ANNEXES FOR FEASIBILITY STUDY

ANNEX F-6

IEE REPORT FOR ROUTE 14A

Ministry of Communication, Transport, Post and Construction
Department of Roads, Lao PDR

Draft Initial Environmental Examination (IEE)

The Construction and Improvement of Road 14A Project

September 2002

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Introduction

Assessing the impacts of any project is a complex process that requires careful consideration of the legislative and regulatory environment of the country, a sound understanding of the environmental conditions, a clear articulation out of the objectives of the project and the development of an environmental management plan. In many cases the proponent/owner is either from the private sector or is a public/private partnership. In these situations the government's role is to insure that the project meets the objectives and regulatory requirements of the country. Owners are responsible for assessing whether their projects are successful, most often measured on the grounds of economic imperatives.

In the case of public sector projects the assumption must be that no country would willingly negatively impact the ecological, social, economic, cultural and physical systems of their country. More importantly, the objectives of public sector projects should always be to improve the quality of life of residents and act on behalf of the greater public good. In the case of a road project it is essential that the positive impacts from the investment process be realized. It is not sufficient for the government to simply ensure that the national regulations and legislative requirements have dealt with negative impacts. There must be a conscious process of ensuring that the objectives of the investment project are realized.

This project is different from other environmental assessment exercises since the owner is also the entity responsible for the monitoring of the construction and operational phases. This is unique and requires that the owner work carefully with its various stakeholders to ensure that the positive impacts are realized and the negative impacts avoided.

Study Approach

The Initial Environmental Examination (IEE) for the road improvement project for Route 14A was carried out using international practices and within the legislative and regulatory structure of Lao PDR. This assessment along with that of Route 16A is the first IEE to proceed through the formal STEA process. The assessment has been carried out using available information and therefore there are gaps in the information base. Nevertheless, in most cases it has been possible to understand the overall impacts of the proposed changes and improvements to Route 14A. The environmental assessment has been an ongoing process with the objective always to define an alignment that would have the highest possible positive impacts and the least direct negative consequences.

Route 14A along with Route 16A was selected for assessment based on a comprehensive evaluation of the road network in Southern Lao PDR and a master planning process. The proposed work requires the improvement and upgrading of the road surface of significant portions of the road. The alignments selected by the engineering team for this route will have the least direct negative impact on both the cultural and social environment. The adjustment of the alignment of the road section at Vat Phou area and Ancient City to minimize adverse impacts on ancient city and communities from upgrading the existing road through the middle of the city has been

undertaken with the involvement of and agreement from the Ministry of Culture and Information. Full details of the proposed route can be found in the IEE report.

The IEE has considered cultural, socio-economic, physical and ecological dimensions when measuring the impact of the proposed construction and improvement initiatives.

Overall Assessment

The objectives of improving the road have to do with increasing the quality of life and economic and social conditions of the residents as well as the whole country. Given these objectives it is the overall assessment that the road has a significant positive impact on the immediate environment as well as the national situation. The road will significantly increase the access of residents to a range of social services and markets and will help position the area to achieve higher levels of economic development. It is recognized that there will have to be considerable cooperation of several government ministries and departments and aid agencies in order to achieve the desired benefits of the road construction and improvement. This will require initiatives such as training programs, small business development programs, technical assistance in local product development and tourism destination management for local people and officials.

Positive Impacts

The major positive impacts from the road improvement and construction project of route 14A will be the improvement to the quality of life of local communities thereby helping to reduce poverty. During construction the project could provide opportunities for local people to increase their incomes largely through encouraging the use of local labor for employment or contracting out to local communities or groups various activities such as for replanting trees.

Once the improved road is in operation there will be opportunities for increased access to markets for agricultural, handicraft and other local products. There will be no doubt that tourism development at Vat Phou and Ancient City will encourage more economic development of the area after the completion of the road project. In addition the project will result in a number of other positive areas including.

- Accessibility for people in the missing link area
- Reduced travel time and cost
- Increased safety
- Less dust pollution
- Less flooding
- More opportunities for local people to access educational, health and social facilities
- Improved living conditions
- More funds for cultural resources preservation

Negative Impacts

Although construction works including bridge construction can generate a number of negative impacts, they can be minimized/avoided by implementation of appropriate mitigation measures during pre-construction, construction and operational phases. To ensure that these mitigation measures are implemented and that negative impacts are avoided, the MCTPC will ensure that the contractor follows guidelines and mitigation

measures as required. A monitoring program for the project will have to be undertaken to ensure the effectiveness of mitigation measures put into place.

With the increasing visitation to Vat Phou and Ancient City, there is a possibility of negative impacts on cultural resources if the site carrying capacity, in terms of its facilities and infrastructure to absorb tourism activities, is exceeded and not properly controlled. The physical environment of the ancient city could also be damaged due to future development associated with tourism activities. It is very important to note that a destination management plan for Vat Phou needs to be developed in order to avoid adverse impacts to the archaeological site itself and the environment nearby.

There is always the concern that with any construction project the influx of workers can have serious social, health and cultural impacts on the local population. The IEE proposes a series of measures to ensure that the positive dimensions of the road are not overshadowed by negative impacts on social and cultural systems both during the construction as well as operational phases.

Monitoring

A monitoring program will have to be carried out by various government agencies in order to assess the effectiveness of mitigation measures in dealing with negative impacts and to assess whether supporting government programs are in fact improving the local economy and quality of life. Prior to the monitoring process there will have to be baseline studies carried out for a number of dimensions.

Conclusion

It has been determined that most of the anticipated negative impacts can be avoided or minimized in almost all cases to an acceptable level through compliance with laws and regulations and the effective implementation of mitigation measures and a rigorous monitoring program.

Since this is the first road project to proceed through the formal environmental assessment process there obviously will be a need for adjustments and ongoing discussions. The required reporting periods, for example, may need to be adjusted based on the capacity of the various government agencies to meet the determined reporting procedures and time tables.

In addition, there may be situations where capacities (training, experience, time, financial resources for travel and information management technologies) may need to be expanded in order to meet the needs of the environmental assessment process. The monitoring process has been designed in order to ensure that as much as possible the legislative and regulatory measures have been met within a realistic implementation framework. The choice of factors to measure has been determined in large part on what are seen to be reasonable expectations given the financial resources of the country.

It must be repeated here that the object of monitoring is not to provide reports. The object of monitoring is to determine the effectiveness of the Environmental Management Plan and to ensure that the regulations and designs that have been established are appropriately/properly adhered to. It must be remembered that monitoring therefore has an action orientation to it which allows the necessary

authorities to put into place remedial measures when necessary. In some instances the monitoring should immediately trigger a remedial action should a negative impact be discovered. For example, if the sewage from a workers' camp is polluting a river, the Department of Roads should take immediate action to deal with this environmental impact. The fact that the problem has occurred should certainly be reported but more significantly it is important to report the remedial action that has been taken .

There is no doubt that there will be a need for constant adjustments in expectations and procedures as the first environmental assessment process develops.

Based on this assessment an Environmental Impact Assessment (EIA) will not be required.

GLOSSARY

ADB – Asian Development Bank
EIA – Environmental Impact Assessment
EMP – Environmental Management Plan
IEE – Initial Environmental Examination
IUCN – International Union for the Conservation of Nature
JICA – Japan International Cooperation Agency
MCTPC – Ministry of Communication, Transport, Post and Construction
STA - Station
STEA – Science Technology and Environment Agency
UNDP – United Nations Development Programme
UXO – Unexploded Ordnance
WWF – World Wildlife Fund

ACKNOWLEDGEMENTS

Several organizations have provided relevant information on the various issues related to the project impacts. These include the following.

- Science, Technology and Environmental Agency (STEA)
- National Tourism Authority of Lao PDR
- Ministry of Agriculture and Forestry
- Ministry of Information and Culture
- Local and provincial governments in Champasack
- Women's Union
- Ministry of Health
- Urban Research Institute
- Ministry of Education
- Lao Front from National Construction
- Ministry of Industry and Handicraft
- National Committee for Control of AIDS
- International organizations – ADB, IUCN, UNESCO, UNDP, SUNV-UNDP and WWF

1. INTRODUCTION

The Japan International Cooperation Agency (JICA), at the request of the Lao government, is providing technical assistance in the development of the national highway network in the southern portion of the country. This work is being carried out in pursuit of the goals of the Ministry of Communication, Transport, Post and Construction (MCTPC). This Project aims to facilitate regional economic growth and co-operation by developing an international standard highway in Southern Lao PDR. It is recognized that the southern region of Laos has high economic potential due to the existence of important natural, social and agricultural resources.

Many of the roads and bridges in the region have deteriorated and even the national roads are often damaged during the rainy season with some sections barely passable even during the dry season. This posed a barrier to the movement of international trade, but has also resulted in this part of Laos being much poorer than the rest of the country due to the lack of access to markets and services.

1.1 BRIEF DESCRIPTION OF THE ROAD PROJECT

In early 2002, the study team reviewed the national road network (12 roads) in the five southern provinces including Champasack, Attapeu, Sekong and Saravan and the area of Savannakhet along Road 1G. A feasibility study was carried out to prioritize the roads that were seen as being crucial for the socio-economic development of the region.

After a comprehensive assessment and discussions with government officials it was determined that road 14A would be one of two routes (the other is route 16A) that would be further examined and for which designs would be prepared by a JICA funded technical team. The location of the roads can be seen in Figure 1. The road therefore must be seen as representing a high priority of the national government in the southern part of the country. It is within this context that this IEE report has been prepared. It must also be recognized that the environmental dimensions of the project are but one input into the final design and location of the road. It is clear that financial considerations, technical imperatives and the objectives and concerns of various national and provincial officials are all important ingredients in the choice of the final route and its design.

Assuming that the recommendations of the feasibility phase are accepted by the Japanese Government a process of basic and detailed design will follow as part of the funding of the road construction and improvement.

Is also important to note that there is a scarcity of reliable inventory and baseline information. In some cases decisions have been made based on the best available information and the experience of the consultants. As will be seen throughout the report there are recommendations for baseline studies to be established before any construction does take place and in some instances inventory work carried out to help to guide the detailed design of bridge structures and the construction process of those bridges.

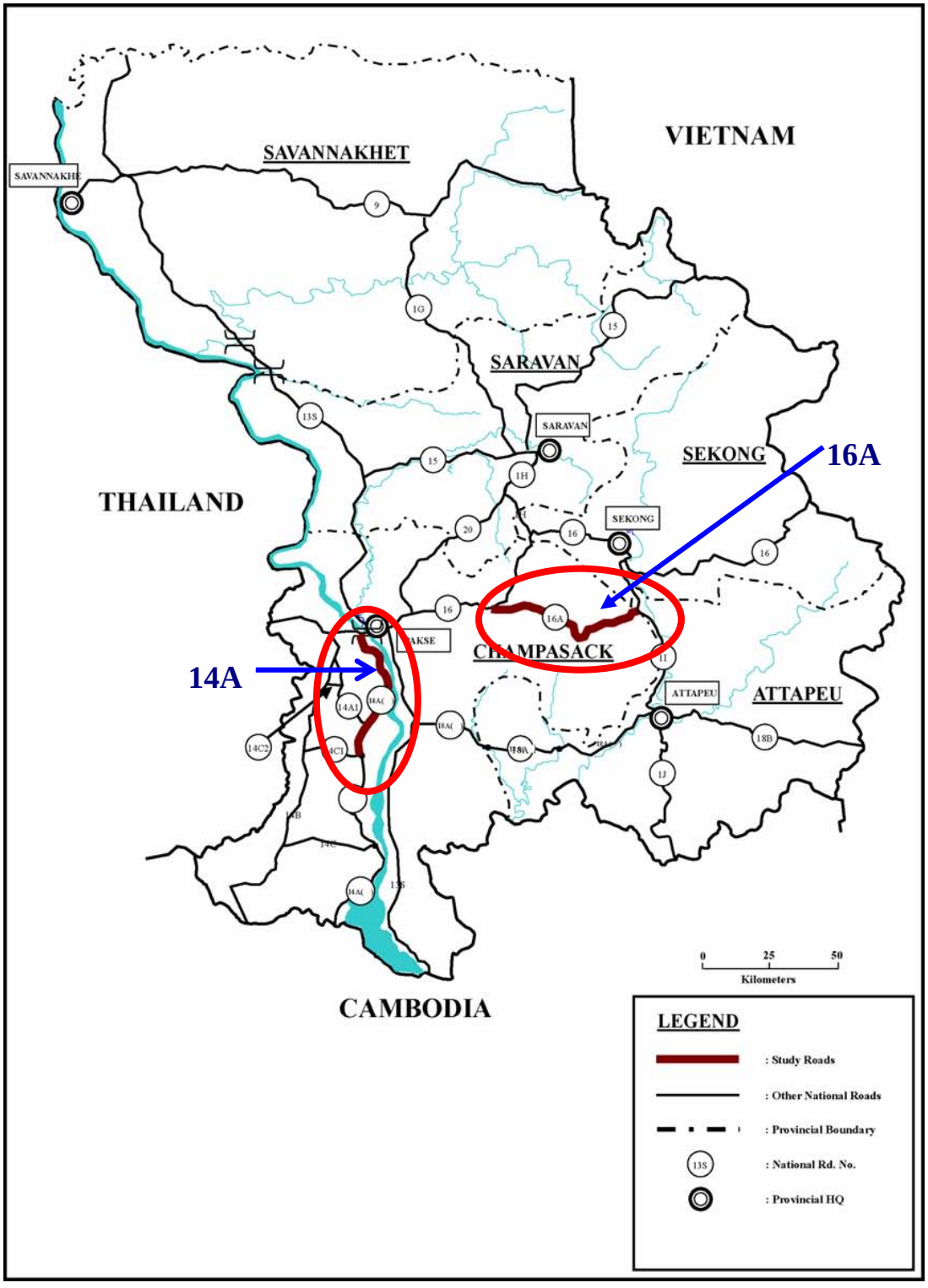


Figure 1: Location of Roads 14A and 16A

1.2 SCOPE AND METHODOLOGY OF THE IEE STUDY

This Initial Environmental Examination (IEE) is concerned with road improvement and construction work to a 59.75 km. section of Road 14A in Champasack province. This report is designed to provide the government with the opportunity of evaluating overall impacts.

The preparation of the study has used a full range of activities including examining the work from the Project's April 2002 Interim Report, discussions with relevant stakeholders, conducting a major social and economic study through the survey of a number of communities along the road, water quality studies, and a thorough assessment of the physical, cultural and ecological impacts of the project. It is important to note that the project is very much concerned with minimizing any negative impacts. The Project is equally concerned with achieving the potential benefits that the significant investment in road construction and improvement will provide for the overall social and economic development of the country and the people in the immediate area and the province.

The IEE will identify the impacts of the construction phase but will not deal with such factors as quarry sites and the specific locations of work camps and material processing facilities since this is seen as the focus of another phase of work. It is recognized that IEEs may have to be done for these operations when the sites have been chosen.

1.3 DEPARTMENT OF ROADS, MCTPC

The executing agency for this project is the Ministry of Communication, Transport, Post and Construction (MCTPC) through the Department of Roads. The environmental impact process is the direct responsibility of the Social and Environment Division of the Department of Roads.

1.4 INSTITUTIONAL AND LEGISLATIVE FRAMEWORK

There are a number of laws, regulations and guidelines that have an influence on the overall environmental management and protection in Laos. It is our assessment that many of the laws provide a supporting process of impact evaluation and management. Table 1 presents a summary of laws and regulations related to environmental protection, land acquisition and compensation for rehabilitation from the road improvement project.

Acts/Regulations/Decrees	Responsible Agency	Provisions Relating to the Project
Environmental Protection Law #02/NA/99 (1999)	STEA	Protection and management of physical and ecological resources
Regulation on Environmental Assessment (2002)	STEA	IEE and EIA guidelines and regulations for assessing a project
National Forestry Law (1996)	MAF	Protection and management responsibilities for forestry land
Decree 1074 of the Ministry of Agriculture and Forestry (1996)	MAF	Protection and management responsibilities for forestry land
National Law on Land (1997)	DOL	Land acquisition and compensation procedures
Preservation and Management of National Cultural Heritage – Notice No. 943	MOIC	Protection and management of heritage sites and artifacts

Acts/Regulations/Decrees	Responsible Agency	Provisions Relating to the Project
Prohibition of Wildlife Trade-Council of Ministers' Decree No. 285/CCM (1986)	MAF	Prohibits all kinds of wildlife trade including live or dead specimens, trophies and articles produced from wild animals
National Biodiversity Conservation Areas-Prime Minister's Decree No. 164 (1993)	MAF	Declaration of NBCAs to protect large contiguous tracts of Lao PDR forests
Management and Protection of Aquatic Animals, Wildlife and on Hunting and Fishing-Council of Ministers' Decree No. 118/PCM (1989)	MAF	Prohibits hunting, catching, killing, damaging, transporting, and the selling alive or dead of animals or parts thereof.
Rules and Regulations of Town Planning-Prime Minister's Decree No.9 (1991)	MCTPC	Town planning regulations
Declaration of the President #125/PO on the Forestry Law approved by National Assembly #04/NA (1996)	Department of Forestry	Protection and management responsibilities for forestry land
Road Law approved by National Assembly #04/99/NA (1999)	MCTPC	Responsibilities relating to the management of roads.

Note:
MAF Ministry of Agriculture and Fisheries
MOIC Ministry of Information and Culture
STEA Science, Technology and Environmental Agency
DOL Department of Lands
MCTCP Ministry of Communications, Transport, Post and Construction

Table 1: Principal Laws and Regulations Relating to Environmental Protection, Land Acquisition and Compensation

2. PROJECT DESCRIPTION

2.1 OVERALL OBJECTIVES OF THE PROJECT

From an analysis of various government documents the country's primary national goals can be defined as:

- Economic growth
  Economic development is one of the important goals of the Lao PDR national government designed to ensure the creation of wealth and gainful employment for all its citizens.
- Poverty reduction
  The reduction of poverty can be seen as a subset of the overall goal of economic development. However, experience has shown that while overall national economic conditions may improve the condition of the poor may remain the same or in some cases deteriorate even within a climate of economic expansion. Investment in road construction and improvement is one way to help facilitate the poverty reduction process.
- National integration
  In a sparsely populated country with many small villages representing numerous ethnic minorities, a road system can help to bring people together and to achieve a much better level of communication in order to contribute to the process of nation building.
- Environmental protection.
  In Lao PDR there is a strong recognition of the important role that the natural environment will play in providing for prosperity in the future and providing for the food needs of the population. Protection of the environment must therefore be considered along with the other national goals.

2.2 SPECIFIC OBJECTIVES OF THE PROJECT

In addition to meeting overall national goals the construction and improvement of Road 16A has been selected as one of the priority roads in Southern Lao PDR since it will:

- The road will provide for all weather access for the residents in order to allow greater opportunities for moving their goods to important market centers as well as facilitating access to schools and medical facilities.
- Contribute to rural development in the area near the Champasak-Attapeu border and also improve East-West connections between Thailand, Laos and Vietnam.

2.3 CONSIDERATION OF ALTERNATIVES

As noted earlier twelve roads in south Lao PDR were evaluated in order to assess their priority for road improvement. Cost-benefit analysis for each road was carried out using three main factors: environmental, socio-economic and traffic impacts. Road 14A (between Phon Thong District and Ban Soukhouma: 59.75 km.) and 16A (70.05 km.) were identified as having the highest priority for implementation given their ability to meet national, regional and local priorities and interests.

2.4 NATURE & LOCATION OF THE EXISTING & PROPOSED ROAD

2.4.1 General Condition of Road 14A

Road 14A starts from Han Houay Phek, which is located 2.0 km west of Pakse bridge, and ends at Ban Soukhouma the capital of Soukhouma District. The entire road is located in Champasack Province and is 59.75 km proposed length for road improvement. There are industrial and service sector activities as well as Vat Phou, a Khmer World Heritage archaeological site.

2.4.2 Existing Road Conditions and Proposed Road Alignment

In order to better understand environmental conditions the road has been divided into seven sections as can be seen in Figure 2.

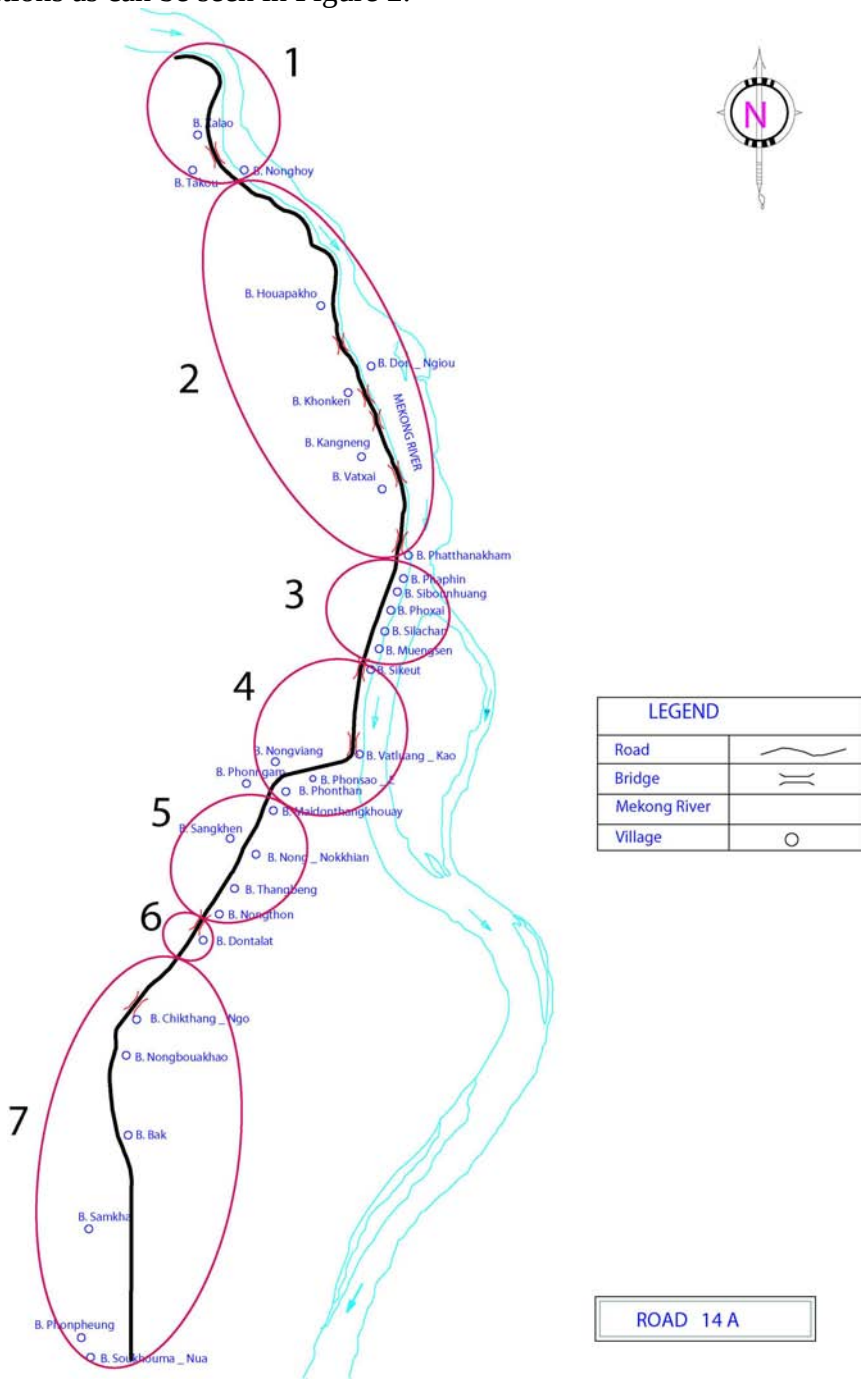


Figure 2: The 7 Sections of Road 14A

Section 1: STA. 0+000 – STA. 6+400 (Length: 6.4 km)

There were two alternatives considered for this section as illustrated in Figure 3. One was designed to improve the existing national road and the second examined the upgrading of the provincial road. It was decided to improve the provincial road given lower construction costs and better road structure. In addition, this second alternative is also more accessible to a greater number of villages. There will be no relocation required since the road passes through what are mostly paddy fields and local forest. There is no evidence of any feature of ecological value in this area.

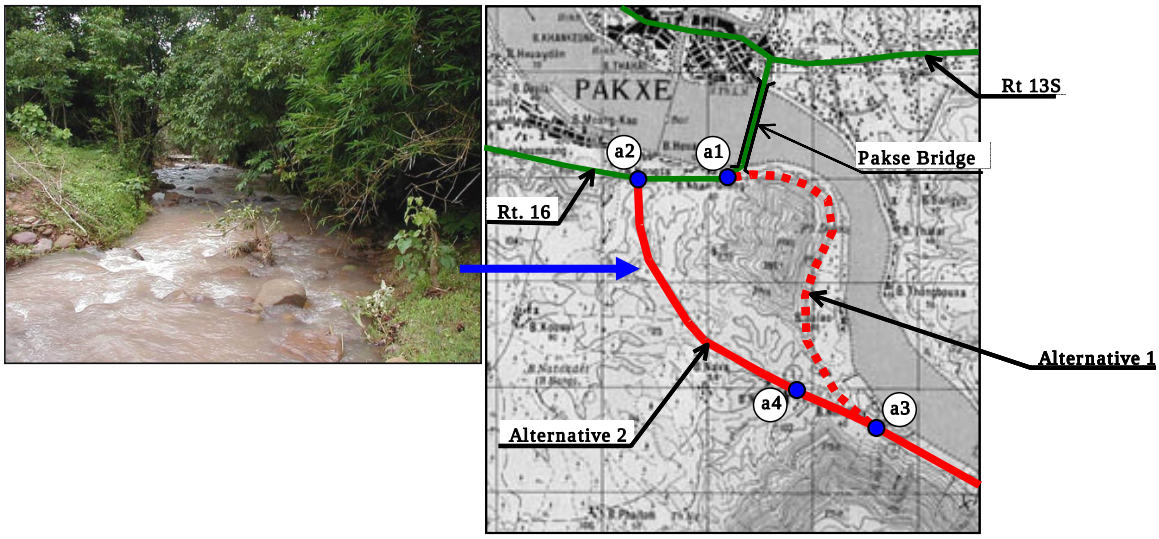


Figure 3: Section STA. 0+000 – STA. 6+400

Section 2: STA. 6+400 – STA. 25+000 (Length:18.6 km)

This is no road within this section. Local people travel by boat along the Mekong River. Flooding from the Mekong River poses a very serious problem for this section and therefore flooding countermeasures have to be carefully considered.

There were three alternatives considered for this section as illustrated in Figure 4.

- Locate the road in the paddy field.
- Locate the road at a mid point between the Mekong River and the foot of the mountain.
- Locate the road at the foot of the mountain

The first alternative was chosen for the improvement largely based on the opinion of the local people.

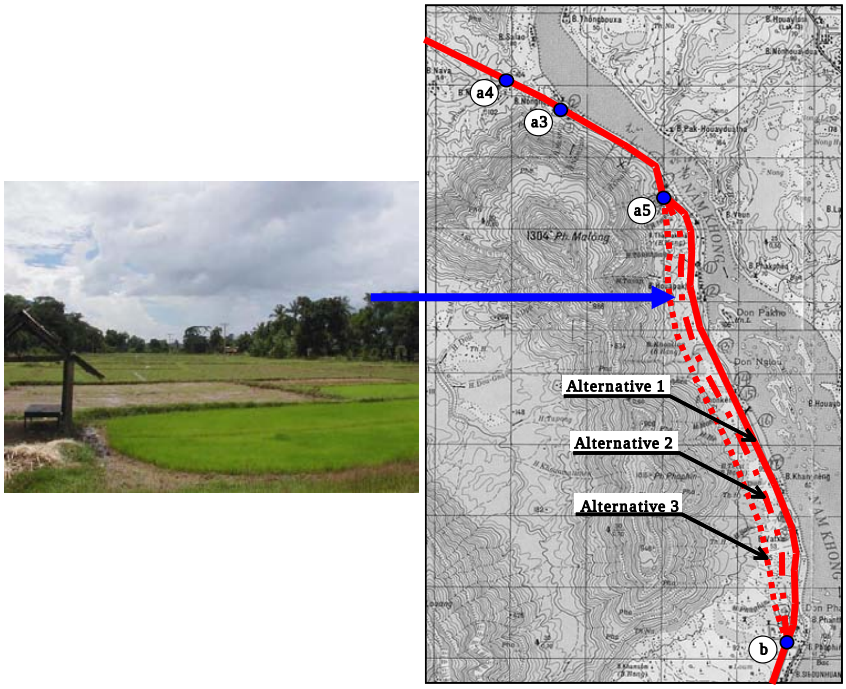


Figure 4: Section STA. 6+400 – STA. 25+000

Section 3: STA. 25+000 – STA. 29+050 (Length: 4.05 km)

This section passes through Champasack Town. This is a built-up area with a number of houses, temples and schools located very close to the existing road. The human settlements have cultural and heritage value that should be maintained and protected.

Given this situation there were three alternatives considered for this section as illustrated in Figure 5.

- A new road along Mekong River.
- Improvement of the existing road.
- Using the village road which is 150 meters away from the existing road.

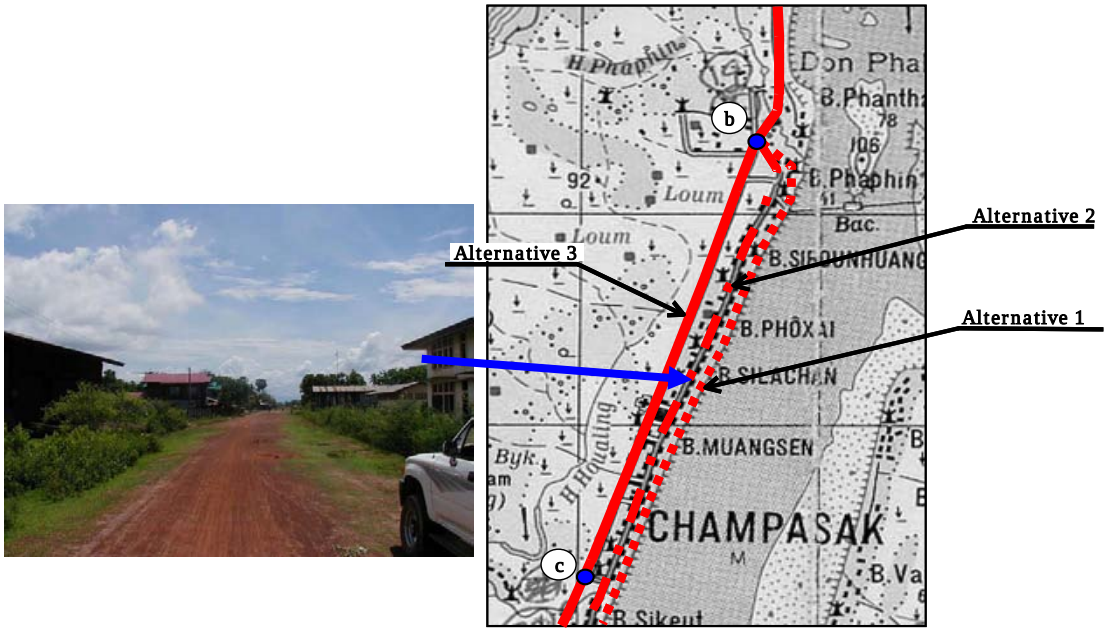


Figure 5: Section STA. 25+000 – STA. 29+050

It was decided that the village road be improved it will allow for the existing cultural to be protected.

Section 4: STA. 29+050 – STA. 35+800 (Length is 6.75 km – Vat Phou)
The present road passes through the ancient city. The relationship of the village and Vat Phou creates an important historical precinct that must be maintained and enhanced for cultural as well as economic development purposes.

There were 2 alternatives for this section as illustrated in Figure 6. One was to construct a new road to avoid any impacts on the ancient city. The second one was to improve the existing road. Based on cultural preservation objectives alternative 1 was elected. There are no villages along the new alignment.

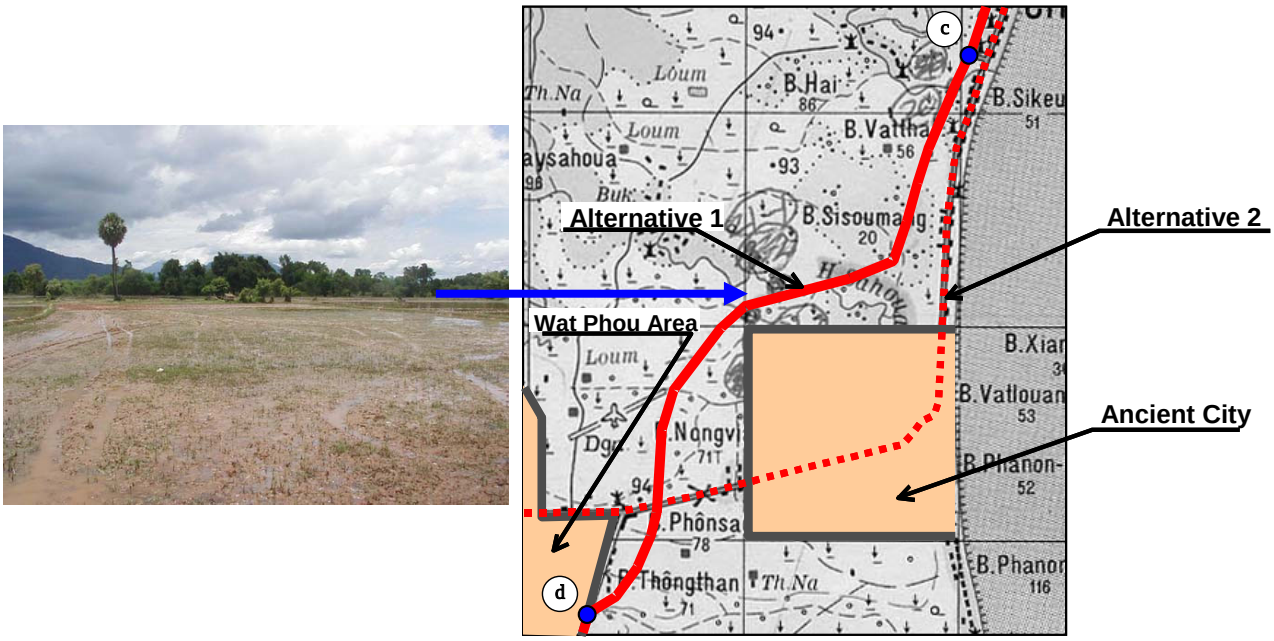


Figure 6: Section STA. 29+050 – STA. 35+800

However since this section is through what are largely paddy fields, the road height varies between 0-4 meters. At some point where the height is 4 meters but analysis has shown that the visual impacts on historical resources are minimal and can be dealt with landscape design.

Section 5: STA. 35+800 – STA. 41+500 (Length: 5.7 km)
The existing road is in good condition and is approximately 10 meters wide. Figure 7 illustrates the existing road. Improving the existing road is proposed with minimal widening required.

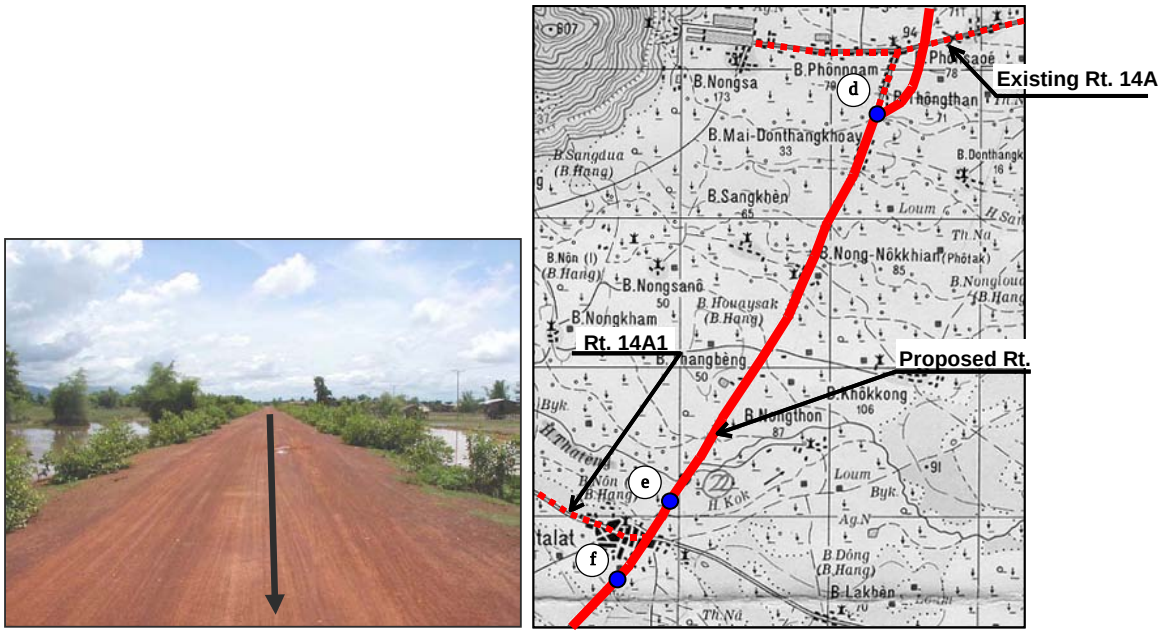


Figure 7: Section STA. 35+800 – STA. 41+500

Section 6: STA. 41+500 – STA. 43+000 (Length: 1.5 km – Ban Dontalat)

This section passes through Ban Dontalat village, where a large number of houses and shops are located right along the existing road as illustrated in Figure 8. There were two alternatives considered for this section. One was to improve the existing road through the Dontalat community and the other was to construct a bypass route. Considering the significant requirement of land acquisition and relocation of people required to meet road standards for alternative 1, alternative 2 was considered adopted.

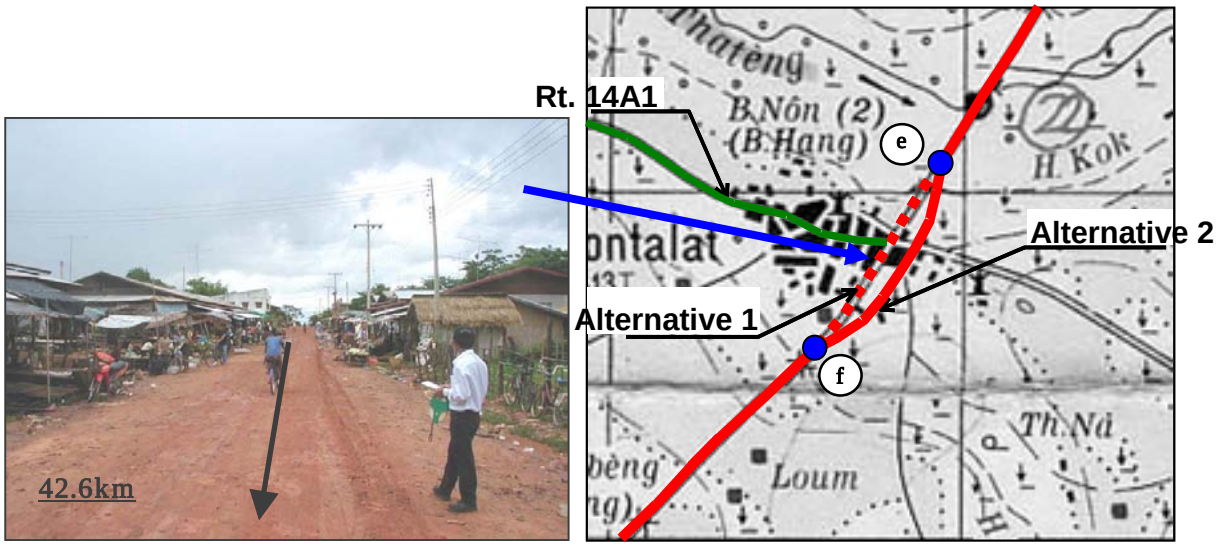


Figure 8: Section STA. 41+500 – STA. 43+000

Constructing a by-pass for this section will require a small-scale relocation of different types of structures. Given that the bypass alignment is only 150 meters away from the existing route residents will be able to easily access the proposed by-pass route.

Section 7: STA. 43+000 – STA. 59+750 (Length: 16.75 km)

The existing road is wide and is in good condition as illustrated in Figure 9. Therefore the improvement of the existing road is proposed. Since the existing road width is approximately 10 meters, widening work required is minimal.

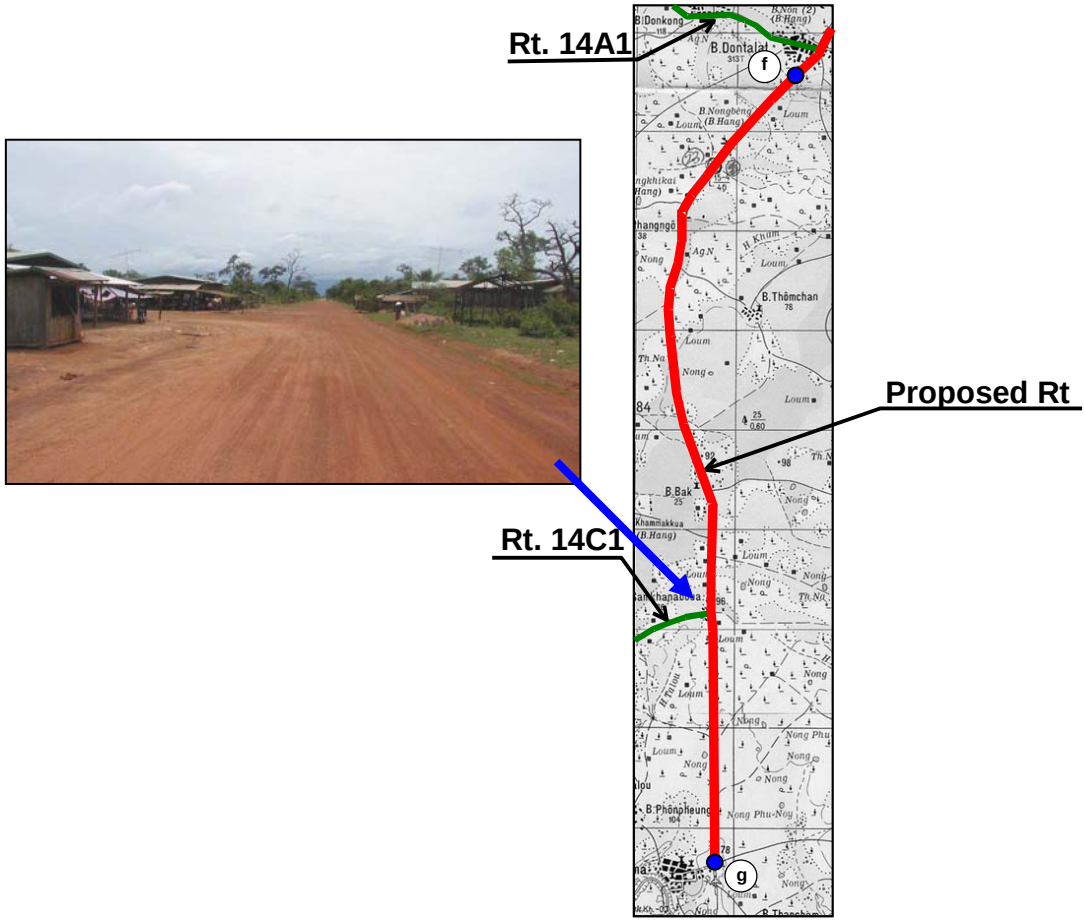
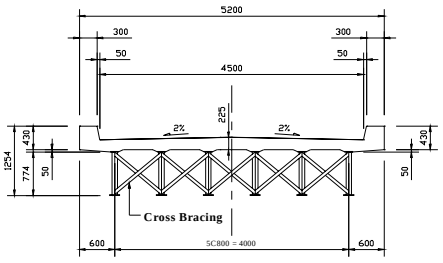


Figure 9: Section STA. 43+000 – STA. 59+750

2.5 BRIDGE IMPROVEMENT AND CONSTRUCTION

The project proposes to build 10 new bridges and improve two existing bridges. The bridge designs and bridge locations are illustrated in Figure 10 and 11.



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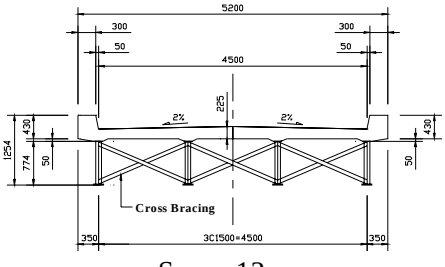

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Figure 10: Proposed Bridge Designs

Figure 11: Bridge Locations

2.6 ROAD IMPROVEMENT ACTIVITIES:

The construction and improvement of Road 14A will require four distinct areas of activity. They include the following considerations.

2.6.1 Planning and Design

The planning and design process brings with it a series of activities and possible impacts. The process must consider factors including cost, the full range of environmental impacts, technical and engineering issues and political and community objectives. The eventual planning and design decisions can bring about a number of positive and negative impacts that must be clearly identified and environmental management plans and mitigative measures designed to deal with those impacts.

2.6.2 Pre Construction

Pre construction involves the following major activities:

- A public involvement/consultation process to raise awareness of people on project activities and take their concerns into account in order to avoid possible opposition.
- The establishment of a public information program to provide relevant information related to project activities and its impacts.
- Preparation of a land acquisition plan
- Preparation of a resettlement plan
- Development of compensation procedures for affected people.

2.6.3 Construction

Road 14A improvement and construction will include the following:

- Temporary works such as access roads, work camps as well as material processing facilities.
- Site clearance will include cutting trees but only where absolutely necessary.
- Earthwork.
- Pavement work.
- Widening of the road formation and reconstruction of the road shoulders.
- Drainage measures.
- Miscellaneous activities including slope protection, provision of safety facilities, side ditches, etc.

2.6.4 Operation

In addition to the more commonly understood operational issues related to road maintenance the success of a road project in meeting national goals requires a number of planning policy and project implementation initiatives. These include monitoring the full range of impact factors, the development and delivery of safety campaigns, implementing land use planning regulations, health and educational development and in some cases community development efforts in order to ensure that the full potential of the road is achieved.

2.7 QUANTITY AND QUALITY OF RAW MATERIALS AND WASTE PRODUCTS

The contractor will determine the quantity and quality of the raw materials required for construction activities and the amount of waste generated from the road

construction process. Based on these plans the contractor will develop mitigation measures to minimize the impacts from these construction related activities. MCTPC is responsible for ensuring that the contractor strictly follows the necessary environmental regulations and guidelines.

2.8 ANTICIPATED COST OF THE ROAD IMPROVEMENTS

The projected total cost for Road 14A includes the cost of these following items.

- Road improvement
- Bridge improvement
- House compensation

3. OVERALL ENVIRONMENTAL CONDITIONS OF ROAD 14A

3.1 PHYSICAL CONDITIONS

3.1.1 Climate

The climate of Southern Lao PDR is tropical monsoon. There is a pronounced rainy season associated with the influence of the southeast monsoons from May to October. The rest of the year is dry. November and December are the coolest months with daytime temperatures in the 27-29 Celsius range, falling to 15-17 Celsius at night. Highest temperatures occur in April and May and can exceed 40 Celsius.

Tropical cyclones or typhoons are a frequent occurrence in the Project area. Typically typhoons form as deep depressions in the South China Sea or near the Philippines. These intensify and can travel in an easterly direction across the Vietnamese coast into Lao PDR. These typhoons or tropical depressions result in rainfalls in the Mekong Basin of 95-250 millimeters or more in a 24-hour period.

3.1.2 Air Quality, Noise and Vibration

Presently most of the vehicles using this road are small trucks, motorcycles, bicycles and a few pickup and four-wheel drive vehicles. Dust is a major issue in the dry season affecting the health of the nearby residents. In addition, during the New Year's period, a number of vehicles pass through road sections 3 and 4 to Vat Phou and the ancient city thereby increasing air and noise pollution levels.

3.1.3 Physical Characteristics of Community Environments

Most of the communities along the Road are of the typical Lao style wood construction and in most cases the homes are on stilts. There are now new homes of masonry construction being introduced in some of the communities. The villages in road section 3 in Champasack town are quite exceptional providing a unique blend of building and architecture styles and can be seen as an integral part of the heritage of Vat Phou and the ancient city.

3.2 ECOLOGICAL RESOURCE CONDITIONS

3.2.1 Forests, Forest Biodiversity, and Habitat

Road 14A does not pass through any declared NBCAs. Road improvement and construction works, related bridge repairs and quarrying activities in this area will not impinge on any NBCAs or any other pristine forests.

3.2.2 Fish, Fisheries, and Aquatic Biology

As is common in rural areas in Lao PDR fish and other aquatic fauna provide a major source of protein for families. There are two peak migration periods, April to July, when fish move upstream, and September to December when the river level drops and fish return from the tributaries and spawning and feeding grounds to the main stream of the Mekong River. It is important that upstream and downstream movements of fish and access to tributaries not be impeded.

3.3 ECONOMIC AND SOCIAL CONDITIONS AND ACTIVITIES

3.3.1 Perspectives of the Communities along Road 14A

Information about the Project has been presented and discussed with the provincial governor, district officers and a cross-section of village heads, and village residents along Road 14A. Villagers and communities along the road, with the understanding that there was potential for some short-term nuisance and disturbance during construction, positively received the Project. Most consider that they will benefit from the Project. In cases where compensation will be involved, villagers expressed a strong preference for compensation through allocation of new land rather than financial compensation.

The residents were surveyed by the Urban Research Institute (URI) using a carefully designed process that is described in the URI report on the complete survey results.

Generally local people in the project area have very positive views on the improvement of road 14A. They expect a number of benefits including the following:

- Easy access for children to go to school and for people to travel to social services and government offices.
- Local economic development and business opportunities given the increased levels of tourism activity at Vat Phou.
- Solution of the dust problem in the dry season.
- Solution of the flooding situation in the rainy season.
- Improved safety especially when traveling at night.
- More opportunities to obtain information and knowledge from the outside world

Local people do realize that there will be immediate negative impacts from the road improvement project such as loss of some trees and agricultural land. In addition, some of them were also aware of long-term impacts e.g. more accidents in the future. However they still prefer having a high standard road and feel that the positive impacts from the road improvements and construction are significant. They are also willing to relocate if their land is acquired by the project but are concerned about compensation for land, rice fields and for relocation costs. They would like to be informed by the government about how the compensation process will be dealt with.

The majority of respondents reported that their primary use of the existing road was to go to the hospital followed by traveling to markets to sell agricultural products and to access government offices.

People who live in the missing link section (25 km) have no other choice but to travel by boat. From their perspectives traveling by boat is very dangerous, especially during the rainy season, and it also takes more time and money to go to Pakse or Champasack than it would by road. Most of the people in other areas use public buses and bicycles as major modes of transportation. Average travel times can range from 20 minutes to 1 hour to go to Champasack and approximately 1-2 hours to Pakse depending on the mode of transportation and the season. In the rainy season it usually takes more time to travel to other places due to flooding and muddy road conditions that only buses, trucks or private vehicles can travel through.

Land Use
Land use along the road's recommended alignment is mainly agriculture.

Agriculture
This road is located in one of the most significant rice growing areas in the nation. The construction and improvement of Road 14A will enhance the economic activities of the area by increasing access to markets.

Tourism
Vat Phou, a group of temple ruins by Hunduy Khmers, is a designated World Heritage Site and is located along Road 14A. In 2001 Vat Phou received approximately 13,000 domestic visitors and 1,100 foreigners. Most of foreigners visiting Vat Phou are from Thailand, France and Japan. With the improvement of the road link from Pakse it is anticipated that will be increased income generation and job opportunities for the local people. In addition, the road link will also contribute to improving access to the Mekong River, which will support the regional tourism development efforts of Lao PDR, Thailand and Cambodia under the Emerald Triangle Plan. The Emerald Triangle is a tourism effort linking Khmer civilization consisting of Vat Phou, Phnom Rung of Thailand and Angkor Wat of Cambodia.

The carrying capacity of Vat Phou to accommodate higher numbers of tourists and the capability of local government and communities to manage the increased tourism sustainably is of concern and must be addressed in the environmental management plan.

Utilization of Transport Infrastructure
Traffic surveys reported in Chapter 4 of the Interim Report 2 on Improvement of Roads in the Southern Region in Lao PDR, April 2002 indicate that passenger vehicle trips by purpose could be categorized into three types: home-based work trips (46%), home-based other trips, and non home-based trips. The composition of traffic included 36% by motorcycle followed by 30% on bicycles and others (pickups, buses, trucks, farm vehicles, cars, jeeps and 3-wheelers). The 12-hour flow for motorized vehicles of the project area is approximately 825 vehicles. Average travel speed for 14A was 52 km/hr.

Access to Markets
There are two main problems for the villagers in not being able to access to the market. One arises from the flooding of the roads during the rain season. The other problem is that part of Road 14A has no road forcing the villages to walk out of the area in order to reach the main road in order to sell or buy goods.

3.3.2 Quality of Life Issues

Poverty
Poverty is a major problem in southern Laos. This poverty can be understood in part due to lack of access to a wide range of services and markets especially during the rainy seasons. Raising income levels as well as access to various services must be seen as one of the highest priorities of this road project using an integrated approach with the physical road provisions complimented by community development initiatives.

Health Care

Malaria and dysentery are reported as being significant health problems. The high cost of medicines and access to hospitals and medical practitioners are seen as the main reasons for the poor health levels. There are six health care centers located in the area of Champasack and Pakse.

Education and Literacy

According to the 1995 census conducted by the Ministry of Education the average literacy rate of the villagers in the area covering Phonthong, Champasack and Soukhouma districts in Champasack province is approximately 70%. Compared to other areas, the population in this area has access to a higher percentage of access to secondary education. There are about 20 schools within the project area - 14primary schools and 6 secondary schools.

Accessibility is always one of the important criteria that donor agencies consider in providing funds for schools' facilities. With the improvement of Road 14A there is a higher possibility for the Ministry of Education to obtain funding for the improvement of school facilities.

Gender

Women usually work, take care of the house and children and therefore accessibility to markets, schools and hospitals are very important issues to them. With improvements to the road system their quality of life should be increased as measured by an increase in the ease, cost and time of their travel.

3.4 CULTURAL VALUES

The Champasack cultural landscape is of international importance and must be protected. The area has been very well documented within a significant document entitled Champasack Heritage Management Plan.

4. SCREENING OF POTENTIAL ENVIRONMENTAL IMPACTS

There are a significant number of factors that must be considered in assessing the environmental impacts of road construction and improvement. It is important to note the difference between a change and an impact. In this IEE both changes and impacts are discussed. The positive impacts will often not occur without government, NGO, donor and community action within a framework on mitigative measures and environmental management plans. On the other hand negative impacts are not inevitable but will occur if mitigation and environmental management plans are not followed.

It is important to take into account that changes and impacts occur on an international, national, provincial and local basis. The emphasis in this IEE will be on the local level given the extensive documentation provided in the Project's Interim Report on national and provincial level concerns.

4.1 OVERALL SOCIO-ECONOMIC CHANGES AND IMPACTS

The overall socio-economic changes and impacts of the proposed Road 14A are presented in Figure 12.

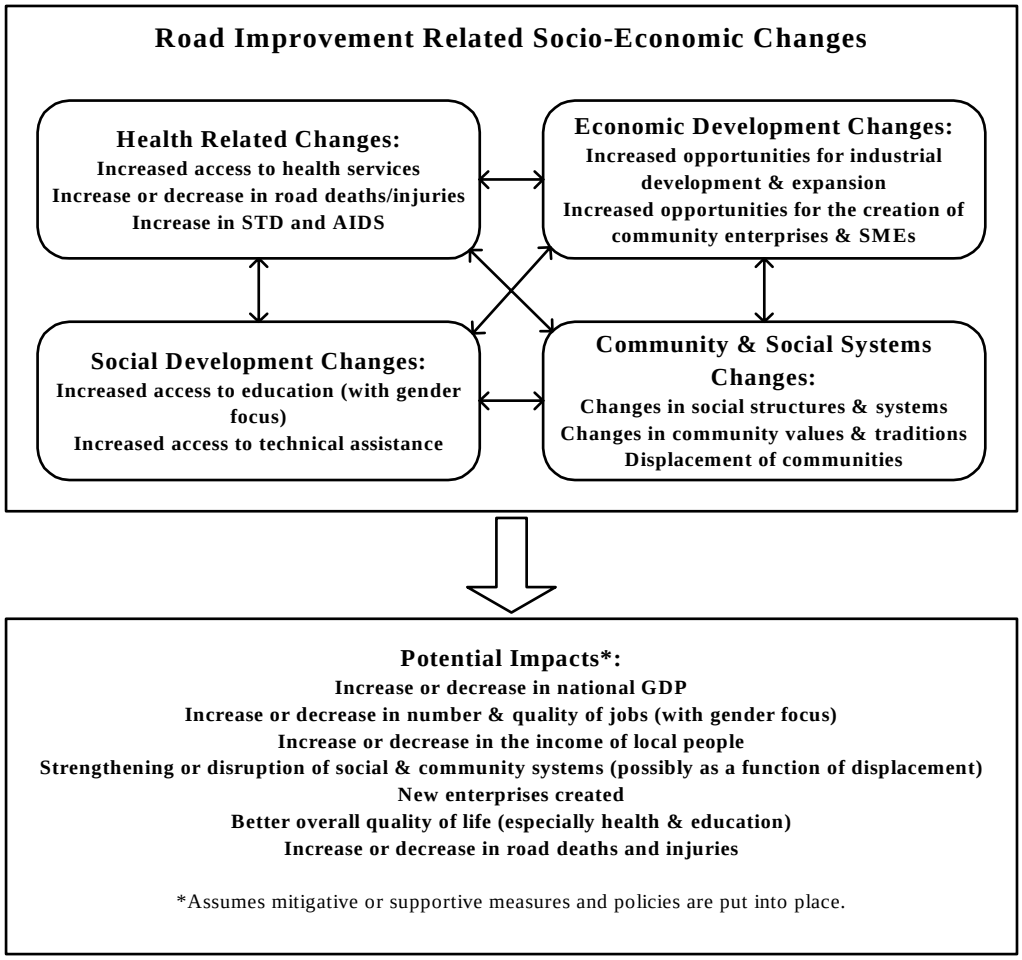

Figure 12: 14A Socio-Economic Changes and Impacts

4.2 OVERALL CULTURAL ENVIRONMENTAL CHANGES AND IMPACTS

The overall cultural environmental changes and impacts of the proposed Road 14A are presented in Figure 13.

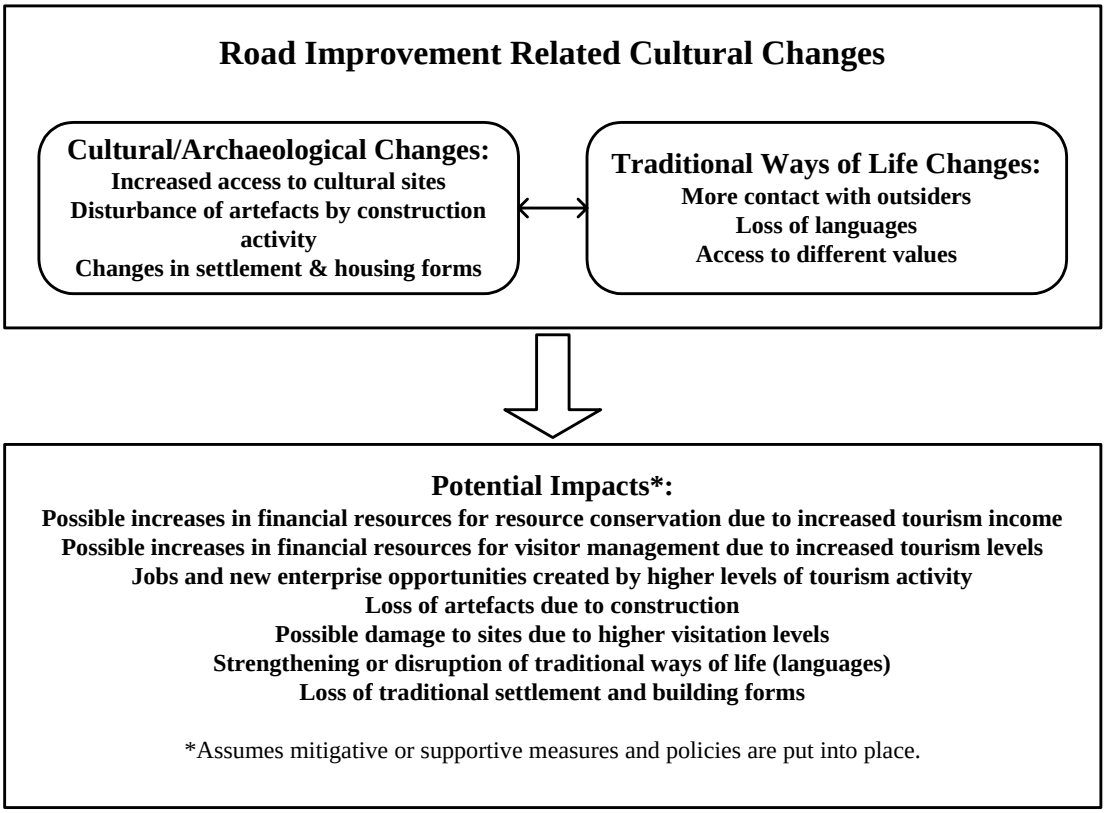

Figure 13: 14A Cultural Environment Changes and Impacts

4.3 OVERALL NATURAL/ECOLOGICAL ENVIRONMENTAL CHANGES AND IMPACTS

Given the proposed road construction and improvement activities there are minimal overall natural/ecological impacts. Bridge construction could create negative impacts to the environment if improperly planned.

4.4 OVERALL PHYSICAL ENVIRONMENTAL CHANGES AND IMPACTS

The overall physical environment changes and impacts of the proposed Road 14A are presented in Figure 14.

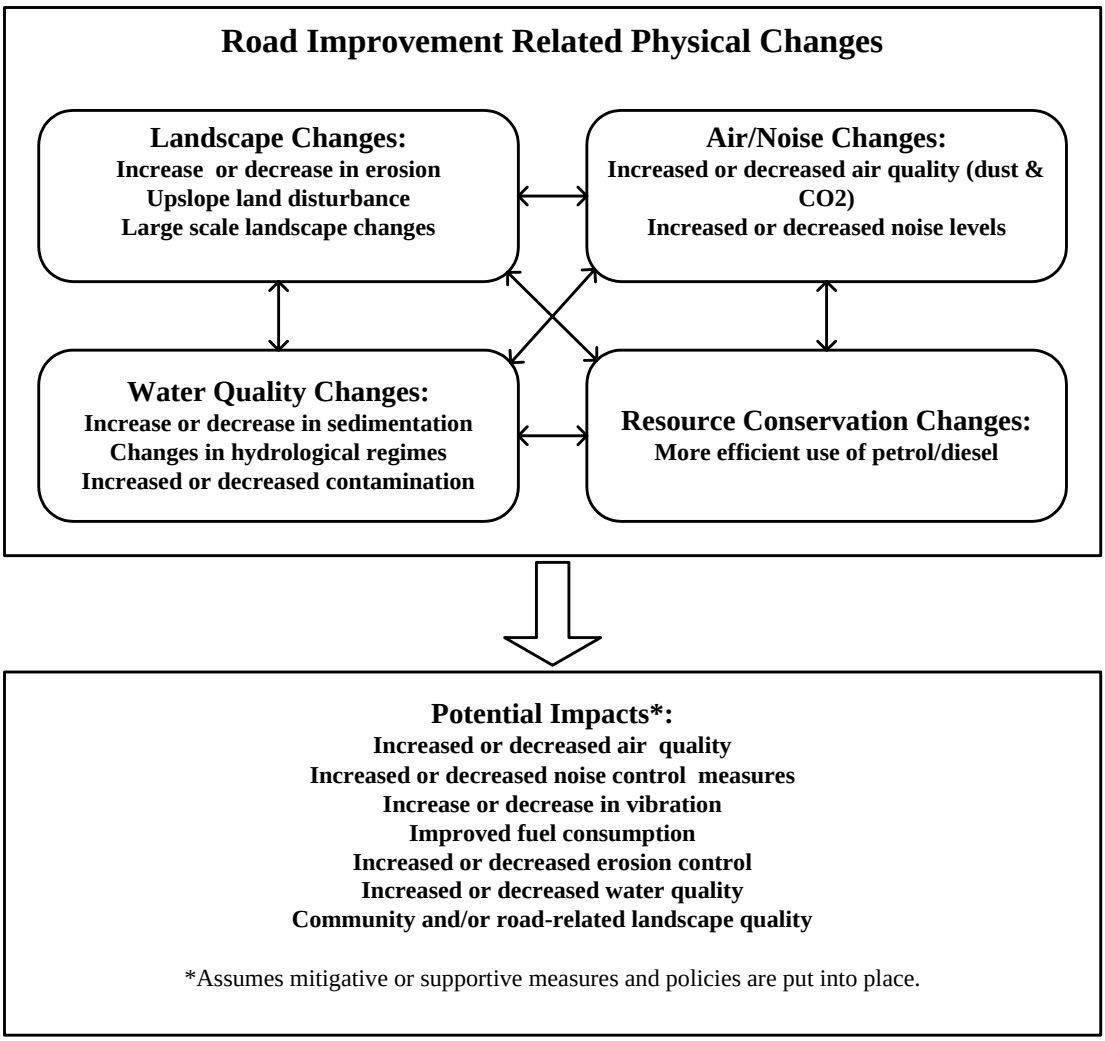

Figure 14: 14A Overall Physical Environmental Changes and Impacts

5. ASSESSMENT OF THE IMPACTS OF THE PROPOSED CHANGES TO ROAD 14A

In previous sections of this report the nature the existing environment and the design proposals have been put forward. In this chapter the nature out of the impacts will be explored given the existing environmental conditions and the engineering and design plans that have been developed by the engineering team.

Impacts are assessed from the perspective of the pre construction, construction and operational stages.

5.1 IMPACTS DURING PRE CONSTRUCTION

5.1.1 Land Acquisition

The Project will require some agricultural land for project implementation on road sections 1,2,3, 4 and 6. However, since detailed designs of the road are still being developed, the Project is not in a position to provide the exact requirements for and the costs of acquiring the agricultural land at this moment.

5.1.2 Resettlement

A limited level of relocation will be required on road sections 3 and 6. The exact requirement will be determined once detailed design work is completed.

The government declared a 50 meter right-of-way on all national roads in the early 1990s. When the residents were questioned during the Urban Research Institute's survey there was general awareness of these provisions and most people that were interviewed viewed some moving as a cost of obtaining the advantages related to an improved road. The respondents indicated they would willingly relocate their structures outside of the right-of-way with their own resources before project construction commences.

Relocations will generally be less than 50 meters and can be managed at the village level. While compensation is not payable under Lao law, budgetary provisions should be made to assist households that experience hardship as a consequence of relocation.

5.2 IMPACTS DURING CONSTRUCTION AND OPERATION

During the construction process there will be impacts on the surrounding communities particularly if proper procedures and regulations are not put into place. The object of the construction process must be to minimize unnecessary impacts on the surrounding populations. Providing adequate information about activities will be seen as an important element of dealing with the impacts of the construction work. This environmental management plan will provide for measures to ensure that both natural as well as human impacts are minimized and dealt with.

It is particularly important that special care must be taken during construction in the Vat Phou and ancient city area. The challenge during the construction phase must be to prevent any cultural resource damage. In the environmental management plan procedures and regulations for minimizing impacts are proposed.

5.2.1 Physical Environmental Impacts

Air

Dust will be a nuisance created by the construction activities to a greater or lesser extent and will affect air quality. During the operational period depending on local conditions there may be some increased levels of pollution from vehicles.

Noise

Construction activity could cause disturbances to nearby properties but they will be minor and short term in duration. There could be a possibility of increasing noise level during the operational period if the traffic is not effectively controlled and road is not well maintained.

Contamination of Water from Construction Waste

If proper controls and procedures are not put into place there may be negative impacts on surface water quality during construction caused by runoff from material storage areas, emissions from machinery, and domestic sewage from the construction workers.

Soil

There are four new and two existing borrow pits being proposed for this project. Soil erosion could be a problem from the location of quarries and borrow pits and earthwork related activities. In the mountainous area soil conditions will be affected through cut and fill operations. Erosion and earth slippage could be a problem if careful and immediate revegetation and slope stabilization measures are not instituted.

Traffic Disturbance

Traffic disturbances will occur during the construction process. Traffic control by local authorities and the contractor will be essential in order to minimize the impact of construction activities to the local people.

Visual Effects

Visual impacts including road cuts, oil disposal and poorly managed borrow pits are potential impacts of the road construction process unless proper management techniques are used. The visual impacts of the road improvement works will be minor in most cases.

On several recently completed road improvement projects laterite borrows have left unsightly scars on the roadside landscape that must be avoided in this projects.

There are places along the route where the road will have to be elevated up to four meters in order to meet the necessary flood protection measures. There is no doubt that this will cause visual intrusion whenever this occurs. It is important that the visual impacts be minimized especially in the vicinity of the ancient city and Vat Phou. It is recommended that the slopes be gentler than would normally be technically required. It is hoped that this landscaping will help to minimize the impact of the road and help to integrate it more fully into the landscape.

5.2.2 Ecological Impacts

There are no apparent ecological impacts given the already disturbed nature of the area. Although the project has to construct a new road in road section 2, it will cut through what is largely a paddy field.

The construction process of proposed bridges, piers and their locations could have negative impacts on the migratory patterns of the fish and aquatic ecosystems.

5.2.3 Cultural Resources Impacts

It is important to note that Champasak Town, Vat Phou, the Ancient City and the surrounding landscape form part of the protected area of the world heritage site. The nature of the protection zones is presented in Appendix 1.

Section 3

The townscape of Champasak Town is recognized as having international significance. It represents an important cultural landscape that must be respected. This significance has been recognized in the road design process and the construction of a new road along the provincial road will ensure that the construction process does not in any way destroy this cultural landscape. The increased visitation to Vat Phou will have a potential negative impact on the community if development is not properly managed and controlled. There can be no argument that there is the potential to provide for the economic benefit of the local people through tourism development. However, there is also the possibility that attempts to meet the needs of the tourists (provision of hotels, restaurants, retail services etc.) within the existing village environment could have negative impacts on the physical characteristics of the community.

Section 4

Vat Phou is of the highest cultural significance not only for the country but for world heritage purposes. The significance of the site has been recognized internationally and a very comprehensive plan has been prepared for the management and protection of the cultural resources. Given the national decision to improve Route 14A the challenge is to protect this heritage significance while accommodating the road. It is also recognized that the improvement of the road and access to Pakse will provide improved access to a wide range of visitors thereby both improving the local economy and providing visitors with the possibility of experiencing the heritage value of the site.

The increased visitation should also allow heritage interests to obtain further resources to carry out conservation and interpretive work at the world heritage site.

The alignment that has been chosen avoids the Ancient City and has the immediate benefit of removing any further pressures on this important dimension of the overall cultural landscape. The overall alignment that has been chosen and approved by both the Ministry of Information and Culture and the UNESCO and is sited in such a way as to avoid any significant visual impacts.

It is recognized that increased access to the site will bring with it the negative impacts that normally come about from increased visitation. All measures must be taken to protect the significance of the site through proper visitor management.

5.2.4 Quality of Life and Conditions of Local Girls and Women

As has been discussed earlier it is anticipated that the road improvement project will improve the quality of life of girls and women by providing better access to schools, health care centers and government services. However, in order to ensure that the

conditions of girls and women are improved after the completion of the project, the government will need to provide supporting programs in the areas of health, education and economic development

There is always the threat of sexually transmitted diseases from temporary workers and it will be necessary to ensure that both awareness programs and preventive measures are made available.

5.2.5 Encouraging Economic Development

If properly managed the construction process can help to create job opportunities for local people during the construction process. While for most people the introduction of an improved road will lead to the potential for increased income and therefore a better quality of life but some may be disadvantaged by the location of the road. In road section 6 at Ban Dontalat the proposed bypass may cause a loss of business for vendors and retailers along the existing road.

In all discussions with stakeholders as well as the communities there is a recognition that the increased access will provide for higher levels of tourists visiting the Vat Phou World Heritage Site. In fact that in the Champasak Heritage Management Plan there is recognition of the importance of tourism and the plan presents ways of accommodating this tourism activity.

5.2.6 Health Impacts

The present lack of all weather access limits the opportunities for all residents to access health services. With the introduction of an all weather road there will be increased opportunities to access existing health services. As will be discussed in the environmental management plan there must be a conscious effort made to ensure that the increased access is matched with other initiatives in order to assure a higher quality of health throughout the area of the road.

The main health risks during the construction stage may arise from the introduction of AIDS, sexually transmitted or other diseases by immigrant workers.

Large trucks transporting raw materials during the construction period must be seen as an important safety issue for the residents. There is also the possibility of transporting hazardous materials along this road in the future. With an inadequate accidental spill management plan, spills of hazardous materials could be seen as a major problem to local people.

The UXO hazard is seen as a risk on socio-economic activities and quality of life of local communities as well as during the construction process.

5.2.7 Improving Access to Educational Services

As reported in the socio-economic survey the lack of an all weather road, especially in road sections 1 and 2, is a major reason why children do not attend school on a regular basis especially during the rainy season. The improved road will improve access to schools with shorter travel times required which should encourage children to go to school thereby raising education levels in the future. It is recognized that other measures as well as societal attitudes will form an important part of ensuring that the road construction meets its educational goals.

5.2.8 Better Access to Government Services

Better road conditions will increase opportunities to access government services. This is particular important since in the survey process people indicated that this was one of highest uses they made of the existing road.

5.2.9 Cultural Impacts on Local People

In-migration facilitated by the improved road can have undesirable consequences when the influx of newcomers leads to possible undesired changes in traditional ways of life and displacement of groups or individuals who do not have formal ownership papers for the land they occupy. Changes should be documented and assessed in order to avoid negative impacts.

5.2.10 Lack of Access for Local People on the Existing Road Section 3 to the New Road

With the proposed bypass route at Champasack town people living on the existing road will not benefit from the improved road conditions. It is important that local community be connected to the new road alignment.

5.3 SUMMARY

The overall implementation of the improvement of Road 14A will have few significant negative impacts and will bring significant positive social, economic and cultural impacts if the proposed mitigative measures and environmental management plans are implemented.

It will only be possible to evaluate the real success of the road over a period of time. Clearly good management will help to ensure success in terms of raising the quality of life of the residents. All possible steps have been taken through careful design and planning to ensure that the impacts on cultural, ecological and physical environments are minimized. It is clear that unless the construction process is carefully directed there could be negative impacts.

It is important to remember that the road is simply a way of facilitating social, cultural and economic development and that government programs and the community participation will be essential in making this happen.

6. ENVIRONMENTAL MANAGEMENT PLAN: PLAN, POLICIES & REGULATIONS

As has been discussed earlier there are a significant number of positive impacts that will be made possible by the road improvements. The environmental management plan discussed in this and the following chapter is designed to minimize the negative impacts and to ensure that the full benefits of the road will be realized in order to increase the quality of life of the residents.

The environmental management plan is divided into two parts.

- Plan, Policies and Regulations in this chapter
- Monitoring and Remediation Plan in Chapter 7.

According to the Regulation on Environment Assessment in the Lao PDR prepared by STEA 2002, an environment management plan must contain:

- Protective or reductive measures for environmental impacts.
- Compensation measures (if any).
- Institutional arrangements, timing and budgets for implementation of EMP.
- An environmental monitoring program.
- Community preparation including dissemination of information about the Project prior to work commencing.

The IEE for Road 16A has been developed to incorporate these factors.

The nature of the environmental management planning process can be seen in Figure 15.

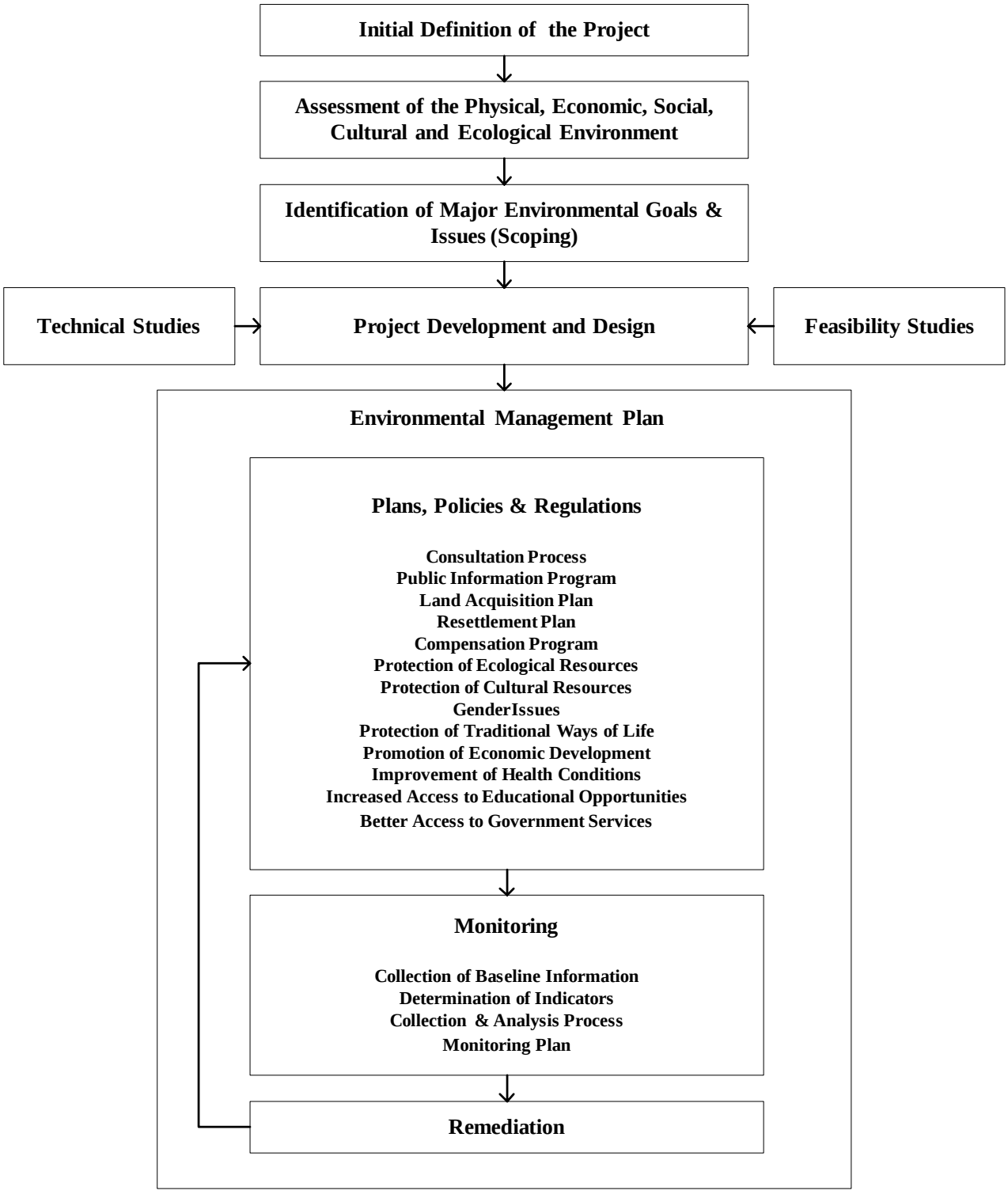

Figure 15: Environmental Assessment Process

6.1 PLANS, POLICIES & REGULATIONS

This environmental management plan is designed to deal with the potential negative impacts identified in the assessment process and to maximize the benefits from the positive results of the road construction and operation. It is assumed that the plans,

policies and regulations suggested in this IEE are implemented and monitored in order to ensure that the road has the desired beneficial impact and does not negatively affect any of the important environmental dimensions discussed earlier.

As will be seen the implementation of the plans and policies depends on the participation and cooperation of various government ministries and agencies. It is clear that the Department of Roads, MCTPC, neither has the resources nor the expertise to ensure that the full benefits of the construction are achieved and that the negative dimensions are dealt with as part of the design, construction and operational phases. The implementation of the plans and policies and the necessary monitoring must be done in a cooperative matter with MCTPC playing an essential coordinating and integrative role.

6.2 PRE CONSTRUCTION

6.2.1 Resident Consultation and Participation

In order to ensure that the road construction meets the needs of local people and does not negatively impact their existing social and economic conditions it is essential that there be an ongoing process of discussion and information sharing with local residents. This must range from major issues such as compensation and resettlement to more localized problems such as ensuring that the road does not directly negatively impact individual families. Given the changing nature of community needs it is essential that during the construction process that this consultation process be undertaken in a comprehensive matter. This will require that staff from the Department of Roads as well as other ministries and departments be involved in the process. It will also will be important that staff from these departments and ministries be trained in order to be able to effectively deal with the feedback and that a forum be provided for the local residents to voice their concerns.

It is also equally important however to consider that the road serves national, provincial and district needs and that there will be instances where decisions must be made that may not be in complete accordance with the views and perspectives of local people. In these instances it is vitally important that solutions be sought to that provide for the minimum of negative impacts.

During the construction phase it is essential that residents be kept informed of activities and that they be alerted to any of the potential negative impacts that may come from temporary construction activity. Contact points in various villages along the road will be established where village heads/and or local people can communicate their concerns directly.

6.2.2 Public Information Program

The project will ensure that public information program is put in place. Local people will receive relevant information regularly during both pre construction and construction period. Information disseminated to local people will be in an easy understandable format using various media such as a poster, radio, public hearing and local officials. Necessary information should include the following:

- A clear description of the negative and positive impacts that will occur during construction period.
- The development and implementation of transparent compensation procedures.
- Information on plans and a timetable that is updated on a regular basis.

- Information and consultation with local people on activities which could disturb their daily life. This would be particularly true of activities such as blasting or transporting hazardous materials used in the plant
- Making people aware of the traffic control measures.
- Providing residents with the results of the ongoing monitoring process.

6.2.3 Land Acquisition Plan

Before construction begins a land acquisition plan must be in place and implemented.

6.2.4 Resettlement Plan

While there is no large-scale resettlement that will occur in the project there will be instances where some small-scale moving on road sections 3 and 6 may be required. There may be some voluntary resettlement that will occur. In whatever resettlement does occur it is important that MCTPC ensure that quality of life of the families affected by the project implementation is not in anyway diminished. In other words as a result of resettlement those directly impacted must be at least as well-off as they were prior to the resettlement process.

The MCTPC resettlement plan should place an emphasis on public participation and must include a clear articulation of resettlement policies and principles of compensation for affected families. A monitoring program must also be established to ensure that the resettlement plan is implemented within the timeline provided for in the plan and to ensure that the affected villagers are satisfied with the compensation process.

6.2.5 Compensation

There are a number of possible impacts on the local people that must be considered in the compensation process. In some cases the impacts may be relatively insignificant such as the loss of a tree or the need to move a house back by several meters in order to accommodate the improvement of the road. Compensation for affected people could be in kind (extra land or materials) or in cash for losses sustained.

6.3 CONSTRUCTION AND OPERATION

Based on nature of the possible impacts identified in Chapter 5 these regulations and guidelines are designed to avoid negative impacts and to ensure the positive impacts to the local communities. It is assumed that international standards and practices are adopted in construction operations.

6.3.1 Physical Environmental Design/Engineering Criteria

The MCTPC will ensure that contractors follow regulations and guidelines to minimize/avoid any pollution from construction and operation activities on environment. In order to ensure that the regulations and guidelines are followed a monitoring program must be put in place.

<u>Air</u>

Contractors will be required to follow the below guidelines in order to prevent dust pollution during construction period.

- Water will be sprayed on the construction sites and major feeder roads twice a day during dry season.

- All vehicles delivering granular or fine materials to the site are to be covered to avoid spillage.
- Brick, asphalt and concrete plants will be operated within the terms of government pollution control legislation, and located as far away from settlements as is possible.
- All vehicles used for construction must be regularly and well maintained.
- The emission level from equipment and vehicles must comply with national emission standards.
- Plants and equipment shall be well maintained using dust collectors whenever this is necessary.
- Roads used by contractor to transport materials are to be kept clean and clear of all dust and mud.

To control an increase of air pollution level from vehicles during operational stage in the future the MCTPC will have to maintain roadside tree plantations and vehicles on the road should be tested for emission pollutants.

Noise

Contractors will be required to follow the below guidelines in order to prevent noise pollution during the construction period.

- All construction equipment should have well-maintained muffler systems and be operated within design limits.
- Limit on nighttime work in populated area
- Special noise generators such as mobile crushing and mixing facilities should be located at least 2 km. from the nearest community.
    - Noise levels from construction activities must comply with the national standard.

During the operational period overloaded vehicles on highway should be prohibited in order to avoid excessive noise levels from vehicles. Roadside planting using densely leafed shrubs and trees should be provided in order to allow for noise attenuation where this becomes necessary based on the monitoring process.

Water

All measures will be taken to prevent the wastewater produced in construction from entering directly into watercourses. Contractors will be required to follow the below guidelines in order to avoid any pollution to watercourses from worker camps and construction activities.

- Chemicals and oil will be stored in secure and impermeable compounds well away from surface water.
- Construction camps will be equipped with sanitary latrines that do not pollute surface water.
- Discharge of sediment-laden construction water into surface water will be forbidden. Such water will be discharged into settling tanks and treated prior to final discharge.
- Construction work close to the water bodies shall be avoided during heavy rain periods.
- Discharge standards shall be strictly adhered to by the contractors.

During the operational phase these preventive measures must be incorporated into the design and implementation dealing with runoff be maintained in order that this runoff does not flow directly into watercourses. Proper maintenance must be implemented that allows runoff to flow over grassed or pervious areas in order to permit the settling of fine materials, retention of oily matter and a reduction in volume and rate of flow.

Soil

Prior to using borrow pits, the MCTPC will ensure that the contractor prepares a plan, which includes details of excavation, materials processing, handling, means of transporting modes and defines how environmental impacts from these activities will be mitigated. All borrow areas must be inspected by the MCTPC.

On road embankment slopes, slopes of all cuts, etc., shrubs and grass will be planted. On sections with high fill and deep cutting in the mountainous area the side slopes will be graded and covered with bush and grass, etc.

Management of Traffic

Local authorities will control traffic to avoid traffic disturbance during the construction period. The contractor shall provide safe and convenient passage for vehicles, pedestrians and livestock. It is necessary for contractors to provide information on construction program and transport schedules to the local people.

Minimizing Negative Visual Impacts

Rehabilitation and re-vegetation of borrow pits must be carried out in order to avoid visual impacts to the surrounding areas. Retaining walls to stabilize the slopes must be carefully designed in order to respect the special scenic value of this particular environment. It is essential that the design be carried out in such a way as to complement the quality of the environment and that standard construction techniques may not be appropriate in this important natural environment.

6.3.2 Protection of Aquatic Environments

Before any road construction takes place a careful inventory must be carried of the fish species in the major watercourses identified by the Ministry of Agriculture and Forestry. There is no doubt that the construction process could have negative impacts on the aquatic ecosystems if there is little or no knowledge about the significance, behavior and sensitivity of the fish stocks. Based on this inventory construction schedules must be adjusted in order that there are no significant negative impacts on the migratory patterns of the fish. This may require that at certain times of the year that the flow of the river not be impeded and that all possible measures be taken to ensure that the normal migratory patterns can occur. It also must be assured that the placement and size of piers does not in any way alter the ecosystems that have been identified as being of significance by the Ministry of Agriculture and Forestry.

It is also important that the means of dealing with drainage be carefully considered in order to ensure that the water reaching the rivers do not contain contaminants either from the construction or operational process. Water must be carefully tested in order to ensure that the ecological systems are not being upset due to construction or operation activities. Since baseline information has already been obtained during the IEE process the testing process could use this information as the basis to assess differences in water quality over a period of time.

6.3.3 Protection of Cultural Resources

The Champasak Heritage Management Plan is a comprehensive document that not only identifies the heritage value of the site but puts forward a detailed management plan. The first recommendation of this Environmental Management Plan is that the Champasak Plan be adhered to and implemented in all its dimensions. It is not possible within this Environmental Management Plan to do other than to strongly support the professionally developed and nationally recognized procedures and measures put forward in this Plan. It is important to note that be that the Provincial Decree on the Regulations for the Preservation of the Historical Site of Vat Phou and the Areas Related to Vat Phou No.38/88 be seen as the enabling legislation that supports the management plan referred to earlier. (This document is provided in Appendix 2.) This Decree along with the Plan provide for the necessary protection and development measures both during the construction process as well as in the operational stages of the road.

There is concern about the impacts of tourism on the site. It can only be recommended that the protection zone regulations be adhered to and that all the necessary national and provincial regulations be put into place in order to ensure that tourism development does not infringe on this cultural landscape.

It has been agreed that an archeological survey will be undertaken in sections 2, 3 and 4 during the basic and detailed stages of the road. The survey will be undertaken by The Ministry of Information and Culture and will identify areas of cultural sensitivity. In cooperation with the road designers the alignment will then be specifically determined in order to avoid any impact on major cultural resources. There will be instances where individual artifacts may be found and their location carefully documented and removed for preservation and interpretive purposes. Where major archeological sites are discovered there will be a protection zone of 40m implemented in order to avoid any negative impacts.

During the construction process the following actions will be taken:

- Given the importance of the site a full-time archeologist must always be available for consultation as well as monitoring. It will be the responsibility of the Ministry of Information and Culture to ensure that the construction process adheres to be agreed to guidelines and regulations.
- Trees will be planted to mask the presence of the road where necessary.
- The contractor will adhere to all of the normal regulations relating to road construction.
- In the construction documents the contractor must be alerted to the possibility of uncovering specific cultural artifacts and the need to treat these artifacts with care and attention.
- The contractor and his senior staff must be trained to recognize artifacts of value. All supervisors must be provided with photographs illustrating examples of artifacts.
- If cultural sites of significance are uncovered there must be an immediate notification to the MCTPC of the discovery and what actions will be taken by the Ministry of Information and Culture. If extensive investigation is to occur there must be contingency funds set aside to compensate the contractor for time lost.

6.3.4 Improvement in the Quality of Life and Conditions of Women

It is important that the various health, education and economic development initiatives be designed to ensure an improvement in the quality of life of women and young girls.

Baseline Information

Baseline information has to be established to determine the conditions of women prior to construction. This information will allow the monitoring process to determine whether the conditions of women have actually improved due to the investment in road construction.

Technical Assistance

It is equally important that the women themselves be assisted in dealing with the new opportunities facing them as well as the adverse effects that may come about from the construction and operation of the road. Specific initiatives should be taken to help form women's cooperatives or to design economic development programs that will specifically assist women in taking advantage of the improved access made possible by the new road.

Gender Sensitive Project Orientation

It will be understood that all programs are gender sensitive and inclusive. Gender is seen as a crosscutting theme that must affect all dimensions of the initiatives suggested in this environmental management plan. All officials responsible for the implementation of rules, plans and regulations must be sensitive to the special concerns and needs of women. Staff should be trained in gender sensitive planning and implementation concerns.

6.3.5 Promotion of Economic Development and Poverty Reduction

One of the national and therefore project goals is to increase income opportunities for local communities thereby helping to reduce poverty. During construction the project could provide opportunities for local people to increase their incomes largely through encouraging the employment of local labor for employment or contracting out various activities such as for replanting trees to local communities and groups.

Baseline Information

Baseline information has to be established to determine income and employment levels. This information will allow the monitoring process to determine whether economic development and poverty reduction are working.

Technical and Financial Assistance

Once the improved road is an operation there will be opportunities for increased access to markets for agricultural, handicraft and other local products. In order to ensure that these opportunities are achieved it is essential that the government provides support and technical assistance to the communities such as the following initiatives:

- Conducting market research studies to make local people and officials aware of agricultural and handicraft market opportunities.
- Providing access to small loans for establishing small businesses.
- Development of policies that give priority to local people for business development opportunities.

Current policies of the Ministry of Industry and Handicrafts are clearly working in this direction and should be implemented in the subject area.

There is no doubt that tourism development at Vat Phou and Ancient City will encourage more economic development of the area after the completion of the road project. To ensure that local people have access to the financial returns from this form of activity public involvement in tourism planning and management and in small business to support tourism activity must be implemented. The economic impact of tourism on the communities and individuals in the area will be monitored. Technical assistance in setting up tourism related small businesses and access to small loans should be provided.

Tourism

The strategies that have already put forward in the Champasak Heritage Management Plan should be adhered to. It is important however that these strategies be built upon since they are only the principles which would form the basis for a comprehensive tourism destination management plan. The tourism destination management plan must include product development, marketing, organizational and management concerns as well as operational dimensions.

It must also be recognized that the Ancient City and the actual Vat Phou site are not ready for increased tourism numbers. There is a distinct lack of interpretation, site safety is a significant concern, access for older and disabled visitors, basic tourism support services such as a parking lot able to accommodate buses and proper washroom facilities are not available, there is no literature available on the site and there is no guiding system in place. Given the fact that a great deal of the physical fabric that been lost it becomes especially important that there be a sound interpretation and presentation plan in place and implemented before the road is completed. Serious consideration should begin to the development of a virtual reality presentation of the site.

If these issues are not addressed the tourism benefits that could accrue from the construction of the road will not be achieved. Dissatisfied visitors will not help to build a reliable tourism flow and the lack of visitors services will encourage tourists to only stay for a short period of time at the site and then return to Pakse. This is clearly an area where the various authorities must work together in order to ensure that the tourism potential is achieved in a sustainable manner.

It is recommended that all the authorities work together to build upon the principles put forward in the Champasak Heritage Management Plan. Where funding is required there should be a strong case made to donor agencies that these improvements are necessary in order to protect the resource and the community and at the same time achieve the potential economic development. Without these plans in place the investment will not provide for the possible societal improvements.

The levels of tourism and the levels of satisfaction of the tourists and tour operators must be constantly monitored in order to ensure that the necessary mitigation measures can be put into place. Site operators must develop a visitor management

plan and monitor its success and failures in order to protect the resource while at the same time enhancing the visitor experience.

How to involve the community in the development of the tourism infrastructure must be the object of collaborative activity amongst several government ministries and other interest groups. Local people will require reliable market information on numbers and types of tourists and when they will travel to the site, entrepreneurs will require information on how to establish tourism businesses, some will require access to reasonable credit and there will be a distinct need for technical advice as tourism businesses are established. Care must be taken that local people are given first preference in establishing businesses. Gender sensitive development initiatives must be initiated in order to ensure that the women in the community have an opportunity to share in the potential economic benefits of tourism.

A tourism destination management plan must be developed that includes product development, marketing, organizational and management concerns as well as operational dimensions.

Tourism Related AIDS Prevention

The must also be caution exercised to protect the community from the negative impacts of tourism. Residents must be prepared for increased tourism levels and encouraged to maintain their lifestyles and traditions when this is desired. Care must be taken to implement AIDS and sexually transmitted disease awareness and treatment programs.

6.3.6 Promotion of Improved Health Conditions

One of the possible impacts of an improved road is increased access to health services. An all weather surface will ensure that everyone has the possibility of reaching the necessary health facilities which is not the case within the present road conditions. However it is recognized that there are several other issues influencing increased health conditions. Issues of ability to travel to the necessary health facilities, cost of treatments and the language of the health workers are all seen as important ingredients in improving health conditions. It is essential that the Ministry of Health mobilize the necessary resources in order to ensure that the increased road access is matched with improvements in program delivery.

Baseline Information

Baseline information has to be established to determine financial and time costs for both residents at the beginning of the road construction process. This information will allow the monitoring process to determine whether health conditions have actually improved due to the investment in road construction.

Site Safety Measures

The following site safety measures during construction period must be implemented.

- Contractors will be required to submit and obtain approval for health and safety plans prior to commencement of work.
- Carefully siting (isolated from local communities) and approved plans and designs for construction and management work camps will be required in order to minimize impacts.
- Safety markings will be set up on temporary road.

- Effective safety measures should be taken during blasting and no blasting occurs during busy hours.
- Plans for carrying out post construction site clean-ups will be required.
- Adequate drainage should be provided throughout the camps to ensure that stagnant water bodies and puddles do not form.

AIDS and STD Prevention and Treatment

Programs must be instituted that ensure that everyone in the area of the road be sufficiently alerted to the problems associated with AIDS and STD. In addition, there must be programs in place that help provide assistance in the form of treatments in the case of contracting a sexually transmitted disease and in obtaining birth control assistance.

The program must be funded and will have the following dimensions:

- Strengthening the capacity of provincial AIDS officers
- Services to cure sexually transmitted infection
- Increasing education/public awareness on HIV and AIDS
- Social marketing of condoms

Hazardous Spills

During the operational period there is a possibility of spills of hazardous materials, which could harm the quality of life of local communities. The MCTPC will ensure that the delivery of hazardous substances will require a permit license. Road safety programs and a spill contingency and emergency plan for hazardous and toxic materials will be put in place.

UXO

To avoid any impacts from UXO all necessary measures must be taken to clear the construction areas of unexploded ordinances.

6.3.7 Increased Access to Educational Opportunities

One of the major complaints about present road conditions is that it is very difficult or at times impossible for children to travel to school during the rainy season. The improved road will certainly provide for an all weather surface thereby facilitating travel. As in the case of health there are a number of other essential ingredients to increasing access to educational opportunities. Issues such as cost, the need to employ children in agricultural activities and the perceived benefits of education must be addressed. The Ministry of Education must work to ensure that the constraints that presently exist are minimized in order to take advantage of the increased access provided by the improved road.

Baseline Information

Baseline information has to be established to determine educational levels of residents at the beginning of the road construction process. This information will allow the monitoring process to accurately measure the impact of the road on educational issues.

6.3.8 Better Access to Government Services

The improved road will very much facilitate the movement of residents to various government offices. There are clearly constraints to accessing offices having to do with levels of mobility.

Baseline Information

Collecting baseline information will allow for an assessment of whether there actually has been increased access to government services given the new road.

6.3.9 Protection of Traditional Ways of Life

In order to ensure that traditional ways of life are protected the project should fund studies asking communities to identify and assess government offices what is socially and culturally important for them to protect and then use this information as baseline data in ongoing monitoring. Government officials will then work with communities to evaluate if the changes occurring in the communities meet with community expectations and standards. In the case of unexpected negative changes communities will be helped in developing strategies for countering these negative impacts.
In the case of unexpected negative changes communities will be helped in developing strategies for countering these negative consequences.

6.3.10 Access for People on the Old Road Section

Due to the proposed new road alignment in section 3 people who are left behind should be provided with the opportunity to move to either the newly constructed road or connect to the new road. It is essential that an all weather link be provided for the community to the new road. This link does not necessarily have to be built to national road standards but must provide for all weather access.

7. ENVIRONMENTAL MANAGEMENT PLAN: MONITORING AND REMEDIATION

7.1 MONITORING PLAN

Article 15 of the Regulation on Environment Assessment in the Lao PDR of the Science Technology and Environment Agency specifies that the project owner is directly responsible for the monitoring and evaluation of the project environment during the implementation of the EMP. Reports on project environmental monitoring must be produced monthly and sent to the concerned agencies, which are STEA, Provincial, Municipal or Special Zone Science and the Environment Management and Monitoring Units of the concerned line ministries for information and supervision. The general outline for environmental monitoring reports developed by STEA can be found in Appendix 4.

7.1.1 Collection of Baseline Information

It is not certain when the road construction will actually begin. Given the shifting nature of the population and other conditions in the region of the road it is recommended that just prior to the construction process beginning that a complete baseline study be undertaken to collect the necessary data on the indicators that have been identified by the various stakeholders. In some cases this baseline information can be collected by the various ministries and departments while in other cases consultants may have to be hired in order to collect this information in a reliable and professional manner. It is important to ensure that the information collected is accurate since it will form the basis for the monitoring process. Funding should be available by the road construction program to collect this information.

7.1.2 The Determination of Indicators

The indicators that have been identified are chosen to accomplish the objective of measuring the negative and positive impacts of the road construction as well as being feasible in terms of their collection and analysis. It must be recognized that there are resource and capacity constraints that will very much affect the ability of the various government ministries and departments to collect information. It is important that the indicators be seen as helping to understand overall impacts and not be seen as only considering one portion of a particular environmental issue. For example the number of children attending school will be important to be aware of but also this figure will be seen as an indicator of the overall success of the road in helping to encourage higher levels of enrollments in schools. It is important that the indicators be seriously considered and that may be amended if this is seen as desirable once the monitoring process takes place.

7.1.3 Collection & Analysis Process

As has been mentioned there are clear resources capacity constraints within the present government system as it relates to monitoring. Therefore if the monitoring program is to be successful financial resources must be allocated to the process and the capacities of the various actors must be developed. It is recommended that the overall funds allocated to the road construction incorporate financial resources for the monitoring process. The monitoring program that is presented identifies financial and capacity issues and it is seen that these considerations are essential in ensuring a successful assessment of the impact of the road from the perspective of the many

dimensions considered in this IEE. Figure 16 illustrates the monitoring and remediation process.

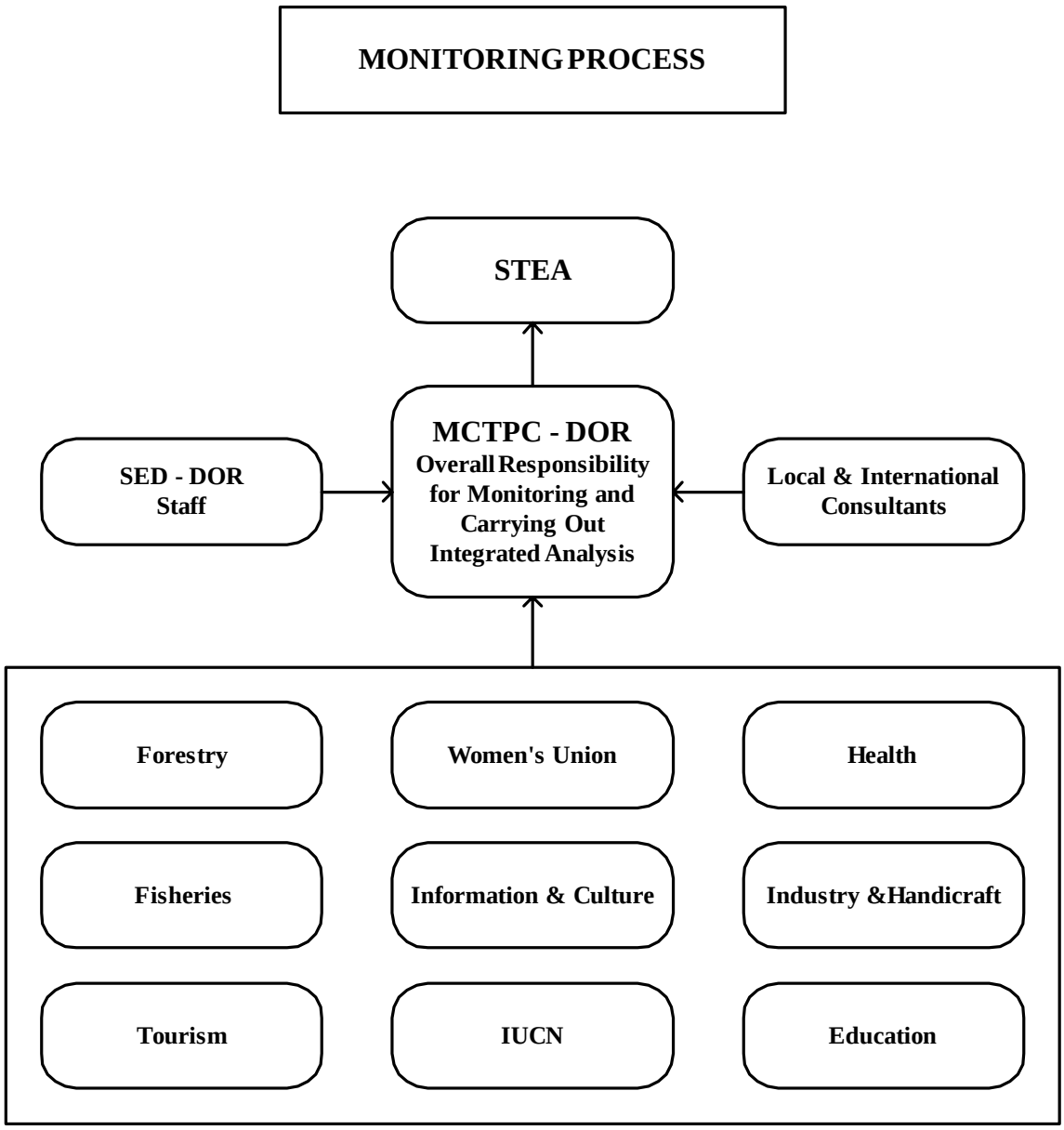

Figure 16: Monitoring Process

The analysis process must be seen as more than one that collects the information and reports it. The various government departments and ministries must analyze the information in order to better understand the impact of the road. It may be that negative or positive impacts that are occurring are not directly related to the road construction but as a result of advances and programs within the national, provincial and district environment. For example, it may be that an increased enrollment of children in schools could be attributable in large part to the construction of schools and the allocation of funding to subsidize the very poor to attend the schools. There must be caution always exercised that the results of the monitoring process are always carefully analyzed in order to accurately assess the impact of the road construction

and operation. This will require capacity building and sophistication in dealing with the data generated by the monitoring process.

The Department of Roads will then be faced with the task of bringing together the various indicators that have been collected and analyzed and reported to STEA as well as the donors about the impact of the road. It is important that the monitoring process also be seen as a learning exercise where lessons derived from the experience are incorporated into other design and construction activities.

7.1.4 Monitoring Program

Pre Construction

No.	Issues	Monitoring			
		Institutional Responsibility	**Factor(s) to Be Measured**	**Means of Validation**	**Collection & Reporting Time Scale**
6.2.1	Public consultation program during the preconstruction process.	MCTPC	▪ Adherence to consultation program schedules and activities	Assessment of actual activities	Bi-Monthly
6.2.2	Public information program	MCTPC	▪ Adherence to public information program schedules and activities	Assessment of actual activities	Bi-Monthly
6.2.3	Land Acquisition Plan	MCTPC	▪ The quality of life of affected people as measured by income levels and cost of living after the land acquisition plan is put into place	Survey of affected people's conditions according to baseline studies	Bi-Monthly
6.2.4	Resettlement Plan	MCTPC	▪ Quality of life of affected people after resettlement as measured by income levels and cost of living	Survey of affected people's conditions according to baseline studies	Monthly during resettlement process and yearly after completion of the project
6.2.5	Compensation	MCTPC	▪ Whether the terms and conditions of compensation plan are adhered to.	Assessment of actual allocations	Every three months during the compensation process.

Construction

No.	Impacts/Issues	Monitoring			
		Institutional Responsibility	**Factor(s) to be Measured**	**Means of Validation**	**Collection & Reporting Time Scale**
6.3.1	Dust	MCTPC	▪ Dust levels at adjacent buildings	Visual testing at designated sites	Monthly
	Noise pollution	MCTPC	▪ Adherence to designated working hours ▪ Possible testing of noise levels at sensitive locations	Site monitoring Testing by instruments	Monthly
	River water quality at plants & worker camps	MCTPC	▪ Water quality as measured by national standards	Water quality measurement Tests at key sites	Monthly
	River water quality at bridge construction sites	MCTPC	▪ Water quality as measured by national standards	Water quality measurement tests at key sites	Monthly
	Erosion	MCTPC Ministry of Agriculture & Forestry	▪ Erosion levels	Site inspection	Every 2 weeks
	Traffic safety	MCTPC Provincial Government	▪ Number of accidents compared to national levels	Statistical survey	Monthly
	Visual impacts	MCTPC	▪ Cleanliness of road and construction areas	Site inspections	Monthly
6.3.2	Negative changes in the health and migratory patterns of fish species	MCTPC Ministry of Agriculture and Forestry	▪ Changes in migration patterns and fish yields	Studies based on baseline studies at key sites	Monthly
6.3.3	Loss or damage of cultural resources	MCTPC Contractor Ministry of Information and Culture	▪ Condition of cultural relics	Site inspections	Ongoing monitoring and monthly reporting
6.3.5	Economic development	MCTPC	▪ Income levels of local people	Statistical reviews	Bimonthly
6.3.6	AIDS and STD	MCTPC Ministry of Health	▪ AIDS & STD occurrences in residents	Surveys based on baseline studies	Bimonthly

Operation

No.	Impacts/Issues	Monitoring			
		Institutional Responsibility	**Factor(s) to be Measured**	**Means of Validation**	**Collection & Reporting Time Scale**
6.3.1	Air quality	MCTPC	▪ Air quality levels at sensitive areas assessed by national standards	Air quality instrument Measurement at key sites	Yearly
	Noise Pollution	MCTPC	▪ Noise level at school and residential areas assessed by national standards	Noise instrument measurement at key sites	Yearly
	Water quality at river sites	MCTPC	▪ Water quality as measured by national standards	Water quality measurement tests	Monthly
6.3.3	Physical impacts from future development on community on road section 3, Champasak Town	MCTPC Ministry of Information and Culture	▪ Changes on cultural landscape ▪ Changes in housing style	Survey	Reporting yearly
6.3.4	Gender	MCTPC Women' Union	▪ Income levels ▪ Educational levels ▪ Basic health levels	Survey	Yearly
6.3.5	Economic development/poverty reduction	MCTPC	▪ Income levels ▪ Income levels as compared to national levels	Survey based on baseline studies	Yearly
6.3.5	Impacts on community daily life and business from the proposed bypass at Ban Dontalat on road section 6	MCTPC	▪ Change in income levels	Survey	Yearly
6.3.5	Impacts of tourism development on Vat Phou and Ancient City	Ministry of Information and Culture	▪ Changes in physical and environmental conditions of the area ▪ Revenue/funds generated from tourism development ▪ Income distribution of from tourism to local people	Survey & research studies	*Yearly*
6.3.6	Increase in health conditions	MCTPC Ministry of Health	▪ Basic health levels as measured by WHO ▪ Health levels as compared to national levels	Survey based on baseline studies	Yearly
6.3.7	Increase in educational levels	MCTPC Ministry of Education	▪ School enrollments ▪ School enrollments as compared to national levels	Survey based on baseline studies	Yearly

No.	Impacts/Issues	Monitoring			
		Institutional Responsibility	**Factor(s) to be Measured**	**Means of Validation**	**Collection & Reporting Time Scale**
6.3.8	Increased access to social services	MCTPC Provincial Government	▪ Average travel times and costs ▪ Average travel times and costs compared to national levels	Survey based on baseline studies	Yearly
6.3.9	Cultural impacts on local people	MCTPC	▪ Changes in traditional ways of life as measured by baseline study	Survey	Yearly

7.2 REMEDIATION PROCESS

While it is important to monitor positive and negative impacts for purposes of reporting to various ministries, donor agencies and STEA it must be remembered that monitoring is essentially carried out in order to ensure that any unexpected negative impacts are dealt with. It is also designed to ensure that if the hoped for positive impacts are not occurring that there can be changes implemented to the various plans, programs and approaches. It is vital therefore that the various ministries and departments as well as the Department of Roads use the information generated by the monitoring process to re-examine various dimensions of the environmental management plan as well as the design and construction standards and regulations in order to ensure that the desired impacts are being achieved.

This will require at times a multi-stakeholder approach where various programs may have to be put into place in order to ensure the overall success of the road construction project. An example would be that if the number of children enrolling in schools does not increase that there is a serious examination to determine why. It may be that the reasons have nothing to do with the road but have to do with subsidy programs or public attitudes related to education. If the government is sincere in wanting in raise educational levels and to take advantage of the improved access provided by the road then that these government programs will have to be altered at times to achieve the hoped for benefits.

8. CONCLUSION

8.1 CAPACITY BUILDING

To effectively prevent the negative impacts and ensure the benefits from the road improvement project, there will be a need for a capacity building program for all levels of government. For government officials varying levels of capacity building in the following areas will be required recognizing the reality that the capacity building will be different for each ministry and agency:

- Overall environmental assessment ideas and procedures.
- Establishing and carrying out a baseline data program.
- Conducting the collection of indicator data.
- Analyzing and reporting the results of this collection process.
- Integrating the data to develop an overall perspective of the road impacts.
- Developing expertise in remediation processes.

The capacity building will in large part be hands-on and it is recommended that there will be a need for significant on the job training as opposed to formal classroom sessions.

8.2 FINDING AND RECOMMENDATIONS

The environmental examination for the Project has been thorough and conducted in close consultation with the MCTPC and other relevant stakeholders. Overall environmental impacts are assessed as minor because:

- The project significantly increases the access of residents to markets for their produce as well as a range of social services (especially schools and hospitals).
- The residents in the section without a road will have access where none has existed. This increased access must be seen as a major positive impact for the residents.
- The project provides additional protection for heritage resources with the moving of the road away from the ancient city.
- Increased access to Vat Phou, if properly managed, will generate additional income possibilities to local people.
- Given that the natural/ecological environment is of no significance there are little or no negative impacts on the ecological system of the area.
- Provisions have been made to mitigate whatever negative impacts may occur through compensation as well as government programs.
- The project has recognized that there are significant benefits that can accrue from the road construction and improvement if mitigation measures and programs are put into place and can help realize the potential of the significant investment that will be provided to improve Road 14A.

The IEE concludes that the overall adverse impacts of the Project will be minor. Careful consideration has been given to Project location, design, construction and operational issues to minimize impacts on environmentally sensitive areas. Compensation procedures and mitigative actions have been identified.

APPENDIX 1: VAT PHOU PROTECTION ZONES

APPENDIX 2: PROVINCIAL DECREE FOR VAT PHOU

APPENDIX 3: BUDGET OUTLINE FOR THE ENVIRONMENTAL MANAGEMENT PLAN

BUDGET

Since detailed designs are not complete and political and resource questions must be resolved it is not possible to develop a budget at this stage of writing. Associated costs such factors as transportation, lodging, computer resources etc.

1. Plan, Policies and Regulations

Pre-Construction Phase		
Plans and Baseline Studies	**Associated Cost (USD)**	**Time**
Resettlement		
Land acquisition		
Compensation		
Public consultation and participation		
Public information program		
Fisheries survey		
Archaeological survey		
UXO survey and excavation		
Baseline studies for physical environment (air, noise, water quality and soil)		

Construction Phase		
Mitigation Measures	**Associated Cost (USD)**	**Time**
Having experts in Archaeology at the construction site		
Prepare traffic control program		
Public information program		
Public awareness program on AIDS and sexually transmitted diseases		

Operational Phase		
Mitigation Measures	**Associated Cost (USD)**	**Time**
Road safety program		
Developing a destination management plan for Vat Phou		
Public awareness program on AIDS and sexually transmitted diseases		
Technical assistant in forming women's cooperatives		
Market research studies for agricultural and handicraft market opportunities		
Develop a small loan program for small local businesses		

2. Monitoring Program

Phases	Associated Cost (USD)	Time
Pre-construction		
Construction		
▪ Negative impacts (physical environment)		
▪ Positive impacts (poverty, health, education, economic)		
Operation		
▪ Negative impacts (physical environment)		
▪ Positive impacts (poverty, health, education, economic)		

APPENDIX 4: GENERAL OUTLINE FOR ENVIRONMENTAL MONITORING REPORT

APPENDIX 5: LIST OF PEOPLE CONTACTED

Government Agencies

Living Aquatic Resources Research Center
- Mr. Xaypladeth Choulamany, Director

Lao Front for National Construction
- Mr. Bounthavee Vilaivong, Department of Ethnic Groups
- Mr. S. Noichansamone Dene Chaleunesouk, Department of Ethnic Groups

Ministry of Agriculture & Forestry, Department of Forestry
- Mr. Phetsamay Vongkhammounty, Director General
- Mr. Khamphone Rasachack, Head of Technical Division

Ministry of Education
- Mr. Ouam Sengchandavong, Deputy Director, Department of Planning & Cooperation

Ministry of Health
- Mr. Khampeth Manivong, Deputy Director General

Ministry of Industry & Handicraft
- Mr. Kham Ouan, Deputy Director General, Department of Handicraft

Ministry of Information and Culture
- Mr. Thongsa Sayavongkhamdy, Director General
- Mr. Bounhom Chanthamat, Deputy Director General
- Mr. Viengkeo Souksavatdy, Head of Division of Archaeological Research

National Committee for Control of AIDS
- Dr. Chansy Phimphachanh

National Tourism Authority of Lao PDR
- Mr. Sounh Manivong, Director, Planning, Cooperation and Marketing Division
- Mr. Khom Douangchantha, Deputy Director, International Relations Division
- Mrs. Phengchanh Phengmunang, Deputy Director, Statistic, Planning, Cooperation & Marketing Division

Science Technology and Environment Agency (STEA)
- Mr. Soukata Vichit, Director General, Department of Environment
- Mr. Xayaveth Vixay, Deputy Director General, Department of Environment
- Mr. Somsanouk Phommakhoth, Director, Environment Management Division
- Mr. Derek Ratcliff, EIA Adviser

Women's Union
- Mr. Phothong Siliphong, Project Advisor, Gender Resources Information and Development Center

International Organizations

Asian Development Bank (ADB)

- Ms. Arouny Sakulku, Senior Project Implementation Officer
- Ms. Rattanatay Luanglatbandith, Senior Economist GMS Liaison Officer
- Dr. James R. Chamberlain, Team Leader, Participatory Poverty Monitoring and Evaluation Project

IUCN

- Ms. Nikhat Sattar, Head of Special Assignments
- Ms. Latsamay Sylavong, Senior Programme Officer
- Mr. Mark Dubois, Assistant Programme Coordinator

SUNV-UNDP

- Mr. Sisaveuy Chanthavisack, SUNV Programme Assistant

UNESCO

- Mr. Richard Engelhardt

WWF Lao Project Office

- Mr. Roland EVE, Country Director

APPENDIX 6: REFERENCES

Environmental Law

Environmental Protection Law
April 3, 1999

Regulation on Environment Assessment in the Lao PDR
Science Technology and Environment Agency (STEA)
2002

Environment

Environmental Guidelines for Reducing the Environmental Effects of Road Projects in Lao PDR
World Bank
1994

Strengthening Social and Environmental Management in Lao PDR
Science, Technology and Environment Agency and, MIH Department of Electricity and MCTPC Department of Roads
ADB TA 3133--LAO
July 2000

Environments in Transition Cambodia, Lao PDR, Thailand, Vietnam
ADB
February 2001

Final Report Environmental Study
JICA
June 2000

Impact Assessment

Environmental Impact Assessment for Developing Countries in Asia
Bindu Lohani et al.
ADB
1997

Guidelines and Principles for Social Impact Assessment
U.S. Department of Commerce, national Oceanic and atmospheric administration and national Marine fisheries service
May 1994

Manual of Environmental Impact Assessment Procedures for Road Projects in Lao PDR
IUCN
1999

Transportation Publications

Subregional Transport Sector Study for the Grea7er Mekong Subregion
ADB
1995

Rural Access Roads Improvement Project
MCTPC
Dept. of Roads
Environmental Impact Assessment Report
Pacific Consultants International
ADB
June 2001

Integrated Rural Accessibility Planning in Lao
Road Network Analysis
Muang Xepone, Savannakket Province
MCTPC/UNDP/ILO
1995

Application for Japan's Grant AID for he Project of Rehabilitation of National Road #18
MCTPC
2001

Road Infrastructure for Rural Development Project
Beca International Consultants Ltd.
ADB
2000

GMS Study Sub-Regional Transport Sector Study for the Greater Mekong Sub-Region
ADB

Strategic Directions for the Development of the Road Sector for the Preparatory Roundtable Meeting
June 2000.

The Transit Transportation System for the Lao PDR
Resource Paper
Consultative Meeting on the Transit Transportation System of the Lao PDR
2000

East-West Transport Corridor Study
Maunsell
ADB
Mekong River Commission
1996

Guidelines for Reducing the Environmental Effects of Road Projects in Lao PDR
World Bank
March 1994

Socio Economic Publications
Master Plan Study on Integrated Agricultural Development in Lao
Nippon Koei Co., Ltd

JICA
Ministry of Agriculture and Forestry
2001

The Study on the Integrated Regional Development Plan for the Savannakket and Khammouan Region
KR International
JICA
2001

Participatory Poverty Assessment in Lao PDR
ADB
State Planning Committee
2001

Socio Economic Survey of Rural Resettlement Sites
UNHCR
1998

Master Plan Study on Integrated Agricultural Development in Lao PDR
JICA
August 2001

Mekong Lancang River Tourism Planning Study
Concept Plans
Pacific Consultants International
1998

Socio-Economic Profile of Savannakhet Province
Rural Development Programme Formulation
UNDP Lao PDR
1998

Economic Development in Lao PDR: Horizon 2000
Chi Do Pham (ed.)
IMF Resident Representative in the Lao PDR
1994

Laos Village Information System (AVIS) Material
Nagata Yoshikatsu
Media Center
Osaka City University
2000

Poverty Reduction and Environmental Management in remote Greater Mekong
Watersheds Phase II
Draft Final Report
Margules Poyry
CD Rom
2000

World Development Report 2000/2001
Attacking Poverty
World Bank
2000

Poverty in the Lao PDR
Participatory Poverty Assessment
State Planning Committee
2000

"Participatory Poverty Assessment: Case of Lao"
Brent Dark
The Poverty Reduction Focus
ADB
October 2001

"Examining How Transport and Energy Contribute to Poverty Reduction"
Tyrrell Duncan
The Poverty Reduction Focus
ADB
October 2001

Attapeu Province, Lao PDR
Background Information
WWF
Sub-Regional Transboundary Conservation Project
1998

Poverty Assessment
Technical report No. 9
Small Town Development Project
ADB TA 3492-LAO
ADB & Arcadis Euroconsult Urban Development
2001

Overcoming Human Poverty
UNDP Poverty Report
2000

The Project Formulation Study "Government's Efforts to Rural Development in Consideration with Ethnic Minority, Lao PDR"
JICA
May 2002

From AIDS Epidemic to an AIDS Pandemic
Is an HIV/AIDS Hub Building in Southeast Asia?
UNDP Program Southeast Asia HIV and Development Project
UNOPS and UNDP
2000

Trafficking in Women and Children in the Lao PDR: Initial Observation
Ministry of Labor and Social Welfare
United Nations Interagency Project
October 2001

Educational Strategic Planning 20 Years (2001-2020), 10 Years (2001-2010) and 5 Years Development Plan for Education at the Fifth Plenary Session (2001-2005)
Ministry of Education
August 2001

Small Towns Development Project Technical Report No.6 Short Resettlement Plan
ADB TA No. 3492-LAO
November 2001

Economic Development in Lao PDR: Horizon 2000
Bank of the Lao People's Democratic Republic
1994

Feasibility Study Project for Development and Promotion of Tourism Investment in Champasak Province
Tourism Authority of Thailand
1995

Development Dynamic and Priority Need Areas of the Champasak Province
UNDP
February 2000

Champasak Heritage Management Plan
UNESCO
2000

Prime Ministerial Instruction No. 10: Planning for the Eradication of Poverty
2001

National Environment Publications

Biodiversity Conservation, Protected Areas and the Development Imperative in Lao PDR: Forging Links
Stuart Chape
IUCN
1996

Lao PDR - Environmental Overview
East English and Pacific Regional Office
World Bank
July 1993

The Wildlife and Habitat Survey of the Dong Uua Sao National Biodiversity Conservation Area
T. Evans et al.

IUCN
1995

Protected Areas System Planning and Management in Lao PDR
Klaus Berkmuller at Al.
Lao--Swedish Forestry Cooperation Program, Forest Resources Conservation Sub Program (IUCN), Department of Forestry of the Ministry of Agriculture and Forestry
1995

Wildlife in Lao PDR – Status Report
Compiled by Richard Salter
IUCN
1993

An Inventory of Wetlands of the Lao PDR
G. Claridge
The IUCN Wetlands Program

The Second Mekong International Bridge Construction Project
Environmental Study
Final Report
Oriental Consultants
JICA
2000

Fact Sheets for National Biodiversity Areas in the Loa PDR
Division of Forest Resources Conservation
Dept. of Forestry, Lao PDR
Lao Swedish Forestry {Programme and IUCN
2000

Forest Management and Conservation Program
National Biodiversity Conservation Areas Sub-Program
Xe Pain NBCA
Rapid and Participatory Biodiversity Assessment Final Report
Prepared by WWF- Thailand Project Office
1997

Experiences from the Laos Swedish Forestry Programme 1995 - 2001
CD ROM
2001

Initial Assessment of Social and Economic Factors Affecting Biodiversity Conservation Efforts in the Forests of the Lower Mekong Ecoregion Complex
John Baker et al.
WWF & IUCN
2000

Towards a Vision for Biodiversity Conservation in the Forests of the Lower Mekong Ecoregion Complex

Complied by Michael C. Baltzer et al.
WWF Indochina/WWF-US

2001

ANNEX F-7

IEE REPORT FOR ROUTE 16A

Ministry of Communication, Transport, Post and Construction
Department of Roads, Lao PDR

Draft Initial Environmental Examination (IEE)

The Construction and Improvement of Road 16A Project

September 2002

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EXECUTIVE SUMMARY

Introduction

Assessing the impacts of any project is a complex process that requires careful consideration of the legislative and regulatory environment of the country, a sound understanding of the environmental conditions, a clear articulation out of the objectives of the project and the development of an environmental management plan. In many cases the proponent/owner is either from the private sector or is a public/private partnership. In these situations the government's role is to insure that the project meets the objectives and regulatory requirements of the country. Owners are responsible for assessing whether their projects are successful, most often measured on the grounds of economic imperatives.

In the case of public sector projects the assumption must be that no country would willingly negatively impact the ecological, social, economic, cultural and physical systems of their country. More importantly the objectives of public sector projects should always be to improve the quality of life of residents and act on behalf of the greater public good. In the case of a road project it is essential that the positive impacts from the investment process be realized. It is not sufficient for the government to simply ensure that the national regulations and legislative requirements have dealt with negative impacts. There must be a conscious process of ensuring that the objectives of the investment project are realized.

This project is different from other environmental assessment exercises since the owner is also the entity responsible for the monitoring of the construction and operational phases. This is unique and requires that the owner work carefully with its various stakeholders to ensure that the positive impacts are realized and the negative impacts avoided.

Study Approach

The Initial Environmental Examination (IEE) for the road improvement project for Route 16A was carried out using international practices and within the legislative and regulatory structure of Lao PDR. This assessment along with that of Route 14A(i) is the first IEE to proceed through the formal STEA process. The assessment has been carried out using available information and therefore there are gaps in the information base. Nevertheless, it has been possible to understand the overall impacts of the proposed changes and improvements to Route 16A. The environmental assessment has been an ongoing process with the objective always to define an alignment that would have the highest possible positive impacts and the least direct negative consequences.

Route 16A along with Route 14A(i) was selected for assessment based on a comprehensive evaluation of the road network in Southern Lao PDR and a master planning process. The proposed work requires the improvement and upgrading of the road surface of significant portions of the road, some new construction and interventions through the Bolaven Plateau to bring the road surface up to the necessary national standards. Full details of the proposed work can be found in the IEE report.

The IEE has considered cultural, socio-economic, physical and ecological dimensions when measuring the impact of the proposed construction and improvement initiatives.

Overall Assessment

The objectives of improving the road have to do with increasing the quality of life and economic and social conditions of the residents as well as the whole country. Given these objectives it is the overall assessment that the road has a significant positive impact on the immediate environment as well as the national situation. The road will significantly increase the access of residents to a range of social services and markets and to will help the position the area to achieve higher levels of economic development. It is recognized that there will have to be considerable cooperation of several government ministries and departments and aid agencies in order to achieve the desired benefits of the road construction and improvement. This will require initiatives such as training programs, small business development programs, technical assistance in local product development and tourism destination management for local people and officials.

Positive Impacts

There can be no doubt that improving Route 16A will improve the quality of life of the residents of local and regional communities thereby helping to reduce poverty. The road will provide for significantly improved access to markets and encourage more trade and economic activities for coffee plantations and tourism development in the area, especially between Thailand and Vietnam. In addition to these benefits the project will result in a number of other positive impacts including:

- Reduced travel time and costs
- Less dust pollution
- More opportunities for local people to access educational, health and social facilities
- Increased growth in the economy of the southern region
- Increased income and employment opportunities
- Improved living conditions
- More funds for environmental conservation

Negative Impacts

Most of the potential negative impacts of the improvement process will take place during construction. All possible measures have been taken to mitigate these negative impacts. However, it must be remembered that decisions have been made at the national level to improve this road and that with the improvement process some physical and minor social/cultural impacts will occur. It is assumed that the plans and regulations outlined in the IEE will be adhered to and implemented.

The major intervention that will have important consequences on the physical environment will be through the mountainous area of the Bolaven Plateau where in about 30% of the section there will be considerable alterations to the landscape. The design work has recognized the importance of this scenic resource and mitigation measures have been developed to ensure the lowest possible level of negative change. Through this section careful construction procedures must be implemented, and professionally managed replanting and revegetation should occur.

Through this particular section there will have to be careful monitoring of the construction process and the contractor must adhere to the regulations and guidelines put forward in the IEE in order that additional serious physical environmental damage does not occur.

Erosion could be seen to be an important problem if careful and immediate revegetation and slope stabilization is not implemented. Rehabilitation of borrow areas and associated access roads will require considerable and sensitive actions by the contractor.

There is always the concern that with any construction project the influx of workers can have serious social, health and cultural impacts on the local population. The IEE proposes a series of measures to ensure that the positive dimensions of the road are not overshadowed by negative impacts on social and cultural systems both during the construction as well as operational phases.

Monitoring

A monitoring program will have to be carried out by various government agencies in order to assess the effectiveness of mitigation measures in dealing with negative impacts and to assess whether supporting government programs are in fact improving the local economy and quality of life. Prior to the monitoring process there will have to be baseline studies carried out for a number of dimensions.

However it is important to note that there are clear resource capacity constraints within the government system as it relates to monitoring. If the monitoring program is to be successfully implemented the capacities of various actors must be improved.

Conclusion

It has been determined that most of the anticipated negative impacts can be avoided or minimized in almost all cases to an acceptable level through compliance with laws and regulations, and the effective implementation of mitigation measures in addition to a rigorous monitoring program.

Since this is the first road project to proceed through the formal environmental assessment process there obviously will be a need for adjustments and ongoing discussions. The required reporting periods for example may need to be adjusted based on the capacity of the various government agencies to meet the determined reporting procedures and time tables.

In addition, there may be situations where capacities (training, experience, time, financial resources for travel and information management technologies) may need to be expanded in order to meet the needs of the environmental assessment process. The monitoring process has been designed in order to ensure that as much as possible the legislative and regulatory measures have been met within a realistic implementation framework. The choice of factors to measure has been determined in large part on what are seen to be reasonable expectations given the financial resources of the country.

It must be repeated here that the object of monitoring is not to provide reports. The object of monitoring is to determine the effectiveness of the Environmental

Management Plan and to ensure that the regulations and designs that have been established are appropriately/properly adhered to. It must be remembered that monitoring therefore has an action orientation to it which allows the necessary authorities to put into place remedial measures when necessary. In some instances the monitoring should immediately trigger a remedial action should a negative impact be discovered. For example, if the sewage from a workers' camp is polluting a river the Department of Roads should take immediate action to deal with this environmental impact. The fact that the problem has occurred should certainly be reported but more significantly it is important to report the remedial action that has been taken

There is no doubt that there will be a need for constant adjustments in expectations and procedures as the first environmental assessment process develops.

The IEE concludes that the overall positive impacts far outweigh the negative impacts. Therefore there is no requirement for an environmental impact assessment for this proposed project.

GLOSSARY

ADB – Asian Development Bank
EIA – Environmental Impact Assessment
EMP – Environmental Management Plan
IEE – Initial Environmental Examination
IUCN – International Union for the Conservation of Nature
JICA – Japan International Cooperation Agency
MCTPC – Ministry of Communication, Transport, Post and Construction
STA - Station
STEA – Science Technology and Environment Agency
UNDP – United Nations Development Programme
UXO – Unexploded Ordnance
WWF – World Wildlife Fund

ACKNOWLEDGEMENTS

Several organizations have provided relevant information on the various issues related to the project impacts. These include the following.

- Science, Technology and Environmental Agency (STEA)
- National Tourism Authority of Lao PDR
- Ministry of Agriculture and Forestry
- Ministry of Information and Culture
- Local and provincial governments in Champasack
- Women's Union
- Ministry of Health
- Urban Research Institute
- Ministry of Education
- Lao Front from National Construction
- Ministry of Industry and Handicraft
- National Committee for Control of AIDS
- International organizations – ADB, IUCN, UNESCO, UNDP, SUNV-UNDP and WWF

PREFACE

This IEE draft represents the environmental assessment consultant's work, in consultation with various government officials up to September 24, 2002. All of the environmental impacts have been identified and mitigation measures, plans, regulations and procedures have been designed to deal with both positive as well as negative impacts and a monitoring plan is in place.

The planning and consultation work continues and until more detailed designs are completed there are certain aspects of the environmental assessment process that cannot be completed. The missing elements have to do with the budget dimensions of the environmental management plan. Until the detailed designs are completed it is impossible to determine the costs of the resettlement and land acquisition plans, and the compensation regulations and procedures that need to be put into place. These plans and procedures must be developed by the Lao PDR government given that they are a function of government policies and are dependent on the level of available resources.

It is not possible at this point to determine the costs of various studies and plans and the monitoring process. Repeated requests have been made for this information and responses have yet to be received. There is ongoing debate about who will be responsible for the various studies and monitoring, and until this debate is resolved it will not be possible to develop a budget.

One of the issues to be determined is whether government staff will be employed in certain tasks or whether national or international consultants will carry out certain tasks.

In appendix 4 the elements that should be considered in the development of a budget are outlined.

Dr. Walter Jamieson
September 24, 2002
Vientiane, Lao PDR

1. INTRODUCTION

The Japan International Cooperation Agency (JICA), at the request of the Lao government, is providing technical assistance in the development of the national highway network in the southern portion of the country. This work is being carried out in pursuit of the goals of the Ministry of Communication, Transport, Post and Construction (MCTPC). This Project aims to facilitate regional economic growth and co-operation by developing an international standard highway in Southern Lao PDR. It is recognized that the southern region of Laos has high economic potential due to the existence of important natural, social and agricultural resources.

Many of the roads and bridges in the region have deteriorated and even the national roads are often damaged during the rainy season with some sections barely passable even during the dry season. This posed a barrier to the movement of international trade, but has also resulted in this part of Laos being much poorer than the rest of the country due to the lack of access to markets and services.

1.1 BRIEF DESCRIPTION OF THE ROAD PROJECT

In early 2002, the study team reviewed the national road network (12 roads) in the five southern provinces including Champasack, Attapeu, Sekong and Saravan and the area of Savannakhet along Road 1G. A feasibility study was carried out to prioritize the roads that were seen as being crucial for the socio-economic development of the region.

After a comprehensive assessment and discussions with government officials it was determined that road 16A would be one of two routes (the other is route 14A(i)) that would be further examined and for which designs would be prepared by a JICA funded technical team. The location of the roads can be seen in Figure 1. The road therefore must be seen as representing a high priority of the national government in the southern part of the country. It is within this context that this IEE report has been prepared. It must also be recognized that the environmental dimensions of the project are but one input into the final design and location of the road. It is clear that financial considerations, technical imperatives and the objectives and concerns of various national and provincial officials are all important ingredients in the choice of the final route and its design.

Assuming that the recommendations of the feasibility phase are accepted by the Japanese Government a process of basic and detailed design will follow as part of the funding of the road construction and improvement.

It is also important to note that there is a scarcity of reliable inventory and baseline information. In some cases decisions have been made based on the best available information and the experience of the consultants. As will be seen throughout the report there are recommendations for baseline studies to be established before any construction does take place and in some instances inventory work carried out to help to guide the detailed design of bridge structures and the construction process of those bridges.

This Project aims to facilitate regional economic growth and co-operation by developing an international standard highway using both new construction and improvement mechanisms.

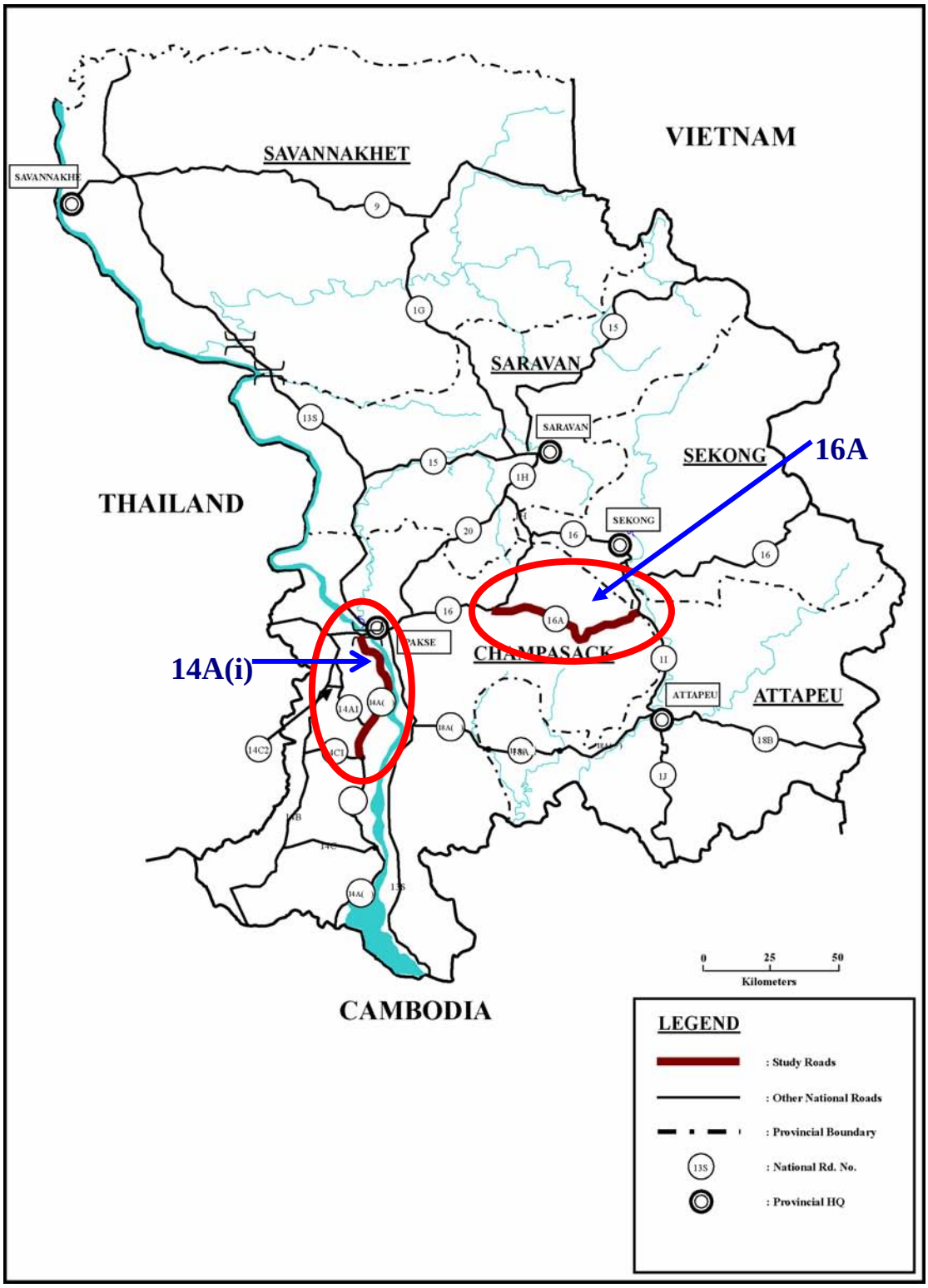

Figure 1: Location of Roads 14A(i) and 16A

1.2 SCOPE AND METHODOLOGY OF THE IEE STUDY

This Initial Environmental Examination (IEE) is concerned with road improvement works to a 70.05 km. section of Road 16A in Champasak and Attapeu province. This report is designed to provide the government with the opportunity of evaluating overall impacts.

The preparation of the study has used a full range of activities including examining the work from the Project's April 2002 Interim Report, discussions with relevant stakeholders, conducting a major social and economic study through a survey of a number of communities along the road, water quality studies, and a thorough assessment of the physical, cultural and ecological impacts of the project. It is important to note that the project is very much concerned with minimizing any negative impacts. The Project is equally concerned with achieving the potential benefits that the significant investment in road construction and improvement will provide for the overall social and economic development of the country and the people in the immediate area and the province.

The IEE will identify the impacts of the construction phase but will not deal with such factors as quarry sites and the specific locations of work camps and material processing facilities since this is seen as the focus of another phase of work. It is recognized that IEEs may have to be done for these operations when the sites have been chosen.

1.3 DEPARTMENT OF ROADS, MCTPC

The executing agency for this project is the Ministry of Communication, Transport, Post and Construction (MCTPC) through the Department of Roads. The environmental impact process is the direct responsibility of the Social and Environment Division of the Department of Roads.

1.4 INSTITUTIONAL AND LEGISLATIVE FRAMEWORK

There are a number of laws, regulations and guidelines that have an influence on the overall environmental management and protection in Laos. It is our assessment that many of the laws provide a supporting process of impact evaluation and management. Table 1 presents a summary of laws and regulations related to environmental protection, land acquisition and compensation for rehabilitation from the road improvement project.

Acts/Regulations/Decrees	Responsible Agency	Provisions Relating to the Project
Environmental Protection Law #02/NA/99 (1999)	STEA	Protection and management of physical and ecological resources
Regulation on Environmental Assessment (2002)	STEA	IEE and EIA guidelines and regulations for assessing a project
National Forestry Law (1996)	MAF	Protection and management responsibilities for forestry land
Decree 1074 of the Ministry of Agriculture and Forestry (1996)	MAF	Protection and management responsibilities for forestry land

Acts/Regulations/Decrees	Responsible Agency	Provisions Relating to the Project
National Law on Land (1997)	DOL	Land acquisition and compensation procedures
Preservation and Management of National Cultural Heritage – Notice No. 943	MOIC	Protection and management of heritage sites and artifacts
Prohibition of Wildlife Trade-Council of Ministers' Decree No. 285/CCM (1986)	MAF	Prohibits all kinds of wildlife trade including live or dead specimens, trophies and articles produced from wild animals
National Biodiversity Conservation Areas-Prime Minister's Decree No. 164 (1993)	MAF	Declaration of NBCAs to protect large contiguous tracts of Lao PDR forests
Management and Protection of Aquatic Animals, Wildlife and on Hunting and Fishing-Council of Ministers' Decree No. 118/PCM (1989)	MAF	Prohibits hunting, catching, killing, damaging, transporting, and the selling alive or dead of animals or parts thereof.
Rules and Regulations of Town Planning-Prime Minister's Decree No.9 (1991)	MCTPC	Town planning regulations
Declaration of the President #125/PO on the Forestry Law approved by National Assembly #04/NA (1996)	Department of Forestry	Protection and management responsibilities for forestry land
Road Law approved by National Assembly #04/99/NA (1999)	MCTPC	Responsibilities relating to the management of roads.

Note:
MAF Ministry of Agriculture and Fisheries DOL Department of Lands
MOIC Ministry of Information and Culture MCTCP Ministry of Communications, Transport, Post and Construction
STEA Science, Technology and Environmental Agency

Table 1: Principal Laws and Regulations Relating to Environmental Protection, Land Acquisition and Compensation

2. PROJECT DESCRIPTION

2.1 OVERALL OBJECTIVES OF THE PROJECT

From an analysis of various government documents the country's primary national goals can be defined as:

- Economic growth
  Economic development is one of the important goals of the Lao PDR national government designed to ensure the creation of wealth and gainful employment for all its citizens.
- Poverty reduction
  The reduction of poverty can be seen as a subset of the overall goal of economic development. However, experience has shown that while overall

national economic conditions may improve the condition of the poor may remain the same or in some cases deteriorate even within a climate of economic expansion. Investment in road construction and improvement is one way to help facilitate the poverty reduction process.

- National integration
  In a sparsely populated country with many small villages representing numerous ethnic minorities, a road system can help to bring people together and to achieve a much better level of communication in order to contribute to the process of nation building.
- Environmental protection.
  In Lao PDR there is a strong recognition of the important role that the natural environment will play in providing for prosperity in the future and providing for the food needs of the population. Protection of the environment must therefore be considered along with the other national goals.

2.2 SPECIFIC OBJECTIVES OF THE PROJECT

In addition to meeting overall national goals the construction and improvement of Road 16A has been selected as one of the priority roads in Southern Lao PDR since it will:

- The road will provide for all weather access for the residents in order to allow greater opportunities for moving their goods to important market centers as well as facilitating access to schools and medical facilities.
- Contribute to rural development in the area near the Champasak-Attapeu border and also improve East-West connections between Thailand, Laos and Vietnam.

2.3 CONSIDERATION OF ALTERNATIVES

As noted earlier twelve roads in south Lao PDR were assesses in order to assess their priority for road improvement. Cost-benefit analysis for each road was carried out using three main factors: environmental, socio-economic and traffic impacts. Road 14A(i) (between Phon Thong District and Ban Soukhouma: 59.75 km.) and 16A (70.05 km.) were identified as having the highest priority for implementation given their ability to meet national, regional and local priorities and interests.

2.4 NATURE AND LOCATION OF THE EXISTING AND PROPOSED ROAD

2.4.1 General Condition of Road 16A

Road 16A, a 70.05 km gravel road, starts from the junction with Road 16 located at the 1 meter mark east of Paksong in Champasack Province and ends at Ban Lak 52, or the junction with Road 11 in Attapeu Province. This Road connects Attapeu and Sekong provinces to the western part of the country. There are small villages along the road cultivating cash crops such as coffee rather than rice.

The road surface of the first 50 km. is in generally good condition due to previous improvements to the gravel surface. The average speed in this section is more than 40 km/ hr. The existing road is a two-lane carriageway that varies in width from 4.7 to 7.0 meters. The rest of the existing road is located in a mountainous area and is in a poor condition. In general the road width in this mountainous section ranges from 3.5 to 3.9 meters.

There are a total of six small and medium-scale rivers located along the road. There are five permanent one-lane bridges and one Bailey bridge.

2.4.2 Specific Existing and Proposed Road Conditions Alignment

In order to better understand environmental conditions the road has been divided into four sections as can be seen in Figure 2.

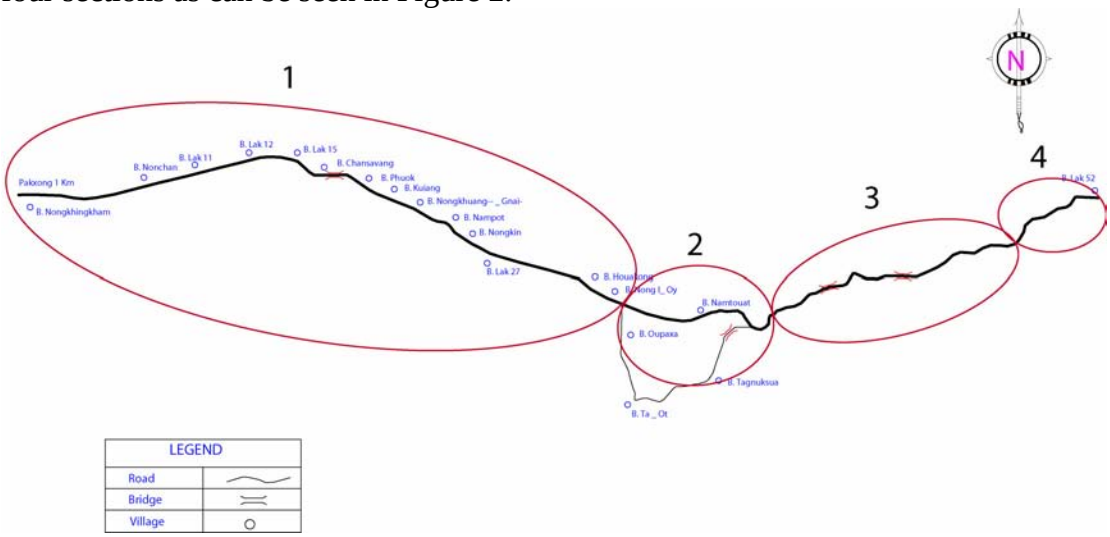

Figure 2: Proposed 16a Alignment and Sections

Section 1: STA.0+000 – STA. 33+800 (length 33.8 km)

This portion of the existing road has a gravel surface and a road width is approximately 4.5 meters as illustrated in Figure 3. This section passes through flat or rolling terrain with a number of villages located along its alignment with few distinguishing features or environmental impact concerns.

It is proposed that the existing road is a surface to be improved. Construction activities on this section will be mostly road widening and paving with no significant earthworks.

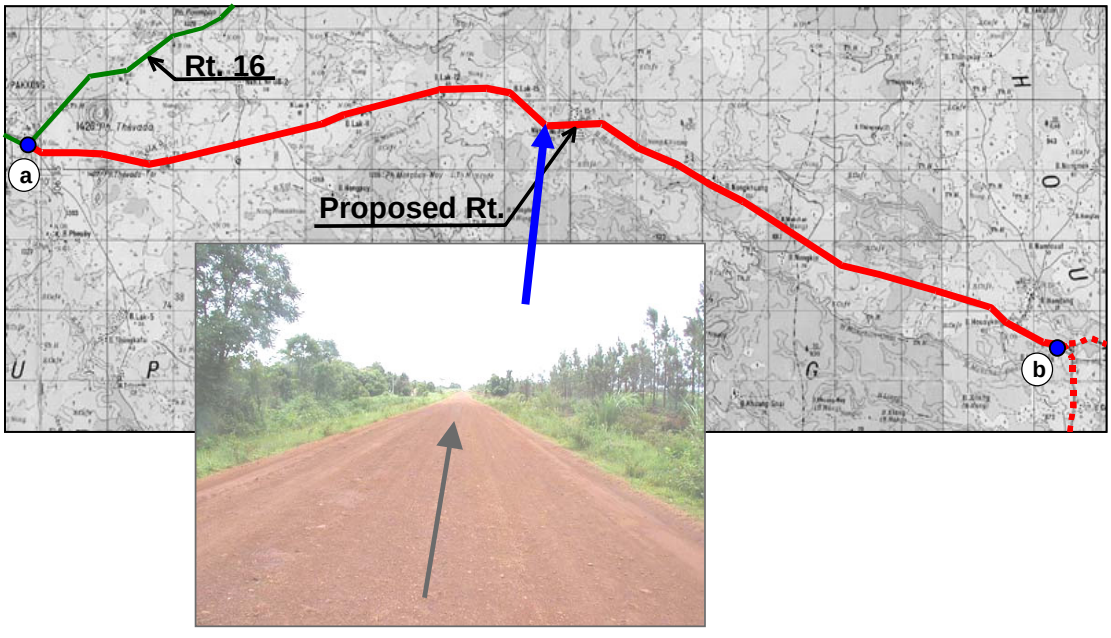

Figure 3: Section STA.0+000 – STA. 33+800

Section 2: STA. 33+800 + STA. 42+200 (length 8.4 km)

There were two alternatives considered for this section as illustrated in Figure 4. One was to improve the existing road (13.94 km.) which passes through four villages. Improving the existing road will require few house removals. The second alternative was to construct a shortcut (8.4 km.) through local forests and coffee plantations. There are few villages along this route.

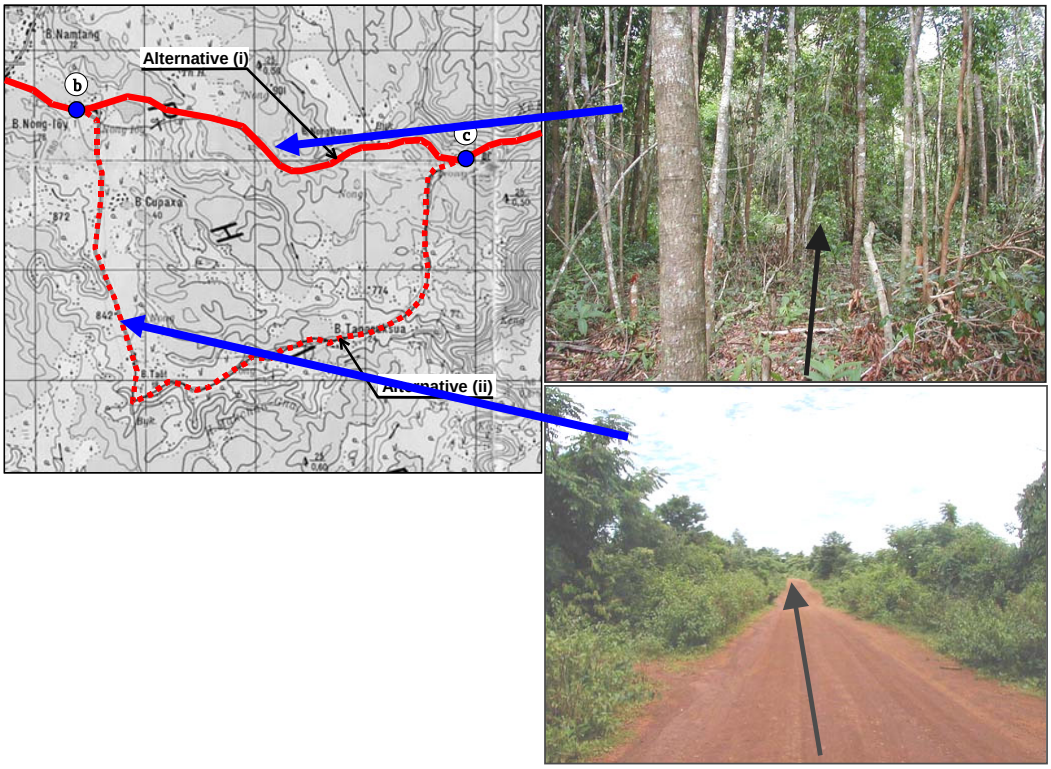

Figure 4: Section STA. 33+800 + STA. 42+200

The shortcut route has been proposed by the engineering team due to lower construction costs and a reduction in transport time and costs. The consideration of the alternative route was carried out without the benefit of any significant biophysical data. Since it does not constitute part of a NBCA and it has not identified by the Department of Forestry as an area of ecological sensitivity it has been assumed that the necessary physical interventions are justified given the cost benefit carried out by the overall engineering team. There will be physical impacts especially where the excavation work will be required in order to provide for an acceptable grade to the road. It is proposed that all possible measures will be taken to limit the impact of the construction through this area.

The nature of the physical interventions can be seen in Figures 5.

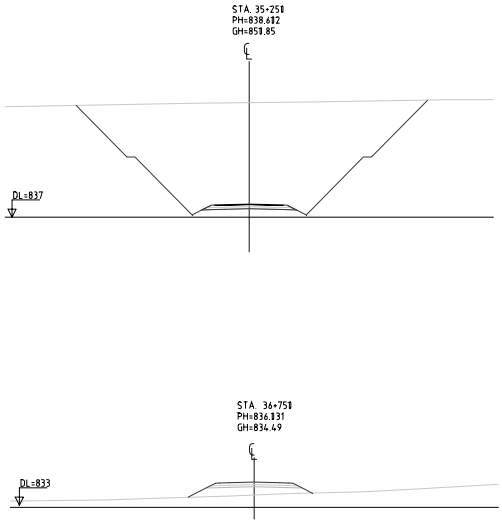

Figure 5: Cross Sections of Proposed Road Design STA. 33+800 + STA. 42+200

Section 3: STA. 42+200 – STA. 58+000 (length 15.8 km)

This is largely a mountainous area with a scenic natural environment and the Se Katam Tok waterfall. There are a few small settlements located along the road as well as evidence of growing slash and burn activities. The road is not located in a national biodiversity conservation area. Map of this section is illustrated in Figure 6.

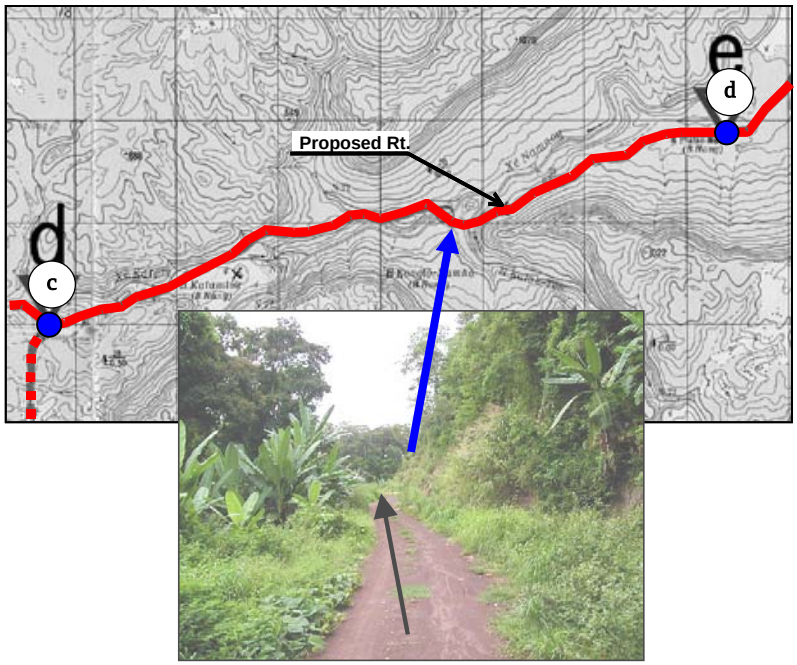

Figure 6: Section of STA. 42+200 – STA. 58+000

In this section there will be major interventions necessary to meet basic road safety and performance standards for a national road. More is said on this later in the report. In about 30% of the section there will be considerable alterations to the landscape.

Cross-sections of particular earthworks are illustrated in Figure 7.

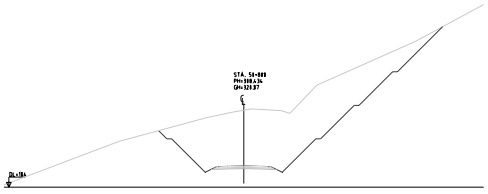

Figure 7: Cross Section of Proposed Road Design STA. 42+200 – STA. 58+000

Section 4: STA. 58+000 – STA. 64+500 (length 6.5 km)

It is proposed that the existing road is a surface to be improved. Construction activities on this section will be mostly road widening and paving with no significant earthworks. Map of this section is illustrated in Figure 8.

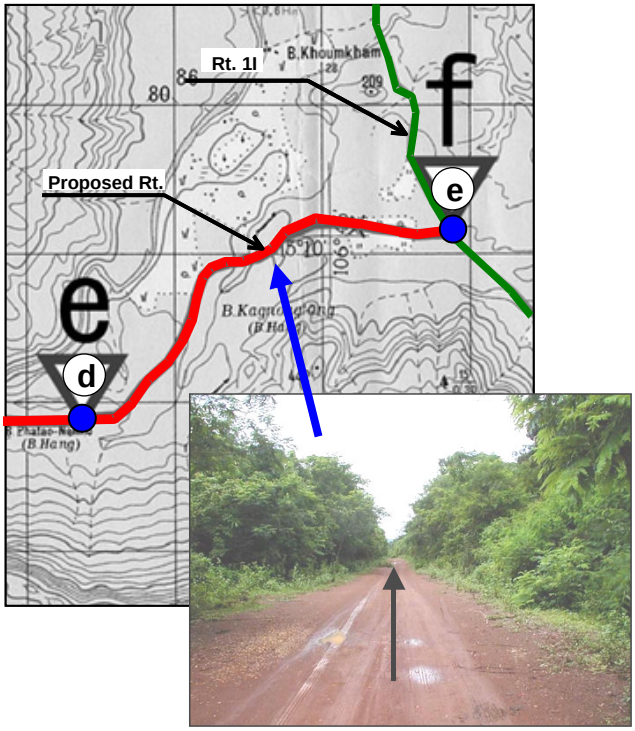

Figure 8: Section STA. 58+000 – STA. 64+500

2.5 BRIDGE IMPROVEMENT AND CONSTRUCTION

The project proposes to build one new bridge and improve six existing bridges. The proposed bridge design and locations are illustrated in Figure 9 and 10.

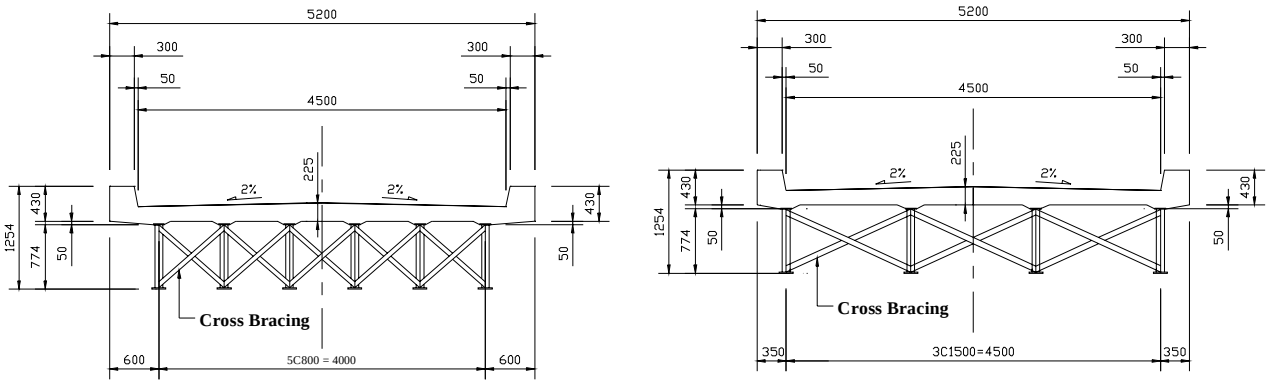

Figure 9: Proposed Bridge Designs

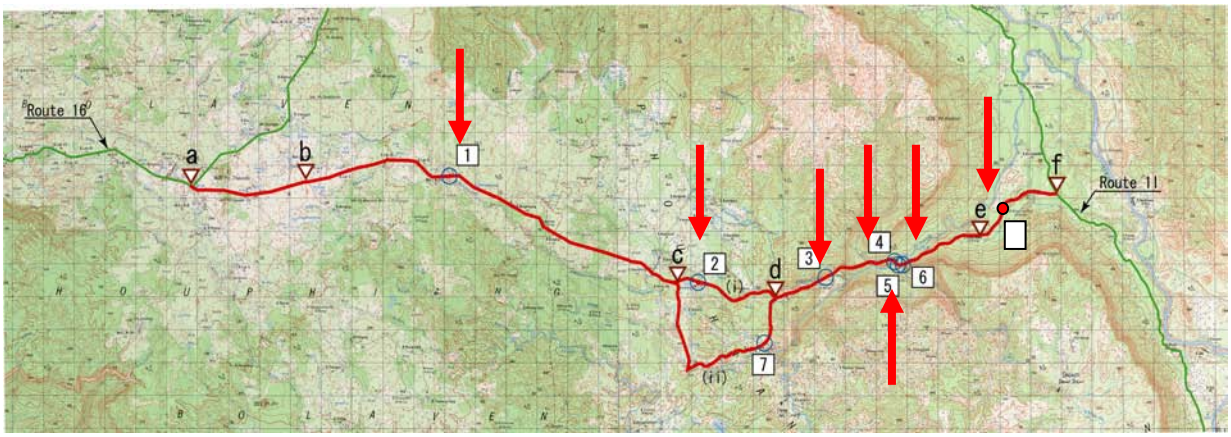

Figure 10: Bridge Locations

2.6 ROAD IMPROVEMENT ACTIVITIES:

The construction and improvement of Road 16A will require four distinct areas of activity. They include the following considerations.

2.6.1 Planning and Design

The planning and design process brings with it a series of activities and possible impacts. The process must consider factors including cost, the full range of environmental impacts, technical and engineering issues and political and community objectives. The eventual planning and design decisions can bring about a number of positive and negative impacts that must be clearly identified and environmental management plans and mitigative measures designed to deal with those impacts.

2.6.2 Pre Construction

Pre construction involves the following major activities:

- A public involvement/consultation process to raise awareness of people on project activities and take their concerns into account in order to avoid possible opposition.
- The establishment of a public information program to provide relevant information related to project activities and its impacts.
- Preparation of a land acquisition plan
- Preparation of a resettlement plan
- Development of compensation procedures for affected people.

2.6.3 Construction

Road 16A improvement and construction will include the following:

- Temporary works such as access roads, work camps as well as material processing facilities.
- Site clearance will include cutting trees but only where absolutely necessary.
- Earthwork.
- Pavement work.
- Widening of the road formation and reconstruction of the road shoulders.
- Drainage measures.
- Miscellaneous activities including slope protection, provision of safety facilities, side ditches, etc.

2.6.4 Operation

In addition to the more commonly understood operational issues related to road maintenance the success of a road project in meeting national goals requires a number of planning policy and project implementation initiatives. These include monitoring the full range of impact factors, the development and delivery of safety campaigns, implementing land use planning regulations, health and educational development and in some cases community development efforts in order to ensure that the full potential of the road is achieved.

2.7 QUANTITY AND QUALITY OF RAW MATERIALS AND WASTE PRODUCTS

The contractor will determine the quantity and quality of the raw materials required for construction activities and the amount of waste generated from the road construction process. Based on these plans the contractor will develop mitigation measures to minimize the impacts from these construction related activities. MCTPC is responsible for ensuring that the contractor strictly follows the necessary environmental regulations and guidelines.

2.8 ANTICIPATED COST OF THE ROAD IMPROVEMENTS

The projected total cost for Road 16A includes the cost of these following items.

- Road improvement
- Bridge improvement
- House compensation
- UXO clearing (Unexploded Ordinance)

3. OVERALL ENVIRONMENTAL CONDITIONS OF ROAD 16A

3.1 PHYSICAL CONDITIONS

3.1.1 Climate

The climate of Southern Lao PDR is tropical monsoon. There is a pronounced rainy season associated with the influence of the southeast monsoons from May to October. The rest of the year is dry. November and December are the coolest months with daytime temperatures in the 27-29 Celsius range, falling to 15-17 Celsius at night. Highest temperatures occur in April and May and can exceed 40 Celsius.

Tropical cyclones or typhoons are a frequent occurrence in the Project area. Typically typhoons form as deep depressions in the South China Sea or near the Philippines. These intensify and can travel in an easterly direction across the Vietnamese coast into Lao PDR. These typhoons or tropical depressions result in rainfalls in the Mekong Basin of 95-250 millimeters or more in a 24-hour period.

3.1.2 Air Quality, Noise and Vibration

Presently most of the vehicles using this road are small trucks, motorcycles, bicycles and a few pickup and four-wheel drive vehicles. Dust is a major issue in the dry season affecting the health of the nearby residents.

3.1.3 Physical Characteristics of Community Environments

Most of the communities along Road are of the typical Lao style of wood construction and in most cases the homes are on stilts. There are now new homes of masonry construction being introduced in some of the communities.

3.2 ECOLOGICAL CONDITIONS

3.2.1 Forests, Forest Biodiversity, and Habitat

Road 16A passes through the Bolaven Plateau, which is not declared NBCAs. Road improvement and construction works, related bridge repairs and quarrying activities in this area will not impinge on any NBCAs or other pristine forests. Areas that this road passes through are mostly paddy field and local forests.

3.2.2 Fish, Fisheries, and Aquatic Biology

As is common in rural areas in Lao PDR fish and other aquatic fauna provide a major source of protein for families. There are two peak migration periods, April to July, when fish move upstream, and September to December when the river level drops and fish return from the tributaries and spawning and feeding grounds to the main stream of the Mekong River. It is important that upstream and downstream movements of fish and access to tributaries not be impeded.

3.3 ECONOMIC AND SOCIAL CONDITIONS AND ACTIVITIES

3.3.1 Perspectives of the Communities along Road 16A

Basic information about the Project has been presented and discussed with the provincial governor, district officers and a cross section of village heads, and village residents along Road 16A. Villagers and communities along the road, with the understanding that there was potential for some short-term nuisance and disturbance during construction, positively received the Project. Most consider that they will benefit from the Project. In cases where compensation will be involved, villagers

expressed a strong preference for compensation through allocation of new land rather than financial compensation.

The residents were surveyed by the Urban Research Institute (URI) using a carefully designed survey process that is described in the URI report on the complete survey results.

Generally local people in the project area have very positive views on the improvement of Road 16A. They prefer to have a better quality of road and expect a number of benefits from the road improvement project to their communities:

- Easy access for children to go to school and for people to travel to social services and government offices.
- Economic development and business opportunities.
- Improved opportunities for eco and agro tourism activity.
- Solution of the dust problem in the dry season.
- Release the problem of muddy road during the rainy season.
- Improved safety especially when traveling at night.
- More opportunities to obtain information and knowledge from the outside world

Local people realize some immediate negative impacts from the road improvement project such as loss of some trees, land and coffee plantation areas. In addition some of them are also aware of long-term impacts i.e. more accidents in the future, higher risks to their children from high-speed vehicles passing along this Road, increased traffic, and noise problem. However they still prefer having a high standard road in order to deal with the problem of dust in the dry season and muddy roads in the rainy season. Local communities clearly stated that impacts from road improvements are insignificant and are acceptable. They are also willing to relocate if their land is acquired by the project. It is important to note that people from Ban Ta Yuk Seu, who will be relocating to the new focal point, prefer to have the existing road improved because with the proposed short cut route construction their village will be cut off from the new main road.

To assess the utilization of the existing road, the majority of respondents travel to the hospital followed by trips to the market to sell agricultural products and government offices. This indicates the importance of health care facilities for these communities. Most of the local people go to the nearest hospital at Paksong or to that in Champasak. Language is an issue for some minority groups, who do not speak the Lao national language.

Most of the people use public buses followed by motorcycles, bicycles and by foot as modes of transportation. Average travel time ranges could be from 20 minutes to 1 hour to go to Paksong depending on village location, mode of transportation and season. In the rainy season it usually takes more time to go to other places due to muddy road condition that only buses, trucks or private vehicles can travel through.

3.3.2 Economic Activity

Land Use

Land use along the Project road's recommended alignment is either agriculture (about 50.0 km. of the alignment) or local forest in the Boloven Plateau (21.0 km).

Agriculture

In this area cash crops like coffee are cultivated rather than rice with much of the coffee sold to Thailand. From 1996 to 2000 the average export growth rate for coffee has been 7.7%. In addition to coffee beans, this Plateau is also known for vegetables, spices and tea. One of the major issues for the Plateau is a lack of access to markets and an improved Road 16A will help contribute to the agriculture development of the Plateau area.

Tourism

Although presently there is little tourism activity in the area, the Boloven Plateau has potential for tourism development because of its natural scenic beauty. In addition to Se Katam waterfall, agro-tourism for coffee, tea, and cardamom farms also hold tourism promise.

Utilization of Transport Infrastructure

Traffic surveys reported in Chapter 4 of the Interim Report 2 on Improvement of Roads in the Southern Region in Lao PDR, April 2002 indicate that passenger vehicle trips by purpose could be categorized into three types: home-based work trips (46%), home-based other trips, and non home-based trips. The composition of traffic included 36% by motorcycle followed by 30% on bicycles and others (pickups, buses, trucks, farm vehicles, cars, jeeps and 3-wheelers). The 12-hour flow for motorized vehicles in the project area was approximately 228 vehicles. Road travel speed for Road 16A was 52 km./hr.

From the perspective of traffic demand and time savings, Road 16A plays an important role in the road transport network by serving as an important East-West link connecting Attapeu and Vietnam with the more populated and richer western portions of Southern Lao. According to the July 2000 "Study on the National Transport Development Strategy of Vietnam", this is especially important given that Vietnam is putting more emphasis on its links with southern Lao via Attapeu.

Access to Markets

Accessibility to markets is already secured most of the year with the connections to the Thai border through Pakse. Only during the rainy season are there difficulties of movement. With the road improvement project there will be better access to markets for the coffee-rich Boloven Plateau. Upon completion of Road 16 East and Road 18B, most of the traffic from Vietnam will take 16A in order to reach Pakse and Thailand. There is no doubt that one of the direct beneficiaries of this road will be the coffee farmers of the Boloven Plateau.

3.3.3 Quality of Life Issues

Poverty

Poverty is a major problem in southern Laos. This poverty can be understood in part due to lack of access to a wide range of services and markets especially during the rainy seasons. Raising income levels as well as access to various services must be seen as one of the highest priorities of this road project using an integrated approach with the physical road provisions complimented by community development initiatives.

Health Care

Malaria and dysentery are reported as being significant health problems. The high cost of medicines and access to hospitals and medical practitioners are seen as the main reasons for the poor health levels. There is only one health care center along the road thereby people usually go to the hospital at Paksong.

Education and Literacy

According to the 1995 census conducted by the Ministry of Education the average literacy rate of villagers in the area covering Paksong in Champasak province and Saysettha district in Attapeu province is approximately 62.3%. There are 12 schools within the area - 11 primary schools and 1 secondary school.

Accessibility is always one of the important criteria that donor agencies consider in providing funds for school facilities. With the improvement of Road 16A there is a higher possibility for the Ministry of Education to obtain funding for the improvement of school facilities.

Gender

Women usually work, take care of the house and children and therefore accessibility to markets, schools and hospitals are very important issues to them. With improvements to the road system their quality of life should be increased as measured by an increase in the ease, cost and time of their travel.

3.4 CULTURAL VALUES

There are no reported areas of heritage value along the road but as noted later surveys will have to be undertaken to ensure that any cultural resources that are discovered are carefully protected.

4. SCREENING OF POTENTIAL ENVIRONMENTAL IMPACTS

There are a significant number of factors that must be considered in assessing the environmental impacts of road construction and improvement. It is important to note the difference between a change and an impact. In this IEE both changes and impacts are discussed. The positive impacts will often not occur without government, NGO, donor and community action within a framework on mitigative measures and environmental management plans. On the other hand negative impacts are not inevitable but will occur if mitigation and environmental management plans are not followed.

It is important to take into account that changes and impacts occur on an international, national, provincial and local basis. The emphasis in this IEE will be on the local level given the extensive documentation provided in the Project's Interim Report on national and provincial level concerns.

4.1 OVERALL SOCIO-ECONOMIC CHANGES AND IMPACTS

The overall socio-economic changes and impacts of the proposed Road 16A are presented in Figure 11.

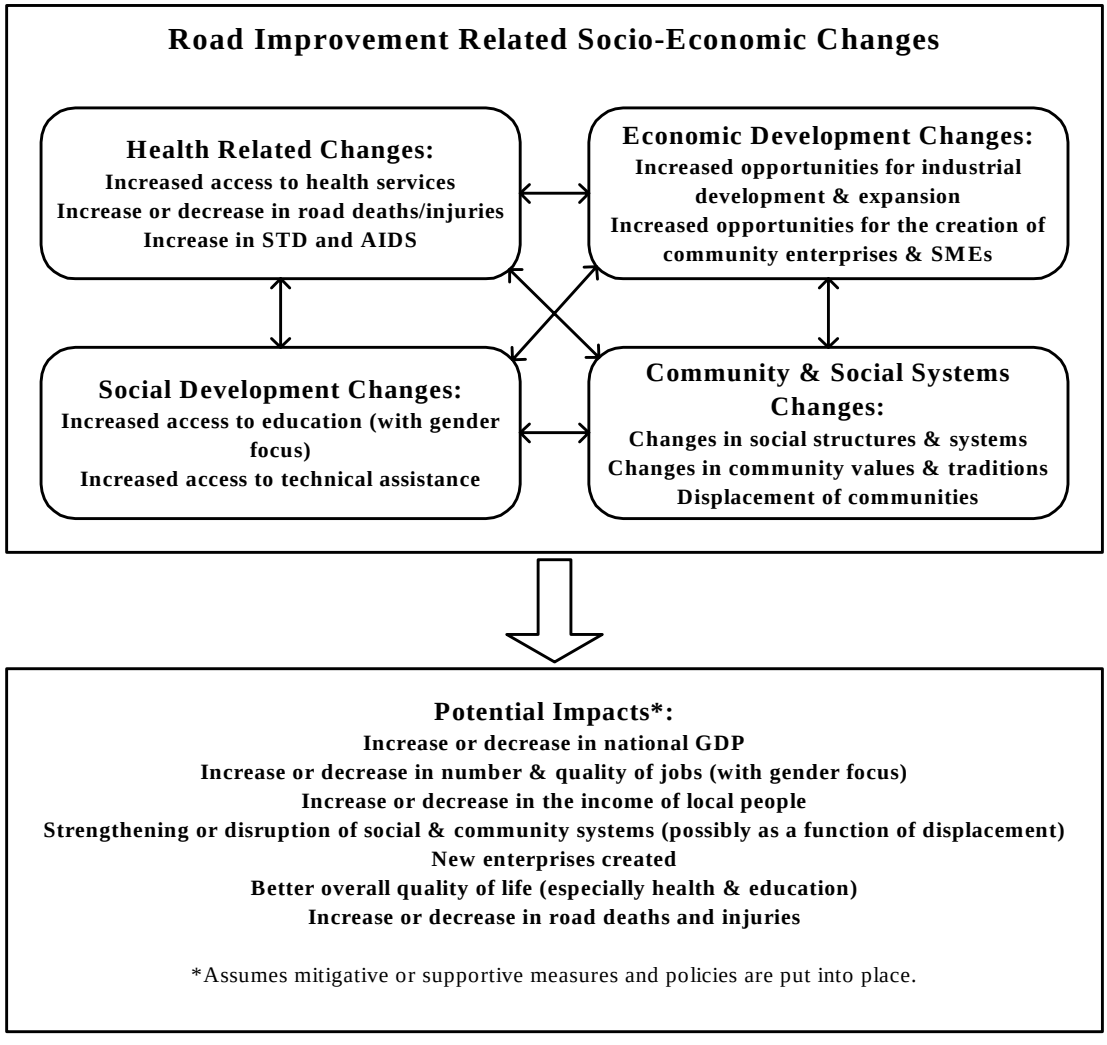

Figure 11: Road 16A Socio-Economic Changes and Impacts

4.2 OVERALL CULTURAL ENVIRONMENTAL CHANGES AND IMPACTS

Given the lack of identified heritage resources there are no major cultural environmental changes and impacts. However, there may be changes to the ethnic minorities' way of life and traditions that may be a cause for concern. These possible changes are illustrated in Figure 12.

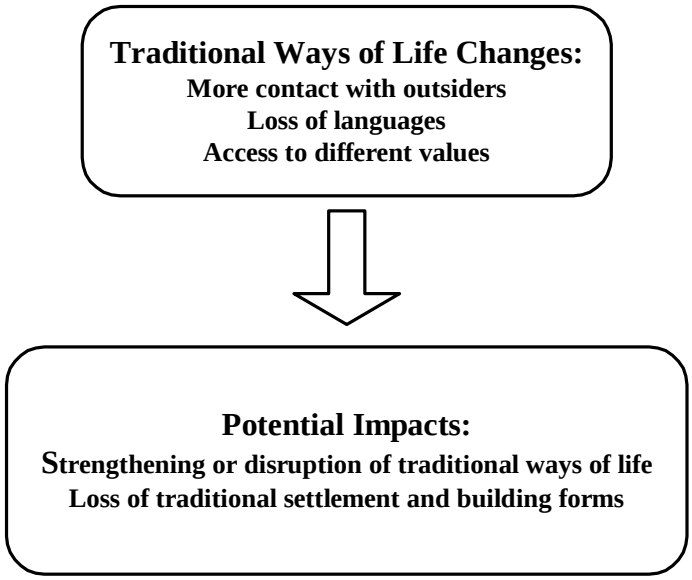

Figure 12: Road 16A Cultural Environment Changes and Impacts

4.3 OVERALL NATURAL/ECOLOGICAL ENVIRONMENTAL CHANGES AND IMPACTS

Given the proposed road construction and improvement activities there are minimal overall natural/ecological impacts. However, as noted earlier there is a need for careful deign work to be carried out in the Bolaven Plateau area to maintain the area's scenic value for nature/heritage as well as tourism purposes.

Possible changes and impacts are illustrated in Figure 13.

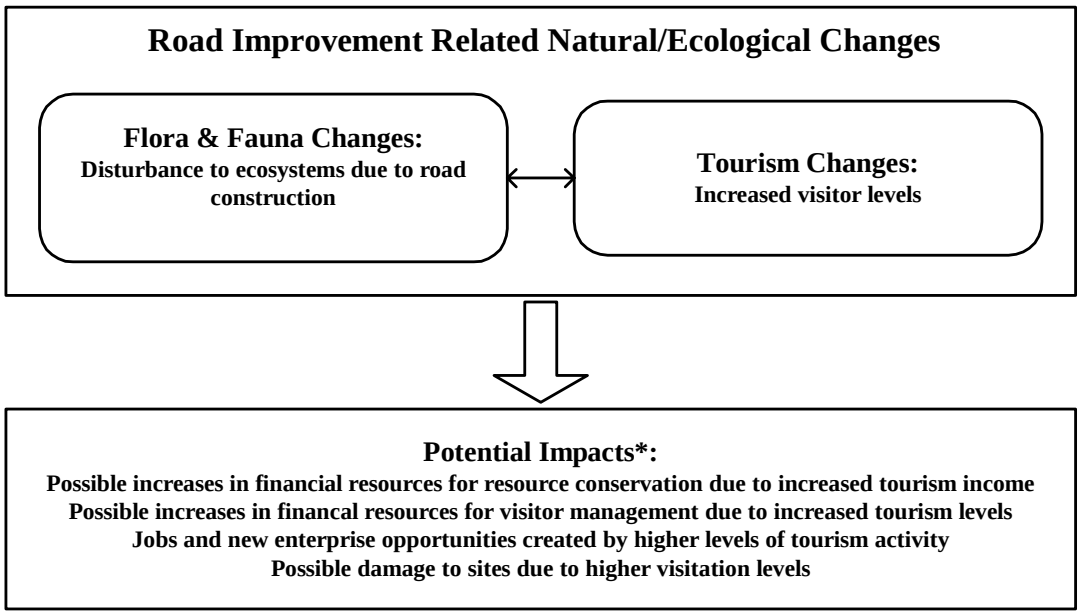

Figure 13: Road 16A Natural/Ecological Changes and Impacts

Given the proposed road construction and improvement activities there are minimal overall natural/ecological impacts. Bridge construction could create negative impacts to the environmental if improperly planned.

4.4 OVERALL PHYSICAL ENVIRONMENTAL CHANGES AND IMPACTS

The overall physical environment changes and impacts of the proposed Road 16A are presented in Figure 14.

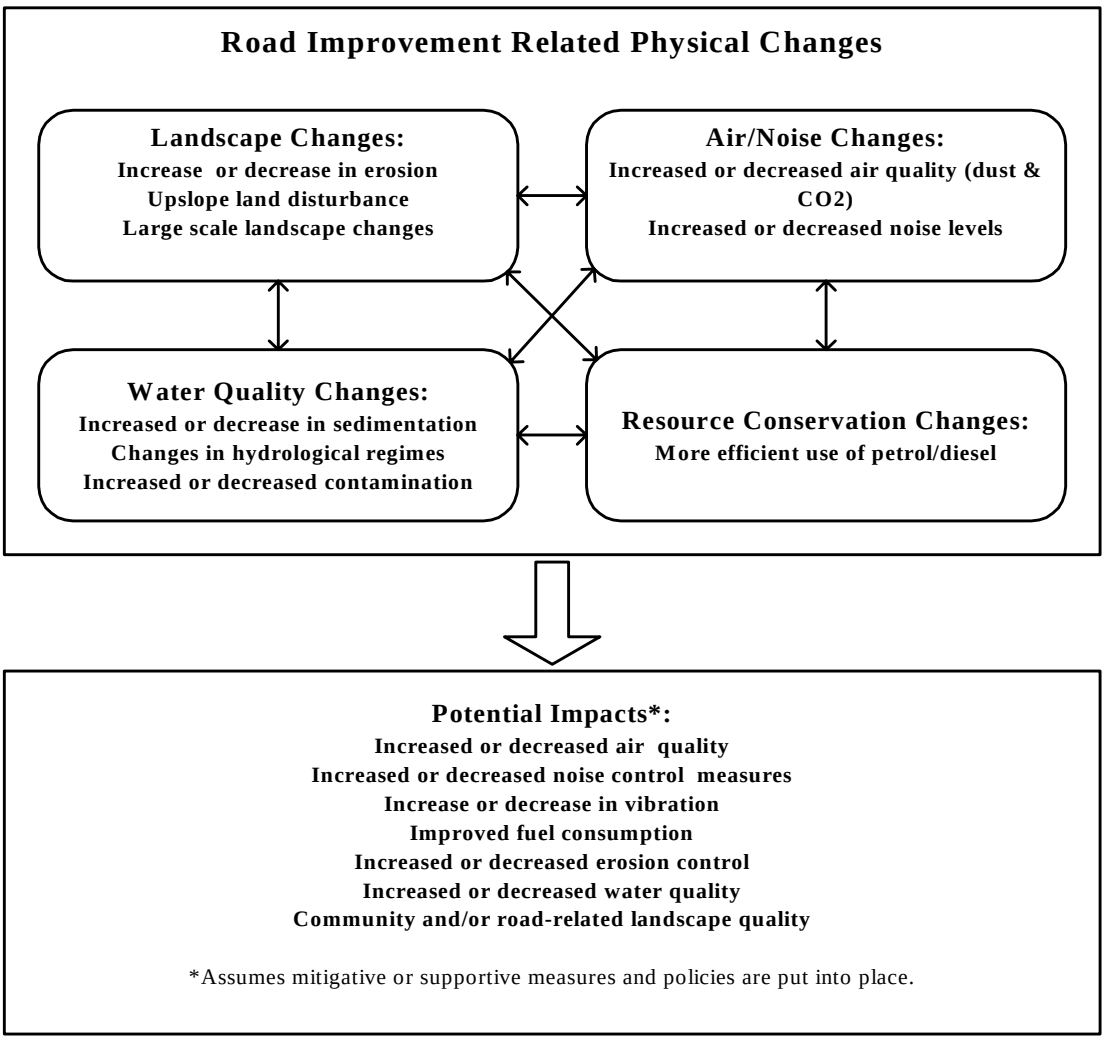

Figure 14: Overall Physical Environmental Changes and Impacts

5. ASSESSMENT OF THE IMPACTS OF THE PROPOSED CHANGES TO ROAD 16A

In previous chapters of this report the nature of the existing environment and the design proposals have been put forward. In this chapter the nature of the impacts will be explored given the existing environmental conditions and the engineering and design plans that have been developed by the engineering team.

Impacts are assessed from the perspective of the pre construction, construction and operational stages.

5.1 IMPACTS DURING PRE CONSTRUCTION

5.1.1 Land Acquisition

There will be a need to acquire some land at road section 2. This matter has been discussed with the provincial governor as well as MCTPC and there are no problems foreseen in acquiring the necessary land.

5.1.2 Resettlement

There is a possibility of small-scale relocation at road section 2. The number of affected families will be determined once more detailed designs are in place.

The government declared a 50 meter right-of-way on all national roads in the early 1990s. When the residents were questioned during the Urban Research Institute's survey there was general awareness of these provisions and most people that were interviewed viewed some moving as a cost of obtaining the advantages related to an improved road. The respondents indicated they would willingly relocate their structures outside of the right-of-way with their own resources before project construction commences.

Relocations will generally be less than 50 meters and can be managed at the village level. While compensation is not payable under Lao law, budgetary provisions should be made to assist households that experience hardship as a consequence of relocation.

5.2 IMPACTS DURING CONSTRUCTION AND OPERATION

During the construction process there will be impacts on the surrounding communities particularly if proper procedures and regulations are not put into place. The object of the construction process must be to minimize unnecessary impacts on the surrounding populations. Providing adequate information about activities will be seen as an important element of dealing with the impacts of the construction work.

As noted earlier there are two sections of new construction along Route 16A. The first is through Section 2 where in one location ***(approximately 8.4 km)*** there is a significant intervention that is necessary in order to accommodate access to a bridge that must be constructed.

In section 3 there are significant physical disturbances**.** There is no doubt that the disturbances in road section 3 constitute a significant physical impact given the fact that in this section 30% of the physical environment will be disturbed. In some cases

the physical disturbance is of significance. Since there is not information available that documents the ecological systems nor the plant ecology in these locations it is impossible to gauge the impact of the planned improvements. It is important to note that this area is not included in any of the national inventories nor is it a nationally protected area.

There is an impact on the visual environment. Given the level of disturbance the character of the environment will be seriously altered in some instances.

While it would be preferable not to subject the environment to this level of intervention there are a series of imperatives that drive the design process. The first and most important is that after an exhaustive study of all of the roads in southern Lao PDR this route has been chosen along with 14A(i) as having the highest level of priority for development given economic and social development purposes. While the standard for national roads is designed to accommodate speeds of 80 Kph the design speed of this section through the Bolaven Plateau has been reduced to 40 Kph in order to protect the natural environment. However, even given a 50% reduction in speed there are still requirements to undertake the construction work as outlined in order to provide for the necessary performance and safety requirements.

5.2.1 Physical Environmental Impacts

Air

Dust will be a nuisance created by the construction activities to a greater or lesser extent and will affect air quality. During the operational period depending on local conditions there may be some increased levels of pollution from vehicles.

Noise

Construction activity could cause disturbances to nearby properties but they will be minor and short term in duration. There could be a possibility of increasing noise level during the operational period if the traffic is not effectively controlled and road is not well maintained.

Contamination of Water from Construction Waste

If proper controls and procedures are not put into place there may be negative impacts on surface water quality during construction caused by runoff from material storage areas, emissions from machinery, and domestic sewage from the construction workers.

Soil

There are one new and five existing borrow pits being proposed for this project. Soil erosion could be a problem from the location of quarries and borrow pits and earthwork related activities. In the mountainous area soil conditions will be affected through cut and fill operations. Erosion and earth slippage could be a problem if careful and immediate revegetation and slope stabilization measures are not instituted.

Traffic Disturbance

Traffic disturbance will occur during the construction process due to transporting of construction materials. Traffic control by local authorities and the contractor will be essential in order to minimize the impact of construction activities to the local people.

Visual Effects
Visual impacts including road cuts, oil disposal and poorly managed borrow pits are potential impacts of the road construction process unless proper management techniques are used. The visual impacts of the road improvement works will be minor in most cases.

On several recently completed road improvement projects laterite borrows have left unsightly scars on the roadside landscape that must be avoided in this projects.

5.2.2 Ecological Impacts

Loss or Damage of Ecological Resources
Construction activities will result in the removal of trees for widening the existing road and all care must be taken to reduce this removal. It is also possible that the setting up of temporary construction sites can have the impacts on the existing environment.

Impacts on Aquatic Environments
The construction process of proposed bridges, piers and their locations could have negative impacts on the migratory patterns of the fish and aquatic ecosystems.

Impacts from Hazardous Spill
There is a possibility of ecological impacts during the transportation of hazardous materials that an accidental spill may occur. Special care and control measures must be put in place to deal with these occurrences.

Increased funds for natural resource conservation
One of the important possible positive impacts of increased visitation from future tourism development in the mountainous area will be that there will be more money made available for conservation and interpretation efforts.

5.2.3 Cultural Resources Impacts

The improvement of work in sections 1 4 will not have any impact on the physical environment. However, in sections 2 and 3 there will be physical disturbances. The Ministry of Information and Culture is not aware of any sites of cultural resource significance. Without a process of archeological investigation it is therefore not possible to identify any potential negative cultural impacts.

5.2.4 Quality of Life and Conditions of Local Girls and Women

It is anticipated that the road improvement project will improve the quality of life of girls and women by providing better access to schools, health care centers and government services. However, in order to ensure that the conditions of girls and women are improved after the completion of the project, the government will need to provide supporting programs in the areas of health, education and economic development

There is always the threat of sexually transmitted diseases from temporary workers and new comers and it will be necessary to ensure that both awareness programs and preventive measures are made available.

5.2.5 Encouraging Economic Development

As previously discussed if properly managed the construction process can help to create job opportunities for local people during the construction process.

There are encouraging signs that opportunities for agro-tourism related to the coffee plantations will be facilitated by the construction and improvement of Road 16A. As will be argued in the environmental management plan it will be important that economic development assistance be provided to ensure the success of the economic development initiatives.

In all discussions with stakeholders as well as the communities there is a recognition that the increased access will provide for higher levels of tourists to the region. There have been no studies carried out to look at the actual tourism potential of the area and the scale of tourism that could be anticipated. There are clearly the necessary natural resources but whether the market exists and how these markets can be exploited must be further determined.

The increased access to Se Katam Tok Waterfall will provide an opportunity for ecotourism development that should bring additional visitors who will provide the potential for increased economic opportunities for people. It must also be recognized that this increased tourism activity if not properly managed and planned for can have significant negative impacts and more importantly little positive impacts for the local people.

5.2.6 Health Impacts

The present lack of all weather access limits the opportunities for all residents to access health services. With the introduction of an all weather road there will be increased opportunities to access existing health services. As will be discussed in the environmental management plan there must be a conscious effort made to ensure that the increased access is matched with other initiatives in order to assure a higher quality of health throughout the area of the road.

The main health risks during the construction stage may arise from the introduction of AIDS, sexually transmitted or other diseases by immigrant workers.

Large trucks transporting raw materials during the construction period must be seen as an important safety issue for the residents. There is also the possibility of transporting hazardous materials along this road in the future. With an inadequate accidental spill management plan, spills of hazardous materials could be seen as a major problem to local people.

The UXO hazard is seen as a risk on socio-economic activities and quality of life of local communities as well as during the construction process.

5.2.7 Improving Access to Educational Services

As reported in the socio-economic survey the lack of an all weather road is one of the reasons why children do not attend school on a regular basis especially during the rainy season. The improved road will improve access to schools with shorter travel times required which should encourage children to go to school thereby raising education levels in the future. It is recognized that other measures as well as societal

attitudes will form an important part of ensuring that the road construction meets its educational goals.

5.2.8 Better Access to Government Services

Better road conditions will increase opportunities to access government services. This is particular important since in the survey process people indicated that this was one of highest uses they made of the existing road.

5.2.9 Cultural Impacts on Minorities

From the available evidence there does not appear to be any serious negative impacts on the ethnic minorities. Changes should be documented and assessed in order to avoid negative impacts.

In-migration facilitated by the improved road can have undesirable consequences when the influx of newcomers leads to possible displacement of groups or individuals who do not have formal ownership papers for the land they occupy.

5.2.10 Lack of Access for Local People in the New Settlement in Section 2 to the New Road

With the proposed shortcut route people living on the existing road will not benefit from the improved road conditions. Some of these people may already be moving to the new settlement, which is presently being built on the existing road and it is important that this new community be connected to the new road alignment.

5.3 SUMMARY

The improvement of Road 16A project will have some significant negative impacts and will bring significant positive social, economic and cultural impacts if the proposed mitigative measures and environmental management plans are implemented.

It will only be possible to evaluate the real success of the road over a period of time. Clearly good management will help to ensure success in terms of raising the quality of life of the residents. All possible steps have been taken through careful design and planning to ensure that the impacts on cultural, ecological and physical environments are minimized. It is clear that unless the construction process is carefully directed there could be negative impacts.

It is important to remember that the road is simply a way of facilitating social, cultural and economic development and that government programs and the community participation will be essential in making this happen.

6. ENVIRONMENTAL MANAGEMENT PLAN: PLAN, POLICIES & REGULATIONS

As has been discussed earlier there are a significant number of positive impacts that will be made possible by the road improvements. The environmental management plan discussed in this and the following chapter is designed to minimize the negative impacts and to ensure that the full benefits of the road will be realized in order to increase the quality of life of the residents.

The environmental management plan is divided into two parts.

- Plan, Policies and Regulations in this chapter
- Monitoring and Remediation Plan in Chapter 7.

According to the Regulation on Environment Assessment in the Lao PDR prepared by STEA 2002, an environment management plan must contain:

- Protective or reductive measures for environmental impacts.
- Compensation measures (if any).
- Institutional arrangements, timing and budgets for implementation of EMP.
- An environmental monitoring program.
- Community preparation including dissemination of information about the Project prior to work commencing.

The IEE for Road 16A has been developed to incorporate these factors.

The nature of the environmental management planning process can be seen in Figure 15.

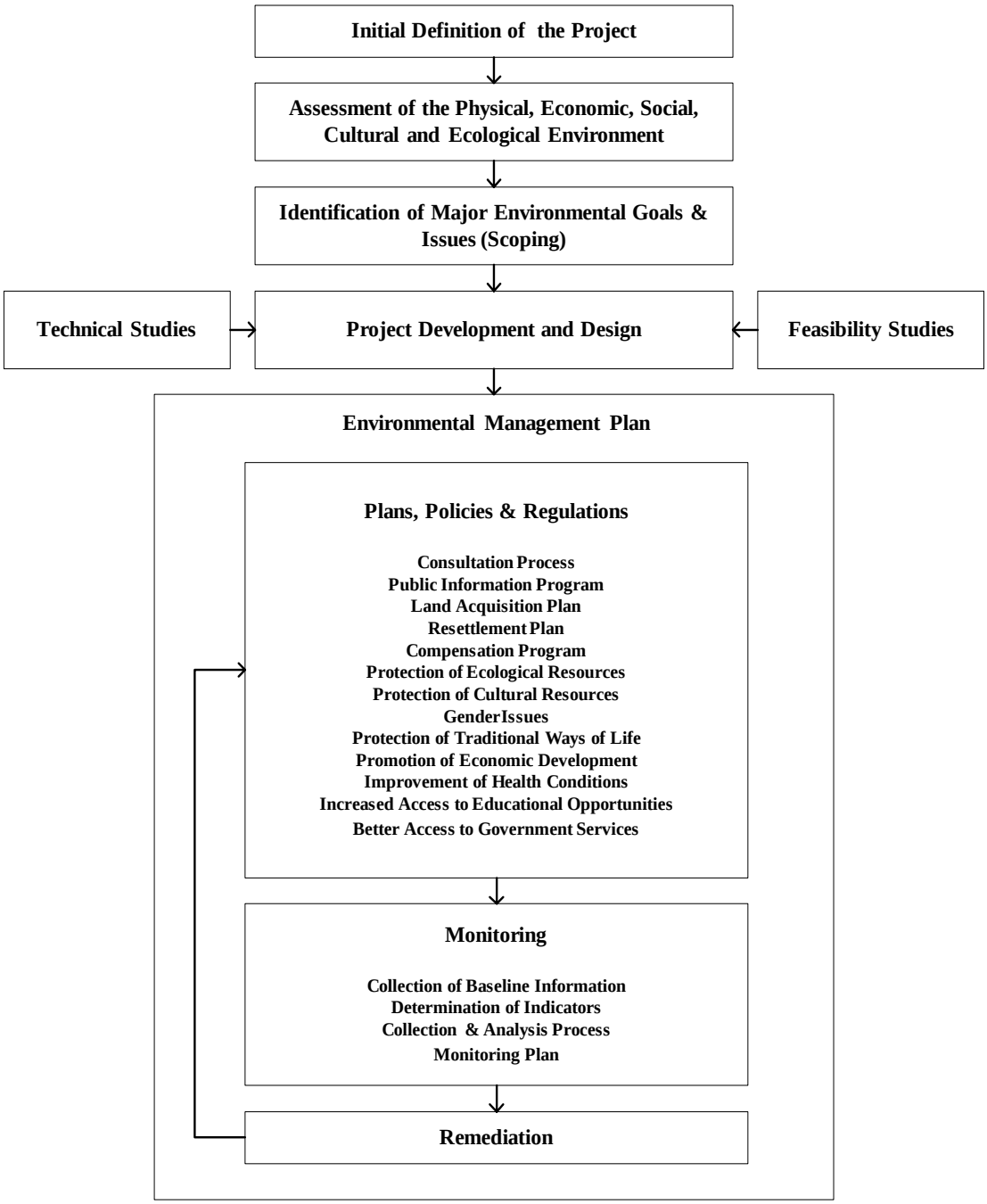

Figure 15: Environmental Assessment Process

6.1 PLANS, POLICIES & REGULATIONS

This environmental management plan is designed to deal with the potential negative impacts identified in the assessment process and to maximize the benefits from the positive results of the road construction and operation. It is assumed that the plans, policies and regulations suggested in this IEE are implemented and monitored in order to ensure that the road has the desired beneficial impact and does not negatively affect any of the important environmental dimensions discussed earlier.

As will be seen the implementation of the plans and policies depends on the participation and cooperation of various government ministries and agencies. It is clear that the Department of Roads, MCTPC, neither has the resources nor the expertise to ensure that the full benefits of the construction are achieved and that the negative dimensions are dealt with as part of the design, construction and operational phases. The implementation of the plans and policies and the necessary monitoring must be done in a cooperative matter with MCTPC playing an essential coordinating and integrative role.

6.2 PRE CONSTRUCTION

6.2.1 Resident Consultation and Participation

In order to ensure that the road construction meets the needs of local people and does not negatively impact their existing social and economic conditions it is essential that there be an ongoing process of discussion and information sharing with local residents. This must range from major issues such as compensation and resettlement to more localized problems such as ensuring that the road does not directly negatively impact individual families. Given the changing nature of community needs it is essential that during the construction process that this consultation process be undertaken in a comprehensive matter. This will require that staff from the Department of Roads as well as other ministries and departments be involved in the process. It will also will be important that staff from these departments and ministries be trained in order to be able to effectively deal with the feedback and that a forum be provided for the local residents to voice their concerns.

It is also equally important however to consider that the road serves national, provincial and district needs and that there will be instances where decisions must be made that may not be in complete accordance with the views and perspectives of local people. In these instances it is vitally important that solutions be sought to that provide for the minimum of negative impacts.

During the construction phase it is essential that residents be kept informed of activities and that they be alerted to any of the potential negative impacts that may come from temporary construction activity. Contact points in various villages along the road will be established where village heads/and or local people can communicate their concerns directly.

6.2.2 Public Information Program

The project will ensure that public information program is put in place. Local people will receive relevant information regularly during both pre construction and construction period. Information disseminated to local people will be in an easy understandable format using various media such as a poster, radio, public hearing and local officials. Necessary information should include the following:

- A clear description of the negative and positive impacts that will occur during construction period.
- The development and implementation of transparent compensation procedures.
- Information on plans and a timetable that is updated on a regular basis.
- Information and consultation with local people on activities which could disturb their daily life. This would be particularly true of activities such as blasting or transporting hazardous materials used in the plant
- Making people aware of the traffic control measures.

- Providing residents with the results of the ongoing monitoring process.

6.2.3 Land Acquisition Plan

Before construction begins a land acquisition plan must be in place and implemented.

6.2.4 Resettlement Plan

While there is no large-scale resettlement that will occur in the project there will be instances where some small-scale moving may be required. There may be some voluntary resettlement that will occur and which is discussed in section 6.3. In whatever resettlement does occur in this important that MCTPC ensure that quality of life of the families affected by the project implementation is not in anyway diminished. In other words as a result of resettlement those directly impacted must be at least as well-off as they were prior to the resettlement process.

The MCTPC resettlement plan should place an emphasis on public participation and must include a clear articulation of resettlement policies and principles of compensation for affected families. A monitoring program must also be established to ensure that the resettlement plan is implemented within the timeline provided for in the plan and to ensure that the affected villagers are satisfied with the compensation process.

6.2.5 Compensation

There are a number of possible impacts on the local people that must be considered in the compensation process. In some cases the impacts may be relatively insignificant such as the loss of a tree or the need to move a house back by several meters in order to accommodate the improvement of the road. Compensation for affected people could be in kind (extra land or materials) or in cash for losses sustained.

6.3 CONSTRUCTION AND OPERATION

Based on nature of the possible impacts identified in Chapter 5 these regulations and guidelines are designed to avoid negative impacts and to ensure the positive impacts to the local communities. It is assumed that international standards and practices are adopted in construction operations.

6.3.1 Physical Environmental Design/Engineering Criteria

The MCTPC will ensure that contractors follow regulations and guidelines to minimize/avoid any pollution from construction and operation activities on environment. In order to ensure that the regulations and guidelines are followed a monitoring program must be put in place.

<u>Air</u>

Contractors will be required to follow the below guidelines in order to prevent dust pollution during construction period.

- Water will be sprayed on the construction sites and major feeder roads twice a day during dry season.
- All vehicles delivering granular or fine materials to the site are to be covered to avoid spillage.

- Brick, asphalt and concrete plants will be operated within the terms of government pollution control legislation, and located as far away from settlements as is possible.
- All vehicles used for construction must be regularly and well maintained.
- The emission level from equipment and vehicles must comply with national emission standards.
- Plants and equipment shall be well maintained using dust collectors whenever this is necessary.
- Roads used by contractor to transport materials are to be kept clean and clear of all dust and mud.

To control an increase of air pollution level from vehicles during operational stage in the future the MCTPC will have to maintain roadside tree plantations.

Noise

Contractors will be required to follow the below guidelines in order to prevent noise pollution during the construction period.

- All construction equipment should have well-maintained muffler systems and be operated within design limits.
- Limit on nighttime work in populated area
- Special noise generators such as mobile crushing and mixing facilities should be located at least 2 km. from the nearest community.
- Noise levels from construction activities must comply with the national standard.

During the operational period overloaded vehicles on highway should be prohibited in order to avoid excessive noise levels from vehicles. Roadside planting using densely leafed shrubs and trees should be provided in order to allow for noise attenuation where this becomes necessary based on the monitoring process.

Water

All measures will be taken to prevent the wastewater produced in construction from entering directly into watercourses. Contractors will be required to follow the below guidelines in order to avoid any pollution to watercourses from worker camps and construction activities.

- Chemicals and oil will be stored in secure and impermeable compounds well away from surface water.
- Construction camps will be equipped with sanitary latrines that do not pollute surface water.
- Discharge of sediment-laden construction water into surface water will be forbidden. Such water will be discharged into settling tanks and treated prior to final discharge.
- Construction work close to the water bodies shall be avoided during heavy rain periods.
- Discharge standards shall be strictly adhered to by the contractors.

During the operational phase these preventive measures must be incorporated into the design and implementation dealing with runoff be maintained in order that this runoff does not flow directly into watercourses. Proper maintenance must be implemented

that allows runoff to flow over grassed or pervious areas in order to permit the settling of fine materials, retention of oily matter and a reduction in volume and rate of flow.

Soil

Prior to beginning the basic and detailed design stages there must be a complete survey undertaken of the affected areas in road section 2 and in road section 3. A skilled plant ecologist should be employed to carry out the survey in order to determine areas of ecological significance and sensitivity.

During the construction process the excavation work that will be necessary in the mountainous region of the Bolaven Plateau must be carefully monitored. Excavation work on the steep slopes will not occur during the rainy season in order to avoid the possibility of serious erosion from earthwork activities.

Earthwork operations should be strictly managed by the contractors as per design requirements. Material generated from excavation will be removed to areas approved by the MCTPC and Department of Forestry and under no circumstances will be dumped in adjacent locations. The contractor shall ensure that the method of stock pilling materials, use of plant and siting or structure of temporary buildings or structure do not adversely affect the stability of excavation or fills.

Prior to using borrow pits, the MCTPC will ensure that the contractor prepares a plan, which includes details of excavation, materials processing, handling, means of transporting modes and defines how environmental impacts from these activities will be mitigated. All borrow areas must be inspected by the MCTPC.

On road embankment slopes, slopes of all cuts, etc., shrubs and grass will be planted. On sections with high fill and deep cutting in the mountainous area the side slopes will be graded and covered with bush and grass, etc.

Management of Traffic

Local authorities will control traffic to avoid traffic disturbance during the construction period. The contractor shall provide safe and convenient passage for vehicles, pedestrians and livestock. It is necessary for contractors to provide information on construction program and transport schedules to the local people.

Minimizing Negative Visual Impacts

Rehabilitation and re-vegetation of borrow pits must be carried out in order to avoid visual impacts to the surrounding areas. Retaining walls to stabilize the slopes must be carefully designed in order to respect the special scenic value of this particular environment. It is essential that the design be carried out in such a way as to complement the quality of the environment and that standard construction techniques may not be appropriate in this important natural environment.

6.3.2 Protection of Ecological Resources

Minimizing loss or damage on ecological resources

It is assumed that the design for the route through the mountainous area of the Bolaven Plateau will have adopted the necessary environmental controls and standards suggested by the environmental consultant. During the construction phase the Ministry will ensure that the contractors adopt the following guidelines:

- Restrict road improvement activities within the road easement designated by the road design strategies.
- As identified in the design strategies maintain forest cover as closely to the edge as possible on either side of the road. Excessive stripping should be avoided.
- Construction workers should be instructed to preserve natural resources and not to use firewood from local forest.
- Construction workers will not be able to enter into the area outside of the designated zone without the permission of Ministry of Forestry.

Since there will have to be the removal of certain vegetation species during the construction process budgets will be allocated to replace the vegetation either with the existing plant materials or with similar species. It would not be acceptable to lose the vegetation that helps to form the basis of this important scenic resource. This will require that specialists (preferably plant ecologists) be involved in the removal process and replanting in order to ensure that as much as possible of the original character is maintained.

Protection of Aquatic Environments

Before any road construction takes place a careful inventory must be carried of the fish species in the major watercourses identified by the Ministry of Agriculture and Forestry. There is no doubt that the construction process could have negative impacts on the aquatic ecosystems if there is little or no knowledge about the significance, behavior and sensitivity of the fish stocks. Based on this inventory construction schedules must be adjusted in order that there are no significant negative impacts on the migratory patterns of the fish. This may require that at certain times of the year that the flow of the river not be impeded and that all possible measures be taken to ensure that the normal migratory patterns can occur. It also must be assured that the placement and size of piers does not in any way alter the ecosystems that have been identified as being of significance by the Ministry of Agriculture and Forestry.

It is also important that the means of dealing with drainage be carefully considered in order to ensure that the water reaching the rivers do not contain contaminants either from the construction or operational process. Water must be carefully tested in order to ensure that the ecological systems are not being upset due to construction or operation activities. Since baseline information has already been obtained during the IEE process the testing process could use this information as the basis to assess differences in water quality over a period of time.

Protection Against Hazardous Spills

During the operational period there is the possibility of spills of hazardous materials which could affect nearby ecological resources. The MCTPC will ensure that the delivery of hazardous substances will require a permit license. Road safety programs and a spill contingency and emergency plan for hazardous and toxic materials will be put into place.

Allocation of Funds for Environmental Conservation

It should be recognized by the relevant authorities that in order to cope with increased visitor numbers and to improve the quality of ecological resources that additional funding for conservation will be required. Allocation of additional funds will be

necessary in order to ensure that resources are well managed and controlled; do not exceed carrying capacities, thereby avoiding future negative impacts due to the high visitation levels.

6.3.3 Protection of Cultural Resources

Given that there is no awareness of the specific location of any cultural resources of significance an archeological field survey must be undertaken prior to the basic and detailed design stages to investigate the possible location of cultural resources. The results of this investigation will then be incorporated into the design process.

During the construction phase the following steps of must be taken:

- In the construction documents the contractor must be alerted to the possibility of uncovering specific cultural artifacts and the need to treat these artifacts with care and attention.
- The contractor and his senior staff must be trained to recognize artifacts of value. All supervisors must be provided with photographs illustrating examples of artifacts.
- There must be specific requirements that when artifacts are uncovered that all work ceases and that the provincial staff of the Department of Information and Culture be immediately alerted in order to allow them to assess the significance of the discovery. It is understood that representatives of the Department of Information and Culture will respond in a timely fashion.
- If cultural sites of significance are uncovered there must be immediate notification to the MCTPC of the discovery and a determination of what actions will be taken by the Ministry of Information and Culture. If extensive investigation is to occur there must be contingency funds set aside to compensate the contractor for time lost.
- There must be ongoing monitoring of all construction work in order to ensure compliance to the requirements outlined above.

6.3.4 Improvement in the Quality of Life and Conditions of Women

It is important that the various health, education and economic development initiatives be designed to ensure an improvement in the quality of life of women and young girls.

<u>Baseline Information</u>

Baseline information has to be established to determine the conditions of women prior to construction. This information will allow the monitoring process to determine whether the conditions of women have actually improved due to the investment in road construction.

<u>Technical Assistance</u>

It is equally important that the women themselves be assisted in dealing with the new opportunities facing them as well as the adverse effects that may come about from the construction and operation of the road. Specific initiatives should be taken to help form women's cooperatives or to design economic development programs that will specifically assist women in taking advantage of the improved access made possible by the new road.

Gender Sensitive Project Orientation

It will be understood that all programs are gender sensitive and inclusive. Gender is seen as a crosscutting theme that must affect all dimensions of the initiatives suggested in this environmental management plan. All officials responsible for the implementation of rules, plans and regulations must be sensitive to the special concerns and needs of women. Staff should be trained in gender sensitive planning and implementation concerns.

6.3.5 Promotion of Economic Development and Poverty Reduction

One of the national and therefore project goals is to increase income opportunities for local communities thereby helping to reduce poverty. During construction the project could provide opportunities for local people to increase their incomes largely through encouraging the employment of local labor for employment or contracting out various activities such as for replanting trees to local communities and groups.

Baseline Information

Baseline information has to be established to determine income and employment levels. This information will allow the monitoring process to determine whether economic development and poverty reduction are working.

Technical and Financial Assistance

Once the improved road is an operation there will be opportunities for increased access to markets for agricultural, handicraft and other local products. In order to ensure that these opportunities are achieved it is essential that the government provides support and technical assistance to the communities such as the following initiatives:

- Conducting market research studies to make local people and officials aware of agricultural and handicraft market opportunities.
- Providing access to small loans for establishing small businesses.
- Development of policies that give priority to local people for business development opportunities.

Current policies of the Ministry of Industry and Handicrafts are clearly working in this direction and should be implemented in the subject area.

Tourism Development

The possibility of agro-tourism and eco-tourism development along the road was mentioned on several occasions by both local people and officials. In fact there is already an agreement being signed on an agro tourism project on one of the coffee plantations. A tourism destination management plan must be developed that includes product development, marketing, organizational and management concerns as well as operational dimensions.

If such a plan is not developed and implemented tourism benefits that could accrue from the construction of the road will not be achieved. The levels of tourism and the levels of satisfaction of the tourists and tour operators must be constantly monitored in order to ensure that the necessary mitigation measures can be put into place. Site operators must develop a visitor management plan and monitor its success and failures in order to protect the resource while at the same time enhancing the visitor experience.

How to involve the community in the development of the tourism infrastructure must be the object of collaborative activity amongst several government ministries and other interest groups. Local people will require reliable market information on numbers and types of tourists and when they will travel to the site, entrepreneurs will require information on how to establish tourism businesses, some will require access to reasonable credit and there will be a distinct need for technical advice as tourism businesses are established. Care must be taken that local people are given first preference in establishing businesses. Gender sensitive development initiatives must be initiated in order to ensure that the women in the community have an opportunity to share in the potential economic benefits of tourism.

Tourism Related AIDS Prevention

The must also be caution exercised to protect the community from the negative impacts of tourism. Residents must be prepared for increased tourism levels and encouraged to maintain their lifestyles and traditions when this is desired. Care must be taken to implement AIDS and sexually transmitted disease awareness and treatment programs.

6.3.6 Promotion of Improved Health Conditions

One of the possible impacts of an improved road is increased access to health services. An all weather surface will ensure that everyone has the possibility of reaching the necessary health facilities which is not the case within the present road conditions. However it is recognized that there are several other issues influencing increased health conditions. Issues of ability to travel to the necessary health facilities, cost of treatments and the language of the health workers are all seen as important ingredients in improving health conditions. It is essential that the Ministry of Health mobilize the necessary resources in order to ensure that the increased road access is matched with improvements in program delivery.

Baseline Information

Baseline information has to be established to determine financial and time costs for both residents at the beginning of the road construction process. This information will allow the monitoring process to determine whether health conditions have actually improved due to the investment in road construction.

Site Safety Measures

The following site safety measures during construction period must be implemented.

- Contractors will be required to submit and obtain approval for health and safety plans prior to commencement of work.
- Carefully siting (isolated from local communities) and approved plans and designs for construction and management work camps will be required in order to minimize impacts.
- Safety markings will be set up on temporary road.
- Effective safety measures should be taken during blasting and no blasting occurs during busy hours.
- Plans for carrying out post construction site clean-ups will be required.
- Adequate drainage should be provided throughout the camps to ensure that stagnant water bodies and puddles do not form.

AIDS and STD Prevention and Treatment

Programs must be instituted that ensure that everyone in the area of the road be sufficiently alerted to the problems associated with AIDS and STD. In addition, there must be programs in place that help provide assistance in the form of treatments in the case of contracting a sexually transmitted disease and in obtaining birth control assistance.

The program must be funded and will have the following dimensions:

- Strengthening the capacity of provincial AIDS officers
- Services to cure sexually transmitted infection
- Increasing education/public awareness on HIV and AIDS
- Social marketing of condoms

Hazardous Spills

During the operational period there is a possibility of spills of hazardous materials, which could harm the quality of life of local communities. The MCTPC will ensure that the delivery of hazardous substances will require a permit license. Road safety programs and a spill contingency and emergency plan for hazardous and toxic materials will be put in place.

UXO

To avoid any impacts from UXO all necessary measures must be taken to clear the construction areas of unexploded ordinances.

6.3.7 Increased Access to Educational Opportunities

One of the major complaints about present road conditions is that it is very difficult or at times impossible for children to travel to school during the rainy season. The improved road will certainly provide for an all weather surface thereby facilitating travel. As in the case of health there are a number of other essential ingredients to increasing access to educational opportunities. Issues such as cost, the need to employ children in agricultural activities and the perceived benefits of education must be addressed. The Ministry of Education must work to ensure that the constraints that presently exist are minimized in order to take advantage of the increased access provided by the improved road.

Baseline Information

Baseline information has to be established to determine educational levels of residents at the beginning of the road construction process. This information will allow the monitoring process to accurately measure the impact of the road on educational issues.

6.3.8 Better Access to Government Services

The improved road will very much facilitate the movement of residents to various government offices. There are clearly constraints to accessing offices having to do with levels of mobility.

Baseline Information

Collecting baseline information will allow for an assessment of whether there actually has been increased access to government services given the new road.

6.3.9 Protection of Traditional Ways of Life

In order to ensure that traditional ways of life are protected the project should fund studies asking communities to identify and assess government offices what is socially and culturally important for them to protect and then use this information as baseline data in ongoing monitoring. Government officials will then work with communities to evaluate if the changes occurring in the communities meet with community expectations and standards. In the case of unexpected negative changes communities will be helped in developing strategies for countering these negative impacts.

6.3.10 Access for People on the Old Road Section

Due to the proposed shortcut in section 2 people who are left behind should be provided with the opportunity to move to either the newly constructed road or someone else on Route 16A. A public consultation process must be put into place to ensure that all interests are served.

It is essential that an all weather link be provided for the new focal point community to the new road. This link does not necessarily have to be built to national road standards but must provide for all weather access.

7. ENVIRONMENTAL MANAGEMENT PLAN: MONITORING AND REMEDIATION

7.1 MONITORING PLAN

Article 15 of the Regulation on Environment Assessment in the Lao PDR of the Science Technology and Environment Agency specifies that the project owner is directly responsible for the monitoring and evaluation of the project environment during the implementation of the EMP. Reports on project environmental monitoring must be produced monthly and sent to the concerned agencies, which are STEA, Provincial, Municipal or Special Zone Science and the Environment Management and Monitoring Units of the concerned line ministries for information and supervision. The general outline for environmental monitoring reports developed by STEA can be found in Appendix 2.

7.1.1 Collection of Baseline Information

It is not certain when the road construction will actually begin. Given the shifting nature of the population and other conditions in the region of the road it is recommended that just prior to the construction process beginning that a complete baseline study be undertaken to collect the necessary data on the indicators that have been identified by the various stakeholders. In some cases this baseline information can be collected by the various ministries and departments while in other cases consultants may have to be hired in order to collect this information in a reliable and professional manner. It is important to ensure that the information collected is accurate since it will form the basis for the monitoring process. Funding should be available by the road construction program to collect this information.

7.1.2 The Determination of Indicators

The indicators that have been identified are chosen to accomplish the objective of measuring the negative and positive impacts of the road construction as well as being feasible in terms of their collection and analysis. It must be recognized that there are resource and capacity constraints that will very much affect the ability of the various government ministries and departments to collect information. It is important that the indicators be seen as helping to understand overall impacts and not be seen as only considering one portion of a particular environmental issue. For example the number of children attending school will be important to be aware of but also this figure will be seen as an indicator of the overall success of the road in helping to encourage higher levels of enrollments in schools. It is important that the indicators be seriously considered and that may be amended if this is seen as desirable once the monitoring process takes place.

7.1.3 Collection & Analysis Process

As has been mentioned there are clear resources capacity constraints within the present government system as it relates to monitoring. Therefore if the monitoring program is to be successful financial resources must be allocated to the process and the capacities of the various actors must be developed. It is recommended that the overall funds allocated to the road construction incorporate financial resources for the monitoring process. The monitoring program that is presented identifies financial and capacity issues and it is seen that these considerations are essential in ensuring a successful assessment of the impact of the road from the perspective of the many

dimensions considered in this IEE. Figure 16 illustrates the monitoring and remediation process.

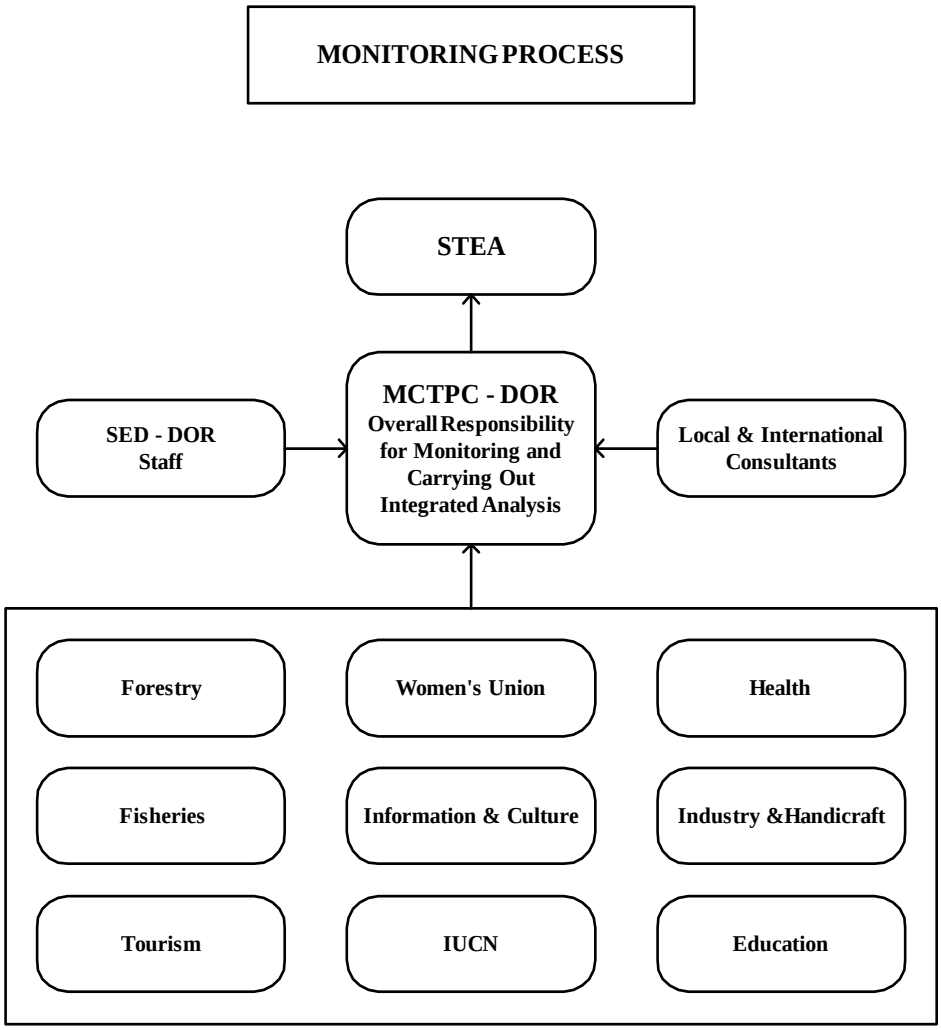

Figure 16: Monitoring Process

The analysis process must be seen as more than one that collects the information and reports it. The various government departments and ministries must analyze the information in order to better understand the impact of the road. It may be that negative or positive impacts that are occurring are not directly related to the road construction but as a result of advances and programs within the national, provincial and district environment. For example, it may be that an increased enrollment of children in schools could be attributable in large part to the construction of schools and the allocation of funding to subsidize the very poor to attend the schools. There must be caution always exercised that the results of the monitoring process are always carefully analyzed in order to accurately assess the impact of the road construction and operation. This will require capacity building and sophistication in dealing with the data generated by the monitoring process.

The Department of Roads will then be faced with the task of bringing together the various indicators that have been collected and analyzed and reported to STEA as well as the donors about the impact of the road. It is important that the monitoring

process also be seen as a learning exercise where lessons derived from the experience are incorporated into other design and construction activities.

7.1.4 Monitoring Program

Pre Construction

No.	Issues	Monitoring			
		Institutional Responsibility	**Factor(s) to Be Measured**	**Means of Validation**	**Collection & Reporting Time Scale**
6.2.1	Public consultation program during the preconstruction process.	MCTPC	▪ Adherence to consultation program schedules and activities	Assessment of actual activities	Bi-Monthly
6.2.2	Public information program	MCTPC	▪ Adherence to public information program schedules and activities	Assessment of actual activities	Bi-Monthly
6.2.3	Land Acquisition Plan	MCTPC	▪ The quality of life of affected people as measured by income levels and cost of living after the land acquisition plan is put into place	Survey of affected people's conditions according to baseline studies	Bi-Monthly
6.2.4	Resettlement Plan	MCTPC	▪ Quality of life of affected people after resettlement as measured by income levels and cost of living	Survey of affected people's conditions according to baseline studies	Monthly during resettlement process and yearly after completion of the project
6.2.5	Compensation	MCTPC	▪ Whether the terms and conditions of compensation plan are adhered to.	Assessment of actual allocations	Every three months during the compensation process.

Construction

No.	Impacts/Issues	Monitoring			
		Institutional Responsibility	**Factor(s) to be Measured**	**Means of Validation**	**Collection & Reporting Time Scale**
6.3.1	Dust	MCTPC	▪ Dust levels at adjacent buildings	Visual testing at designated sites	Monthly
	Noise pollution	MCTPC	▪ Adherence to designated working hours ▪ Possible testing of noise levels at sensitive locations	Site monitoring Testing by instruments	Monthly
	River water quality at plants & worker camps	MCTPC	▪ Water quality as measured by national standards	Water quality measurement Tests at key sites	Monthly

No.	Impacts/Issues	Monitoring			
		Institutional Responsibility	**Factor(s) to be Measured**	**Means of Validation**	**Collection & Reporting Time Scale**
6.3.1	River water quality at bridge construction sites	MCTPC	▪ Water quality as measured by national standards	Water quality measurement tests at key sites	Monthly
	Erosion	MCTPC Ministry of Agriculture & Forestry	▪ Erosion levels	Site inspections	Every 2 weeks
	Traffic safety	MCTPC Provincial Government	▪ Number of accidents compared to national levels	Statistical survey	Monthly
	Visual impacts	MCTPC	▪ Cleanliness of road and construction areas	Site inspections	Monthly
6.3.2	Loss or damage to forest resources	MCTPC Ministry of Agriculture and Forestry	▪ Unplanned loss of forest resources	Site inspections	Monthly
	Negative changes in health and migratory patterns of fish species	MCTPC Ministry of Agriculture and Forestry	▪ Changes in migration patterns and fish yields	Studies based on baseline studies at key sites	Monthly
6.3.3	Loss or damage of cultural resources	MCTPC Contractor Ministry of Information and Culture	▪ Condition of cultural relics	Site inspections	Ongoing monitoring and monthly reporting
6.3.5	Economic development	MCTPC	▪ Income levels of local people	Statistical reviews	Bimonthly
6.3.6	AIDS and STD	MCTPC Ministry of Health	▪ AIDS & STD occurrences in residents	Surveys based on baseline studies	Bimonthly

Operation

No.	Impacts/Issues	Monitoring			
		Institutional Responsibility	**Factor(s) to be Measured**	**Means of Validation**	**Collection & Reporting Time Scale**
6.3.1	Air quality	MCTPC	▪ Air quality levels at sensitive areas assessed by national standards	Air quality instrument Measurement at key sites	Yearly
	Noise Pollution	MCTPC	▪ Noise level at school and residential areas assessed by national standards	Noise instrument measurement at key sites	Yearly
	Water quality at river sites	MCTPC	▪ Water quality as measured by national standards	Water quality measurement tests	Yearly

No.	Impacts/Issues	Monitoring			
		Institutional Responsibility	**Factor(s) to be Measured**	**Means of Validation**	**Collection & Reporting Time Scale**
6.3.4	Gender	MCTPC Women' Union	▪ Income levels ▪ Educational levels ▪ Basic health levels	Survey	Yearly
6.3.5	Economic development/poverty reduction	MCTPC	▪ Income levels ▪ Income levels as compared to national levels	Survey based on baseline studies	Yearly
6.3.6	Increase in health conditions	MCTPC Ministry of Health	▪ Basic health levels as measured by WHO ▪ Health levels as compared to national levels	Survey based on baseline studies	Yearly
6.3.7	Increase in educational levels	MCTPC Ministry of Education	▪ School enrollments ▪ School enrollments as compared to national levels	Survey based on baseline studies	Yearly
6.3.8	Increased access to social services	MCTPC Provincial Government	▪ Average travel times and costs ▪ Average travel times and costs compared to national levels	Survey based on baseline studies	Yearly
6.3.9	Cultural impacts on minorities	MCTPC	▪ Changes in traditional ways of life as measured by baseline study	Survey	Yearly
6.3.10	Access of people on old road section 2 (See map 2)	MCTPC	▪ Length of travel times for various activities	Survey based on baseline study	Yearly

7.2 REMEDIATION PROCESS

While it is important to monitor positive and negative impacts for purposes of reporting to various ministries, donor agencies and STEA it must be remembered that monitoring is essentially carried out in order to ensure that any unexpected negative impacts are dealt with. It is also designed to ensure that if the hoped for positive impacts are not occurring that there can be changes implemented to the various plans, programs and approaches. It is vital therefore that the various ministries and departments as well as the Department of Roads use the information generated by the monitoring process to re-examine various dimensions of the environmental management plan as well as the design and construction standards and regulations in order to ensure that the desired impacts are being achieved.

This will require at times a multi-stakeholder approach where various programs may have to be put into place in order to ensure the overall success of the road construction project. An example would be that if the number of children enrolling in schools does not increase that there is a serious examination to determine why. It may be that the reasons have nothing to do with the road but have to do with subsidy programs or public attitudes related to education. If the government is sincere in wanting in raise educational levels and to take advantage of the improved access provided by the road

then that these government programs will have to be altered at times to achieve the hoped for benefits.

8. CONCLUSION

8.1 CAPACITY BUILDING

To effectively prevent the negative impacts and ensure the benefits from the road improvement project, there will be a need for a capacity building program for all levels of government. For government officials varying levels of capacity building in the following areas will be required recognizing the reality that the capacity building will be different for each ministry and agency:

- Overall environmental assessment ideas and procedures.
- Establishing and carrying out a baseline data program.
- Conducting the collection of indicator data.
- Analyzing and reporting the results of this collection process.
- Integrating the data to develop an overall perspective of the road impacts.
- Developing expertise in remediation processes.

The capacity building will in large part be hands-on and it is recommended that there will be a need for significant on the job training as opposed to formal classroom sessions.

8.2 FINDINGS AND RECOMMENDATIONS

The environmental examination for the Project has been thorough and conducted in close consultation with the MCTPC and other relevant stakeholders. Overall environmental impacts are assessed as minor because:

- The project significantly increases the access of residents to markets for their produce.
- Increased access to the Se Katam Tok Waterfall, if properly managed, will generate additional income possibilities for local people.
- Given that the natural/ecological environment is not of national significance there are little or no negative impacts on the ecological system of the area.
- Provisions have been made to mitigate whatever negative impacts through compensation as well as government programs.
- The project has recognized that there are significant benefits than can accrue from the road construction and improvement if mitigation measures and programs are put into place in the help realize the potential of the significant investment that will be provided to improve Road 16A.

The IEE concludes that the overall adverse impacts of the Project will be minor. Careful consideration has been given to Project location, design, construction and operational issues to minimize impacts on environmentally sensitive areas. Compensation procedures and mitigative actions have been identified.

APPENDIX 1: BUDGET FOR ENVIRONMENTAL MANAGEMENT PLAN

BUDGET

Since detailed designs are not complete and political and resource questions must be resolved it is not possible to develop a budget at this stage of writing. Associated costs such factors as transportation, lodging, computer resources etc.

1. Plans, Policies and Regulations

PRE-CONSTRUCTION PHASE		
Plan Preparation and Baseline Studies	**Associated Cost (USD)**	**Time Required**
Resettlement		
Land acquisition		
Compensation		
Public consultation and participation		
Public information program		
Fisheries survey		
Tourism destination plan		
Forestry survey		
UXO survey and removal		
Baseline studies for physical environment (air, noise, water quality and soil)		
Education baseline study		
Health baseline study		
Gender baseline study		
Income baseline studies		
AIDS/STD baseline studies		
Average travel times		
Total		

CONSTRUCTION PHASE		
Mitigation Measures	**Associated Cost (USD)**	**Time Required**
Forestry expert supervising construction		
Traffic control program		
Public information program		
Public awareness program on AIDS and sexually transmitted diseases		

OPERATIONAL PHASE		
Mitigation Measures	**Associated Cost (USD)**	**Time Required**
Road safety program		
Developing a destination management plan for ecotourism and agro-tourism		
Public awareness program on AIDS and sexually transmitted diseases		
Technical assistant in forming women's cooperatives		
Market research studies for agricultural and handicraft market opportunities		
Develop a small loan program for small local businesses		

2. Monitoring Program

Mitigation Measures	Associated Cost (USD)	Time Required
PRE-CONSTRUCTION		
▪ Public consultation program during the preconstruction process.		
▪ Public information program		
▪ Land Acquisition Plan		
▪ Resettlement Plan		
▪ Compensation		
CONSTRUCTION		
▪ Air		
▪ Noise		
▪ Water		
▪ Soil		
▪ Erosion		
▪ Traffic safety		
▪ Visual impacts		
▪ Loss or damage to forest resources		
▪ Negative changes in health and migratory patterns of fish species		
▪ Loss or damage of cultural resources		
▪ Economic development		
▪ AIDS and STD		
OPERATION		
▪ Air quality		
▪ Noise Pollution		
▪ Water quality at river sites		
▪ Gender		
▪ Economic development/poverty reduction		
▪ Increase in health conditions		
▪ Increase in educational levels		
▪ Increased access to social services		
▪ Cultural impacts on minorities		
▪ Access of people on old road section 2 (See map 2)		

APPENDIX 2: GENERAL OUTLINE FOR ENVIRONMENTAL MONITORING REPORT

APPENDIX 3: LIST OF PEOPLE CONTACTED

Government Agencies

Living Aquatic Resources Research Center
- Mr. Xaypladeth Choulamany, Director

Lao Front for National Construction
- Mr. Bounthavee Vilaivong, Department of Ethnic Groups
- Mr. S. Noichansamone Dene Chaleunesouk, Department of Ethnic Groups

Ministry of Agriculture & Forestry, Department of Forestry
- Mr. Phetsamay Vongkhammounty, Director General
- Mr. Khamphone Rasachack, Head of Technical Division

Ministry of Education
- Mr. Ouam Sengchandavong, Deputy Director, Department of Planning & Cooperation

Ministry of Health
- Mr. Khampeth Manivong, Deputy Director General

Ministry of Industry & Handicraft
- Mr. Kham Ouan, Deputy Director General, Department of Handicraft

Ministry of Information and Culture
- Mr. Thongsa Sayavongkhamdy, Director General
- Mr. Bounhom Chanthamat, Deputy Director General
- Mr. Viengkeo Souksavatdy, Head of Division of Archaeological Research

National Committee for Control of AIDS
- Dr. Chansy Phimphachanh

National Tourism Authority of Lao PDR
- Mr. Sounh Manivong, Director, Planning, Cooperation and Marketing Division
- Mr. Khom Douangchantha, Deputy Director, International Relations Division
- Mrs. Phengchanh Phengmunang, Deputy Director, Statistic, Planning, Cooperation & Marketing Division

Science Technology and Environment Agency (STEA)
- Mr. Soukata Vichit, Director General, Department of Environment
- Mr. Xayaveth Vixay, Deputy Director General, Department of Environment
- Mr. Somsanouk Phommakhoth, Director, Environment Management Division
- Mr. Derek Ratcliff, EIA Adviser

Women's Union
- Mr. Phothong Siliphong, Project Advisor, Gender Resources Information and Development Center

International Organizations

Asian Development Bank (ADB)

- Ms. Arouny Sakulku, Senior Project Implementation Officer
- Ms. Rattanatay Luanglatbandith, Senior Economist GMS Liaison Officer
- Dr. James R. Chamberlain, Team Leader, Participatory Poverty Monitoring and Evaluation Project

IUCN

- Ms. Nikhat Sattar, Head of Special Assignments
- Ms. Latsamay Sylavong, Senior Programme Officer
- Mr. Mark Dubois, Assistant Programme Coordinator

SUNV-UNDP

- Mr. Sisaveuy Chanthavisack, SUNV Programme Assistant

UNESCO

- Mr. Richard Engelhardt

WWF Lao Project Office

- Mr. Roland EVE, Country Director

APPENDIX 4: REFERENCES

Environmental Law

Environmental Protection Law
April 3, 1999

Regulation on Environment Assessment in the Lao PDR
Science Technology and Environment Agency (STEA)
2002

Environment

Environmental Guidelines for Reducing the Environmental Effects of Road Projects in Lao PDR
World Bank
1994

Strengthening Social and Environmental Management in Lao PDR
Science, Technology and Environment Agency and, MIH Department of Electricity and MCTPC Department of Roads
ADB TA 3133--LAO
July 2000

Environments in Transition Cambodia, Lao PDR, Thailand, Vietnam
ADB
February 2001

Final Report Environmental Study
JICA
June 2000

Impact Assessment

Environmental Impact Assessment for Developing Countries in Asia
Bindu Lohani et al.
ADB
1997

Guidelines and Principles for Social Impact Assessment
U.S. Department of Commerce, national Oceanic and atmospheric administration and national Marine fisheries service
May 1994

Manual of Environmental Impact Assessment Procedures for Road Projects in Lao PDR

IUCN
1999

Transportation Publications

Subregional Transport Sector Study for the Grea7er Mekong Subregion

ADB
1995

Rural Access Roads Improvement Project

MCTPC
Dept. of Roads

Environmental Impact Assessment Report

Pacific Consultants International
ADB
June 2001

Integrated Rural Accessibility Planning in Lao

Road Network Analysis
Muang Xepone, Savannakket Province
MCTPC/UNDP/ILO
1995

Application for Japan's Grant AID for he Project of Rehabilitation of National Road #18

MCTPC
2001

Road Infrastructure for Rural Development Project

Beca International Consultants Ltd.
ADB
2000

GMS Study Sub-Regional Transport Sector Study for the Greater Mekong Sub-Region

ADB

Strategic Directions for the Development of the Road Sector for the Preparatory Roundtable Meeting
June 2000.

The Transit Transportation System for the Lao PDR

Resource Paper
Consultative Meeting on the Transit Transportation System of the Lao PDR
2000

East-West Transport Corridor Study

Maunsell
ADB
Mekong River Commission
1996

Guidelines for Reducing the Environmental Effects of Road Projects in Lao PDR

World Bank
March 1994

Socio Economic Publications

Master Plan Study on Integrated Agricultural Development in Lao

Nippon Koei Co., Ltd
JICA
Ministry of Agriculture and Forestry
2001

The Study on the Integrated Regional Development Plan for the Savannakket and Khammouan Region

KR International
JICA
2001

Participatory Poverty Assessment in Lao PDR

ADB
State Planning Committee
2001

Socio Economic Survey of Rural Resettlement Sites

UNHCR
1998

Master Plan Study on Integrated Agricultural Development in Lao PDR

JICA

August 2001

Mekong Lancang River Tourism Planning Study

Concept Plans
Pacific Consultants International
1998

Socio-Economic Profile of Savannakhet Province

Rural Development Programme Formulation
UNDP Lao PDR
1998

Economic Development in Lao PDR: Horizon 2000

Chi Do Pham (ed.)
IMF Resident Representative in the Lao PDR
1994

Laos Village Information System (AVIS) Material

Nagata Yoshikatsu
Media Center
Osaka City University
2000

Poverty Reduction and Environmental Management in remote Greater Mekong
Watersheds Phase II
Draft Final Report
Margules Poyry
CD Rom
2000

World Development Report 2000/2001

Attacking Poverty
World Bank
2000

Poverty in the Lao PDR

Participatory Poverty Assessment
State Planning Committee
2000

"Participatory Poverty Assessment: Case of Lao"

Brent Dark

The Poverty Reduction Focus
ADB
October 2001

"Examining How Transport and Energy Contribute to Poverty Reduction"
Tyrrell Duncan
The Poverty Reduction Focus
ADB
October 2001

Attapeu Province, Lao PDR
Background Information
WWF
Sub-Regional Transboundary Conservation Project
1998

Poverty Assessment
Technical report No. 9
Small Town Development Project
ADB TA 3492-LAO
ADB & Arcadis Euroconsult Urban Development
2001

Overcoming Human Poverty
UNDP Poverty Report
2000

The Project Formulation Study "Government's Efforts to Rural Development in Consideration with Ethnic Minority, Lao PDR"
JICA
May 2002

From AIDS Epidemic to an AIDS Pandemic

Is an HIV/AIDS Hub Building in Southeast Asia?
UNDP Program Southeast Asia HIV and Development Project
UNOPS and UNDP
2000

Trafficking in Women and Children in the Lao PDR: Initial Observation
Ministry of Labor and Social Welfare
United Nations Interagency Project
October 2001

Educational Strategic Planning 20 Years (2001-2020), 10 Years (2001-2010) and 5 Years Development Plan for Education at the Fifth Plenary Session (2001-2005)
Ministry of Education
August 2001

Small Towns Development Project Technical Report No.6 Short Resettlement Plan
ADB TA No. 3492-LAO
November 2001

Economic Development in Lao PDR: Horizon 2000
Bank of the Lao People's Democratic Republic
1994

Feasibility Study Project for Development and Promotion of Tourism Investment in Champasak Province
Tourism Authority of Thailand
1995

Development Dynamic and Priority Need Areas of the Champasak Province
UNDP
February 2000

Champasak Heritage Management Plan
UNESCO
2000

Prime Ministerial Instruction No. 10: Planning for the Eradication of Poverty
2001

National Environment Publications

Biodiversity Conservation, Protected Areas and the Development Imperative in Lao PDR: Forging Links
Stuart Chape
IUCN
1996

Lao PDR - Environmental Overview
East English and Pacific Regional Office
World Bank
July 1993

The Wildlife and Habitat Survey of the Dong Uua Sao National Biodiversity Conservation Area

T. Evans et al.
IUCN
1995

Protected Areas System Planning and Management in Lao PDR

Klaus Berkmuller at Al.
Lao--Swedish Forestry Cooperation Program, Forest Resources Conservation Sub Program (IUCN), Department of Forestry of the Ministry of Agriculture and Forestry
1995

Wildlife in Lao PDR – Status Report

Compiled by Richard Salter
IUCN
1993

An Inventory of Wetlands of the Lao PDR

G. Claridge
The IUCN Wetlands Program

The Second Mekong International Bridge Construction Project

Environmental Study
Final Report
Oriental Consultants
JICA
2000

Fact Sheets for National Biodiversity Areas in the Loa PDR

Division of Forest Resources Conservation
Dept. of Forestry, Lao PDR
Lao Swedish Forestry {Programme and IUCN
2000

Forest Management and Conservation Program

National Biodiversity Conservation Areas Sub-Program
Xe Pain NBCA
Rapid and Participatory Biodiversity Assessment Final Report
Prepared by WWF- Thailand Project Office
1997

Experiences from the Laos Swedish Forestry Programme 1995 - 2001

CD ROM
2001

Initial Assessment of Social and Economic Factors Affecting Biodiversity Conservation Efforts in the Forests of the Lower Mekong Ecoregion Complex

John Baker et al.
WWF & IUCN
2000

Towards a Vision for Biodiversity Conservation in the Forests of the Lower Mekong Ecoregion Complex

Complied by Michael C. Baltzer et al.
WWF Indochina/WWF-US
2001