reliability of the testing done at CML due to old and non-functional equipment and recommended that the testing be done at the Polytechnic in Blantyre, provided they can show that their laboratory equipment meets the required standards.

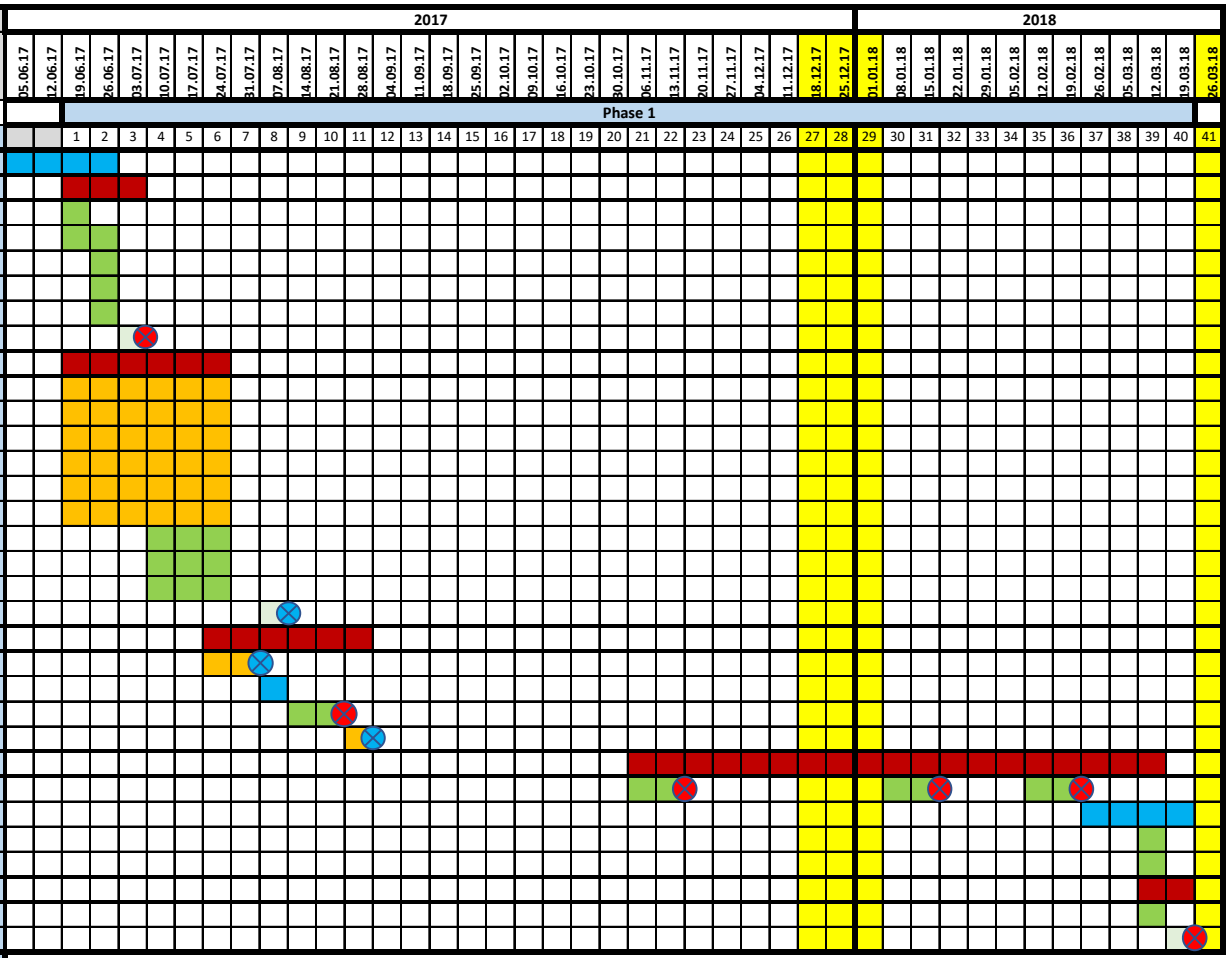
It was agreed to meet the following morning at CML to talk to the laboratory manager and to inspect their equipment. The planned meeting at the Polytechnic on Blantyre will clarify whether they are in a position to carry out the materials testing.

7. AOB

There being no other business, the meeting was adjourned at 16.00

Annex 2: Revised Work Programme

MAL2007D	Year	Team days		
	Week starting date			
Draft Work Programme - Phase 1, Rev 260617		JH	EM	Tot
Selection of Trainees and Appointment of Consultants				
Inception		**15**	**13**	**28**
Consultations with RA		1	1	2
Site visits to Trial Sections		8	8	16
Preparation of Final Work Programme		1	1	2
Customisation of Training Programme		1	1	2
Review of Works Contract Specifications		1	1	2
Inception Report		3	1	4
Site investigations		**3**	**19**	**22**
Standard Site Investigations				
Topographic survey				
Hydrological and drainage survey				
Materials prospecting				
Road Safety assessment				
Environmental Impact Assessment				
DCP data collection			6	
Borrow pit and Centre Line investigations			6	6
Laboratory testing			5	5
Site Investigations & Materials Reports		3	2	5
Design		**10**	**10**	**20**
Draft Design Reports				
Review by RA /AfCAP				
Design Review / **Report**		10	10	20
Final Design Reports				
Training		**43**	**40**	**83**
Training Courses / **Reports**		36	33	69
Preparation of Tender Documents		3	3	6
Course Review and Evaluation Workshop		3	3	6
Individual assessment of the Trainers-in-training		1	1	2
Preparations for Phase 2		**5**	**3**	**8**
Work Programme Phase 2 & 3		2	2	4
Final Report (End Phase 1)		3	1	4
Subtotal		**76**	**85**	**161**
Project Management		**8**	**0**	**8**
Total days		**84**	**85**	**169**
In Malawi		**64**	**77**	**141**



Annex 3: Attendance lists for meetings and site visits

Inception meeting ToT Project (19 June 2017)

No	Names	Organisation	Position	email	Telephone
1	Estimé Mukandila	AfCAP	AfCAP Consultant	Estime.m@ixengineers.co.za	0027768739814
2	Jarrison Chilongo	Roads Authority	Highway Planning Engineer	jchilongo@ra.org.mw	0881771811
3	Sharmey Banda	Roads Authority	Senior Engineer (P &D)	sbanda@ra.org.mw	
4	Jon Hongve	AfCAP	AfCAP Consultant	joho@operamail.com	004748176177
5	Emmanuel Matapa	Roads Authority	Director of Maintenance	ematapa@ra.org.mw	
6	Francis Dimu	Roads Authority	Ag CEO	fdimu@ra.org.mw	0888843906
7	Nkululeko Leta	AfCAP	Regional Technical Manager East & and Southern Africa	Nkululeko.leta@gmail.com	027769956241
8	Jeph Chagunda	Pamodzi	Team Leader	Pamodzi10@gmail.com ; info@pamodziconsult.com	0888832092 / 0999832092

Meeting at Polytechnic Blantyre (23 June 2017)

No	Names	Organisation	Position	email	Telephone
1	Estimé Mukandila	AfCAP	AfCAP Consultant	Estime.m@ixengineers.co.za	0027768739814
2	Jarrison Chilongo	Roads Authority	Highway Planning Engineer	jchilongo@ra.org.mw	0881771811
3	Dr. Ignasio Ngoma	Polytechnic	Director, T2 Centre	ingoma@poly.ac.mw	0888841947 /0991167152
4	Jon Hongve	AfCAP	AfCAP Consultant	joho@operamail.com	004748176177
5	Dinnoh Kasimpha	Polytechnic	Soils Technician	dkasimpha@poly.ac.mw	0888327763
6	Ishmael Ngoma	Polytechnic	Lab Technician	ishmaelngoma@poly.ac.mw	0888528690

Site visit ZAKA -NENO (24 June 2017)

No	Names	Organisation	Position	email	Telephone
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3	Jon Hongve	AfCAP	AfCAP Consultant	joho@operamail.com	004748176177
4	Bonny Malewa	Pamodzi	Surveyor		
5	Beston Massi	Pamodzi	Material Technician		

Meeting with Design Consultant (26 June 2017)

No	Names	Organisation	Position	email	Telephone
1	Estimé Mukandila	AfCAP	AfCAP Consultant	Estime.m@ixengineers.co.za	0027768739814
2	Jarrison Chilongo	Roads Authority	Highway Planning Engineer	jchilongo@ra.org.mw	0881771811
3	Jon Hongve	AfCAP	AfCAP Consultant	joho@operamail.com	004748176177
4	Jeph Chagunda	Pamodzi	Team Leader	Pamodzi10@gmail.com ; info@pamodziconsult.com	0888832092 / 0999832092
5	Nelson Kachali	Pamodzi	Pavement Engineer	nelson_kachali@yahoo.com	0992362425

Feedback meeting on inception visit (27 June 2017)

No	Names	Organisation	Position	email	Telephone
1	Estimé Mukandila	AfCAP	AfCAP Consultant	Estime.m@ixengineers.co.za	0027768739814
2	Jarrison Chilongo	Roads Authority	Highway Planning Engineer	jchilongo@ra.org.mw	0881771811
3	Jon Hongve	AfCAP	AfCAP Consultant	joho@operamail.com	004748176177
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5	Moses Malinda	Roads Authority	Senior Engineer RDM	mosesmalinda@ra.org.mw	0888843923
6	Francis Dimu	Roads Authority	Ag CEO	fdimu@ra.org.mw	0888843906
7	Charles Mtawali	Roads Autority	Senior Engineer Maintenance	cmtawali@ra.org.mw	0888209334