MINISTRY OF COMMUNICATION TRANSPORT AND CONSTRUCTION

MAINSTREAMING APPROPRIATE LOCAL ROAD STANDARDS AND SPECIFICATIONS AND DEVELOPING A STRATEGY FOR THE MCTPC RESEARCH CAPACITY

INCEPTION REPORT

SEACAP 03

UNPUBLISHED PROJECT REPORT

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MAINSTREAMING APPROPRIATE LOCAL ROAD STANDARDS AND SPECIFICATIONS AND DEVELOPING A STRATEGY FOR THE MCTPC RESEARCH CAPACITY

INCEPTION REPORT

Prepared for: Project Record: **SEACAP 03. Mainstreaming Appropriate Local Road Standards and Developing a Strategy for the MCTPC Research Capacity**

	Approvals
Project Manager	
Quality Reviewed	

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PROJECT ABBREVIATIONS & ACRONYMS

ACCESS	Microsoft database software
ADT	Average Daily Traffic
ASEAN	Association of South East Asian Nations
BRC	Bamboo Reinforced Concrete
CAFEO	Conference of ASEAN Federation of Engineering Organisations
CBR	California Bearing Ratio
CNCTP	Cambodia National Community of Transport Practitioners
CSA	Crushed Stone Aggregate
CSIR	Council for Scientific and Industrial Research (South Africa)
DBM	Dry Bound Macadam
DBST	Double Bituminous Surface Treatment
DCP	Dynamic Cone Penetrometer
DCTPC	Department of Communication Transport and Construction
DfID	Department for International Development
DoR	Department of Roads
EDCs	Economically emerging and Developing Countries
ENS	Engineered Natural Surface
esa	equivalent standard axles
EXCEL	Microsoft spreadsheet software
FHWA	Federal Highways Association (US)
FM	Fines Modulus
FWD	Falling Weight Deflectometer
GMSARN	Greater Mekong Sub-region Academic and Research Network
gTKP	global Transport Knowledge Partnership
HDM4	Highway Development and Management Model
HQ	Headquarters
IFG	International Focus Group
IFRTD	International Forum for Rural Transport Development
ILO	International Labour Organisation
IRF	International Road Federation
IRI	International Roughness Index
ITS	Indirect Tensile Strength
Km	kilometre
LCS	Low Cost Surfacing
LRD	Local Roads Division (DoR)

LVRR	Low Volume Rural Road
m	metre(s)
MCTPC	Ministry of Communication Transport and Construction
mm	Millimetre(s)
MERLIN	**M**achine for **E**valuating **R**oughness using **L**ow-cost **IN**strumentation
MPa	Mega pascals
NUoL	National University of Laos
ORN	Overseas Road Note
PCU	Passenger Car Unit
Pen Mac	Penetration Macadam
PIARC	World Road Association
PTD	Planning and Technical Division (DoR)
QA	Quality Assurance
RED	Roads Economic Decision Model
Ref.	Reference
RRGAP	Rural Road Gravel Assessment Programme (Vietnam)
RRSR	Rural Road Surfacing Research (Vietnam)
RRST	Rural Road Surfacing Trials (Vietnam)
SBST	Single Bituminous Surface Treatment
SCC	SEACAP Coordination Committee (MCTPC)
SDC	Swiss Development Cooperation
SEACAP	South East Asia Community Access Programme
SIDA	Swedish International Development Cooperation Agency
SPM	SEACAP Practitioners Meeting
SOE	State Owned Enterprise
TRL	Transport Research Laboratory
UCS	Unconfined Compression Strength
UK	United Kingdom
UNOPS	United Nations Office for Project Services
VN	Vietnam
VOCs	Vehicle Operating Costs
VPD	Vehicles per day
WAN	Wide Area Network
WBM	Water Bound Macadam
WLC	Whole Life Costs

Executive Summary

Introduction

The SEACAP 3 project is part of the wider South East Asia Community Access Programme (SEACAP), whose strategic theme is 'livelihoods of poor and vulnerable people in SE Asia - improved sustainability'. The core SEACAP concept relevant to infrastructure was defined at the SEACAP Practitioners Meeting (SPM) in Phnom Penh in June 2006 as "maximizing input of local resources; which are materials, labour, enterprise and ingenuity which ensures affordability".

SEACAP 3 will contribute to this overall objective by the development and mainstreaming of local resource-based standards for low volume rural roads through three key outcomes:

- Mainstream appropriate local road standards and specifications into the national road programme.
- Develop an affordable and sustainable strategy for attaining the necessary road research capacity.
- Increase the awareness of good practice experience from this project by disseminating the outcomes at the national, sub-regional and international levels.

TRL Ltd in conjunction with their principal Associate, LTEC have signed a contract with Crown Agents, acting as agents for DfID, to undertake the SEACAP 3 programme; with completion scheduled 12 months after project mobilisation on 28th January 2007.

Background

Previous research has indicated that Low Volume Rural Roads (LVRR) tend to respond to the dominance of a range of factors, collectively know as the "road environment", that together describe the matrix of road environment impacts that need to be addressed by design response factors such as pavement type and strength, road geometry, and earthwork and drainage arrangements. The road performance is a direct function of the road environment and its interaction with an appropriate design. For low volume rural roads it is now believed that the direct influence of traffic on road deterioration is much less than that for other roads. One of the implications from this is that appropriate Standards and Specification need to be specially adopted for LVRR regimes.

SEACAP work in Vietnam has highlighted an apparent mis-match between the pavement options currently being used, their road environment, and many of the materials being used to construct them. Given the potential for overlap of road environments between Lao PDR and Vietnam it is likely that a similar mis-match situation occurs in within the LVRR sector in Lao, particularly if a gravel wearing course is considered to the predominant option; hence the current SEACAP 17 project and the links to similar trials in Vietnam and Cambodia.

Undertaking research and developing likely solutions is not nearly enough. There has to be a framework within which they can be mainstreamed. Suitable LVRR Standards are therefore seen as essential to provide the context and control framework within which resource-based pavement options may be assessed and selected for appropriate use. These standards should ideally be able to identify classes of rural road in terms of usage and geometry that can be linked to sustainable pavement options defined by appropriate technical specifications.

Definitions

Working definitions have been proposed using certain key words and phrases

Low Volume Rural Roads (LVRRs)
LVRR Design Classification
LVRR Standard Specifications
LVRR Option Matrix
LVRR Standards

Developing Project Working Relationships

The development of clear working relationships between the various project stakeholders has been seen as a fundamental prerequisite for effective project delivery To this end a number of discussions have been held with key stakeholders. It is essential that SEACAP 3 continues to develop a close working relationship with the Ministry of Communication Transport and Construction (MCTPC) and in particular, key divisions in the DoR; the Local Roads Division (LRD) and the Planning and Technical Division (PTD). Crucial points are:

1. The establishment of a SEACAP Coordination Committee (SCC)

2. Project strategy and progress coordination will be through the SCC in conjunction with SEACAP management

3. Operational links will be through the LRD and PTD

4. Day to day coordination will be through the appointed DoR counterparts.

A number of important stakeholders have been identified outside the MCTPC whose cooperation with or participation in SEACAP 3 would be very beneficial. Discussions have already been held with many of the key personnel and this dialogue will be expanded during the project. Effective linkages with current and completed SEACAP programmes will also be an essential feature of SEACAP 3.

Task Groups

The project ToR and consequent Technical Proposal have clearly identified and described eleven Work Modules within three Task Groups. It is evident both from the ToR and inception period discussions that although research and training are important elements of SEACAP 3, the key issue driving the project will be the development of appropriate standards and specifications.

Task Group 1 (Standards*)*

Key actions to be undertaken are:

1. Collect, collate and review available documents relevant to Low Volume Rural Roads (LVRRs) in Lao PDR, followed by a report summarising the review and highlighting key issues and knowledge gaps.

2. Based on Modules 1 and 2: draft or amend existing definitions of LVRRs based on their perceived function rather then their administrative classification.(LVRR Standards) Draft or amend existing local and regional LVRR Technical Specifications suitable for linkage into the above Standards.

3. Advise and assist the MCTPC on procedures for mainstreaming the LVRR Standards and associated Technical Specifications.

Work during the inception period has focused on the review of the current situation, with the following important issues emerging.

Road Law

- The road law in Lao PDR provides a rational classification system of the different roads.
- The MCTPC has a hierarchical structure that is suitable for dissemination of knowledge and training about the standards through provincial, districts and village authority levels such that they can be mainstreamed.

Costs

- Costs to provide the road network vary of course according to the standard that must be provided to meet the function of the road.
- It is understood that very basic access may be provided at $6,000 per kilometre.

Road Design Standards

- The basis for road design is the Lao PDR road design manual originally produced in 1996.
- In 1999 the geometric design elements were updated to assist with the appropriate design of local roads. The approach was to introduce one new class by splitting the traffic of class 7 and redefining the traffic volume suitable for these lowest two classes. Thus the new class eight caters for roads with up to 20 vehicles per day.
- It is apparent from discussions that the pavement design aspects in terms of heavy vehicles will also need to be addressed to some extent.

Pavement Options

- The existing road design manual offers some relaxation of pavement design standards for low volume roads. The main pavement type is a gravel wearing course.
- Gravel wearing courses are designed to wear and so maintenance costs for this road type are higher, but construction costs are lower.
- Poor performance of gravel roads is usually caused by excessive gravel loss due to traffic, rainfall and geometry or any combination of these. The solution is to offer the road design community alternative pavements, as is the purpose of this project.
- Presently the main alternative to providing a gravel wearing course is to simply seal the surface using a bituminous single or double seal (a surface dressing). There is anecdotal evidence that in Lao PDR these seals may only last for 2-years.
- Presently in Lao PDR the only pavement options available to the engineer for low volume roads are gravel or sealed gravel, neither of which may perform well.
- To seek other alternatives, the review has extended thus far to consider the trial pavements constructed in Vietnam and Cambodia under other SEACAP projects.
- An important factor will be to assess the engineering suitability of these alternative pavements with respect to Lao PDR road environments and to their construction cost.

- An ideal solution would be the replacement of gravel pavements with one of these options from other SEACAP projects at a similar or lower construction cost and retain the same or greater durability.
- Some road user costs have been made available but further work is needed to examine the basis of these and the appropriateness of the usual methods (and programs) to obtain these whole life costs. This is because it is often said to be problematic to obtain realistic vehicle operating costs for low volume roads with diverse traffic types.

Technical Specifications

- The technical specifications used in Lao PDR to specify both the quality and use of a particular material in road construction have been sought. So far only project specific specifications have been found.
- Although technical specifications will be produced for LVRR construction items and those that are linked to them for local roads, it is outside the scope of the project to produce these for all construction items.

Task Group 2 (Training)

Key actions to be undertaken are:

1. Undertake a review of job description versus skill levels for MCTPC staff based on a representative cross section of professional staff. Briefly review previous training programmes. Identify skills gaps and summarise training needs.

2. Devise a modular training programme that will address identified skill gaps relating to the sustainability of SEACAP 3 and takes into account project time and budget constraints.

3. Trial the modular training programme on a selected group of trainers (initially estimated in the ToR as 15 persons).

During the inception phase a number of points have been identified in discussion with stakeholders, namely:

- Training should be linked to the identified requirements within the SEACAP context.
- Training should be targeted at future trainers who can then further disseminate the knowledge
- A selected engineer from each of the 17 provincial Departments of Communication Transport and Construction (DCTPCs) together engineers from central DoR would give a suitable Training Group of around 20.

Task Group 3 (Research Capability)

Key actions to be undertaken are:

1. Briefly review the existing research capacity of the MCTPC and the National University of Lao (NUoL) in the context of likely research requirements in general and any specific requirements and knowledge gaps identified in the course of Task Group 1 work

2. Define a research strategy that will address the research gaps identified above. This to be presented to and discussed with stakeholders

3. Advising the MCTPC on a programme aimed at initiating and mainstreaming, an agreed research strategy as well as advising on identifying potential fund sources.

Work has begun on assessing existing research capacity and some key general points that have emerged are:

- There is currently no active established research body within the MCTPC.
- The long term sustainability of programmes such as SEACAP 3 within the MCTPC depends on there being an appropriate research capacity.
- The Module 1 review process has started to highlight knowledge gaps that could form the basis for a series of SEACAP Research Studies (SRSs); namely

  LVRR traffic patterns in Lao PDR
  Unsealed road performance in Lao PDR
  Performance of local options – eg thin seals on laterite gravel wearing courses
  Appropriate vehicle operating and road management costs for Lao PDR

Task Group 4 (Dissemination)

Key actions to be undertaken are:

1. Prepare technical materials for the future MCPTC Website, Newsletters, Briefing documents, Power Point Presentations, and Scientific Papers.
2. Present project outcomes at local, regional, and international for forums such as PIARC, SEACAP, GMSARN, IFG and other conferences.

Discussions with DoR have shown that MCTPC have a website within which a Rural Road sub-site could be established. Cooperation will be actively sought with the MCTPC InformationTechnology department.

Programme

The review of programme had to take into account a number of strategic requirements;

1. Clear continuity with current and previous relevant SEACAP research in the region
2. Active linkage with ongoing SEACAP projects in Vietnam, Cambodia and Lao
3. Appropriate of Senior Specialist input to the project

The project staff resources are as presented in the TRL Technical Proposal, with only minor adjustments to time inputs and responsibility designation. The programme of work has been reviewed and updated during the inception period to add necessary detail and to confirm the timing of the inputs and the outputs. The resulting detailed programme is included as an Appendix to this report

Outside of these components advice and technical assistance will be provided to MCTPC by the project team. As well as delivering the main three project outputs the project will report progress through monthly reports, frequent stakeholder reviews, and end of module reports.

1 Introduction

1.1 The SEACAP Context

The SECAP 3 project is part of the wider South East Asia Community Access Programme (SEACAP), whose strategic theme is 'livelihoods of poor and vulnerable people in SE Asia - improved sustainability'. The core SEACAP concept relevant to infrastructure was defined at the SEACAP Practitioners Meeting (SPM) in Phnom Penh in June 2006 as "maximizing input of local resources; which are materials, labour, enterprise and ingenuity which ensures affordability."

SEACAP builds on existing knowledge, but also provides a research resource for filling gaps in knowledge, particularly in the local environment. Mainstreaming ensures that these solutions are accepted, adopted and applied on a large scale. This involves a process of dissemination through participatory workshops, guideline documents , demonstrations, training and implementation.

SEACAP 3 will contribute to this overall objective through the development and mainstreaming of local resource-based standards for low volume rural roads. This will allow current regionally available rural road design and maintenance standards and guidelines to be improved for the specific circumstances of Lao PDR and permit more efficient and optimal use of the limited financial and physical resources available for the sector. It will also encourage a more sustainable approach to the provision and maintenance of rural access through selection and application of the most appropriate technology depending on the local circumstances, resources, environment, and based on Whole Life Costing.

The project seeks to achieve three key outcomes:

- Mainstream appropriate local road standards and specifications into the the MCTPC program.
- Develop an affordable and sustainable strategy for attaining the necessary road research capacity.
- Increase the awareness of good practice experience from this project by disseminating the outcomes at the national, sub-regional and international levels.

1.2 Project Identification

Since 2001 DFID have been funding the development of sustainable surfacing and pavement options for low volume rural roads (LVRRs) in Cambodia and Vietnam, from 2003 this work has been managed through the SEACAP initiative. SEACAPs 1 and 4 in Vietnam and SEACAPs 2 and 8 in Cambodia were generally aimed at providing all weather accessibility and improved trafficability through the implementation of innovative techniques and alternative surfacing options. The projects have produced appropriate specifications intended for mainstreaming into modified national standards.

Early information from the above projects was disseminated regionally and the potential project outputs were recognised as being of interest to a number of countries, including Lao PDR. It was observed that in Lao PDR the research into low volume rural roads was necessary for a number of reasons:

1. Assumptions currently guiding the development of the rural road network were not reflecting reality or sound practice either from engineering or a management perspective.

2. Insufficient attention had apparently been paid to the engineering fundamentals of low volume rural road design and construction, which may be being inappropriately designed.

3. In Lao PDR, investments in Local roads and access tend to be made on a project basis. In the absence of comprehensive and appropriate standards in regular use by the MCTPC, each project tends to develop its own operating systems, capacity building and standards

4. Chronic overestimation of the maintenance capacities of the infrastructure managers and underestimation of the maintenance burden, have resulted in an expensive cycle of construction, asset deterioration, followed by reconstruction.

In 2004, at the request of the Government of Lao PDR, SEACAP 17 was initiated with the objective of designing, constructing and monitoring rural trials totalling 28.86km within the ADB Northern Economic Corridor Project (Houay Xai district). The design of these trials took into account previous SEACAP experience in Vietnam and Cambodia.

Previous DfID research under the Knowledge and Research (KaR) programme had identified the need for LVRR standards to take fully into account both the influence of road environment factors and available resources in addition to being more focussed on tasks or function that the roads were required to undertake. Hence the development of Low Volume Rural Road Standards into which pavement options, such as those from SEACAPs 1, 8 and 17, could be linked was identified as an appropriate topic for SEACAP to support. From the combination of this and the successful completion of the construction trials in Vietnam and Cambodia grew the concept of the SEACAP 3 “Appropriate Standards and Specification” modules.

The linkage of related research and training elements to this central concept was a logical step as the MCTPC will need to develop capacity to apply and sustain the Standards and Specifications.

The Standards and Specifications will eventually become the tool for the MCTPC to harmonize investments in Local Roads; hence the very necessary dissemination and mainstreaming activities.

1.3 Project Nomenclature

The TRL Project Proposal noted that some aspects of project nomenclature required clarification, for example “Task Standard” (which TRL interpreted at that time as road classification or function). The following Table 1.1 sets out proposed working definitions of key project words for SEACAP 3.

ToR and Technical Proposal Terminology	Project Definition	Working Terminology
Local Roads	Low volume rural roads – design classes such as those defined as classes VI-VIII in the MCTPC document "Specification for Local Roads". Definition to be refined as a Task Group 1 output.	Low Volume Rural Roads (LVRRs)
Road Task Standards	A classification of Low Volume Rural Roads and their geometric design based on the function they have to perform in terms of traffic mix and acknowledging the road environment in which they have to operate.	LVRR Design Classification
Road Design specifications	Technical construction specifications (as drafted for example for SEACAPs 1, 8 and 17)	LVRR Standard Specifications
Design Standards Matrix	A matrix of available pavement and surfacing options related to LVRR Design Classification and appropriate rural regions defined by materials, climate and terrain	LVRR Option Matrix
Local Road Technical Standards.	The combination of the LVRR Design Classification and LVRR Standard Specifications together with associated commentary documents	LVRR Standards

Table 1.1 Project Definitions

2 Technical Background

2.1 The Requirement for Appropriate Standards and Specifications

Previous research has indicated that low volume rural roads tend to respond to the dominance of a range of factors, collectively known as the "road environment", (SADC, 2003) Factors important to the road environment can be broadly grouped as:

Natural environment factors – largely uncontrollable

- Geology
- Terrain
- Climate
- Hydrogeology
- Materials availability

Project-related factors: - to some extent controllable

- Materials selection
- Traffic
- Axle loading
- Construction regime
- Maintenance regime
- Socio-economic impacts

These factors together describe the matrix of road environment impacts that needs to be addressed by design response factors such as pavement type and strength, road geometry, and earthwork and drainage arrangements that are in effect the tools for an overall appropriate design strategy. The road performance is a direct function of the road environment and its interaction with an appropriate design. For low volume rural roads it is now believed that the relative influence of traffic, as opposed to environmental factors, on road deterioration is much less that for other roads, Figure 2.1. One of the implications from this is that appropriate Standards and Specification need to be specially adopted for LVRR regimes.

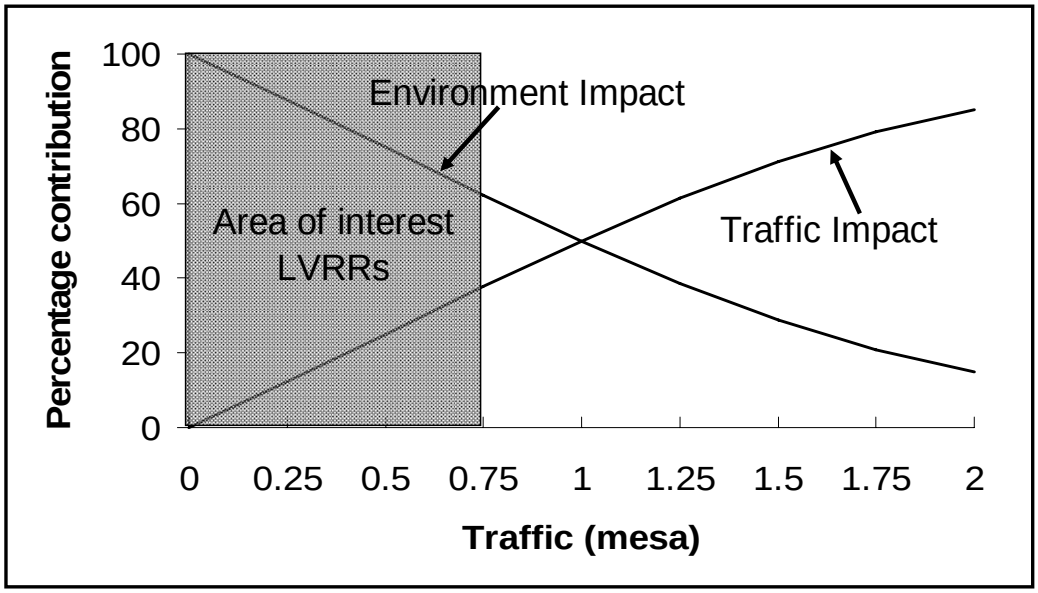


Figure 2.1 Variable Road Impacts on Deterioration of Low Volume Rural Roads

It is also recognised that a key objective in sustainable road construction is to properly match the available material to its road function and its local environment and that greater use should be made of adapting local non-standard materials within appropriate designs (TRL 2001, TRL 2002). In this context it is significant that the RRSR programme in Vietnam highlighted an apparent mis-match between the pavement options currently being used, their road environment, and the materials with which they were constructed (Cook & Petts, 2005).

Given the potential for overlap of road environments between Lao PDR and Vietnam it is likely that a similar mis-match situation occurs within the LVRR sector in Lao, particularly if a gravel wearing course is considered to the predominant option; hence the current SEACAP 17 project and the links to similar trials in Vietnam and Cambodia. However, undertaking research and developing likely solutions is not nearly enough. There has to be a framework within which they can be mainstreamed.

The SPM in June 2006 highlighted concerns regarding the risks required to be taken by road engineers and others in adopting recent research outcomes. It was noted that knowledge gained from

research must be transformed into accepted Standards in order that practitioners at technical levels can adopt new practices under a protective umbrella. They should not continue to have to make a special case for adopting sustainable solutions identified through research. Suitable LVRR Standards are therefore seen as essential to provide the context and control framework within which resource-based pavement options may be assessed and selected for appropriate use. These standards should ideally be able to identify classes of rural road in terms of usage and geometry that can be linked to sustainable pavement options defined by appropriate technical specifications.

2.2 Training and Research

The experience of other regional SEACAP projects in the LVRR sector has highlighted the need for training to be related to the research outcomes if effective mainstreaming is to be achieved. SEACAP 1, for example, identified a need for a national programme of training of contractors and supervisory staff for the mainstreaming of the alternative surfacing options. Quality control was identified as a key issue for training in that it has a significant affect on the performance and life of any pavement surface, whether it is gravel, reinforced concrete or any other material. A greater awareness through training has been recommended to be imparted to relevant political, administrative and engineering personnel.

2.3 The Importance of Dissemination

Previous road sector research work has often been hampered in its application because of insufficient attention to the dissemination and hence the mainstreaming of the results and knowledge. Too often the outputs have been documents or reports which are in themselves insufficient to ensure the uptake and application of the knowledge.

The SPM in June 2006 highlighted concerns regarding shortcomings in current dissemination strategies. Recommendations from a Speciality Session Group on dissemination were that SEACAP should have effective strategies in order to reach not only technical and academic practitioners but to aim to also reach the most influential people such as politicians. The meeting also highlighted the need for more effective dissemination to improve ownership and better response to the needs of the specific challenges for each country.

2.4 The Regional Context

Due to its initial low costs engineers have traditionally relied on the use of natural gravel as a rural road surface, and unsealed earth and gravel surfaces comprise the greater proportion of the length of low volume rural roads in the Lao; Vietnam; Cambodia region. However recent research, particularly in Vietnam, has confirmed the serious problems that exist relating to the sustainability of gravel surfaces in many environments common throughout the region and that consequently there is a need for sustainable alternatives to be mainstreamed within appropriate LVRR Standards.

There is, therefore, a distinct regional context to SEACAP 3, and whilst the main focus of the project will be the Lao PDR, there is perceived need to ensure linkages with rural road programmes in Vietnam and Cambodia.

3 Inception Phase Activities

3.1 Contractual Arrangements

The Agreement for the project to be undertaken was established under a Memorandum of Understanding (MoU) between the Ministry of Communication, Transport, Post and Construction (MCTPC) on behalf of the Government of Lao PDR and the Department for International Development (DfID), UK. The MoU defines the scope of the project; states that it will be undertaken by TRL Limited as the Consultant and implemented under Terms of Reference; and that the Consultant will be appointed by DfID. The MoU also expresses certain Exemptions and Facilities to be provided by MCTPC to the Consultant to facilitate implementation of the project. The MoU was signed on the 16th of October 2006.

In response to a Request for Proposal from Crown Agents for Overseas Governments and Administrations Ltd (acting as Contracting Agent for DfID), TRL provided a comprehensive technical proposal and a financial proposal for carrying out the project and subsequently entered into a contractual arrangement with Crown Agents TRL Ltd was appointed on 21st of November 2006. The duration of the project is 12 calendar months.

TRL is supported in its undertaking of the project by associate firms and by competent and experienced individual consultants. The principal associate firm is an State Owned Enterprise, Lao Transport Engineering Consultants (LTEC), who are providing comprehensive local consulting services.

TRL have entered into a contractual agreement with LTEC to provide a total of 68 person months of services over the duration of the project. Forty-Eight (44) person months are for engineering and translation services and 24 person months are for administrative, secretarial and coordination services.

The other associate firm is Intech Associates consulting engineers who have worked extensively with TRL on other SEACAP projects in the region. Intech will provide a short-tem specialist role on this project similar to that to be provided by the individual consultants.

The individual consultants are:

Rob Petts (Intech)
Andreus Beusch (Intech)
Akram Ahmedi (TRL)
B T Dzung (Vietnam)
P G Tuan (Vietnam)
H Kackada (Cambodia)

All the individual consultants are acting within the framework of a review panel for the project as described in the proposal for the project. They will also be expected to contribute their particular expertise to various components of the project and each will undertake a visit to Lao PDR.

3.2 Mobilisation

Effective mobilisation of SEACAP 3 commenced in week beginning 29th January with the arrival in Vientiane of Dr J Cook and Mr M O'Connell. Prior discussions had already led to agreements that Lao Transport Engineering Consult (LTEC) would work in association with TRL Ltd on SEACAP 3, and these were confirmed formally at this time and mobilisation of LTEC staff commenced also at this time.

Following discussion with DoR and LTEC it was agreed that a Project Office would be set up in the LTEC main office at Km 5, Thadeua Road. The option of setting up a Project Office with the Local Roads Division (LRD) was considered and whilst from a working point of view this would have been an ideal situation, there was insufficient readily available space. It was agreed however that close contact would be maintained both with LRD and PTD through counterpart engineers sitting within their respective organisations.

The SEACAP 3 office at LTEC was fully mobilised on 1st February with telephone and internet communications.

3.3 Work Undertaken

Apart from mobilisation, project work undertaken during the Inception Phase falls under the following principle groups;

1. Developing project working relationships
2. Project Module Assessment
3. Initiating work on the Task Groups 1 and 3
4. Detailed project programming

The development of clear working relationships between the various project stakeholders is a fundamental prerequisite for effective project delivery. This entails frank discussions on the various points of that may held as to the project objectives and the means to achieve these objectives. To this end a number of discussions have been held with key stakeholders. Table 3.1 summarises meetings attended during the project inception period.

The above discussions were a key element in developing and expanding upon the TRL submissions for successfully completing the eleven Project Modules, as contained in the Technical Proposal. The outcome of this assessment of project deliverables is considered in more detail in Section 5 of this report.

Closely linked to the above assessment was an initial collation and review of relevant documents, a summary of which is also included in Section 5.

In order to provide a permanent reference record of the reviewed documents it is proposed to develop an ACCESS database of their key contents. The basic structure of this database has been completed, including hard and soft copy input forms, Figure 3.1.

The detailed programming of SEACAP 3 is a fundamental output from the inception phase and in addition providing a logical and integrated plan for completion of project modules it also had to take into account a number strategic requirements;

1. Clear continuity with current and previous relevant SEACAP research in the region
2. Active linkage with ongoing SEACAP projects in Vietnam, Cambodia and Lao
3. Appropriate of Senior Specialist input to the project

The amended programme is presented in detail in Section 6 of this report.

Date	Stakeholder	Key Personnel	Comment
29/01	SIDA	Belal Hussain	Introductory meeting on SC 3 and 17 with David Salter and LRD
29/01	SIDA-NUL	Prof. Nhinxay Visane (NUoL) Ulf Brudefors	Brief discussions on the development of road engineering modules at the NUL and on cooperation with SECAP
30/01	SEACAP 21	Scott Wilson Kirkpatrick SC21 Team	Knowledge Exchange workshop on the objectives, progress and technical background to the project
30/01	MCTPC - LRD	Sengdarith Kattignasack Voitto Kuronen	Introduction of M O'Connell to LRD and a brief presentation of the SC3 technical proposal.
30/01	LTEC-SEACAP	Sengthavisay Malivanh, David Salter	Introductory meeting between SEACAP and local consultants
31/01	SEACAP 17	Simon Gillett, David Salter	Discussion of cooperation issues, including monitoring programmes and technical specifications
02/02	PTD	Dr Maysy, Ounheunne Siriamphone	Introduction of M O'Connell to PTD. Discussion of key cooperation issues; training, research and counterpart engineers
02/02	MCTPC/DoR	Richard Tomkins (ADB-funded Advisor)	Introduction and discussions on road design from ADB projects perspective.
04/02	MCTPC/DoR	Richard Tomkins (ADB-funded Advisor)	Discussion and information sharing on historical road prices and unit costs for ADB projects , including access roads
09/02	MCTPC/DoR	Laokham Sompeth Deputy Dir General DoR	Courtesy briefing visit and discussion on administrative support with respect to MoU
26/02	LRD	Sengdarith Kattignasack	Regular briefing meeting on progress. Key issues – inception report; LVRR definitions and summary paper on SEACAP 1
27/02	SEACAP	David Salter	Progress meeting; Issues raised: inception programming; inception workshop; visits to SC1, VOCs; WLC papers from Cambodia
05/03	LRD	Sengdarith Kattignasack	Regular briefing meeting: Progress and inception reports

Table 3.1 Key Meetings

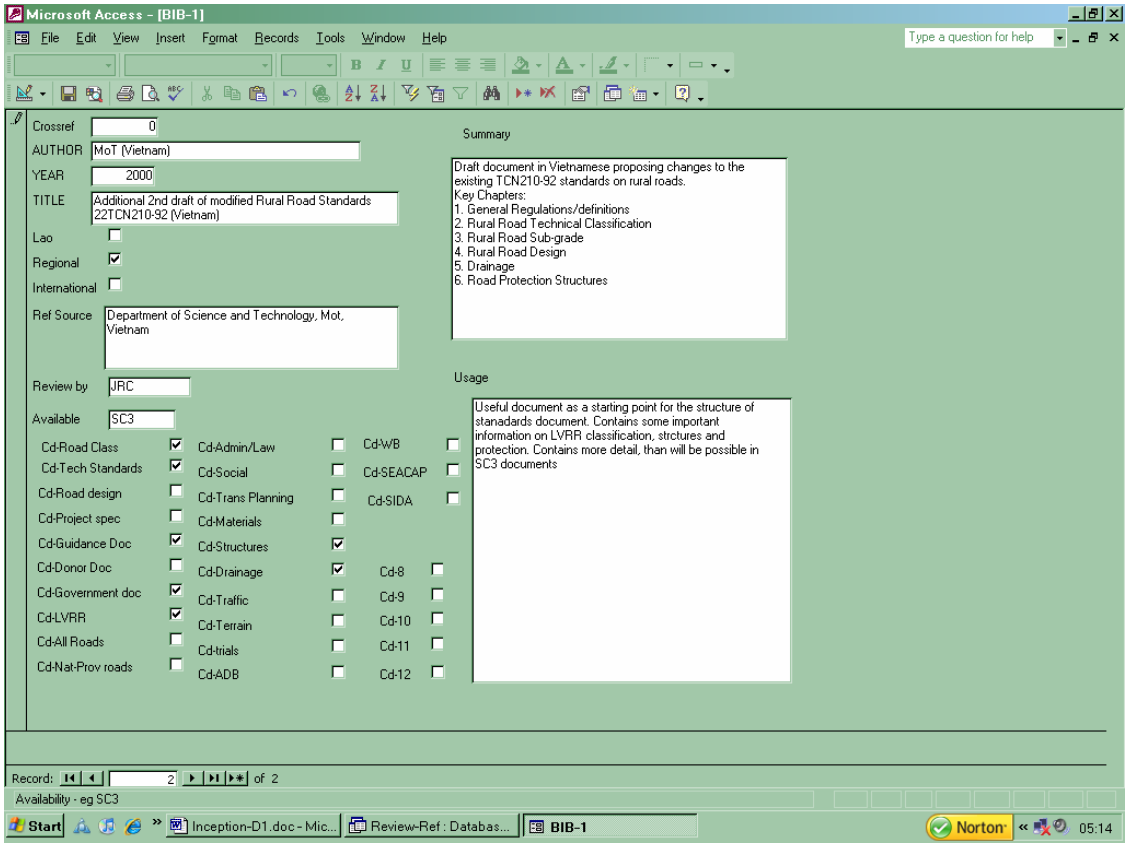


Figure 3.1 Screen-Dump of the Review Database Input Form

4 Project Working Relationships

4.1 MCTPC and SEACAP Management

It is essential that SEACAP 3 continues to develop a close working relationship with the MCTPC and in particular, key divisions in the DoR; the Local Roads Division and the Planning and Technical Division. Figure 4.1 indicates the fundamental elements of SEACAP 3 working relationships. Crucial points are:

1. The establishment of a SEACAP Coordination Committee (SCC),
2. Project strategy and progress will be coordinated through the SCC in conjunction with SEACAP
3. Operational links will be through the LRD and PTD
4. Day to day coordination will be through the DoR counterparts; officially appointed by Director General DoR (Ref 1723/BR)

Table 4.1 lists key DoR persons in the coordination procedure and Figure 4.2 presents the composition of the DoR and links within that to SEACAP 3. There will be an additional link into the MCTPC Information Technology department with regard to establishment of a website related to LVRR issues

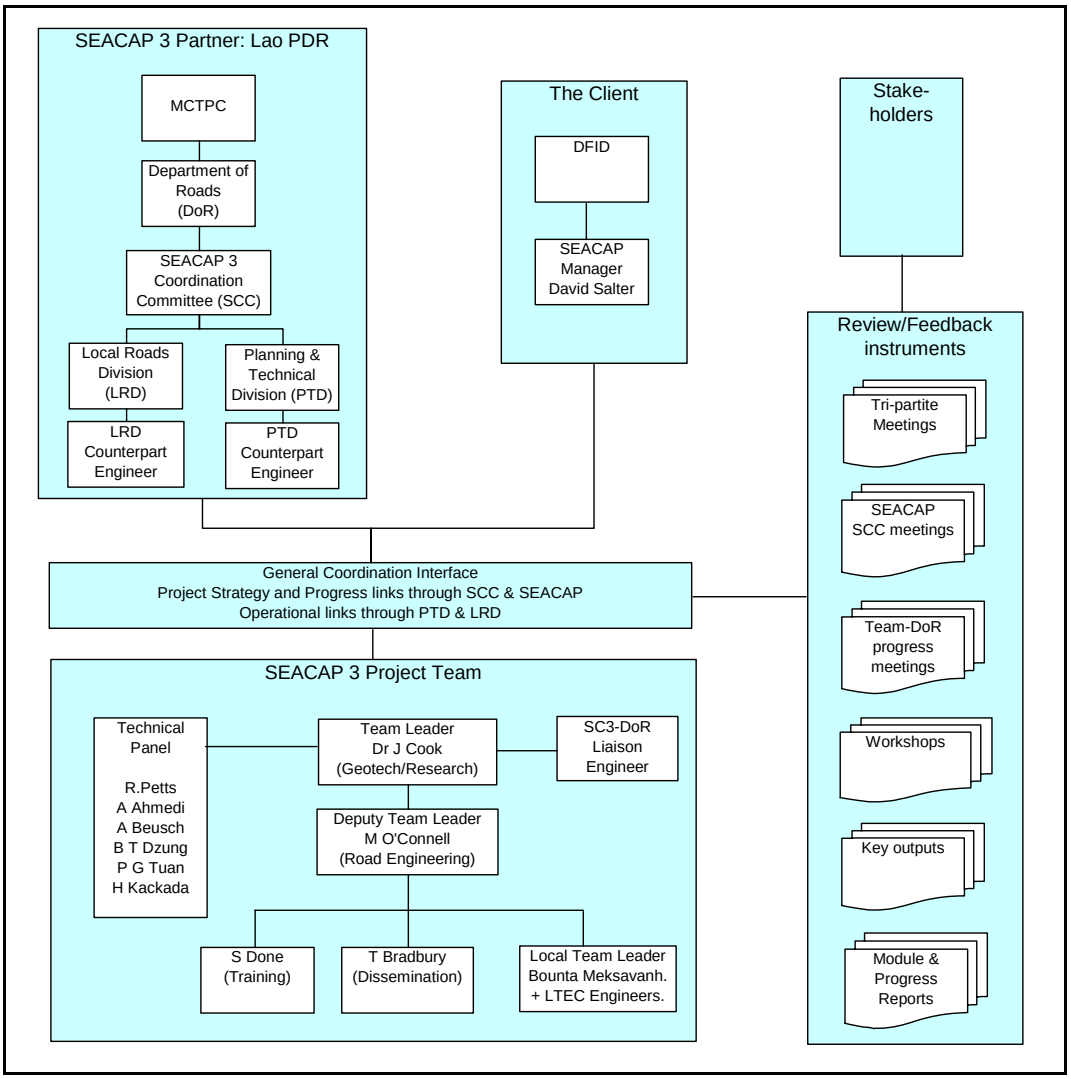


Figure 4.1 SEACAP Working Relationships

Personnel	**Position**	**Cooperation Links to SC 3**
Laokham Somphet	Deputy Director General, DOR	Steering Committee Chairman
Sengdarith Kattignasack	Director of Local Roads Division, DOR	Steering Committee Vice Chairman
Dr. Maysy Viengvilay	Director of Planning & Technical Division, DOR	Steering Committee
Chanh Bouphalivanh	Director of Road Administration Division, DOR	Steering Committee
Khampaseuth Panyanouvong	Civil Engineer (LRD)	Project Counterpart
Ounheuan Siliamphone	Senior Technical Staff (PTD)	Project Counterpart

Table 4.1 Links with MCTPC

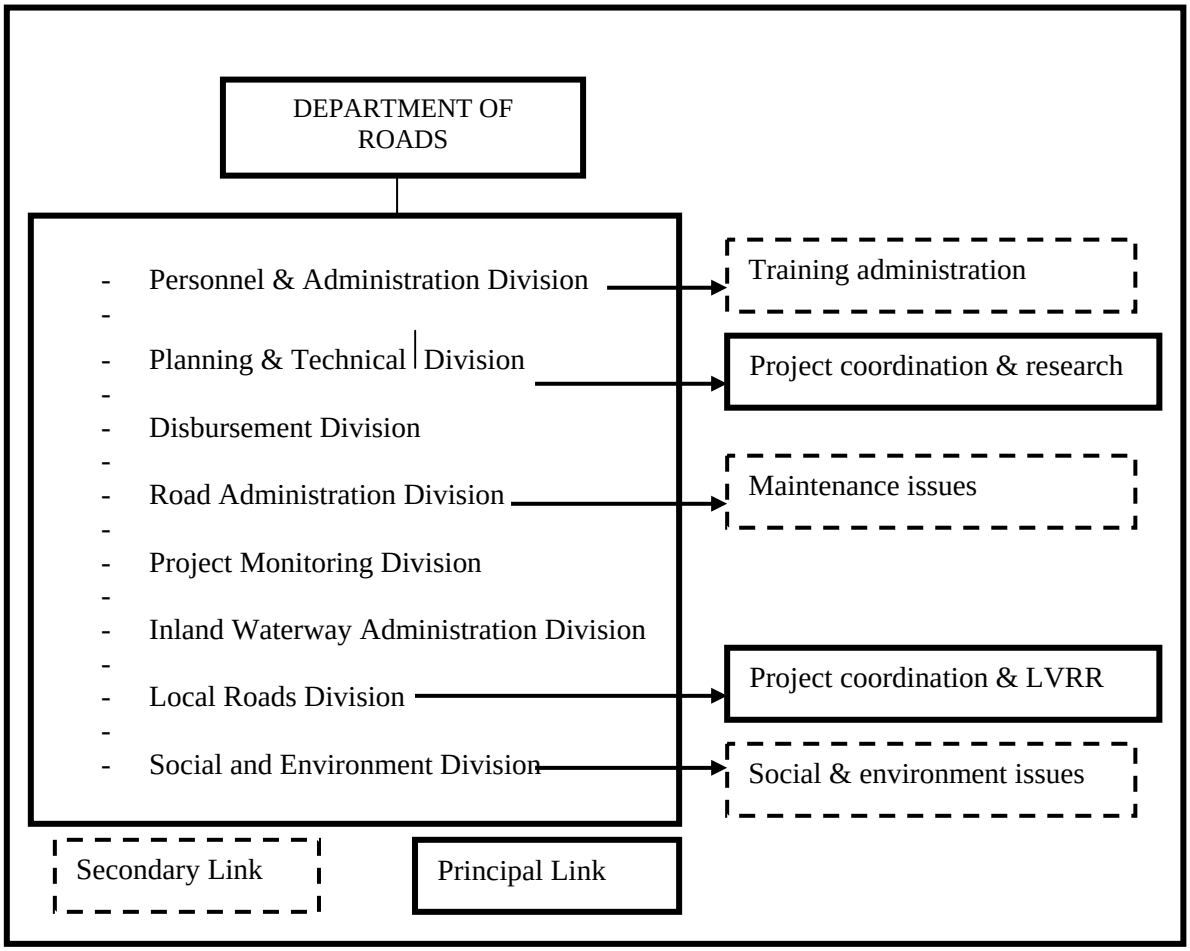


Figure 4.2 SEACAP Links with DoR Divisions

4.2 Non-Ministry Stakeholders

A number of important stakeholders have been identified outside the MCTPC whose cooperation with or participation in SEACAP 3 would be very beneficial, Table 4.2. Discussions have already been held with many of the key personnel and this dialogue will be expanded during the project.

4.3 SEACAP Relationships

Effective linkages with current and completed SEACAP programmes will be an essential feature of SEACAP 3. Table 4.3 lists pertinent SEACAP projects and summarises their key features and relevant links to SEACAP 3.

Organisation	Key Personnel	Cooperation Links to SEACAP 3
SIDA (HIFAB)	Belal Hussain Ulf Brudefors	1. SIDA funded Basic Access programme in developing appropriate low volume road specifications 2. Development of research capacity available to MCTPC, possibly through the NU
National University	Nhinxay Visane Khampaseuth Thepvongsa Chankhachone Sonemanivong	1. Development of research links in LVRR sector. 2. Use of student research teams for gathering data (eg traffic) 3. Support from SC3 to undergraduate modules relevant to rural road engineering
SweRoad	Dick Jonsson Voitto Kuronen	1. Sharing of information on maintenance strategies and maintenance procedures for road options – re-gravelling periods 2. Possible cooperation on spot improvement strategies
ADB	Richard Tomkins Jeffrey Miller	1. Exchange of information on access road pavements option costs and designs
KfW/GITEC*	Thongkhanh Thammavong Dr Philipp Kohlshreiber	1. Exchange of information on access road and bridge design and performance (Bokeo)
World Bank*	Dr M M Nunez	1. (RMP II) Exchange of information on maintenance regime for whole country

* Direct contact to be established

Table 4.2 Key Non-Ministry Stakeholders

SEACAP	Summary Description	Key Links to SEACAP 3
1 (Ongoing)	Development, trialling and monitoring a range of sustainable road surfaces that better use local resources, minimising Whole-life-Costs and supporting the Vietnam Government's poverty alleviation and road maintenance policies.	Technical specifications. Pavement trial performance & whole-life cost model
2 (Complete)	Cambodia transport mainstreaming partnership (TMP); support for a range of complementary transport sector initiatives, which assist the aims and policies of the Government of Cambodia, to provide benefits such as improved rural access, lower transport costs and create local employment and enterprise opportunities for rural communities. The Cambodia TMP is aims to consolidate past research outputs and setting up a unified information system	Procedures for technical dissemination and co-ordination of research outputs
4 (Complete)	Collection, collation and analysis of field assessments of condition of 276 unsealed road links in Vietnam	Unsealed gravel road performance
8 (Complete)	Assessment of low cost surfacing trials and associated costs, together with related key issues of maintenance and axle overloading in the rural road sector	Technical specifications. Pavement trial performance & whole-life cost model
17 (Ongoing)	Development, trialling and monitoring a range of sustainable road surfaces that better use local resources in Lao PDR	Technical specifications.
19 (Ongoing)	A series of rural road research and research development projects aimed at providing a continuation of the work commenced under SEACAPs 2 and 8.	Research outputs on key paving options. Earth road construction trial data. Low cost structures manual
20 (Ongoing)	Assessment of contractor and construction plant related issues within the rural road sector in Vietnam, Cambodia and Lao PDR	Contractor capabilities and plant availability
21.(Ongoing)	The development and application of technologies and approaches for appropriate slope stability management in Lao PDR	Inputs into the technical standards and alignment aspects of LVRR classification
22 (Complete)	Time and distance studies in 3 Lao PDR provinces representing differing conditions	Background information on travel modes

Table 4.3 Key SEACAP Linkages

5 Key Project Considerations

5.1 General

The project ToR and consequent Technical Proposal have clearly identified and described eleven Work Modules with three Task Groups. It is evident both from the ToR and inception period discussions that although research and training are important elements of SEACAP 3, the key issue driving the project will be the development of road standards and specifications appropriate to a sustainable rural access network. Training, research and dissemination are to varying degrees dependant on at least the initiation of this work and should be closely coordinated with its progress.

5.2 Task Group 1 (Standards)

Key actions to be undertaken are:

1. Collect, collate and review available documents relevant to Low Volume Rural Roads (LVRRs) in Lao PDR, followed by a report summarising the review and highlighting key issues. The project will collate the review findings into a LVRR -road environment- technical specification matrix. Knowledge gaps will be identified.

2. Based on Modules 1 and 2: draft or amend existing definitions of LVRRs based on their perceived function rather then their administrative classification.(LVRR Standards) Draft or amend existing local and regional LVRR Technical Specifications suitable for linkage into the above Standards

3. Advise and assist the MCTPC on procedures for mainstreaming the LVRR Standards and associated Technical Specifications.

Work during the inception period has focused on the review of the current situation. More than 60 documents have been obtained so far and other sources such a websites have been searched to provide further information about both the local situation and the information available internationally. The documented information available from other SEACAP project also forms an essential component of the review. Meetings have been held with a number of advisors and stakeholders. This information is being categorized to contribute to the various elements of the review. The following comments summarise the characterization of information to date.

Road Law

The road law in Lao PDR provides a rational classification system of the different roads. It also supports community participation in road infrastructure development. The MCTPC has a hierarchical structure that is suitable for dissemination of knowledge and training about the standards through provincial, districts and village authority levels such that they can be mainstreamed. The poverty reduction initiatives such as the Kum Ban approach, providing access to a centre and to satellite communities, and the draft development of the rural transport infrastructure policy both appear to be consistent with one another and both are focused on the provision of access roads for poverty alleviation.

Costs

Costs to provide the road network vary of course according to the standard that must be provided to meet the function of the road. For sub-regional and national roads these may amount to $200,000 per kilometre, and for two lane local/access the amount may be $25,000 per kilometre. It is understood that very basic access may be provided at $6,000 per kilometre. Historical information on unit rates for construction activities is being collected to permit estimates to be made for new alternative process for local roads that are to be introduced through this project.

Road Design Standards

The basis for road design is the Lao PDR road design manual produced in 1996 which sets out the 4 main processes in the usual way: Road design with geometric standards, the design process, pavement and materials design and hydrology.

Road design standards were originally set out in seven classes. In 1999 the geometric design elements were updated to assist with the appropriate design of local roads. The approach was to introduce one new class by splitting the traffic of class 7 and redefining the traffic volume suitable for these lowest two classes. Thus the new class eight caters for roads with up to 20 vehicles per day. The general trend in the revision was is to reduce geometric standards appropriately for the lowest traffic levels, and thus make savings in construction costs.

It is apparent from discussions that the pavement design aspects in terms of heavy vehicles will also need to be addressed to some extent. While it is intended that these local roads provide community access with little heavy traffic it is also apparent that traffic will be generated and diverted. Thus consideration must be given to the loading that can be tolerated and to limiting by physical means or otherwise prevent unwarranted access to heavy vehicles that are seeking the “easiest route”.

Pavement Options

The existing road design manual offers some relaxation of pavement design standards for low volume roads. The main pavement type is a gravel wearing course. Gravel wearing courses are designed to wear and so maintenance costs for this road type are higher, but construction costs are lower. They are known to function well in some environments and not so in others. Road user costs are usually high because of the unevenness of the road surface and other defects. Usually dust is an environmental problem especially for roadside communities.

Poor performance of gravel roads is usually caused by excessive gravel loss due to traffic, rainfall and geometry or any combination of these. Basically, high rainfall and steep gradients increase the rates of deterioration to unsustainable levels on low volume roads where the deterioration caused by traffic maybe a less severe problem. The solution is to offer the road design community alternative pavements, as is the purpose of this project.

Presently the main alternative to providing a gravel wearing course is to simply seal the surface using a bituminous using a single or double seal (a surface dressing). However, one has to be cautions in the widespread application of this approach because the supporting base material (of gravel wearing course quality) may retain insufficient strength once sealed and may fail. There is anecdotal evidence that in Lao PDR these seals only last for 2-years whereas in normal use (with fully specified pavements) they would be expected to last for approximately 5 to 9 years for a single or a double seal respectively. However, there is little evidence of any research on this apparent problem.

Presently in Lao PDR the only pavement options available to the engineer for low volume roads are gravel or sealed gravel, neither of which may perform well.

To seek other alternatives, the review has extended thus far to consider the trial pavements constructed in Vietnam and Cambodia under other SEACAP projects as well as the current SEACAP 17 work (Intech-TRL 2006a, Intech-TRL 2006b, Roughton, 2006). Although the long-term performance of these is still being assessed, the studies offer a significant number of alternative pavement types and sealing techniques that would greatly increase the options available. Some are suitable for labour intensive operations while others are suitable for mechanised construction, or both.

An important factor will be to assess the engineering suitability of these alternative pavements with respect to Lao PDR conditions and to their construction cost. Appendix A to this report lists Trial Construction Specifications for these options

An ideal solution would be the replacement of gravel pavements with one of these options at a similar or lower construction cost and retain the same or greater durability. However as is usual, it is likely that maintenance and vehicle operating and road management costs will need to be assessed to be able to show the full benefits.

Some road user costs have been made available but further work is needed to examine the basis of these and the appropriateness of the usual methods (and programs) to obtain these whole life costs. This is because it is often said to be problematic to obtain realistic vehicle operating costs for low volume roads with diverse traffic types.

Technical Specifications

The technical specifications used in Lao PDR to specify both the quality and use of a particular material in road construction have been sought. So far only project specific standards have been found. Because they are project specific, they are incomplete dealing only with those standards needed for a particular project.

Although technical specifications will be produced for alternative construction items for LVRRs it is outside the scope of the project to produce these for all construction items.

5.3 Task Group 2 (Training)

Key actions to be undertaken are:

1. Undertake a review of job description versus skill levels for MCTPC staff based on a representative cross section of professional staff. Briefly review previous training programmes. Identify skills gaps and summarise training needs

2. Devise a modular training programme that will address identified skill gaps relating to SEACAP 3 sustainability and takes into account project time and budget constrain

3. Trial the modular training programme on a selected group of 15 trainers (initially estimated in the ToR as 15 in number).

During the inception phase a number of points have been identified in discussion with stakeholders, namely:

- Training should be linked to identified requirements within the SEACAP context. For example, a spot improvement strategy requires provincial or district level skills in walkover and in situ testing assessments of roads for rehabilitation to identify key “spots”.

- Training should be targeted at future trainers who can then further disseminate the knowledge

- A selected engineer from each of the 17 provincial DCTPCs together engineers from central DoR would give a suitable Training Group of around 20.

.

5.4 Task Group 3 (Research Capability)

Key actions to be undertaken are:

1. Briefly review the existing research capacity of the MCTPC and the NU in the context of likely research requirements in general and any specific requirements and knowledge gaps identified in the course of Task Group I work

2. Define a research strategy that will address the research gaps identified above. This to be presented to and discussed with stakeholders

3. Advise and support the MCTPC on a programme aimed at mainstreaming, and initiating, and identifying fund sources for, the agreed research strategy.

Work has begun on assessing existing research capacity and some key general points to emerge are:

1. In 1982-1983 the MCTPC developed a plan for establishing the Research Institute which was a combination of three parties together; the Research Department, Urban Research Institute and Soil Testing Center. In 1984 the major Institute of the Ministry was established.

2. The Department of Research was subsequently renamed the State Enterprise for Road, Bridge Survey Design and Waterway Administration and then to Committee for Communication Planning, then to Communication Design and Research Institute (CDRI).

3. In 2002 CDRI changed its status to Lao Transport Engineering Consult (LTEC) and hence there is currently no active established research body within the MCTPC.

4. The long term sustainability of programmes such as SEACAP 3 within the MCTPC depends on there being an appropriate research capacity available to evaluate the evolving needs of the Lao PDR road sector and to propose and initiate upgrades to such programmes.

The Module 1 review process has started to highlight knowledge gaps that could form the basis for a series of SEACAP Research Studies (SRSs); namely:

- LVRR traffic patterns in Lao PDR

- Unsealed road performance in Lao PDR

- Performance of local options – eg thin seals on laterite gravel

- Appropriate vehicle operating and road management costs for Lao PDR

The concept of SRSs is consistent with ideas expressed by DoR that any research programme must have definite practical benefits.

5.5 Task Group 4 (Dissemination)

Key actions to be undertaken are:

1. Prepare technical materials for the future MCPTC Website, Newsletters, Briefing documents, Power Point Presentations and Scientific papers

2. Present project outcomes at local, regional, and international for such as PIARC, SEACAP, GMSARN, IFG and other conferences.

Discussions with DoR have shown that MCTPC have a website within which a Rural Road sub-site could be established. Cooperation will be actively sought with the MCTPC IT department.

6 Project Programming

6.1 Staff and Resources

The project staff resources are as presented in the TRL Technical Proposal, with only minor adjustments to time inputs and responsibility designation. Table 6.1 summarises the core team members and their responsibilities.

Name	**Position**	**Key Project Responsibilities and Inputs**
Dr Jasper Cook (TRL)	Team Leader Geotechnical Specialist	Project technical direction and management. Appropriate LVRR technical specification development. Research development and application.
Michael O'Connell (TRL)	Transport and road engineering specialist and Deputy Team Leader	TRL Project Manager. Road and pavement engineering. Standards development. Research and training needs assessment
Simon Done (TRL)	Training Specialist	Road engineering and training and capacity building
Trevor Bradbury (TRL)	Dissemination and IT specialist	Engineering and dissemination. Design and set-up of LVRR website
Bounta Meksavanh (LTEC)	Local Team Leader and Road Engineer Specialist	Project management and road engineering
Saysongkham Manodham (LTEC	Road engineering specialist	Local road engineering
Chittakone Maniphan (LTEC)	Training Support	Road engineering and training
Keithiphan S (LTEC)	IT Support	Engineering and IT support

Table 6.1 Project Professional Staff and Responsibilities

6.2 Detailed programme

The programme of work has been reviewed and updated during the inception period to add necessary detail and to confirm the timing of the inputs and the outputs. The resulting detailed programme is included as Appendix B to this report

The project structure remains substantially the same as that given in the proposal whereby the work is structured into three Project Components containing four Task Groups, two within Project Component 1 and one within each of the remaining two components. To achieve the Project Components they are then broken down into to a total of 11 Modules and main subsequent tasks. Seven of these Modules are to be carried out under Project Component 1 by Task Groups one and two. Three of the remaining four Modules are to be carried out by Task Group 3, and the fourth by Task Group 4.

Project Components 1 is tasked to deliver the standards and training, the latter is principally on the content of the standards, Component 2 will deliver the sustainable research strategy and Component 3 will deliver the dissemination system and disseminate the project outputs. The three principal outputs are:

1. Technical Standards and Specifications
2. The delivery of a training programme
3. The research strategy

Outside of these components advice and technical assistance will be provided to MCTPC by the project team. As well as delivering the main three project outputs the project will report progress through monthly reports, frequent stakeholder reviews, and end of module reports

Three workshops and one in-depth stakeholder review are planned. Two of the three workshops are associated with the review of the current situation with regard to the project parameters and the development of the parameters for the standards, modules 1 and 2 respectively. The in-depth stakeholder review is associated with an examination of the content of the draft standards themselves (module 3). The remaining workshop will be held to examine the developing strategy for a sustainable research capacity (module 9).

As planned, there are two workshops during the second quarter (in May and June), and the in-depth stake holder review is scheduled for the 3rd quarter, in July. The dissemination will also commence in the third quarter, and the training is scheduled early in the 4th quarter. The principal project outputs are scheduled for the 4th quarter.

The project staff and resources have been assigned and scheduled to meet these requirements.

Thus the project reports/outputs and workshops are scheduled as shown in Table 6.2

Item	Module/	Output	Delivery
Inception report	N/A	Report	March 2007
Inception report	N/A	Workshop	March 2007
Draft review of current situation	1	Workshop	May 2007
Draft review of current situation	1	Report	May 2007
Develop task standard and road design matrix	2	Workshop	June 2007
Draft research strategy	9	Workshop	June 2007
Draft standards	3	Report	July 2007
In-depth stakeholder review of standards	3	Stakeholder review	August 2007
Training Programme	Component 1	Report	November 2007
Research Strategy	Component 2	Report	December 2007
Technical Standards	Component 1	Final Report	January 2008
Dissemination	Component 3	Dissemination complete	January 2008

Table 6.2 SEACAP 3 Outputs

References

Cook J R & Petts R 2005. Rural Road Gravel Assessment Programme, (SEACAP 4) Module 4: Final Report. DFID funded South East Asian Community Access Programme, Intech-TRL, Vietnam.

Intech-TRL 2006a. Rural Road Surfacing Research; RRST-I Final Report. DfId-Funded SEACAP Report for Ministry of Transport, Vietnam.

Intech-TRL, 2006b. Cambodian Low Cost Surfacing, Phase 2. SEACAP 8. . DfId-Funded SEACAP Report for Ministry Rural Development, Cambodia.

Roughton International 2006. SEACAP 17, Module 1 Report. DfId-Funded SEACAP Report for MCTPC, Lao PDR.

SADC 2003. Guidelines, Low Volume Sealed Roads. DfID-NORAD-SIDA Funded Research Report for, Southern African Development Community

TRL 2002. Promoting the Use of Marginal Materials. . (Cook J R, Bishop E C, Gourley C S and Elsworth N E) DfID-funded TRL Research Report PR/INT/205/2001; R6887

TRL 2001 The Selection and Use of Construction Materials for Road Construction in Tropical and Sub-Tropical Countries (Cook J R ,Gourley C S and Elsworth N E). DfID-funded TRL Research Report ; R6898.

SEACAP 3

MAINSTREAMING APPROPRIATE LOCAL ROAD STANDARDS AND SPECIFICATIONS AND DEVELOPING A STRATEGY FOR THE MCTPC RESEARCH CAPACITY

INCEPTION REPORT

Appendix A

Listing of Current SEACAP Trial Construction Specifications

Existing SEACAP Draft Specifications: Vietnam (SEACAP 1)

Reference	Specification
RRST 1-01	Bituminous Emulsion – Surface Dressing Chip seal
RRST 1-02	Bituminous Emulsion – Sand Seal
RRST 2-01	Gravel Sub-Base/Base
RRST 2-02	Lime Stabilised Sub-Base/Base
RRST 2-03	Cement Stabilised Sub-Base/Base
RRST 2-04	Emulsion Stabilised Sub-Base/Base
RRST 2-05	Armoured Gravel Roadbase
RRST 2-06	Sand Sub-Base
RRST 2-07	Quarry-Run Sub-Base
RRST 2-08	Graded Crushed Stone Sub-Base/Base
RRST 2-09	Sand Bedding Layer
RRST 2-10	Dry Bound Macadam Sub-Base/Base
RRST 3-01	Fired Clay Brick Pavement – Unmortared Joints
RRST 3-02	Fired Clay Brick Pavement – Mortared Joints
RRST 3-03	Cement Brick Pavement – Mortared Joints
RRST 3-04	Mortared Dressed Stone
RRST 3-05	Cobble Stone Paved Surface
RRST 4-01	Bamboo Reinforced Concrete
RRST 4-02	Steel Reinforced Concrete
RRST 4-03	Non-Reinforced Concrete
RRST 5-01	Gravel Shoulders
RRST 5-02	Lime Stabilised Shoulders
RRST 5-03	Cement Stabilised Shoulders
RRST 5-04	Quarry-Run Shoulders
RRST 5-05	Sealed Macadam Shoulders

Existing SEACAP Draft Specifications: Cambodia (SEACAP 8)

Reference	Specification
SC8-1	Earthworks and Sub-Grade
SC8-2	Gravel Shoulder
SC8-3	Gravel Sub-Base/Base
SC8-4	Sand Aggregate Road-base
SC8-5	Water-Bound Macadam Road-base
SC8-6	Armoured Gravel Road-base
SC8-7	Hand Packed Stone Road-base
SC8-8	Dressed Stone Surfacing
SC8-9	Bamboo Reinforced Concrete Pavement

Existing SEACAP Draft Specifications: Lao PDR (SEACAP 17)

Reference	Specification
902	Earthworks and Gravel Pavement Layers
903	Bituminous Seals (Sand, Stone and Otta Seals)
904	Bamboo Reinforced Concrete
905	Geocell Pavement
906	Concrete Block Paving
907	Hand Packed Stone
908	Hand Packed (Mortared) Stone

SEACAP 3

MAINSTREAMING APPROPRIATE LOCAL ROAD STANDARDS AND SPECIFICATIONS AND DEVELOPING A STRATEGY FOR THE MCTPC RESEARCH CAPACITY

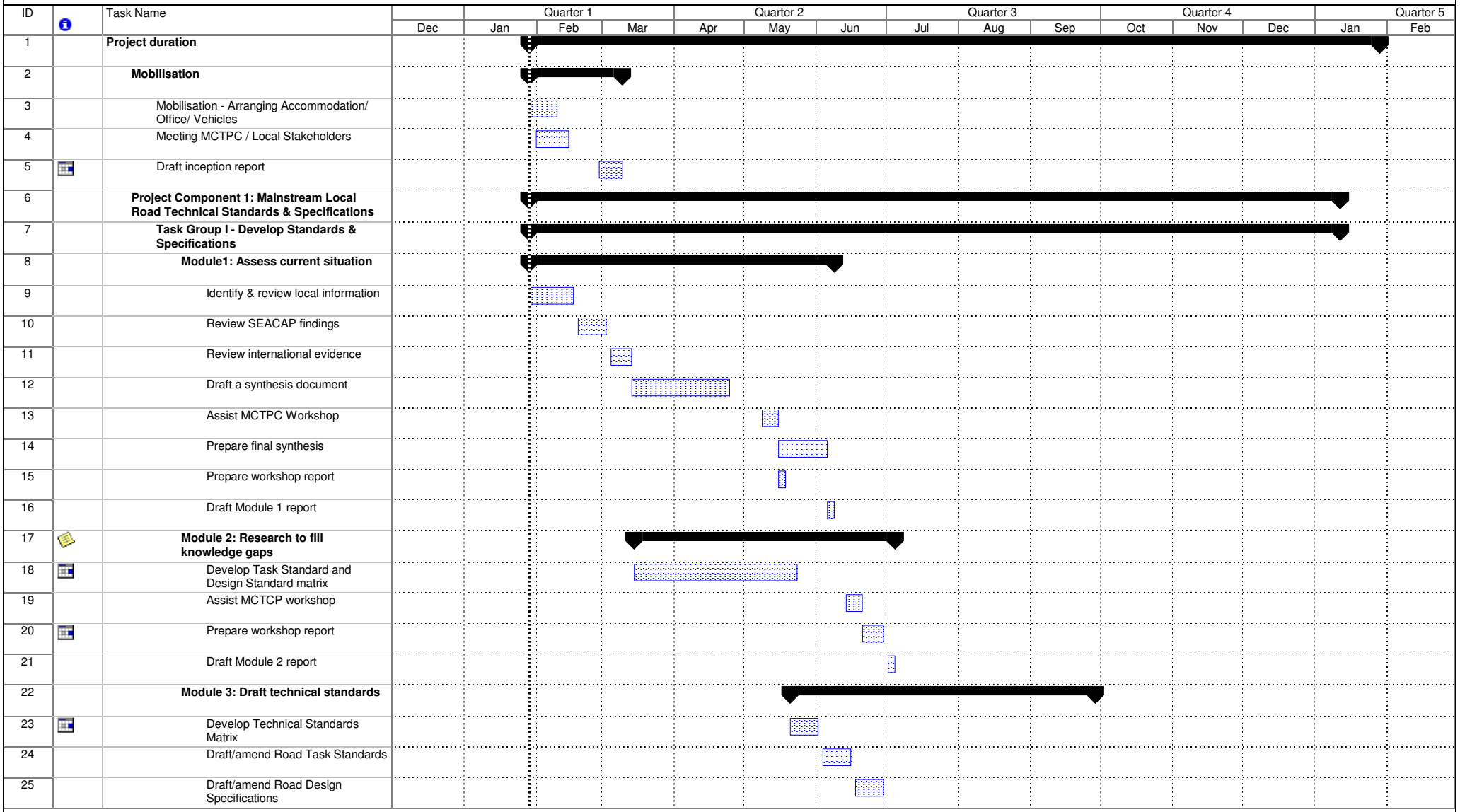
INCEPTION REPORT

Appendix B

Project Programme

SEACAP - 3

Mainstreaming appropriate local road standards and specifications & developing strategy for MCTPC research capacity

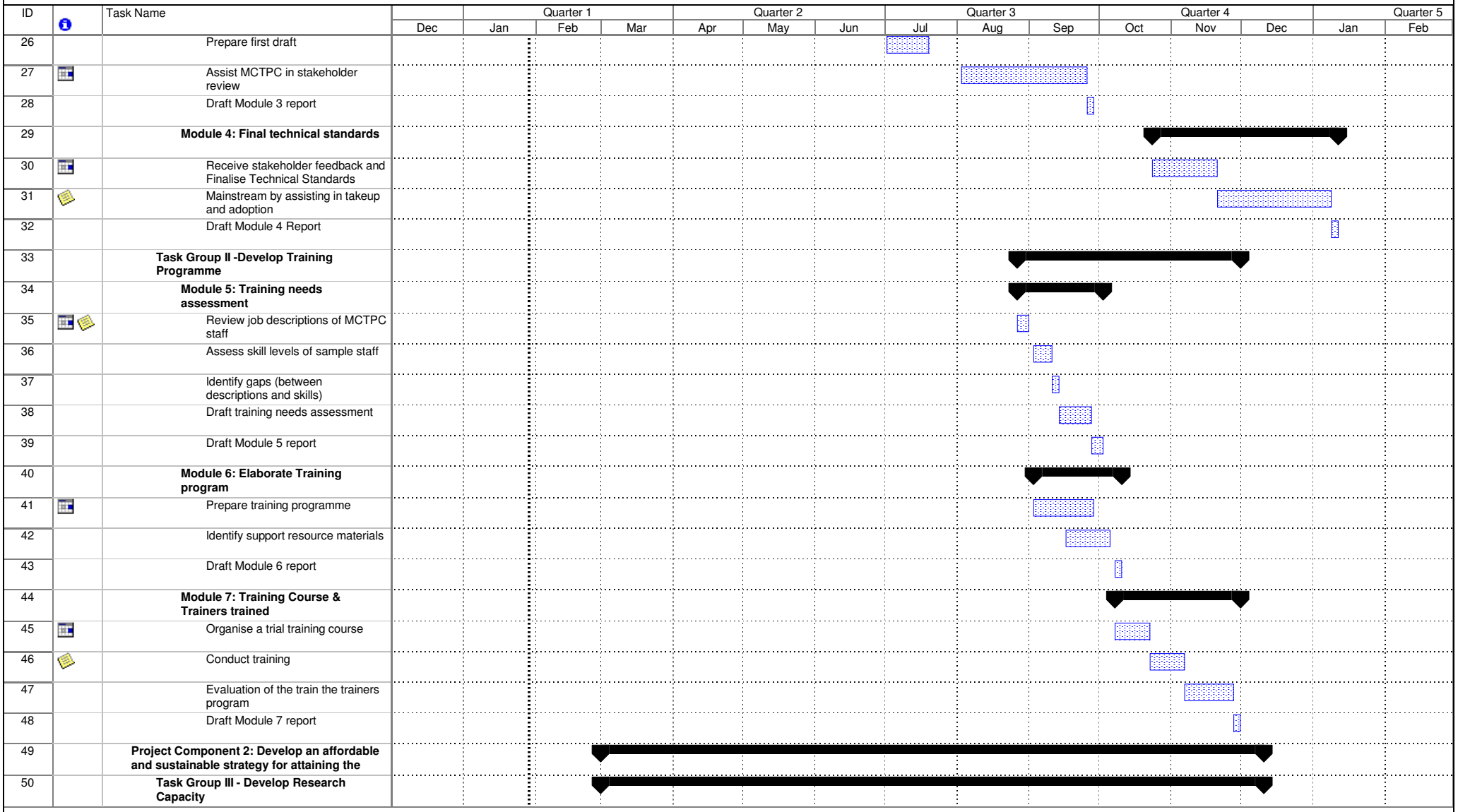


Project: SEACAP 03 - Lao PDR

Task	Summary	Rolled Up Progress	Project Summary		
Progress	Rolled Up Task	Split	Group By Summary		
Milestone	Rolled Up Milestone	External Tasks			

SEACAP - 3

Mainstreaming appropriate local road standards and specifications & developing strategy for MCTPC research capacity

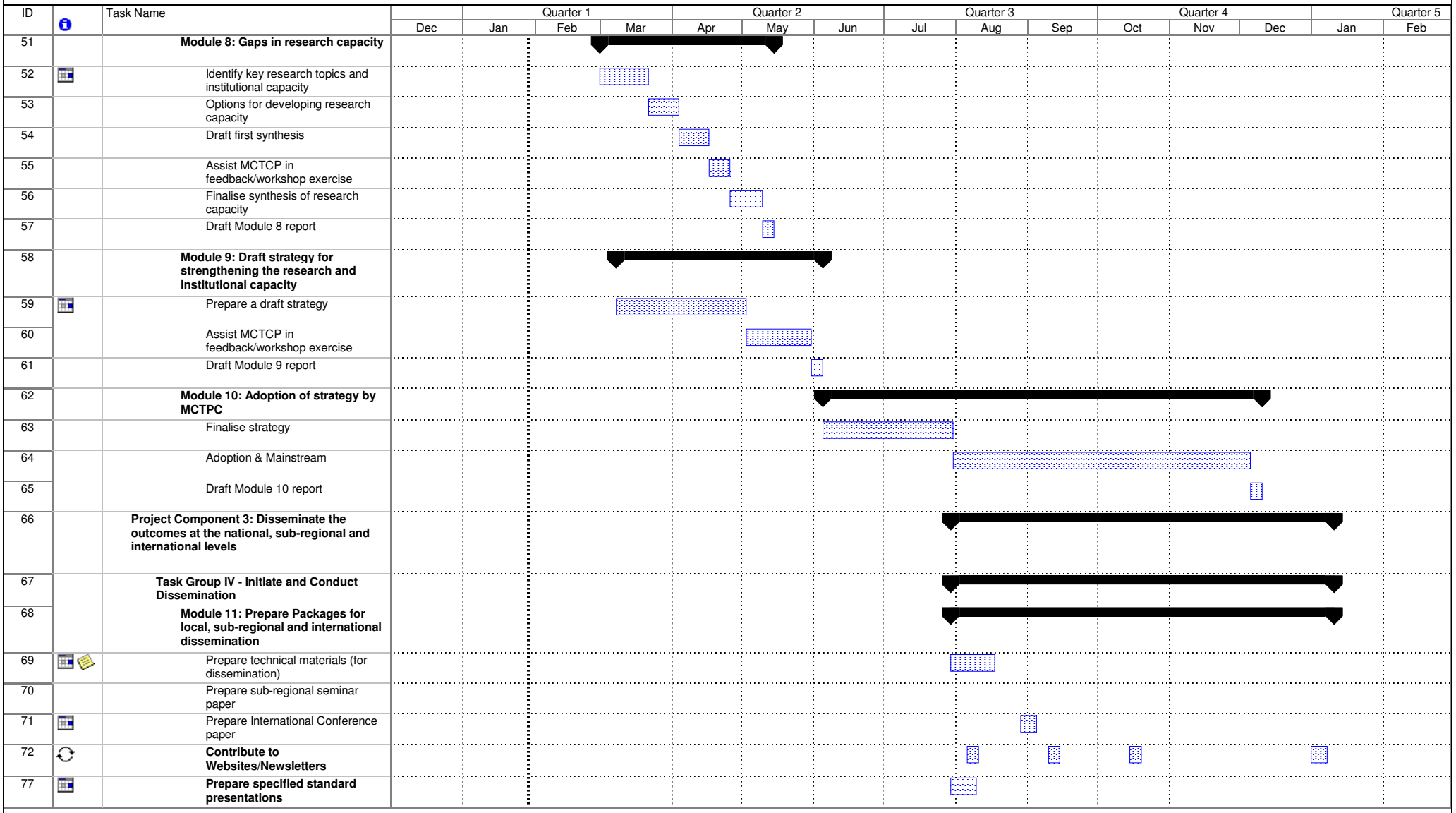


Project: SEACAP 03 - Lao PDR

Task		Summary		Rolled Up Progress		Project Summary	
Progress		Rolled Up Task		Split		Group By Summary	
Milestone		Rolled Up Milestone		External Tasks			

SEACAP - 3

Mainstreaming appropriate local road standards and specifications & developing strategy for MCTPC research capacity

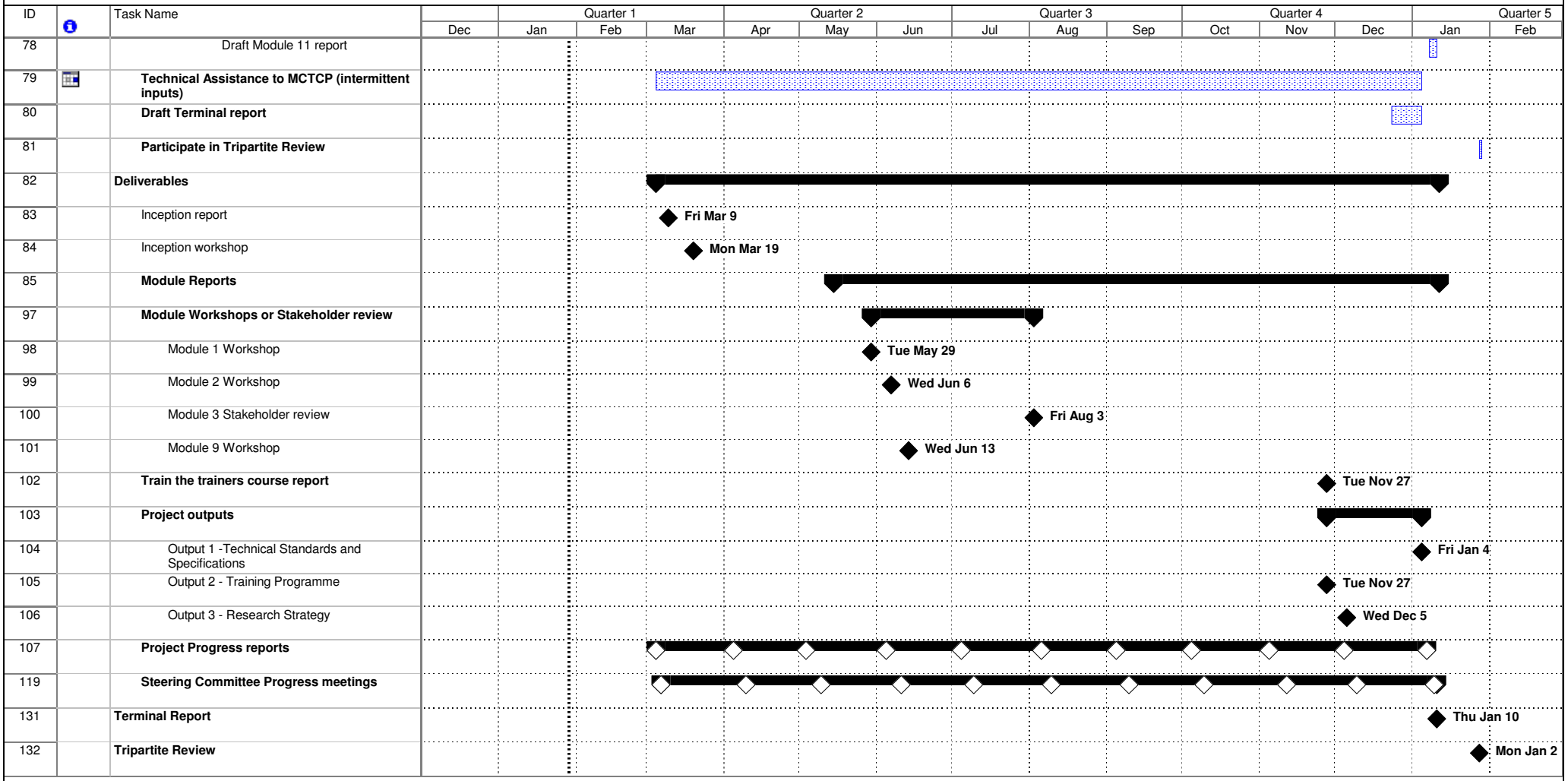


Project: SEACAP 03 - Lao PDR

Task		Summary		Rolled Up Progress		Project Summary	
Progress		Rolled Up Task		Split		Group By Summary	
Milestone		Rolled Up Milestone		External Tasks			

SEACAP - 3

Mainstreaming appropriate local road standards and specifications & developing strategy for MCTPC research capacity



Project: SEACAP 03 - Lao PDR

Task	Summary	Rolled Up Progress	Project Summary		
Progress	Rolled Up Task	Split	Group By Summary		
Milestone	Rolled Up Milestone	External Tasks			

SEACAP-3 Schedule of Staff Inputs

ID	Task Name	Position
1	**Project Duration**	
2	**International**	
3	**J Cook**	**Team Leader Geotechnical Specialist**
14	**M O'Connell**	**Transport and road eng. Spec. & Deputy Team**
20	**S Done**	**Training specialist**
22	**T Bradbury**	**Dissemination expert**
24		
25	**Domestic LTEC**	
26	**Bounta MEKSAVANH**	**Local Team Leader and Road Engineer Specialist**
28	**Saysongkham MANODHAM**	**Road engineering specialist**
30	**Keithiphan SENAMAHMOUNTRY**	**IT Engineer**
32	**Chittakone MANIPHON**	**Junior Engineer**
34	**Thipdavane VONGSAY**	**Project coordinator**
36	**Chanthida PHAPHIBOURN**	**Secretary / Office Manager**
38	**Xoumaitri PANYANOUVONG**	**Translator**
47		
48	**MCTPC Counterpart staff**	
49	**Khampaseuth Panyanouvong (LRD)**	**Civil Engineer (LRD)**
51	**Ounheuan Siliamphone (PTD)**	**Senior Technical Staff (PTD)**
53		
54	**Technical Panel**	
55	**R Petts**	**Quality Assurance**
59	**A Ahmedi**	**Research capacity**
61	**A Beusch**	**Training**
63	**B Dzung**	**SEACAP -Vietnam**
65	**P Tuang**	**SEACAP - Vietnam**
67	**H Kackada**	**SEACAP-Cambodia**