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## **CHAPTER 12**

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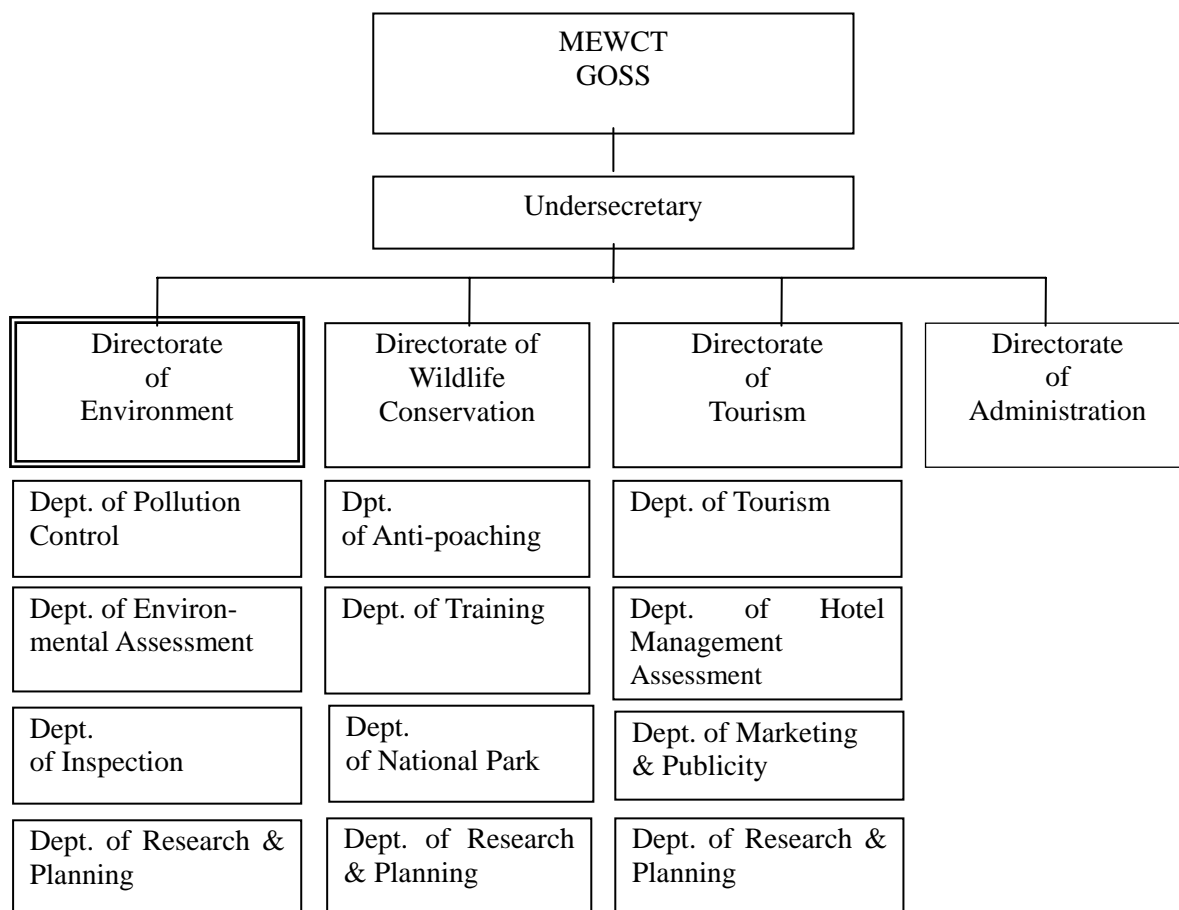
# **E**NVIRONMENTAL AND SOCIAL CONSIDERATIONS

## CHAPTER 12 ENVIRONMENTAL AND SOCIAL CONSIDERATIONS

### 12.1 ENVIRONMENTAL INSTITUTION

#### (1) Ministry of Wildlife Conservation & Tourism and Ministry of Housing, Physical Planning and Environment, GOSS

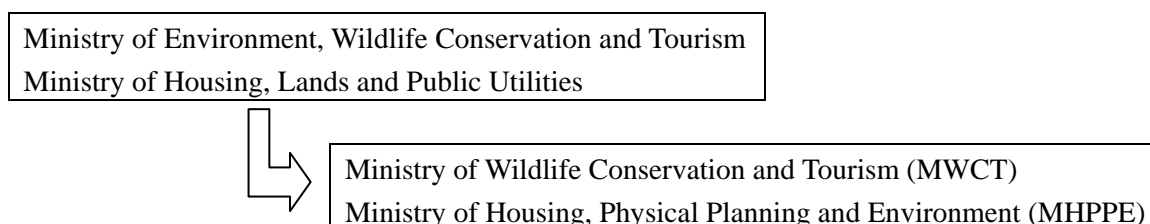
The organization of former Ministry of Environment, Wildlife Conservation and Tourism (MEWCT), GOSS until December 31, 2008 is shown in Figure 12.1-1 below.



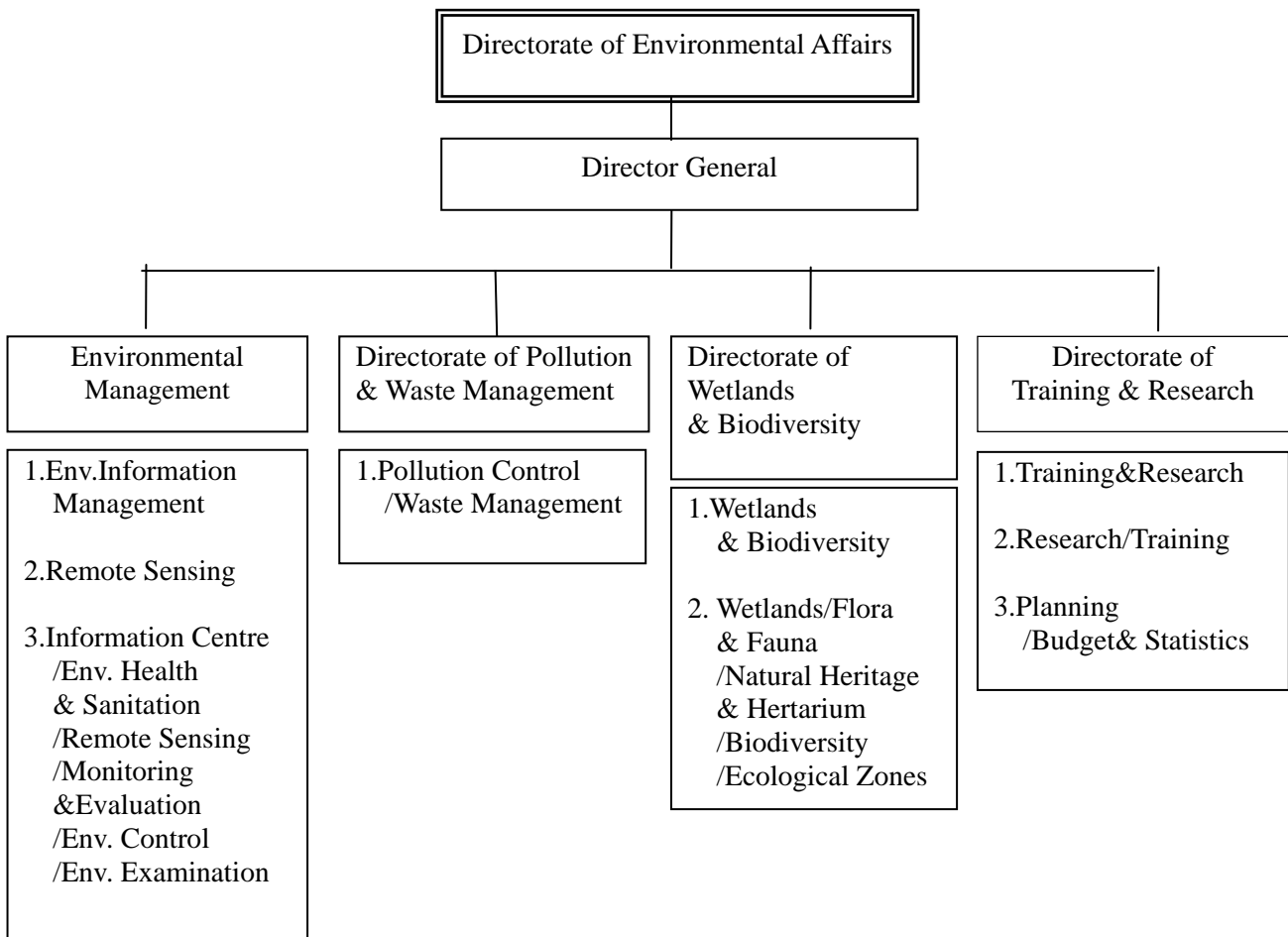
**Figure 12.1-1 Organization of Former Ministry of Environment, Wildlife Conservation and Tourism (GOSS)**

However, the Directorate of Environment in former MEWCT was integrated to the Ministry of Housing, Physical Planning and Environment (MHPPE) in January 1, 2009 officially.

As a result, the two Ministries were reorganized as follows:



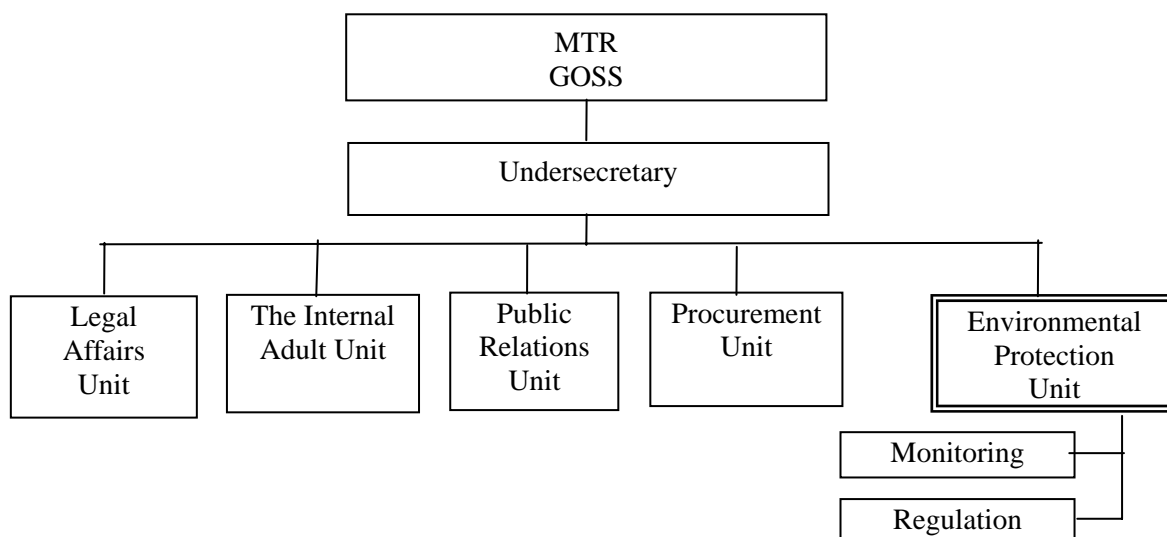
The organization of Directorate of Environmental Affairs in MHPPE is shown in Figure 12.1-2.



**Figure 12.1-2 Organization of Directorate of Environmental Affairs of MHPPE, GOSS**

**(2) Ministry of Transport and Roads, GOSS**

In the organization of MTR, GOSS, the environment section is designated as the Environmental Protection Unit. This Unit is divided into 2 sections, namely the Monitoring and Regulation Sections as shown in Figure 12.1-3. But the person in charge is only one person.



**Figure 12.1-3 Organization of Ministry of Transport and Roads, GOSS**

The functions of the Environmental Protection Unit are listed below. However, these functions are not yet adopted since the Environment section of MHPPE is not yet managing the preparations of EIA procedure, etc. The Environment Guidelines of MTR, GOSS was formulated by USAID in November, 2007, but it may take more time to be fully functional in the environment section of MHPPE.

**Functions of the Environmental Protection Unit**

- Development of environmental management procedure guidelines and checklist for use by the Ministry and related agencies,
- Promoting use of energy efficient and less polluting modes of transport,
- Create closer liaison between ministries in charge of natural resources, energy and transport for the implementation of the Clean Air Initiative(CAI) resolutions, which committed African countries to adopt less polluting fuels by the year 2005,
- Monitor implementation of the environmental requirements by the Ministry and related institutions,
- In road construction and maintenance, provide environment management guidelines and checklist,
- In road transportation, institute regulation barring the use of leaded fuel, in favor of the less pollutant unleaded fuels for vehicles and industrial use,
- In road transportation, institute regulation on disposal of abandoned and written off vehicles on road transport,
- In aviation, ensure compliance with International Civil Aviation Organization (ICAO) minimum Standards and Recommendation Practices (SARPS) and applicable national laws in respect of environmental protection; and enforce the disposal of abandoned and written off aircraft and related aircraft waste and equipment within airports,
- In airports development, provide environment management guidelines and checklist for use in construction, maintenance and operation of airports,
- In river transport, ensure that environmental laws applicable to ships in the oceans are also applied to vessels on rivers e.g. laws and regulations relating to disposal of effluents, oils and other wastes (i.e. same standards, regulations and laws applicable

- under international conventions for ocean-going vessels),
- In river transport, provide environment management guidelines and checklist for use in construction and maintenance of ports and river channel,
- In railways, ensure adherence to national environmental standards by railway operators,
- In railways, provide environment management guidelines and checklist for use in construction and maintenance, and
- Carry out environmental impacts of roads, borrow pits, quarries and other building sites used, energy conservation and the control of hazardous wastes and substances.

## 12.2 ENVIRONMENTAL RULES AND REGULATIONS

### (1) GOSS

Environment guideline of MTR, GOSS was formulated by USAID in November, 2007. The content is shown in Table 12.2-1, divided into 6 Practices.

**Table 12.2-1 Contents of the Practices in Environmental Guideline**

1.The Practices : Water Quality	Contractor Camp Site Preparation Earthworks Drainage Materials Convey and Crossing Water
2.The Practices : Air Quality	
3.The Practices : Noise	
4.The Practices : Land Use	Road Material Site Construction Debris Disposal Road Induced Changes in Resource Management
5.The Practices :Community Health and Welfare	STDs and HIV/AIDS, Vectorborne Diseases, Dust, Noise Job Opportunities(including : gender-neutral)
6.The Practices : Cultural Heritage	

In this guideline, the following CHECKLISTs are attached. The guideline does not treat Involuntary resettlement, Local community area, Children's rights but those items are treated in the attached CHECKLIST.

- DEVELOPMENT ACTION CHECKLIST  
Route Selection
  - Resettlement
- ENVIRONMENTAL ATTRIBUTES CHECKLIST  
Consideration Items above mentioned is nothing.
- ENVIRONMENTAL IMPACTS CHECKLIST  
Impacts of Routing
  - Invasion of tribal lands
- MITIGATION MEASURES CHECKLIST  
Routing Measures

- Route to avoid land-use conflict with project population/communities

Measures for Road, Rail and Waterways Use

- Mitigation of socioeconomic impacts
- Compensation for land price and ownership impacts

**(2) World Bank / Multi-Donor Trust Fund (MDTF)**

Preliminary Environmental and Social Assessment Framework for MDTF Investments Southern Sudan (Draft) is formulated in March 2008.

The development objective of the MDTF is to finance the urgent recovery and development needs in war-affected and underdeveloped areas of Southern Sudan by providing social and economic services and infrastructure. It also aims to consolidate peace, enhance good governance, economic recovery and social stability and complements government programs. Consequently, the GOSS is preparing and implementing a number of investment projects for financing by the MDTF and administration by the World Bank.

This Environmental and Social Assessment Framework (the Framework) are applied for the following projects:

- 1) Emergency Transport and Infrastructure Development
- 2) Education Rehabilitation
- 3) Health System Development and HIV/AIDS Program
- 4) Strengthening Capacity to Deliver Community Rural Water Supply, Hygiene and Sanitation
- 5) Livestock and Fisheries; and
- 6) Support to Agriculture and Forest Development Project

And the contents are as follows.

- Policy, Legal and Administrative Framework
- Anticipated Environment and Social Impacts
- Incorporating Environmental and Social Assessment in Project Cycle
- Social Safeguards Processes and Policies
- Public Participation
- Institutional framework-Current Set Up

**(3) JICA**

The impacts to be assessed and examined in terms of “JICA Environmental and Social Considerations Guideline (JICA Guideline)” include impacts on human health and safety as well as the natural environment through air, water, soil, waste, accident, water usage, ecosystems, and biota. Such impacts also include social considerations as follows (Figure 12.2-1):

- migration of people including involuntary resettlement
- local economy such as employment and livelihood
- land use and utilization of local resources
- social institution such as social infrastructure and local decision-making institutions
- existing social infrastructures and services
- vulnerable social groups such as the poor and indigenous peoples
- distribution of benefits and losses and equality in the development process
- gender, children's right
- cultural heritage
- local conflict of interests
- infectious diseases such as HIV/AIDS

#### **(4) IEE and EIA Procedure**

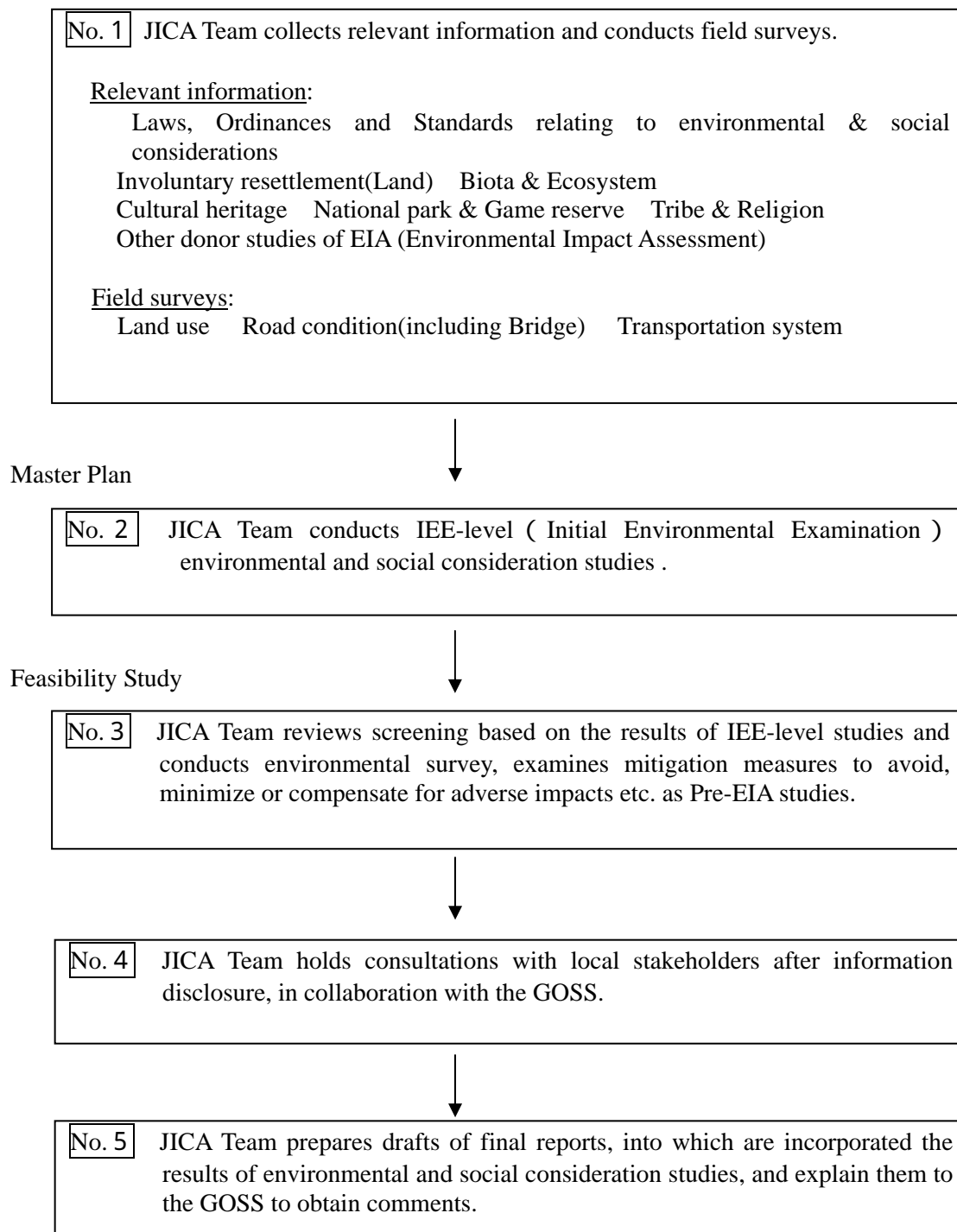
The scope of IEE and EIA level study of JICA Guideline are as follows (Figure 12.2-1):

“Initial Environmental Examination (IEE)” includes analysis of alternative plans, prediction and assessment of environmental impacts, and preparation of mitigation measures and monitoring plans on the basis of secondary data and simple field surveys.

“Environmental Impact Assessment (EIA)” includes analysis of alternative plans, prediction and assessment of environmental impacts, and preparation of mitigation measures and monitoring plans on the basis of detailed field surveys.

In the concerned project, JICA Study Team is going to carry out Pre-EIA for F/S. Therefore, we will carry out a study on the basis of detailed field surveys about specified items.

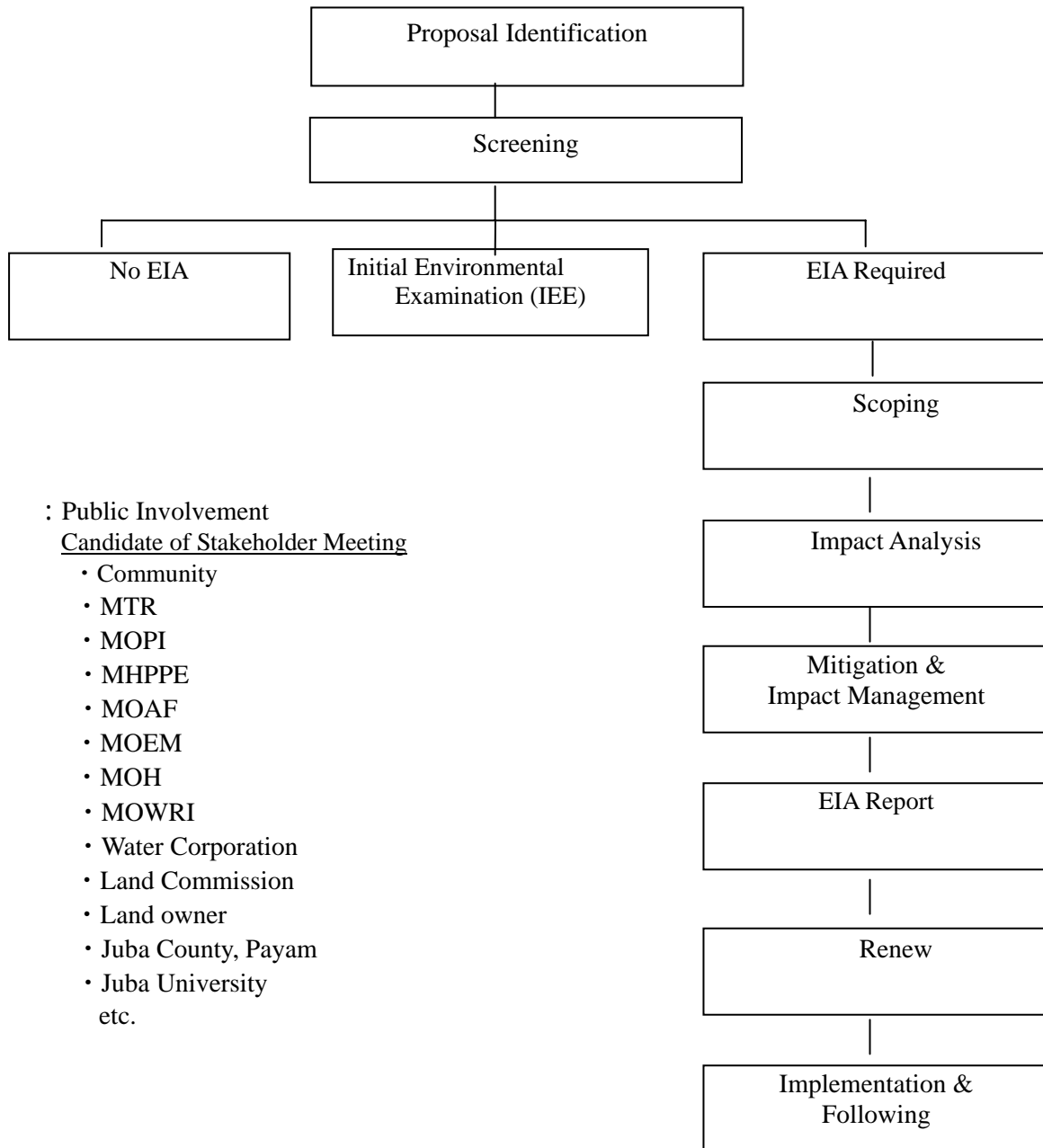
The JICA study team explained the IEE and EIA procedure (see following figure) for case of concerned project of the GOSS in 2<sup>ND</sup> Stakeholder Meeting that was held on 05/Nov./08. We got understanding of persons concerned, and decided to adopt the JICA Guideline for the concerned project.



**Figure 12.2-1 Procedure of Environmental and Social Consideration in JICA  
 (Case of Concerned Project of the GOSS)**



The EIA Procedure for road project in GOSS that was approved by MTR & MHPPE is as shown in Figure 12.2-2:



**Figure 12.2-2 EIA Procedure (MHPPE & MTR)**

## **12.3 PRESENT PRACTICE OF ENVIRONMENTAL AND SOCIAL CONSIDERATIONS**

### **Case study of United Nations Office for Project Services (UNOPS)**

The objective of this study is to prepare an engineering design for the construction and rehabilitation of 264km of road from Wau to Tambura. Once constructed, the road will improve the traffic flow between the State Capital(Wau) of the Bhar Al Ghazal and the Westenmost Country of Western Equitoria, Tambura. The road will also open up areas regarded to have a very high agriculture potential.

The MDTF and MTR have contacted UNOPS to carry out the design and estimates for the rehabilitation of the road. This included the two bridges crossing the rivers and some 140 culverts.

UNOPS has conducted reconnaissance survey and actual field survey, gathering data needed for the detailed engineering design. The survey includes profile and cross-section (topographic survey), material analysis and hydrology analysis, environmental impact surveys, traffic flow survey, public consultations and assessment of condition of existing bridges and other drainage structure.

## **12.4 NATURAL ENVIRONMENTAL CONSIDERATION OF STUDY AREA**

Natural environment consideration of the Study Area is as follows.

### **(1) Topographic features**

Mt. Jebel Kujur lies in the west of the area covered by this survey. The mountain, which rises 744 meters above sea level, creates a natural border in the width of three kilometers and the length of one kilometer between Juba City and its periphery, and other regions. Mt. Jebel Kujur is one of the three craggy mountains in the suburbs of Juba, the other two being Mt. Rajaf West and Mt. Rajaf East. Mt. Jebel Kujur is a granite craggy mountain, and it has been weathered.

### **(2) River system**

Major water areas in the area covered by the survey include the Nile, which runs along the eastern border of the city area, and small rivers that flow into the Nile. There are five small rivers: the Luri River, the Khorbou River, the Lobulyet River, the Wallan River and the Kor Ramula River from the north to the south. There are many bridges crossing these rivers. Rubbish, plastics and plastic bottles have been discarded haphazardly on and along roads (especially along unpaved earthen roads). A large amount of mud, rubbish and plastics that have been discarded or carried by the rivers are piled up near the bridges and culverts, and they have been partially decomposed to create an unsanitary condition.

The groundwater level is extremely high, five to six meters below ground. It is said that groundwater flows northwards because of the characteristics of local topographic features. In

the area covered by the survey, a relatively large amount of groundwater is stored in a shallow water-bearing stratum. Because of this, water wells have been provided in the area, and there are some also along the main street.

### **(3) Flora and Fauna Habitats**

In the area covered by the survey and its vicinity, there existed an area mixed with savannas and forests. However, the vegetation was greatly transformed because of the civil war, and many big trees were cut to be used for military use and as fuel wood. It is said that many of the forests have been destroyed. Therefore, lots of birds and other small wildlife that live in forests have been affected. Their living conditions are not known, but it is assumed that the great majority of the wildlife has disappeared. Most of the forestry vegetation remains along the Nile and its branch rivers. In these areas, there are mango trees, papaya trees, and other fruit trees, in addition to neem and other useful trees. Even now, fishes that fishermen catch, crocodiles and water birds live in and along the Nile.

### **(4) Landscapes**

Typical landscapes in the area covered by the survey include the urban landscapes of the central area of Juba City, rural landscapes with traditional houses called tukuls, the riverside landscapes of the Nile, the flatland landscapes in the west of Munuki Payam, and in the south of Kator Payam, and the hilly landscapes of Jebel Lodu in the northern part, Bilinyang and Luluriet in the eastern part, Rajaf West in the southern part, and Jebel Kujur in the western part. In addition, in the city, there is Juba International Airport, a monument dedicated to the former vice president, churches, mosques, and other religious facilities, a soccer stadium, and a cemetery. However, there are no parks in the city.

### **(5) National Parks**

According to the latest “Wild Conservation Society Southern Sudan Program (May 2007)”, 5 National Parks, 14 Game Reserves, and 1 WCS conservation landscape have been designated in Southern Sudan. In the area covered by the survey in Juba City and its vicinity, there is no such designated area. However, in an area about 20 to 30 kilometers from the center of the city, Bandingalo Game Reserves was designated on the northeastern side, and Juba Game Reserves was designated on the southwestern side.

But, according to “LAWS OF THE NEW SUDAN WILDLIFE CONSERVATION AND NATIONAL PARKS ACT 2003 (Secretariat of Legal Affairs and Constitutional Development)”, the number of National Parks & Game Reserves that was specified is different to the latest document. See Table 12.4-1.

**Table 12.4-1 National Parks and Game Reserves**

National Parks and Game Reserves	LAWS OF THE NEW SUDAN, WILDLIFE CONSERVATION AND NATIONAL PARKS ACT, 2003	Wild Conservation Society Southern Sudan Program May 2007
<u>National Parks</u>	<ol style="list-style-type: none"> <li>1. Southern</li> <li>2. Boma</li> <li>3. Dinder</li> <li>4. Bandingilo</li> <li>5. Lantonto</li> <li>6. Shambe</li> <li>7. Nimule</li> </ol>	<ol style="list-style-type: none"> <li>1. Southern</li> <li>2. Boma</li> <li>3. Lantonto</li> <li>4. Shambe</li> <li>5. Nimule</li> </ol>
<u>Game Reserves</u>	<ol style="list-style-type: none"> <li>1. Zeraf</li> <li>2. Chelkou</li> <li>3. Mushra</li> <li>4. Kidepo</li> <li>5. Ashana</li> <li>6. Boro</li> <li>7. Numatina</li> <li>8. Fanyikang</li> <li>9. Juba</li> <li>10. Bangangai</li> <li>11. Mbarinzunga</li> <li>12. Bire Kpatous</li> </ol>	<ol style="list-style-type: none"> <li>1. Zeraf</li> <li>2. Chelkou</li> <li>3. Mushra</li> <li>4. Kidepo</li> <li>5. Ashana</li> <li>6. Boro</li> <li>7. Numatina</li> <li>8. Fanyikang</li> <li>9. Juba</li> <li>10. Bangangai</li> <li>11. Mbarinzunga</li> <li>12. Bire Kpatous</li> <li>13. Mongala</li> <li>14. Bandingala</li> </ol>

Completely protected species of Mammalia (Mammals) & AVES (Birds) by LAWS OF THE NEW SUDAN WILDLIFE CONSERVATION AND NATIONAL PARKS ACT, 2003 is shown in Table 12.4-2.

**Table 12.4-2 Completely Protected Species of Mammalia (Mammals) & AVES (Birds)**

	Completely Protected Species	
<u>Mammalia (Mammals)</u>	<ul style="list-style-type: none"> <li>• AARD WOLF</li> <li>• COLOMBUS MONKEY</li> <li>• PANGOLIN(All species)</li> <li>• WILD ASS</li> <li>• CARACAL(African Lynx)</li> <li>• GIANT BUSH-BUCK</li> <li>• KUDU(All species)</li> <li>• ORYNX(All species)</li> <li>• HYRAX(All species)</li> </ul>	<ul style="list-style-type: none"> <li>• CHEETAH</li> <li>• ELEPHANT</li> <li>• RHINOCEROS(All species)</li> <li>• LEOPARD</li> <li>• ELAND(All species)</li> <li>• GIRAFFE</li> <li>• SITATUNGA</li> <li>• ZEBRA</li> <li>• CHIMPANZEE</li> <li>• BONGO</li> </ul>
<u>AVES (Birds)</u>	<ul style="list-style-type: none"> <li>• BUSTARDS(All species)</li> <li>• EAGLES(All species)</li> <li>• VULTURES(All species)</li> <li>• GROUND HORBILL</li> <li>• SADDLE BILL BIRD</li> <li>• SECRETARY BIRD</li> </ul>	<ul style="list-style-type: none"> <li>• BALD-HEDED IBIS</li> <li>• Shoe BILL STORK</li> <li>• GREATER FLAMINGO</li> <li>• OSTRICH</li> <li>• SPOON BILL STORK</li> </ul>

## **(6) Land use along arterial roads**

### **Arterial Street**

#### **May Street:**

- Government facilities (including Ministries and Agencies related to the Government of Southern Sudan)
- Hotels; banks and other business-related facilities; markets and other commercial facilities
- Churches and mosques



**Photo 12.4-1 Church**



**Photo 12.4-2 Mosque**



**Photo 12.4-3 Water Supply Facilities**

**Unity Avenue:**

- Commercial facilities including stores dealing with construction materials and other light-industry-related products, stores dealing with miscellaneous daily goods, and restaurants
- Educational and cultural facilities (such as Juba University), and medical-related facilities



**Photo 12.4-4 Juba University (left side)**

**Other roads:**

- Educational facilities
- Military facilities
- International Airport
- Soccer stadium
- Cemetery
- Houses with thatched roofs, and other houses



**Photo 12.4-5 Soccer Stadium**

### **Radial Arterial Street**

#### **Yei Road:**

- Monument dedicated to the former vice president
- Bus terminal (the largest bus terminal in Juba) and gas station
- Clinic and educational facilities
- Stores dealing with construction materials and other light-industry-related products, and street stalls quarrying and selling stones near Mt. Jebel Kujur
- Houses with thatched roofs
- Water well (in an area about six to seven meters from the center of the road)



**Photo 12.4-6 Monument Dedicated to the Former Vice President**



**Photo 12.4-7 Bus Terminal (with pet-bottle after rain)**



**Photo 12.4-8 Selling Stones Near Mt. Jebel Kujur**



**Photo 12.4 -9 Water Well**



**Torit Road:**

- Commercial facilities including stores dealing with construction materials and other light industry-related products, stores dealing with miscellaneous daily goods, market, and restaurants

**Other Related Streets in Munuki Payam:**

- Government facilities (including Ministries and Agencies related to the Government of Southern Sudan)
- Bicycle store (street stall)
- Gas station
- Houses with thatched roofs, and other houses



**Photo 12.4-10 Typical Houses**

## 12.5 LAND ACQUISITION AND RESETTLEMENT LAWS AND PROCEDURE

SOUTHERN SUDAN PROPOSED LAND BILL 2007 (2<sup>nd</sup> Draft) was established by Southern Sudan Land Commission.

This LAND BILL is composed of 16 Chapters & 100 Items.

In accordance with the provisions of Article 59(2)(b) together with 85(1)(g) of the Interim Constitution of Southern Sudan, the Southern Sudan Legislative Assembly, with the assent of the President of the Government of Southern Sudan, hereby enact the following (Table 12.5-1):

**Table 12.5-1 Contents of SOUTHERN SUDAN PROPOSED LAND BILL 2007( 2<sup>nd</sup> Draft)**

(1/3)

### Preliminary provisions

This Bill may be cited as “the Southern Sudan Land Bill, 2007” and shall come into force from the date of its signature by the President.

### Land Ownership

- Ownership
  - (1) All land in Southern Sudan belongs to the people of Southern Sudan and shall vest in them collectively or as individuals.
  - (2) Land may be acquired, held and transacted through these tenure system-
    - a) Customary
    - b) Freehold, and
    - c) Leasehold
- Protection of land rights
  - (1) All Southern Sudanese owning land under customary tenure will be assured security of occupancy and irrespective of whether or not their interest is held individually or in association with others.
  - (2) Customary land rights including those held in common shall have equal force and effect in law with freehold or leasehold rights acquired through statutory allocation, registration or transaction.
  - (3) All rights related to land shall be protected and all attributions on land conferred upon any State by Bill shall be exercised for the common benefit of all Southern Sudanese in accordance with the provisions of this Bill and the Law.

### Land Classification

- Public Land

Public Land is land owned collectively by all Southern Sudanese and held in trust by the appropriate level of government as determined by law.
- Community Land

Community Land shall vest in and be held by communities identified on the basis of ethnicity, residence or community of interest.

### Rights to land

- Rights of National to land
  - (1) Access to land shall not be denied by a State or community on the basis of sex, ethnicity or religion.
  - (2) Every person shall have access to land for pasture, grazing or fishing as shared resources as shall be regulated by this Bill and the law.
  - (3) Women shall have the right to own and inherit land together with any surviving legal heir or heirs of the deceased as stipulated in Article 20(5) of the Interim Constitution of Southern Sudan.

Derivative rights of access to land

A derivative right of access to land shall confer the rights of occupancy upon a person or community and shall be registered by the Land Administration.

- Lease

- (1) Any person owning land in Southern Sudan may lease the right to another person or persons for a definite period of time in accordance with section 7 of this Bill.
- (2) Unless otherwise provided for, this part shall apply to all leases including those governed by customary law and other laws.

Land administration and management

- Functions of Land Administration

- 1) Proceed to land allocation
- 2) Conducted general land mapping
- 3) Carry out land measurement and land quality evaluation
- 4) Classify land into categories
- 5) Design land use plan
- 6) Approve land use plan
- 7) Record land and its statistics
- 8) Keep land registration book
- 9) Carry out land valuation
- 10) Assign land use right
- 11) Issue land title deeds
- 12) Regulate land transfer and land lease
- 13) Control and protect land use
- 14) Protection of customary land rights; and
- 15) Regulate land withdrawal or requisition.

Registration of land rights

- (1) Subject to the principle laid down in this Bill, the registration and recording of land shall be regulated by law.
- (2) Land collectively or individually owned in Southern Sudan shall be registered and given a title in accordance with this Bill.
- (3) Land owned by different levels of government in Southern Sudan shall be registered.
- (4) All land in Southern Sudan which are not registered before the coming into operation of this Bill shall be regulated by this Bill.

Cadastral administration

- Function of the cadastral
- Land registry and documents
- The registrar general
- The state registrar
- Cadastral title

Acquisition of land for investment purposes

Without prejudice to the law, any outside investor may have access to land in Southern Sudan in accordance with this Bill and the law.

- Plan of Exploitation

Any person applying for a plot of land for investment purposes shall present a plan of exploitation including but not limited to the following:

- a) general nature of activities;
- b) duration of the period of investment
- c) nationality of the investor;

- d) geographical area of interest;
- e) financial Guarantees; and
- f) environmental guarantees.

- Compensation for the community

Any community or person affected by such activities in the area of exploitation shall be compensated in accordance with section 80 of this Bill and Article 180(7) of the Interim Constitution of Southern Sudan.

#### Pastoral lands

- Protection of pastoral lands

- (1) For the purpose of this section, pastoral land shall refer to the land used by the livestock for grazing, pasture and watering, including routes dedicated to their circulation and apace ancillary to the activities.
- (2) All pastoral lands in Southern Sudan shall be delineated and protected by the appropriate level of land administration and management.
- (3) Customs and practices related to land used by the communities raising livestock shall be taken into consideration as long as they comply with this Bill and other laws in Southern Sudan.

#### Land use and environmental preservation

- Protection of lands

Every person, communities and organizations shall protect the land in order to keep it in a good condition in which there will be no soil erosion, land slip or soil degradation, and in a quality that will be suitable to each category of land in accordance with article 44 of the Interim Constitution of Southern Sudan, 2005.

- Environmental assessment
- Environmental restoration

#### Expropriation of land for public purpose

- Compensation

- (1) The compensation shall be just, equitable, and shall take into account the following factors:
  - a) the purpose for which the land is being utilizing;
  - b) the market value; and
  - c) the value of the investment in it by those affected and their interest.
- (2) The compensation shall be in cash or in kind or both according to the agreement.
- (3) Where any land expropriated for public purpose is necessary to remove any person therefrom in customary occupation, compensation shall be paid as may be agreed upon.
- (4) Where any land expropriated for public purpose is the subject of a lease under this Bill, compensation shall be paid to the lessee as may be agreed upon.
- (5) No transfer of ownership or rights over land should be made until the type, amount, method and timing of the payment of compensation has been agreed upon with those affected. Should agreement not be reached, this will be determined by the Southern Sudan Land Commission.
- (6) Where payment of compensation is not made within six months of transfer of the property, the affected persons will in addition receive interest on the sum due at commercial rates, recoverable until such compensation is paid.

But this LAND BILL is not published for cost items in relation to land cost, compensation cost etc.

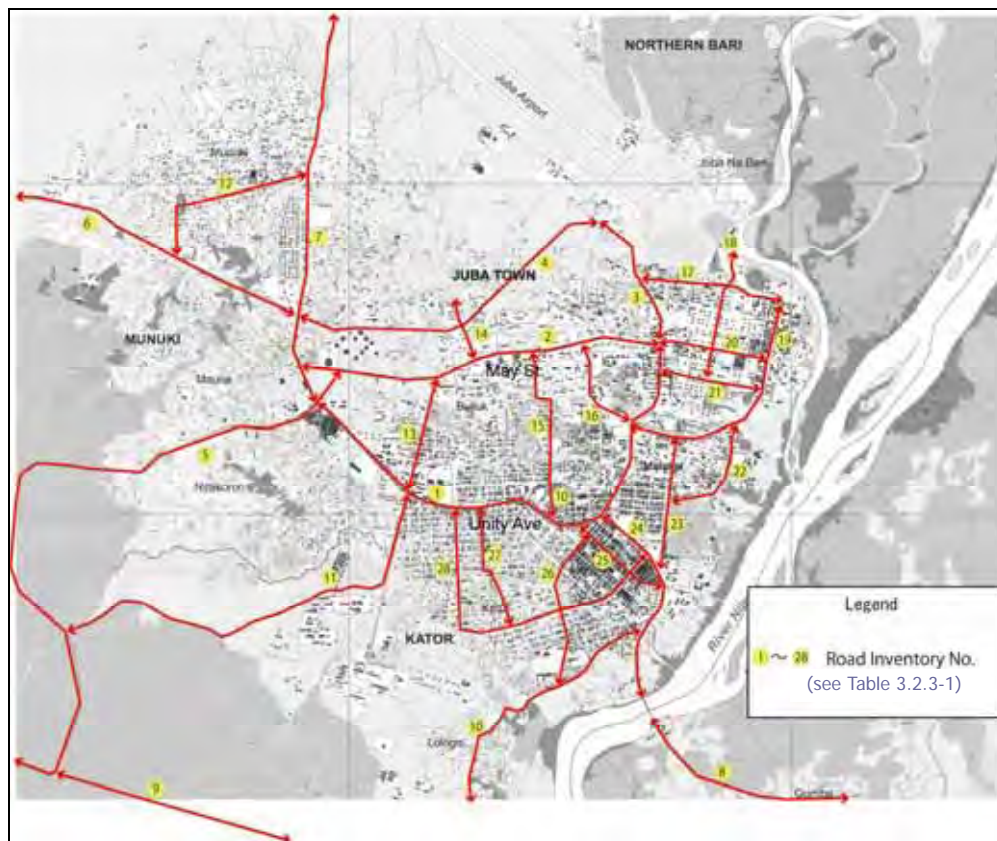
In Juba, land acquisition for public works by the Central and State Governments is done as follows:

- (1) The Land Commission reviews land compensation and scheduling (including costs) at the GOSS level,
- (2) Land surveys related to land acquisition are conducted and relocation destinations reviewed, and
- (3) Stakeholders discuss to make a decision. The basic land price is 4,000 SDG per square meter. However, in case of a government-led public works project, it is said that this land price is not applicable, particularly for temporary facilities.

## 12.6 IEE FOR MAJOR PROJECTS

### 12.6.1 Road Improvement/Construction Project

The roads subjected to IEE are shown in Figure 12.6.1-1 (refer to Table 3.2.3-1). The roadside conditions of the subject roads are shown below.



**Figure 12.6.1-1 Subject Roads**

#### (1) Arterial Streets composing the Central Part of Juba

- **May Street (No. 2), Jct. Unity • May – MOPI (No. 20):**

Arterial streets running east and west in the central part of Juba.

##### **No. 2:**

May Street is a wide two-lane paved road with raised sidewalks (concrete pavements), except in the old town area and some sections of road. Median strips are provided partially

in the western part so as to accommodate both lanes each way. Along this road there are governmental facilities and commercial business facilities including hotels. The head offices of the Government of Southern Sudan and the Sudan Council of Churches (Equatoria region) are located along the south side of the road. Facilities related to the Ministry of Energy and Mining are now constructed. Water supply facilities are also located about five meters from the edge of the road. In addition, the road is lined with tall trees, and electric poles with electric cables are placed along one side of the road.

There is an unpaved 300-meter section of road connecting the Custom Market-Terekera (No. 7) road and a roundabout intersection on the west side of May Street. Water supply facilities are located near the edge of the road. There is a motorcycle shop next to the facilities, where water supply facilities are being constructed. Policemen control traffic in the roundabout intersections at the eastern and western ends of the paved section of May Street during the morning and evening peak hours.

**No. 20:**

The road on the east side in the old part of the city has two lanes, but its severely damaged pavement renders it unfit as a functioning paved road. Along this road there are governmental facilities, commercial business facilities and markets (including temporary stores). Along the road on the south side stand churches, mosques, hotels, Internet cafes and restaurants.

- **Unity Avenue (No. 1):**

A road composing part of a municipal beltway located on the south side in the central part of Juba City.

**No. 1:**

The section of road on the east side from May Street to Juba Univ. Road (No. 13) is a paved road, and paving work is now underway near Juba University. The road has two relatively wide lanes. In contrast, a two-lane road section on the west side from Juba Univ. Road (No. 13) to Yei Road (No. 5) is unpaved.

There are two types of land use along this section of road on the east side. Along the road running south from May Street stand medical facilities, churches and sundries stores (including temporary stores), and the road is partially dotted with tall trees. In contrast, along the road running from the intersection with Nyigilo Street (No. 24), which is a radial road reaching the Nile, there are many sundries stores and stores handling light manufacturing goods like construction materials. There are a few restaurants and other commercial facilities. North of the intersection with No. 13 road are educational facilities (Juba University) within a large district. Electric poles with electric cables are placed on one side of the road.

The section of road on the west side, however, leads to a radial road called Yei Road (No. 5). A customs market and a traffic terminal (mostly minibuses used for shuttle bus service, and some motorcycle taxis) are located near the intersection. The huge Nyakuron Cultural Center is also found here. Electric poles with electric cables are placed on one side of the road.

- **Airport Road (No. 3) and Old Airport Road (No. 4)**

**No. 3:**

The two-lane Airport Road leads to May Street and the Juba International Airport. Along the road there are governmental facilities, hotels and commercial business facilities (including temporary stores). Electric poles with electric cables are placed on one side of the road.

**No. 4:**

The two-lane road leads to Airport Road (No. 3) and the Munuki Payam. This section of road is unpaved. The road is adjacent to a district where large governmental facilities and foreign diplomatic facilities including the U.S. Embassy are located. In farm areas, there is much open space with temporary stores and typical houses scattered about. Almost the entire road (including one bridge) is under construction.

Electric poles with electric cables are placed on one side of the road.

- **Gabad Jct. from Airport Road – Custom Office (No. 17), Addis Ababa Road (No. 19) and Football Stadium Road (No. 22)**

These three roads run through the old town area and function to absorb and disperse traffic in the area. The roads are narrow and unpaved.

**No. 17:**

No. 17 road will serve as an arterial road in the future. Among the roads, this unpaved and narrow road is most closely linked with the people's living environment in terms of access to water wells and small temporary stores in an area dominated by typical houses. However, a hotel and a construction materials factory are located in the area where No. 17 road meets arterial road No. 3.

**No. 19:**

Addis Ababa Road is a relatively wide two-lane road. It seems that the road was paved, but has been severely damaged. Along the road there are governmental facilities, business facilities like an air travel agent and a bank, and commercial facilities (including temporary stores) like a small supermarket. The road runs through a residential area in the old town area.

**No. 22:**

Football Stadium Road is unpaved and leads to No. 19 road. The road runs through a typical residential area where the Football Stadium is located.

**No. 23:**

No. 23 road is unpaved and leads to arterial roads No. 24 and No. 8. In the future, the road will serve as a ring road. Along this road, sundries stores and other small temporary stores are scattered about, but the road is mostly lined with typical houses.

**(2) Arterial Streets to the Suburbs of Juba (Radial Arterial Streets)**

- **Yei Road (No. 5)**

**No. 5:**

Yei Road runs south from the roundabout intersection of May Street (No. 2). A memorial monument for Dr. John Garanga De Mabior stands about 20 meters from the edge of the

road to the west and middle of the road. An access road made of red bricks leads to the memorial monument from the edge of the road.

A section of road running south from the bus terminal passes the foot of Mt. Jebel Kujur and leads to the Way Station (for returnees) supported by GTZ near the Sudan-Uganda border. This section of road has two lanes and is unpaved.

Along the road stand general stores and stores handling light manufacturing goods like construction materials, and Mt. Jebel Kujur lies about three kilometers south of this point. At the foot of the mountain, Sudanese and Ugandan families do quarrying by hand, crush stones according to size, and sell the material along the road. In an area about two kilometers further south is a domestic water well about six to seven meters from the center of the road, which is used by local residents.

Electric poles with electric cables are placed on one side of the road running south from the bus terminal to an area near Mt. Jebel Kujur.

- **Junction of 7 days Adventist – Gudele (No.6), Custom Market – Terakera (No. 7)**

**No. 6:**

No. 6 road is a radial arterial road running on the south side of the Munuki district. The road has two lanes and is unpaved. Along the road stand general stores, sundries stores and stores handling light manufacturing goods like construction materials (including temporary stores), with typical houses found throughout the area. Electric poles with electric cables are placed on one side of the road.

**No. 7:**

No. 7 road is a radial arterial road running on the east side of the Munuki district, and leads to May Street (No. 2), Unity Avenue (No. 1) and Yei Road (No. 5), which is another radial arterial road. The road has two lanes and is unpaved. Along the road there are governmental facilities and sundries stores (including temporary stores), with typical houses scattered throughout the area. Electric poles with electric cables are placed on one side of the road.

- **Nyigilo Street (No. 24) and Nile Bridge – Radio Gumba (No. 8)**

This is a radial arterial road running from Unity Avenue (No. 1) to Nyigilo Street and Torit Road via the White Nile, and on to Uganda and Kenya. The road has two lanes and is unpaved. Along road to the Nile stand many sundries stores and stores handling light manufacturing goods like construction materials (including temporary stores), and there is a market on Nyigilo Street near Unity Avenue.

Electric poles with electric cables are placed on one side of the road to the White Nile.

**(3) Environment along subsidiary arterial roads**

All subsidiary arterial roads are unpaved but spacious enough to have two lanes. However, many parts are sharply sloped in the longitudinal direction, with uneven and undulating road surface both in the longitudinal and transverse sections like a washing board, so the driving



environment is much worse than that on simply unpaved roads.

There are sections where surface soil has been eroded away by heavy rains, thereby making undulation of the road even worse. Roads in the area encompassed by May Street and Unity Avenue, and the area south of Unity Avenue are particularly in bad shape.

A residential area dominated by typical houses lies along the roads in the areas mentioned above, with facilities related to schools also scattered about. Of the roads positioned as subsidiary arterial roads, it is assumed that No. 13 road (Juba University) and No. 11 road (the Junction of Yei Road and Juba University) will function as arterial roads.

**No. 11 and No. 13:**

No. 11 road and No. 13 road are radial arterial roads. Both run to May Street (No. 1) and Unity Avenue (No. 2), and lead to military facilities and Yei Road, which is a radial road. No. 11 road and No. 13 road have two lanes, and are unpaved.

Governmental and educational facilities lie along sections of the roads to May Street (No. 1) and Unity Avenue (No. 2). Along the sections of roads to military facilities, there is open space with temporary stores and typical houses scattered about. There is also open space extending from the area near the military facilities to Yei Road, with typical houses scattered about. A new customs market is located near Yei Road.

The roadside conditions are summarized in the Table 12.6.1-1.

**Table 12.6.1-1 Roadside Condition of Existing Roads and New Roads**

Roadside Condition	Existing Road																New Road	
	1	2	20	3	4	10	11	13	17	19	22	5	6	7	8	24	C3	C4
Sidewalk																		
Roadside Tree																		
Electric Wire																		
Community (Residence)																		
Shop																		
Market																		
Government Facility																		
Commercial Facility																		
Business Facility																		
Education Facility																		
Medical Facility																		
Sports Facility																		
Church																		
Mosque																		
Water supply Facility																		
Well																		
Monument																		
Transportation Terminal																		
Vegetation *																		
River Nile																		

\* Vegetation : Cultivated Field, Grassland, Bush, Forest/Grove/Woodland

Environmental evaluation of the road improvement/construction projects is shown below:

**(1) Involuntary resettlement**

The road network development plan proposed as a component in the urban transport development master plan includes the rehabilitation of the existing roads and the construction of new roads. Basically the rehabilitation of the existing roads will not involve the problem of relocation of residents, while the construction of new roads may require the relocation of residents. However, the relocation of residents is not so many because the new roads pass mainly through the presently vacant or houseless areas and that the routes of new roads will be selected so as to minimize the relocation of residents. In case of relocating residents and facilities, adequate talks with stakeholders are essential to solve the problem.

**(2) Local economy, employment and livelihood**

Employment opportunities will become available only during road construction, but positive effects on the local economy are expected. No. 1 and No. 2 roads are paved roads, but others are unpaved, severely undulating mud roads, resulting in extremely rough road. The

improvement of these mud roads is expected to help vitalize the local economy, including a drastic reduction in travel time.

**(3) Land use and local resource utilization**

As the land use plan aiming at orderly and sound urban development is realized by necessary road improvements under the master plan, positive effects will be generated on land use and local resource use in the future.

**(4) Existing social infrastructure and services**

There is society-related capital in Juba and surrounding areas in the form of water supplied through the Nile and water wells, and electricity supplied by generators. For the supply of water now being transported in water tanks or otherwise manually in particular, the road improvement work is expected to ensure a safe and efficient water supply, and generate other positive effects.

**(5) Local communities**

Many people living in Juba and surrounding areas belong to the Bari ethnic group, but there is little friction between the different ethnic groups. A long civil war recently ended, and more impoverished people including returning soldiers are relocating here. In the future when urban development proposed under the master plan takes place and roads are improved in parallel, the safety and efficiency of transporting people and commodities will be ensured. It is therefore expected that positive effects will be generated.

**(6) Benefits and damage misdistribution**

Since the road improvement work will secure the smooth transport of people and commodities in Juba and surrounding areas, it is considered that the fairness of distribution will be maintained.

**(7) Gender**

In Juba and surrounding areas, water is supplied through the Nile and water wells. In many cases, it is the work of women and children to carry the water.

The Ministry of Transport and Roads (MTR) is now formulating an “HIV/AIDS and Gender Strategic Plan” for its personnel and their families. The Louis Berger Group also submitted its draft in August 2007. Under such circumstances, it is expected that the road improvement work will lighten their exhaustive labor, and thus generate positive effects.

**(8) Children’s rights**

It is considered that the road improvement work will benefit elementary school students in Juba and surrounding areas, secure their means of going to school, and produce other positive effects.

**(9) Cultural heritage**

No special cultural heritage exists in Juba and surrounding areas. However, since the monument of the former vice president and religious facilities like churches and mosques stand along the roads, it is necessary to consider these structures when planning road improvement work.

**(10) Local conflicts of interests**

Because the roads will be improved as the public works project of the Government of Southern Sudan, it is considered that conflicts among beneficiaries will not occur.

**(11) Public sanitation**

The road improvement work is expected to facilitate transportation to hospitals and other medical institutions in Juba and surrounding areas, increase opportunities for obtaining safe food and water more hygienically, and generate positive health effects, such as better eye health by eliminating the dust generated by the existing mud roads.

**(12) Infectious diseases such as HIV/AIDS**

The Government of Southern Sudan (GOSS) has been taking various measures against infectious diseases as follows:

Southern Sudan established the Southern Sudan AIDS Commission (SSAC) in June 2006, and organized HIV/AIDS/STIs(\*) Directorate in the Ministry of Health (MOH) in November 2007. The following are “HIV Indicators in Southern Sudan” described in a pamphlet prepared by the Directorate with regard to the goal, objectives and strategies to prevent HIV/AIDS/STIs:

*\* STIs stands for Sexually Transmissible Infections.*

<u>HIV Indicators in Southern Sudan</u>
1. Taking average population of Southern Sudan as 10,000,000
2. HIV Prevalence estimated for Southern Sudan (3.1%)
3. Number of People Living with HIV (PLHIV) (155,000)
4. Number of people in urgent need of anti retroviral therapy (23,250)
5. Current number of PLHIV on prophylaxis (2000)
6. Current number of PLHIV on anti retroviral therapy (850)
<u>HIV Care and Treatment Centers in Southern Sudan</u>
1. Juba Teaching Hospital    2. Wau Teaching Hospital    3. Malakal Teaching Hospital
4. Yei Civil Hospital    5. Kajo keji Hospital    6. Nzara Hospital    7. SPLA Center

The HIV/AIDS/STIs Directorate also produces and distributes calendars as part of its campaign to fight against HIV/AIDS/STIs. In December 2005, the Sudanese National AIDS Control Programme (SNAP) and UNICEF jointly launched a campaign against HIV/AIDS especially for children. The Ministry of Transport and Roads (MTR) is now formulating an “HIV/AIDS and Gender Strategic Plan” for its personnel and their families, and the Louis Berger Group submitted its draft in August 2007.

When making road improvements, it is essential to disseminate related information and hold seminars involving those related to and interested in the road improvement work including local residents, giving a good opportunity of campaign to fight against HIV/AIDS/STIs at the same time.

**(13) Water usage and right**

Although water rights do not exist for the Nile and its branches, road improvement is expected to produce positive effects on the water related matters as mentioned in (4), (7) and (11).

**(14) Traffic accidents**

Many unpaved two-lane roads will be paved and some will be converted into four-lane roads by the road improvement project. This will increase vehicle speed and consequently more traffic accidents are expected to occur. Furthermore, as the population of Juba and surrounding areas is expected to increase in the future and the ownership rates of automobiles and motorcycles will also increase, it is feared that traffic accidents more and more increase. It is therefore necessary to take software- and hardware-related measures against traffic accidents.

**(15) Biota and ecosystem (Fauna and flora)**

In case of repair/renovation of the existing roads, there is almost no effect on ecosystem or biota, but it is necessary to consider the trees along streets. In case of construction of new roads passing through areas of vegetation in grassland and other areas, and crossing the Nile, it is necessary to conduct detailed investigations and consult with related organizations when making road improvement.

**(16) Geographical features**

There is no geologically significant place in Juba and surrounding areas, but there is an operational quarry at Mt. Jebel Kujur. As described in (15), new roads will pass through areas of vegetation in grassland and other areas, and cross the Nile, so it is necessary to conduct detailed investigations and consult with related organizations when making road improvement.

**(17) Soil erosion**

The project area will not be susceptible to soil erosion caused by rainfall, especially during the rainy season.

**(18) Underground water**

When implementing road improvement works, it is necessary to take necessary measures to maintain the groundwater levels as appropriate.

**(19) Hydrology situation**

The water level of the Nile branches changes greatly depending on the rainy season or dry season. In some places, the water reaches the top of bridges and causes flooding in the rainy season, while the rivers dry up completely in the dry season. It is therefore necessary to pay full attention when making road improvement. In general, hydrological conditions are expected to be bettered by the improvement made to bridges and culverts.

**(20) Coastal zone (mangrove etc.)**

Although there are no mangrove forests or areas important in terms of ecological conservation in Juba and surrounding areas, it is still necessary to pay attention to damp areas in the northern area and the Nile when making road improvement.

**(21) Landscape**

It is considered that changes to the local landscape will be minor.

**(22) Climate exchange**

Since it is assumed that the project will not produce significant topographic alterations or deforestation, there will be no impact on local weather conditions.

**(23) Global warming**

Most of the roads in Juba and surrounding areas are unpaved. It is expected that pavements provided under the road improvement work will be effective in improving mileage due to reduced travel time and improved traffic flow. Therefore, though it is difficult now to predict any impact on global warming, it is considered that there will be no impact for the time being.

**(24) Air pollution**

The same effect as described in (23) can be expected on air pollution. Because the generation of soil dust can be reduced substantially after pavements are provided, positive effects are expected against health problems.

**(25) Water pollution**

At the construction stage, it is necessary to adopt the construction methods that do not affect water quality. At present, sites along the branches of the Nile are used for waste disposal. The road improvement work including bridges and culverts is expected to improve such situation.

**(26) Soil contamination**

There has been no area where soil contamination may arise. At the construction stage, it is necessary to be careful about the properties of soil and stones brought from other areas.

**(27) Bottom sediments in sea and rivers**

The properties of sediments in the Nile and its branches are such that improvement work on the bridges and culverts will not cause any problem.

**(28) Waste**

Because construction waste will be generated during the construction stage, it must be treated appropriately. General waste is currently piled up along the roads and near the bridges and culverts. However, the road improvement work will improve the conditions of the roads, bridges and culverts. It is also necessary to disseminate information about appropriate waste treatment and disposal.

**(29) Noise and vibration**

The noise and vibration will occur during the construction stage due to the operation of construction equipment, and after the completion and opening to traffic due to increased traffic in general. In case of Juba, however, it is considered that the noise and vibration will be rather lower than those caused by the existing unpaved and undulating roads.

**(30) Ground subsidence**

A specific construction plan for securing water for construction use at the construction stage is necessary, but it is considered that securing water for construction use will not cause ground subsidence.

**(31) Offensive odors**

The road improvement work will not generate offensive odors.

The evaluation results for environmental elements are summarized in Table 12.6.1-2.

**Table 12.6.1-2 Evaluation Results for Environmental Elements**

<b>Environmental Elements</b>	<b>Evaluation Results</b>
<b>Social Environment</b>	
1. Involuntary resettlement	B
2. Local economy, employment and livelihood	E
3. Land use and local resources utilization	E
4. Existing social infrastructure and services	E
5. Local communities	E
6. Benefit and damage misdistribution	D
7. Gender	E
8. Children's rights	E
9. Cultural heritage	D
10. Local conflicts of interests	D
11. Public sanitation	E
12. Infectious diseases such as HIV/AIDS	D
13. Water usage and right	E
14. Traffic accidents	B
<b>Natural Environment</b>	
15. Biota and ecosystem (Fauna and flora)	D
16. Geographical features	D
17. Soil erosion	D
18. Underground water	D
19. Hydrology situation	D
20. Coastal zone (mangroves etc.)	D
21. Landscape	D
22. Climate exchange	D
23. Global warming	D
<b>Pollution</b>	
24. Air pollution	E
25. Water pollution	D
26. Soil contamination	D
27. Bottom sediment in sea and rivers	D
28. Waste	D
29. Noise and vibration	D
30. Ground subsidence	D
31. Offensive odors	D

Note) A: serious impacts, B: some impacts, C: degree of impacts is unknown, D: Few impacts  
E: Desirable impact

Source: JICA Study Team

## 12.6.2 Bus Terminal & Bus Parking Area Project

4 bus terminals and 6 bus parking areas are proposed as shown in Figure 12.6.2-1 (Refer to Chapter 10.4.2).



**Figure 12.6.2-1 Location of Proposed Bus Terminals and Bus Parking Areas**

Land use condition for the area related to the bus terminals and bus parking areas project in M/P is shown in Table 12.6.2-1.



**Table 12.6.2-1 Land Use Condition of the Area Related to Bus Terminal & Parking Area Project**

Surrounding condition of Bus Terminal & Parking	Bus Terminal				Bus Parking Area					
	1	2	3	9	4	5	6	7	8	10
Sidewalk										
Roadside Tree										
Electric Wire										
Community(Residence)										
Shop										
Market										
Government Facility										
Commercial Facility										
Business Facility										
Education Facility										
Medical Facility										
Sports Facility										
Church										
Mosque										
Water supply Facility										
Well										
Monument										
Vegetation *										
River Nile										

\*Vegetation : Cultivated field, grassland, bush, forest/grove/woodland

No.1, No.2 and No.3 of bus terminals are already operated now, while No.9 is newly proposed. The land use of surrounding area of No.9 is disorderly. Therefore the project will involve an area-wide development.

The project is environmentally evaluated as D (few impacts) or E (desirable impact) in all environmental elements, except for No.9 Bus Terminal which is evaluated as B (some impacts) in terms the “involuntary resettlement”. The bus terminal and bus parking area projects are expected to have positive effects on local economy, employment and livelihood. Furthermore, the bus terminals and parking areas are expected to play the role as the information bases for public.

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## **CHAPTER 13**

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# **P**ROPOSED PROJECT IMPLEMENTATION SYSTEM

## CHAPTER 13 PROPOSED PROJECT IMPLEMENTATION SYSTEM

### 13.1 PRESENT IMPLEMENTATION SYSTEM

#### 13.1.1 Present Procedure for Urban Transport Project Implementation

Roads in Southern Sudan are administratively classified into three categories, namely, National Road, State Road and County Road, as shown in Table 13.1.1-1.

**Table 13.1.1-1 Administrative Road Classification**

Category	Extension of Road		Responsible Agency	
			Improvement/ Construction	Operation/ Maintenance
National Road	International/ interstate roads	Sections inside Urban Area	Ministry of Transport and Roads (MTR), GOSS	MOPI, CES
		Sections outside Urban Area		MTR, GOSS
State Road	Intra-state roads, and inter-county roads in general		Ministry of Physical Infrastructure (MOPI), CES	
County Road	Intra-county roads, including minor roads within a community		County Office under the direction of MOPI, CES	

The relationship between the present administrative road classes and responsible agencies are in principle as follows:

- Even National Roads, for the sections located within Juba urban area are operated/ maintained by the MOPI with support of the MTR in all aspects as necessary.
- The projects for National Roads and other categories of roads mixed are usually implemented by the MTR.
- The technical and financial supports are provided for the MOPI by the MTR as necessary.
- The MOPI supports County Offices for construction/operation/maintenance of County Roads in all aspects, especially for finance. All funds thereof are taken from the MOPI budget.

*Note : GOSS is creating city councils. Juba City Council, once it is created, will be responsible for operation and maintenance of all categories of roads within Juba urban area together with other urban infrastructures.*

The present procedure for implementation of road projects located in Juba urban area is as follows :

#### **National Road Projects**

Present procedure for implementation of National Road projects located in Juba urban area is shown in Figure 13.1.1-1.

- **Overall Strategic Plan:** The MTR, in coordination with the MOPI, establishes the transport development policy and strategic plan. After formulation of the comprehensive transport development master plan, it will be employed as a guide for the transport development.

- **Project Proposal / Budgeting:** In accordance with the strategic plan or due to urgent needs for some reasons, individual road project is proposed by the MTR or other proponents. The MTR prepares a project description outlining the proposed project including the name, location, objectives, scope and rough cost of the project, expected timing of implementation, expected fund source and so on.

The proposed projects are prioritized and the projects to be implemented in the next year are selected to prepare a budget plan of the MTR. The budget is reviewed by Ministry of Finance & Economic Planning. After approval by the Southern Sudan Legislative Assembly, the budget becomes official.
- **Feasibility Study:** In order to verify the viability of the project, the feasibility study is conducted, including traffic demand forecast, preliminary design, cost estimate, economic evaluation and environmental/social evaluation.

In case of small/simple projects, this step is skipped. As a matter of fact, the feasibility studies have never been carried out except for some foreign assisted projects. In case of foreign assisted projects, the aid country/agency usually engages the consultant to undertake the feasibility study in collaboration with and on behalf of the MTR. The results of the feasibility study are used for appraisal and approval by the aid country/agency in case of foreign assisted project.
- **Project Approval and Fund Preparation:** The project, in case it varies from the approved budget, is subjected to the appraisal and approval by Ministry of Finance and Economic Planning and then the fund is prepared. The fund source is either GOSS fund or foreign assistance (loan or grant). In the latter case, the MTR negotiates and agrees with the aid country/agency on the conditions of the loan/grant.
- **Detailed Design and Bidding Documents Preparation:** The detailed design is carried out and the bidding documents are prepared on the responsibility of the MTR. In some cases, especially for foreign assisted project, a consultant is entrusted with these tasks.
- **Selection of Contractor:** A contractor is selected through advertisement, prequalification, bidding, bid evaluation, contract negotiation and award of contract. the MTR is responsible for all these procedures, sometimes with assistance provided by a consultant, especially for foreign assisted project. The award of contract is subjected to the approval by Ministry of Finance & Economic Planning. In most cases of foreign assisted project, the concurrences from the aid country/agency are required in specific stages.
- **Construction:** The selected contractor executes the construction work under the supervision of the MTR, sometimes with assistance provided by a consultant, especially for foreign assisted project.
- **Maintenance:** The sections of National Roads located within Juba urban areas are handed-over to the MOPI for operation and maintenance after completion of the project and

its acceptance by the MTR. There are two ways of execution of maintenance works: maintenance by force account (The MOPI executes maintenance works by itself using its own manpower and equipment) and maintenance by contract-out (The MOPI entrusts maintenance works to private contractors). Presently, the maintenance by contract-out is not applied.

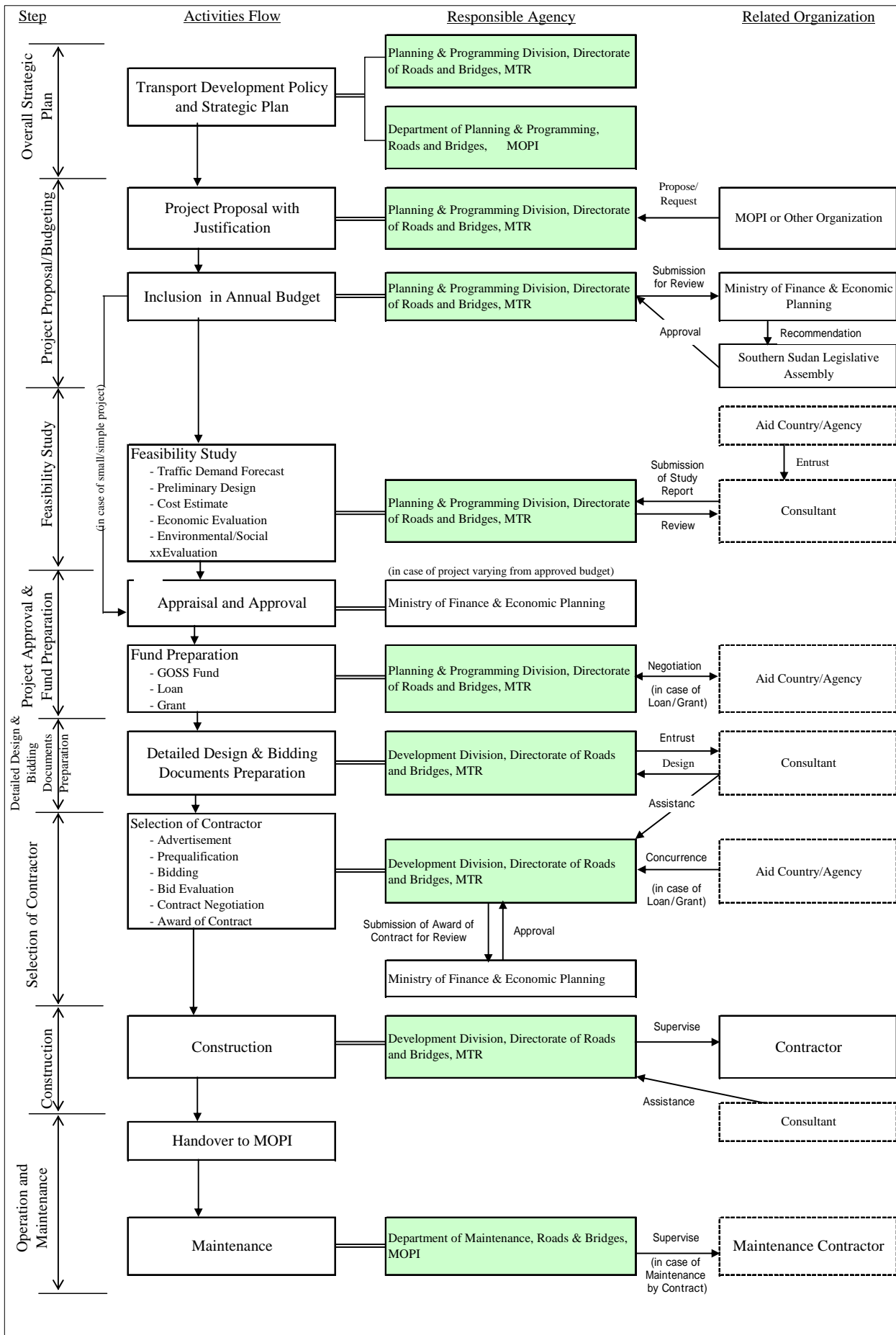
After Juba City Council is created, the operation and maintenance of all roads located within Juba urban area are to be handled by the Council.

### **State Road Projects**

- The implementation procedure for State Road projects is almost the same as that for National Road projects, except for the main actor who is the MOPI in case of State Road projects, instead of the MTR in case of National Road projects.
- In some cases, the MTR provides technical/financial supports to the MOPI in some stages of project implementation, as follows:
  - Technical support in feasibility study
  - Financial support in fund preparation
  - Technical support in detailed design and bidding documents preparation
  - Financial support in operation and maintenance

### **County Road Projects**

- The implementation procedure for County Road projects is almost the same as that for State Road projects, except for the followings :
  - The MOPI, as responsible/implementing agency for State Road projects, is substituted by County Office.
  - Funds for construction, operation and maintenance are taken from the MOPI budget.
  - In addition to the finance, technical support is provided by the MOPI as necessary in all stages.

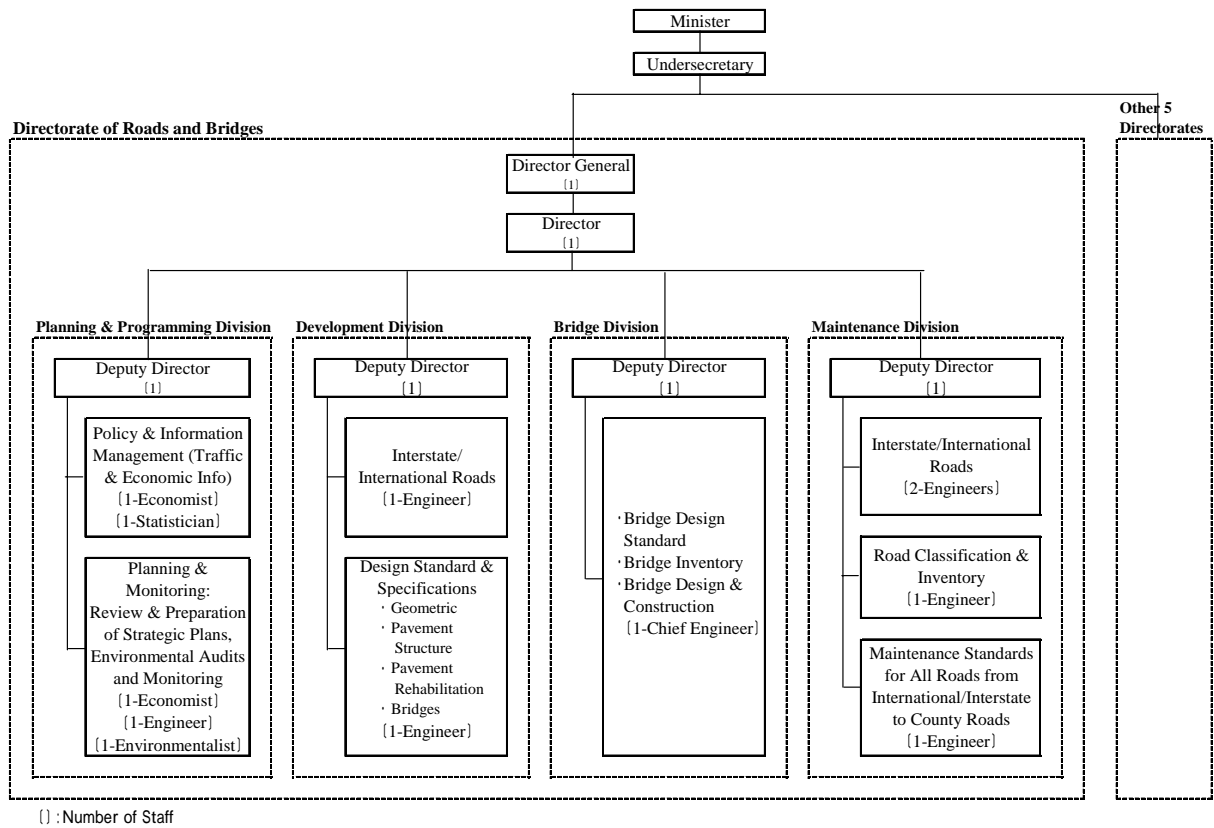


**Figure 13.1.1-1 Procedure for Implementation of Juba Urban Road Projects (in case of National Road)**

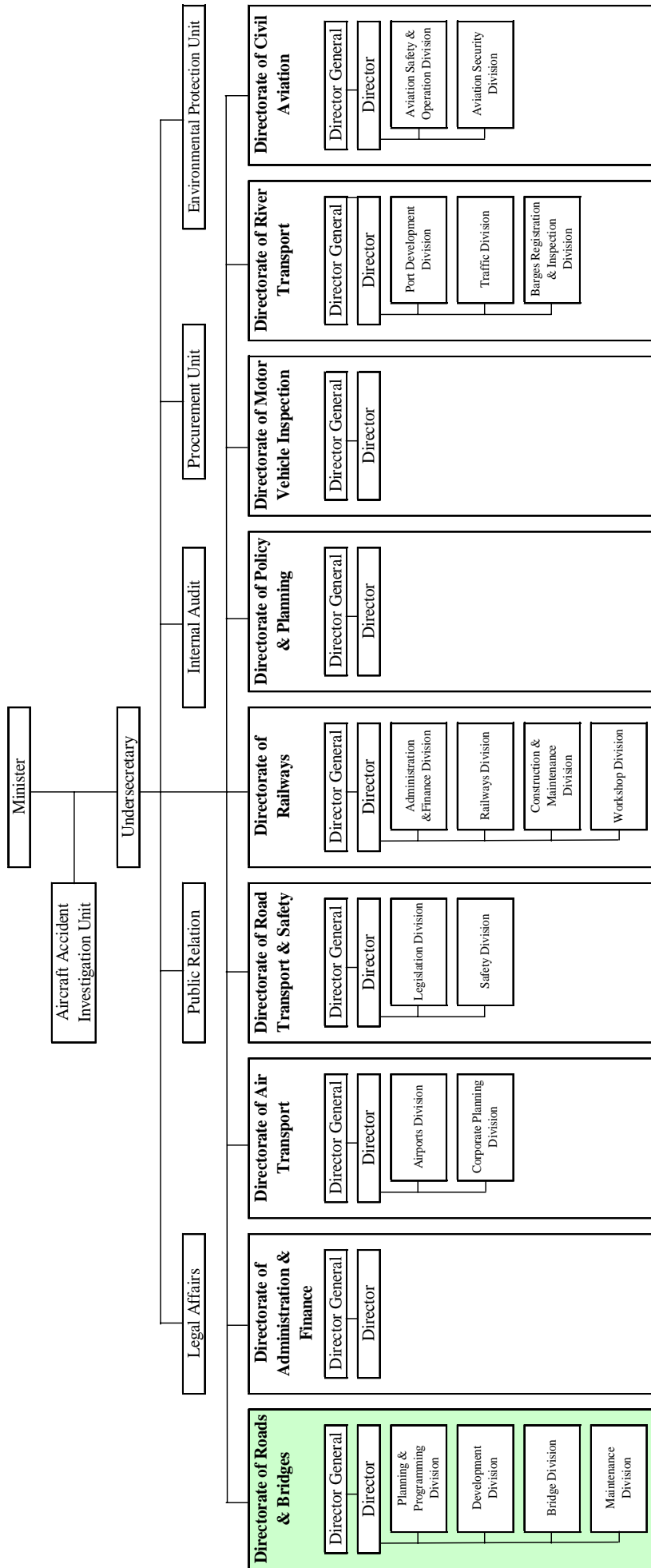
### 13.1.2 Present Organization of Agencies Responsible for Road Management

#### (1) MTR

The organization of the MTR is shown in Figure 13.1.2-1. In the MTR, the Directorate of Roads and Bridges is responsible for road management. Its organization is shown in Figure 13.1.2-2 while the major duties and responsibilities and number of staff of each division are summarized in Table 13.1.2-1.



**Figure 13.1.2-2 Organization of Directorate of Roads and Bridges in the MTR**



**Figure 13.1.2-1 Organization of Ministry of Transport and Roads (MTR)**

Note : Each division is headed by Deputy Director in principle.



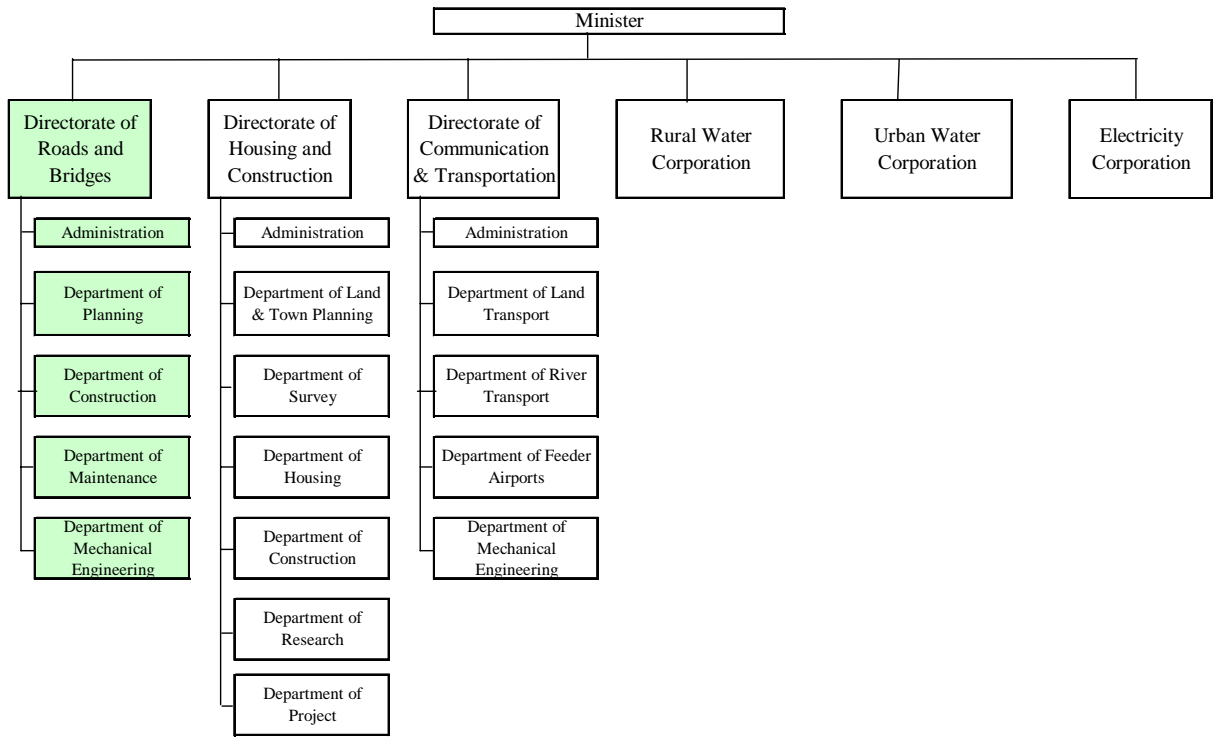
**Table 13.1.2-1 Major Duties and Number of Staff of Directorate of Roads and Bridges in the MTR**

Division	Major Duties and Responsibilities	Number of Staff
Planning and Programming Division	<ul style="list-style-type: none"> <li>• Establishment of transport development policy</li> <li>• Preparation, review and monitoring of strategic plans</li> <li>• Preparation of annual budget</li> <li>• Management of traffic and economic information</li> <li>• Environmental audits and monitoring</li> </ul>	6
Development Division	<ul style="list-style-type: none"> <li>• Preparation of road design standards and specifications</li> <li>• Design, contracting and construction management of road projects of the MTR</li> </ul>	3
Bridge Division	<ul style="list-style-type: none"> <li>• Preparation of bridge design standards and specifications</li> <li>• Bridge inventory</li> <li>• Design, contracting and construction management of bridge projects of the MTR</li> </ul>	2
Maintenance Division	<ul style="list-style-type: none"> <li>• Road classification and preparation of road inventory</li> <li>• Preparation of maintenance standards covering all categories of roads</li> <li>• Management, operation and maintenance of the equipment owned by the MTR</li> <li>• Planning and execution of maintenance of roads under jurisdiction of the MTR</li> </ul>	5
		Total 18 *

\* including 1-Director General and 1-Director

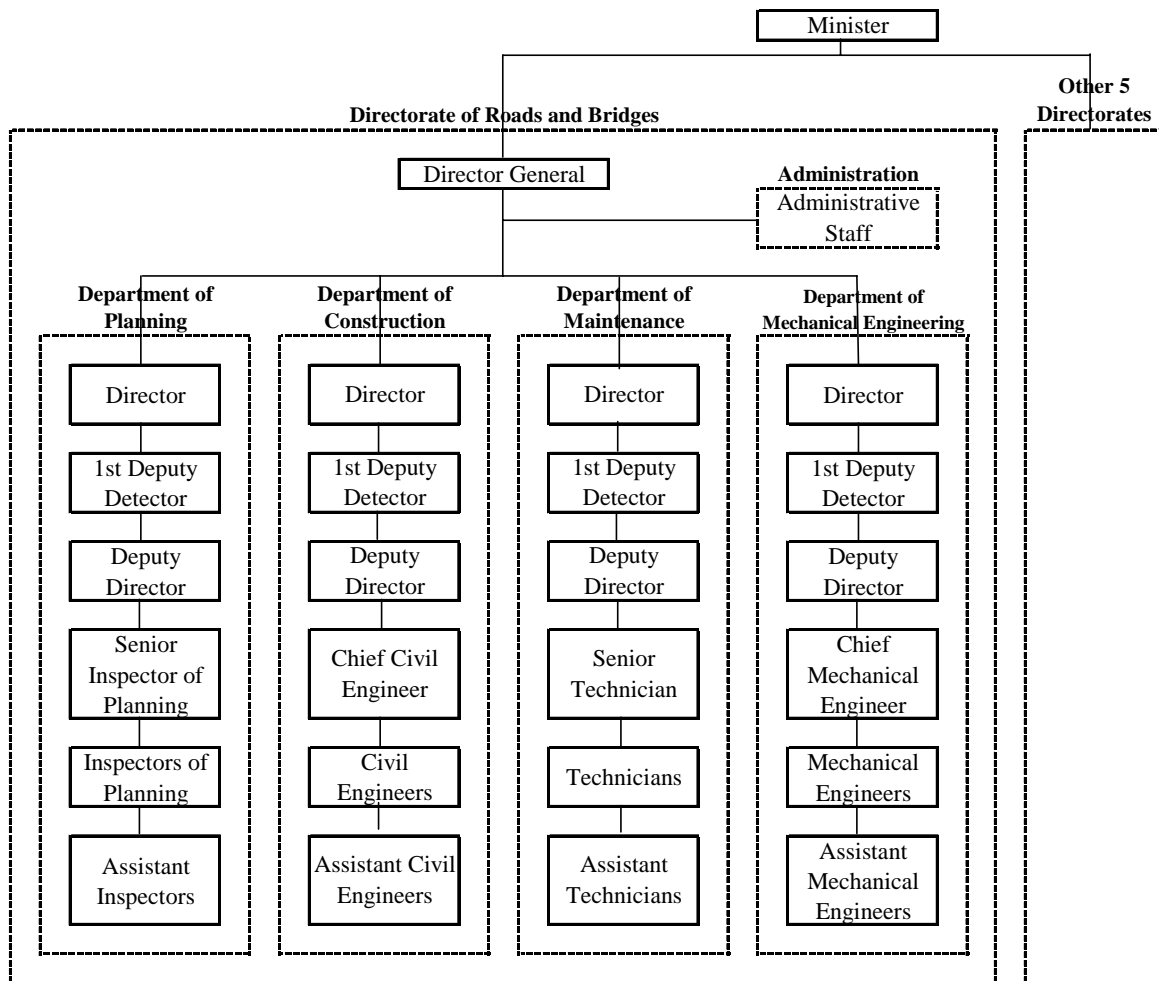
**(2) MOPI**

The organization of the MOPI is shown in Figure 13.1.2-3. In the MOPI, the Directorate of Roads and Bridges is responsible for road management. Its organization is shown in Figure 13.1.2-4 while the major duties and responsibilities and number of staff of each department are summarized in Table 13.1.2-2.



Note : Each Directorate is headed by Director General.  
 Each Department is composed of Director, 1st Deputy Director, Deputy Director, Chief/Senior Staff, General Staff and Assistant Staff.

**Figure 13.1.2-3 Organization of Ministry of Physical Infrastructure (MOPI), CES**



**Figure 13.1.2-4 Organization of Directorate of Roads and Bridges in the MOPI**

**Table 13.1.2-2 Major Duties and Number of Staff of Directorate of Roads and Bridges in the MOPI**

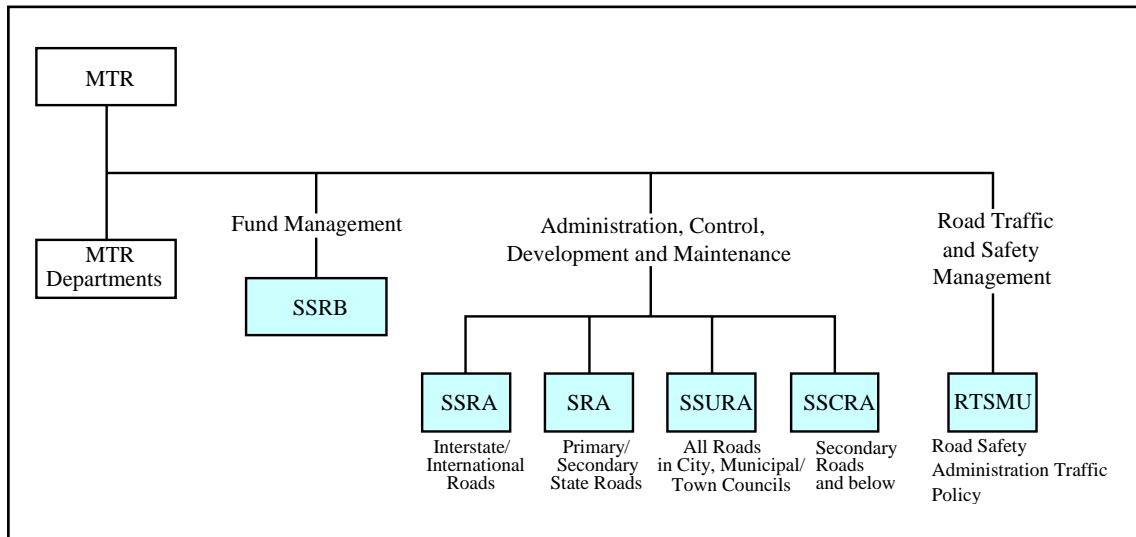
Department	Major Duties and Responsibilities	Number of Staff
Administration	General affairs, accounting	32
Department of Planning	Formulation of annual/long-term strategic plans for road development, formulation/study/design of individual road project	34
Department of Construction	Bidding and construction management of road projects	73
Department of Maintenance	Planning and execution of maintenance of roads under the jurisdiction of the MOPI	310
Department of Mechanical Engineering	Management, operation and maintenance of the equipment owned by the MOPI for rehabilitation/maintenance	165
		Total 614

### (3) Planned New Organizations

The Strategic Plan for Road Sector prepared by the MTR, July 2006, prescribes the strategy in achieving a sustainable development and maintenance of the road sector including the establishment of appropriate institution. The Plan recommends that the institutional arrangement for both funding and management needs to be clearly specified and a system of autonomous agency be established to manage the road infrastructure, finances and operation. These agencies will fall under the aegis and overall policy direction of the MTR. The recommended institutional arrangement is conceptually illustrated in Figure 13.1.2-5

- Southern Sudan Road Board (SSRB)
- Southern Sudan Road Agency (SSRA)
- State Road Agency (SRA)
- Southern Sudan Urban Road Agency (SSURA)
- Southern Sudan County Road Agency (SSCRA)
- Road Traffic and Safety Management Unit (RTSMU)
- 

SSRB will be responsible for fund management for development and maintenance of the entire roads. SSRA, SRA, SSURA and SSCRA will manage the roads demarcating the jurisdictions into interstate and international roads, primary and secondary State Roads, all roads within the areas of city/municipal/town councils, and secondary roads and below and small town roads respectively. RTSMU will take charge of the coordination and management of road safety activities.



**Figure 13.1.2.5 Structure Recommended by Strategic Plan**

### 13.1.3 Problems and Issues in Present Implementation System

Many problems and issues causing the obstructions to efficient implementation of road projects are identified as follows:

#### (1) Institutional Problems

- Rules and regulation for project implementation such as duties and responsibilities of the agencies concerned, project appraisal/approval procedure, project viability evaluation procedure, design review/approval procedure, regulation related to contracting including bidding procedures, prequalification and general conditions of contract, etc. are not clearly established.
- The MTR and MOPI are main actors in road projects implementation. The demarcation of duties and responsibilities between the two Ministries is ambiguous. It should be stipulated.
- Institutional structure is still immature. To improve the institutional structure, GOSS plans to establish new organizations as mentioned in Section 13.1.2 (3), but expected problems such as difficulty in staffing, duplication/dispersion of responsibilities and lack of coordination between Ministries/new organizations should be carefully examined and pre-cautioned.

#### (2) Inadequate Planning Framework

- The overall planning for road network development covering all categories of roads under the jurisdictions of GOSS, State Governments and County Councils is not well undertaken.
- Feasibility studies are seldom conducted except some foreign assisted projects. Feasibility studies are important to implement the project in the optimum scheme, to examine the viability of the project in various aspects, and finally to avoid the project being implemented improperly.

### **(3) Weak Implementing Capacity**

- The administrative and technical capacity of implementing agencies is still weak due to immature institutional structure, lack of qualified managerial personnel, lack of manpower both in number and skill.
- Consulting services are needed in some cases in various stages including planning, feasibility study, design, bidding and construction supervision. However, only few experienced local consulting engineers familiar with local conditions and circumstances are available.

### **(4) Inadequate Funding**

- The fund for road construction/improvement/rehabilitation/maintenance is inadequate, as found in the following fact:

The Ministry of Finance and Economic Planning, in “Expenditure Priorities & Funding Needs”, estimated the financing gap for 2008-2011 derived from the difference between GOSS’s expenditure needs for the period and its estimated revenues as summarized below:

- Total Financing Needs : US\$11,258 million
- Total GOSS Revenue : US\$ 8,662 million
- Committed Donor Funds : US\$ 605 million
- Financial Gap : US\$ 1,992 million

The fund for rehabilitation of road infrastructure accounts for 16 % of the total financing needs. Assuming the same percentage in the financial gap, the fund for road rehabilitation is about US\$320 million deficient.

- The other factor causing the deficiency of fund is high project costs. In Southern Sudan, especially in Juba, the construction cost is extraordinarily high, in all cost components including equipment, materials and personnel costs. It is said that the construction cost in Juba is more than 3 times as much as that in neighboring countries. The causes of such high cost are considered as follows:
  - Almost all equipment and materials are imported.
  - Their transportation costs are very high due to poor condition of roads to carry them.
  - Many skilled labors and even some common labors are foreign employees.
  - Wages of foreign employees are high because of difficult condition of living and high prices.

### **(5) Problems in Construction**

- The capacity of construction management, including dispute resolution, is inadequate due to lack of experienced engineers.
- In many cases, the performance of the contractor is not satisfactory in quality and/or progress. The causes of delay of works are said to be lack of financial capacity, lack of owned equipment, difficulty in materials procurement, etc.
- Only few local contractors are capable of construction works with adequate experiences, equipment and manpower.

- Also experienced local consultants to assist the implementing agencies in construction supervision are few.
- Land tenure is ambiguous due to incomplete land ownership/registration system and many records on land right abandoned/lost during the long conflict, causing disputes in acquisition of road right-of-way.

**(6) Problems in Operation and maintenance**

- Road maintenance works are far from adequate, causing not only deterioration of running condition but also shortening of usable life of assets.
- Some road users do not observe the traffic regulation causing traffic accidents affecting the road function and damaging road facilities in some cases.
- Overloaded vehicles often pass, affecting seriously the durability of pavement and causing damages of road facilities including bridges.

## **13.2 PROPOSED IMPLEMENTATION SYSTEM**

### **13.2.1 Basic Concepts and Measures**

The following basic concepts and countermeasures are considered in proposing an effective implementation system against the problems and issues mentioned in Section 13.1.3:

#### **(1) Institutional Problems**

- To establish a functional organization for project implementation (refer to Sections 13.2.3 and 13.2.4).
- To establish rules and regulation for project implementation, including jurisdictional demarcation between GOSS, State Government and County Government, duties and responsibilities of the agencies/departments/sections concerned, project appraisal/approval criteria/procedure, project viability evaluation criteria/procedure, design review/approval criteria/procedure, regulation related to contracting including bidding procedures, prequalification and general conditions of contract, etc.
- When new organizations as mentioned in Section 13.1.2 (3) are established, to carefully examine the expected problems such as difficulty in staffing, duplication/dispersion of responsibilities and lack of coordination between Ministries/new organizations and to retain in the MTR/MOPI the functions of formulation of basic policy and strategy, overall development planning, and coordination and adjustment between organizations.

#### **(2) Inadequate Planning Framework**

- To authorize the master plan to be formulated in this Study as an official guideline for Juba urban transport development and to acquaint all organizations/personnel concerned to share the common view.
- To review and update the master plan periodically and when socio-economic conditions are remarkably changed.
- To conduct feasibility studies for strategic and/or large-scale projects in order to implement the project in the optimum scheme and examine the viability of the projects in various aspects.

#### **(3) Weak Implementing Capacity**

- To include the component for staff training in as many projects as possible, taking opportunities of in-service and on-the-job-training by which more practical experiences are expected than classroom lectures.
- To encourage the local consultant engineers, by providing opportunities for them to join the consulting services team even as assistants in the beginning.

#### **(4) Inadequate Funding**

- To try to increase the funds for transport sector, e.g. introduction of the system allocating the vehicle related taxes and fees such as fuel tax, vehicle registration fee, drivers license fee, bus/taxi operating license fee, etc., exclusively for road sector budget, based on “beneficiaries to pay” and “causers to pay” principle.
- To try to reduce the construction cost as follows :
  - Since one of the major causes of high construction cost is high transport cost of equipment and materials due to poor road condition, the roads to carry the equipment/materials should be improved strategically.
  - In many cases, foreign contractors get the civil work contracts because of limited number

of experienced and capable local contractors, causing high contract amount. Local contractors should be promoted more so that the contract amount may be lowered through fair competition.

- In addition to the local contractors, other construction supporting industries at local basis such as construction material supplier, equipment lease company, manpower providing company, engineering survey company, skills training institution, etc. should be encouraged.
- Skills training for workers should be promoted so that more local skilled labors can work for construction, resulting in more economical construction. Also more unskilled labors should participate in construction works. It is an idea to stipulate the employment of more than a certain percentage of Sudanese workers in the conditions of contract.

#### **(5) Problems in Construction**

- As a part of staff training for project implementation capacity development as mentioned in Item (3) above, to include in the training subjects the construction management including quality control, progress control and dispute resolution.
- To include the penalty clause for the delay of works in the contract and to apply it strictly.
- To promote local contractors and consultants as mentioned in Item (4) above also addressing this issue.
- To establish proper land ownership/registration system and to develop sound land market in order to facilitate the acquisition of necessary land and prevent the disputes in land acquisition.

#### **(6) Problems in Operation and Maintenance**

- To execute the maintenance as adequately as possible, appreciating the importance of maintenance as follows :
  - To keep the facilities in good operational condition so that the expected benefits can fully be gained.
  - To prevent the facilities from deteriorating to the condition requiring extensive rehabilitation or to the extent that they cannot be economically rehabilitated.
  - To prolong the usable life of the facilities.
  - As a result, to minimize the life cycle cost of the facilities.
- To take strong measures for road users to observe the traffic regulation to prevent the traffic accidents affecting the road function and damaging road facilities.
- To take measures against overloading as an item of traffic regulation, providing axle load measuring facilities such as weigh bridge, portable axle load meter or the like, and strengthening the police monitoring and regulating.

### **13.2.2 Government Policy and Strategic Plan**

#### **(1) Transport Sector Policy**

As presented in Section 7.2 of Chapter 7, the MTR has prepared Transport Sector Policy, with a clear vision, mission, policy, objectives and implementation strategy for its role in achieving the GOSS objectives. It includes roads, railways, airport and river transport.

In the Policy, the following key policy factors for measurement of the effectiveness of transport sector delivery are emphasized, among others.



- **System Preservation**  
A “maintenance first” commitment guides the management of assets and process with funding and resources prioritized for the preservation and betterment of the system and services,
- **Management and Productivity**  
Maximize performance across the organization to make better use of scarce resources and improve an effectiveness and efficiency of the products and services that provide for citizen of the Southern Sudan.
- **Organization Excellence**  
Advance the ability of the MTR and participating institutions to manage for results and innovation.

These 3 key policy factors highlights the importance of maintenance of transport infrastructure, requirement of cooperation among organizations related to transport management, and necessity of capacity development of institutions participating in transport infrastructure development and management.

These policies are respected in proposing the overall implementation system in the Study.

## **(2) Strategic Plan for Road Sector**

As reported in Section 7.3 of Chapter, the Strategic Plan for Road Sector of the MTR prescribes the strategy to be followed by the GOSS in achieving development and maintenance of the road sector involving the following steps, among others.

- **Management of Road Network**  
Classification of roads, road inventory and condition survey, road standard and specifications, information management system, prioritization of project and activities.
- **Training Needs**
- **Contracting Strategy**
- **Road Traffic Safety**
- **Monitoring and Evaluation**

The establishment of appropriate autonomous institution was also underlined for both funding and management.

However, the achievable modification of the present administrative jurisdiction is proposed in establishing the overall implementation system of Juba Urban Transport Infrastructure Development, as mentioned in Section 13.2.3.

The Policy and Strategic Plan mentioned above are adopted as the basic policy of the Study in proposing the overall implementation system.

### 13.2.3 Organization Structure

In accordance with the proposed policy, the organizational structure for implementation of the urban transport infrastructure development in Juba is proposed as shown in Figure 13.2.3-1.

The main consideration in proposing the structure was focused on the practical and effective organization which shall be achievable and attainable in the short period, preferably within a few years.

The organizational structure for overall implementation system for transport sector in Juba shall be simple, straightforward and streamlined, to directly serve with their duties and functions for the transport needs in the area.

The existing Ministries and agencies related to management and operation of urban transport are;

- Ministry of Transport and Roads (MTR)
  - Road and road transport development
  - Air, river and rail transport development
- Ministry of Housing, Physical Planning and Environment (MHPPE)
  - Housing
  - Land and public utilities
  - Environment
- Ministry of Water Resources and Irrigation (MWRI)
  - Water resources
  - Irrigation and hydrology
- Ministry of Finance and Economic Planning (MFEP)
- Southern Sudan Electricity Corporation (SSEC)
- Southern Sudan Urban Water Corporation (SSUWC)
- Ministry of Physical Infrastructure (MOPI), CES

Considering the existing system mentioned above, the following principal institution arrangement is recommended (Refer to Figure 13.2.3-1).

- (1) **Establishment of Inter-Ministry Committee for Transport (IMCT)**
  - Members; MTR, MHPPE, MWRI, MFEP, SSEC, SSUWC, MOPI (CES), Traffic Police and other related agencies
  - Role: formulation of transport development policy, strategy and plan, and coordination between Ministries
- (2) **Demarcation of major roles and functions between MTR and MOPI**
  - The MTR: In charge of International/Interstate Roads (Arterial Streets in Juba)
  - The MOPI: In charge of State Roads/County Roads (Collector and Local Streets in Juba)

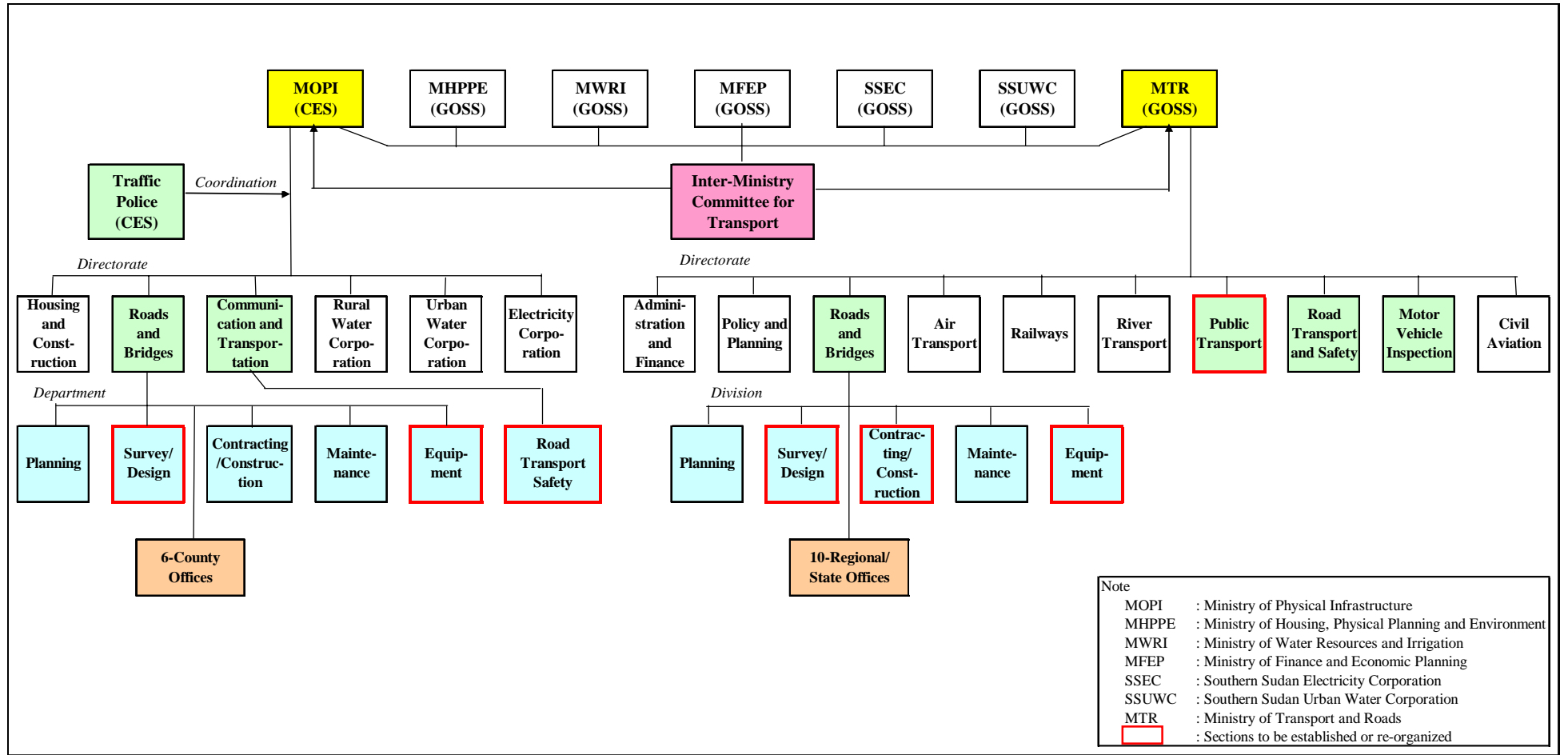


Figure 13.2.3-1 Proposed Overall Organizational Structure for Implementation of Urban Transport Development

### 13.2.4 Organizational Function and Implementation Flow

Figure 13.2.4-1 graphically demonstrates the standardized implementation flow of urban transport infrastructure development projects prepared in accordance with the basic policy and institutional arrangement. It is noted that this Study, Juba Urban Transport Infrastructure Development Study, be authorized by the agencies concerned, especially by the Inter-Ministry Committee for Transport to be newly created.

The establishment and/or re-organization of existing organizations are briefly discussed with respective functions.

**(1) Re-organization of Directorate of Roads and Bridges, MTR**

- Function; - Planning, survey/design, contracting/construction, maintenance and equipment for International/Interstate Roads development  
- Supervision/guidance of 10-Regional/State Offices

**(2) Establishment of Directorate of Public Transport, MTR**

- Function; - Public transport policy, planning and administration  
- Construction of public transport facilities

**(3) Strengthening of Directorate of Road Transport and Safety, MTR**

- Function; - Road transport safety policy, planning and administration  
- Traffic management and installation of traffic safety facilities

**(4) Reinforcement of Directorate of Roads and Bridges, MOPI**

- Function; - Planning, survey/design, contracting/construction, maintenance and equipment for State Roads and County Roads development  
- Supervisions/guidance of 6-County Offices.

**(5) Strengthening of Directorate of Communication and Transportation, MOPI**

- Function; - Road safety planning and administration  
- Installing the traffic safety facilities

**(6) Reinforcement of Traffic Police**

- Function; - Establishment of education system for traffic police  
- Traffic rule enforcement

Upon the establishment, strengthening and reinforcement of existing organizations with the specified functions, all stages of project implementation and management cycles can be steadily executed. It is however emphasized that the key of successful implementation is the harmonious cooperation of each organization.

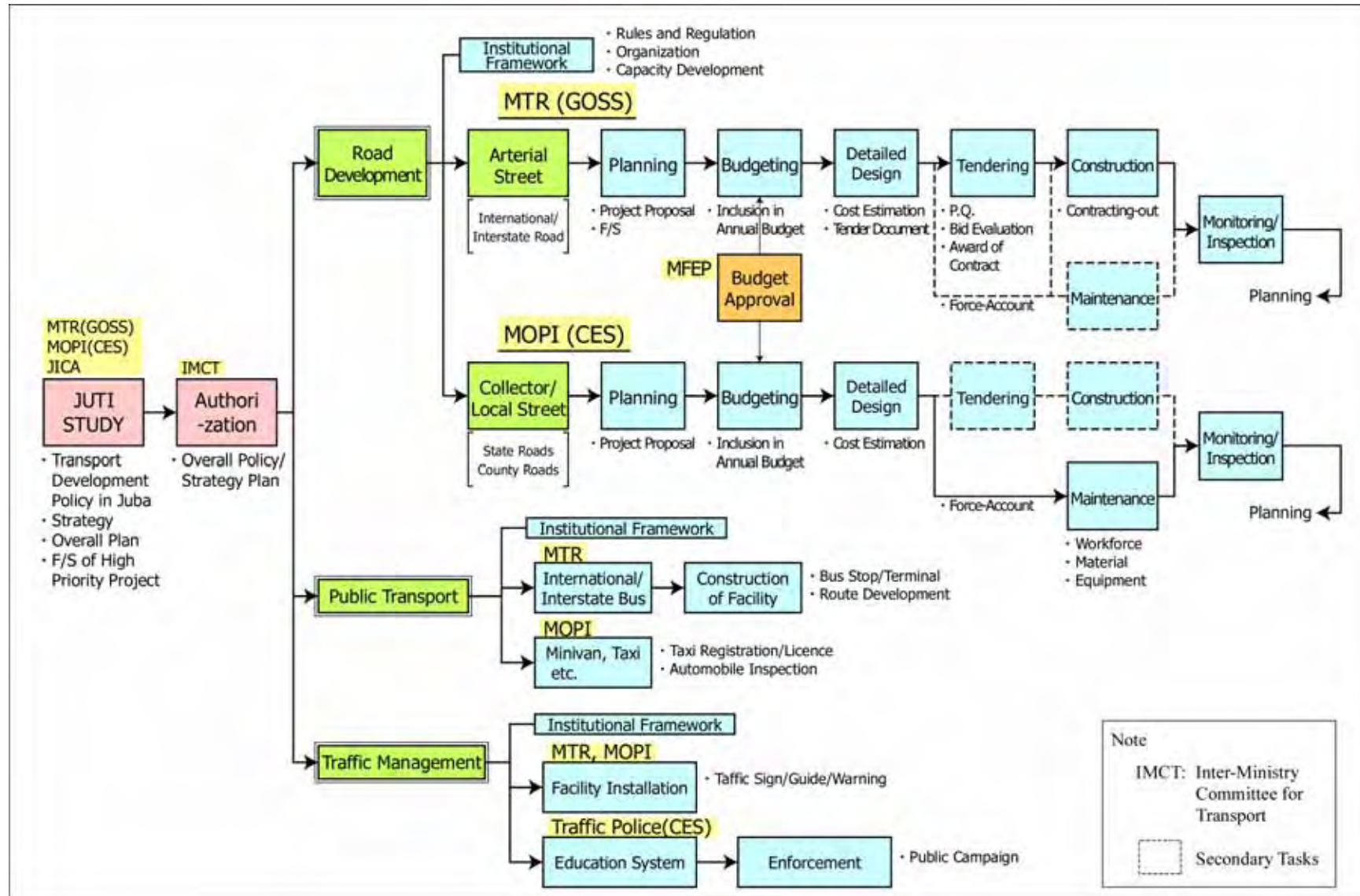


Figure 13.2.4-1 Project Implementation Flow of Juba Urban Transport Infrastructure (JUTI)

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## **CHAPTER 14**

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# **P**ROPOSED ROAD MAINTENANCE SYSTEM

## CHAPTER 14 PROPOSED ROAD MAINTENANCE SYSTEM

### 14.1 PRESENT MAINTENANCE SYSTEM

#### 14.1.1 Demarcation of Road Maintenance Work between MTR and MOPI

As mentioned in Section 3.2 of Chapter 3, the administrative road classification is established, while the demarcation of road development/maintenance works is not yet clearly defined between the MTR and the MOPI.

The MTR stands on the idea as shown in Table 14.1.1-1.

**Table 14.1.1-1 MTR's Idea on Demarcation of Road Improvement/Maintenance Works**

	Arterial Streets in Juba Urban Area	Other Streets in Juba Urban Area	Major International/ Interstate Roads	Other Roads outside Juba Urban Area	Remarks
Maintenance	STATE	GOSS and/or STATE	GOSS	GOSS and/or STATE	Contracted to NGOs
Rehabilitation	STATE	GOSS and/or STATE	GOSS	GOSS and/or STATE	MTR, NGO Contractor (by contract)
Improvement	STATE	GOSS and/or STATE	GOSS	GOSS and/or STATE	MTR, Donors, NGOs (by contract)
New Construction	STATE	GOSS and/or STATE	GOSS	GOSS and/or STATE	MTR, MDTF, Donors (by contract)

*Note)*

*Maintenance* :the works to keep the road in good operational condition, such as cleaning of road surface and side ditches, grading, pot hole repair, crack sealing, etc.

*Rehabilitation* :the works to restore the road to the original condition and function when it was constructed, such as re-gravelling, re-construction of base/subbase courses, re-paving, etc.

*Improvement* :the works to upgrade the original condition and function of the existing road, such as widening, new paving, new installation of drainage, etc.

*New Construction* :the works to construct new road

However, the MOPI has a different idea in the demarcation of road maintenance/rehabilitation/improvement/construction works in Juba Urban Area as shown below.

- Arterial Roads in Juba Urban Area; GOSS
- Other Roads in Juba Urban Area; STATE

## 14.1.2 Organization and Performance of MTR

The organization of the MTR is presented in Figure 13.1.2-1 (Chapter 13).

The major duties and number of staff in the MTR are shown in Table 14.1.2-1.

**Table 14.1.2-1 Major Duties and Number of Staff in MTR**

Sub-section	Major Duties and Responsibilities	Number of Staff
Maintenance	- supervision of on-going projects	6
Proj. Mgt. Team	- budget, contracts, tender process, etc.	2
Highway	- supervision of project	1
Bridges	- supervision, inspection, reporting	2
Urban Roads	- supervision	1
	Total	12

The MTR owns the construction equipment as listed in Table 14.1.2-2.

**Table 14.1.2-2 List of Equipment Owned by MTR**

Equipment	Model	Year of Manufacture	Capacity	Number	Condition*
Excavator	324D	2008	324HP	2	1
Loader Linkage	277B	2008	277HP	1	1
Motor Grader	160H	2008	160HP	2	1
Backhoe Loader		2008		1	1
Wheel Loader	966H	2008	966HP	2	1
Roller		2008		3	1
W-Shopmobile	4031	2007		1	1
Turk Actros	4031	2007	20T	5	1
Water Tank	MI3050	2007	18,000Lit	2	1

Note) \*Equipment Operational Condition

1- Operational

2- Broken

3- Under Repair

4- Not operational due to lack of parts

Table 14.1.2-3 presents the major works that are recently undertaken by the MTR for road rehabilitation and/or maintenance work (including on-going project).

**Table 14.1.2-3 Major Works Undertaken by MTR**

Road Name	Finance Resource
Faraksika – Yambio Road (Gravel Road)	MDTF/MTR
Lainya – Jambo Road (Gravel Road)	MTR
Mvolo – Aluakluak Road (Gravel Road)	MTR
Juba – Mundri Road (Gravel Road)	MDTF/MTR
Wau – Abyei Road (Gravel Road)	MDTF/MTR
Rumbek – Yirol Road (Gravel Road)	MDTF/MTR
Juba – Bor Road (Gravel Road)	MDTF/MTR

The MTR expresses some of the major problems in the present road rehabilitation/maintenance system as itemized below:

- Funds budgeted usually not sufficient.



- Imported materials take time to reach final destination.
- Other constrains
  - Skilled/experienced personnel in short fall.
  - Lack of available data.
  - Not ready planned roads.

Table 14.1.2-4 shows the expenditure in the fiscal year 2008 and the budget for the fiscal year 2009. The amount for the capital in 2009 budget contains the costs for construction and civil works including the road rehabilitation and/or maintenance works as detailed in Table 14.1.2-5.

**Table 14.1.2-4 2008 Expenditure and 2009 Budget of MTR**

*Unit: SDG*

Category	2008 Expenditure	2009 Budget
Salaries	2,154,396	7,650,669
Operating	10,776,861	8,124,794
Capital	560,043,285	444,224,537
Total	572,974,542	460,000,000

**Table 14.1.2-5 Cost Estimates for Construction & Civil Works (2009)**

*Unit: SDG*

Item	Amount
Completion of Aweil-Miriam (Eyat)	90,000,000
Completion of Aweil-Wau (Eyat)	22,648,428
Completion of Aweil-Madhol-Abyei-Amenth-Gogrial (Eyat)	53,471,576
Juba Urban Roads Lot 1 (Eyat)	10,000,000
Juba Urban Roads Lot 2 (CEC)	10,000,000
Completion of Mvolo-Aluak Aluak (Payii)	9,800,000
Completion of Wau-Warrap (Africa Gondei)	10,000,000
On-going construction of Juba-Lobonok-Moli (Kit Enterprise)	10,000,000
On-going construction of Hiyala-ikotos-Tseretanya-Madiope (Maddowel)	6,000,000
Wau-Raja; Juba-Terekeka-Ramchiel-Leer; Rumbek-Mayandit; Tambura-Wau (Eyat)	107,075,000
Ayod-Waat-Akobo (under contracting)	10,000,000
Bor-Pibor-Pichalla (Gabicon)	10,000,000
Buma-Raad (Ethiopia Road Authority)	3,558,333
Construction of Juba Airport Apron Car Park	10,000,000
Construction of Fence for the Juba Port	2,000,000
Total	364,553,337

### 14.1.3 Organization and Performance of the MOPI

The organization of the MOPI is presented in Figure 13.1.2-3 (Chapter 13).

The major duties and number of staff in the MOPI are shown in Table 14.1.3-1.

**Table 14.1.3-1 Major Duties and Number of Staff in MOPI**

Department/ Sub-section	Major Duties and Responsibilities	Number of Staff
Planning	- prepare annual plan of Ministry–projects, rehabilitation, maintenance - Dir. General decides which plan to execute	34
Construction	- supervision of on-going projects	73
Maintenance	- budget, contracts, tender process, etc. - supervision of project	310
Mechanical	- management, operation and maintenance of the equipment owned by MOPI	165
Administration	- general affairs - accounting	32
	Total	614

The MOPI owns the construction equipment as listed in Table 14.1.3-2.

**Table 14.1.3-2 List of Equipment Owned by MOPI**

Equipment	Model	Number	Condition*
Motor Grader	140H	2	1
Bulldozer	D8R	1	1
Motor Grader	14G	1	4
Bulldozer	955	1	4

*Note)\* Equipment Operational Condition*

- 1- Operational
- 2- Broken
- 3- Under Repair
- 4- Not operational due to lack of parts

The MOPI has carried out only one civil work, namely “clearance of roads from Juba Nabari to Gudele (14.9 km)”.

The major problems in the present road rehabilitation/maintenance system expressed by the MOPI are itemized below.

- Budget availability for maintenance and rehabilitation. Annual/3-months plans are prepared by the Directorate but sometimes budget is not available for work execution.
- Lack of Equipment and tools for road and bridge maintenance.
- Staff Capability – Needs capacity/capability improvement for engineers and skilled staff through training, OJT, etc.
- Lack of incentives for staff
  - Skilled labors – overtime pay
  - Engineers – fieldwork pay
- Lack of survey instruments

Table 14.1.3-3 shows the annual budget for 2008 as proposed by the MOPI.

**Table 14.1.3-3 Annual Budget of MOPI for 2008**

*Unit: SDG*

Category	2008 Budget
Salaries	4,482,216
Operating	1,002,200
Capital	5,379,461
Total	10,863,877

## 14.2 REQUIRED MAINTENANCE WORKS

### 14.2.1 Road Maintenance Classification

In general, road maintenance and management works are classified into:

- Routine Maintenance
- Periodic Maintenance
- Emergency Maintenance

The strategy for routine and periodic maintenance is to focus on those roads that have been reconstructed or improved, or which are in fair/good condition where maintenance effort would not be wasted. Emergency maintenance aims to immediately re-open roads which became impassable due to unanticipated incidents.

#### **Routine Maintenance**

These are works that are undertaken each year that are funded from the recurrent budget. Activities can be grouped into cyclic and reactive works types. Cyclic works are those undertaken where the maintenance standard indicates the frequency at which activities should be undertaken. Examples are verge cutting and culvert cleaning, both of which are dependent on environmental effects rather than on traffic levels. Reactive works are those where intervention levels, defined in the maintenance standard, are used to determine when maintenance is needed. An example is the patching, which is carried out in response to the appearance of cracks or pot-holes.

The proposed actions for routine maintenance are:

- Provide routine maintenance on roads only after completion of reconstruction or rehabilitation,
- Provide routine maintenance on roads in relatively good condition which will not be rehabilitated or improved until late in the plan period,
- Provide routine maintenance on roads which have been re-opened following emergency maintenance, and
- Do not provide routine maintenance on roads which are scheduled for reconstruction.

## **Periodic Maintenance**

These include activities undertaken at intervals of several years to preserve the structural integrity of the road, or to enable the road to carry increased axle loadings. The category normally excludes those works that change the geometry of a road by widening or realignment. Works can be grouped into the work types of preventive, resurfacing, overlay and pavement reconstruction. Examples are resealing and overlay works, which are carried out in response to measured deterioration in road conditions. Periodic works are expected at regular, but relatively long, intervals. As such, they can be budgeted for on a regular basis and can be included in the recurrent budget. However, many countries consider these activities as discrete projects and fund them from the capital budget.

The proposed action for periodic maintenance is:

- Provide periodic maintenance on reconstructed/rehabilitated roads as required (assumed to begin approximately six years after completion)

## **Emergency Maintenance**

These are activities whose needs cannot be estimated with any certainty in advance. The activities include emergency works to repair landslides and washouts that result in the road being cut or made impassible. A contingency allowance is normally included within the recurrent budget to fund these works, although separate special contingency funds may also be provided.

Typical works required include:

- Repair of landslides and washouts
- Temporary repair/replacement of dangerous bridges
- Construction of fords or causeway at river/stream crossing
- Temporary restoration of badly failed pavement sections
- Drainage repairs

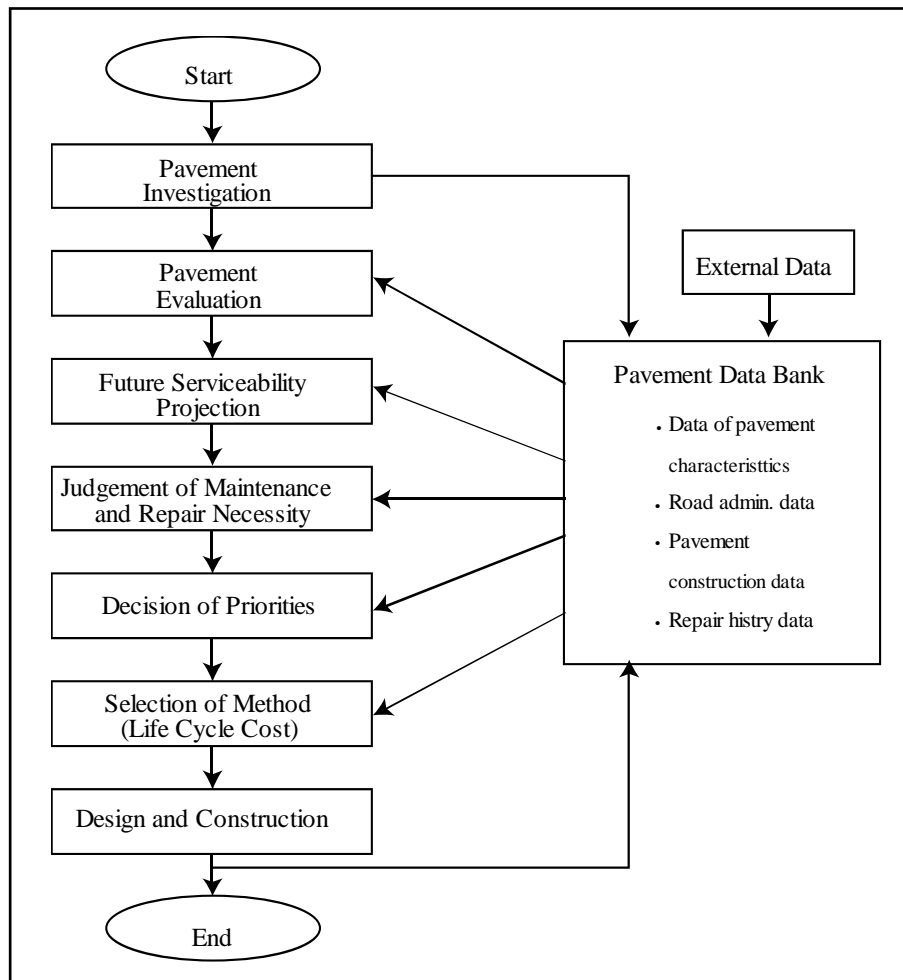
### **14.2.2 Maintenance Management System**

Planning of maintenance and repair of roads is relevant to the selection of the locations to be repaired and the timing and method of repair. It is influenced by many conditions including climate, topography and geology, available technology for design and construction, and budget. A systematic approach on road maintenance is to establish maintenance management system for roads. It is necessary to optimize overall planning including road condition survey and maintenance activities in field, aiming at the establishment of such a systematic approach.

The purpose of maintenance system for pavement is as follows:

- (1) To conduct maintenance of the constructed roadways while making the most effective use of a limited budget, and
- (2) To provide the user with safe, comfortable and economical pavement.

Basic flow of the pavement maintenance system is shown in Figure 14.2.2-1.



**Figure 14.2.2-1 Basic Flow of Pavement Maintenance Management System**

### 14.2.3 Road Maintenance Works

Generally, maintenance works are classified as shown in Table 14.2.3-1.

**Table 14.2.3-1 Classification of Maintenance Works**

<b>Routine Maintenance</b>	
General	Clearing Vegetation, Rubbish and Debris
	Restoration of Rain-cuts and Eroded Embankment Slopes
	Small Scale Landslide/Sand Dune Clearance
	Shoulder Maintenance (Restoring to Original Level and Cross Section/ Profile by Re-grading and Replenishment of Shoulder Material)
	Watering to Planting Tree
Gravel Roads	Erosion Control
	Dealing with Corrugation
	Soft and Weak Subgrade
	Motor-grader Operation
Asphalt Pavement	Filling of Potholes
	Patching of Local Areas
	Crack Sealing
	Repairs of Other Kinds of Faults (Raveling, Sand Blanketing of Bitumen Bleeding Areas, Hugry Areas and Damaged Edge)
Concrete Pavement	Resealing Joints
Bridge and Culvert	Maintenance for Concrete Structure
	Maintenance for Steel Structure
	Maintenance for Masonry Structure
	Maintenance for Other Bridge Components
	Maintenance for Slope and Riverbed Protection
Drainage and Catch Pit	Clearing
	Reshape/Re-grade/Deepen Drains
	Repair Lining/Stone Pitching
	Provide/Repair Scour Protection
Miscellaneous Works	Clearing and Repair of Traffic Signs
	Road Marking
	Replacement of Road Studs, Milestones, Culvert/Bridge Marker Posts, Safety Barriers, Guard Rail and Curbs
<b>Periodic Maintenance</b>	
Asphalt Pavement	Functional Overlay
	Strengthening Overlay
Concrete Pavement	Full Depth Repair
<b>Emergency Maintenance</b>	
	Repair of Landslides or Landslips
	Temporary Repair/Replacement of Dangerous Bridges
	Construction of Fords or Causeways at River/Stream Crossing
	Temporary Restoration of Badly Failed Pavement Sections
	Drainage Repairs

### 14.2.4 Road Maintenance Requirements

#### (1) Paved Road

The process of selecting appropriate methods of maintenance or rehabilitation can be summarized as follows.

- Collect and interpret existing design, construction and maintenance data
- Carry out surface condition, roughness and traffic surveys
- Carry out structural and material testing
- Evaluate cause of the pavement deterioration and distress
- Select appropriate method of maintenance or rehabilitation

The guidelines/manuals for road maintenance as shown below indicate road distress that will be a trigger for maintenance depending on the road surface type (asphalt and concrete). These distresses should be monitored and evaluated by the road owner, and then the maintenance works shown in Table 14.2.3-1 will be applied.

### **AASHTO Guide for Design of Pavement Structures 1993**

The AASHTO Guide shows general description of the major types of distress that may be encountered in both flexible (asphalt concrete) and rigid (cement concrete) pavements as shown in Table 14.2.4-1. Also noted is a typical description of three distress severity levels (**L**-Low, **M**-Medium, **H**-High) associated with each distress.

**Table 14.2.4-1 Identification of Distress Types (AASHTO Guide)**

<b>Asphalt Surfaced Pavements</b>	<b>Jointed Reinforced Concrete Pavements</b>
1. Alligator or Fatigue Cracking	1. Blow-up
2. Bleeding	2. Corner Break
3. Block Cracking	3. Depression
4. Corrugation	4. Durability (“D”) Cracking
5. Depression	5. Faulting-Transverse Joints/Cracks
6. Joint Reflection Cracking from PCC Slab	6. Joint Load Transfer System Deterioration
7. Lane/Shoulder Drop-off or Heave	7. Seal Damage-Transverse Joints
8. Lane/Shoulder Joint Separation	8. Lane/Shoulder Drop-off or Heave
9. Longitudinal and Transverse Cracking (Non-PCC Slab Joint Reflective)	9. Lane/Shoulder Joint Separation
10. Patch Deterioration	10. Longitudinal Cracks
11. Polished Aggregate	11. Longitudinal Joint Faulting
12. Potholes	12. Patch Deterioration
13. Pumping and Water Bleeding	13. Patch Adjacent Slab Deterioration
14. Raveling and Weathering	14. Pop-outs
15. Rutting	15. Pumping and Water Bleeding
16. Slippage Cracking	16. Reactive Aggregate Distress
17. Swell	17. Scaling and Map Cracking
	18. Spalling (Transverse and Longitudinal Joint/Crack)
	19. Spalling (Corner)
	20. Swell
	21. Transverse and Diagonal Cracks

### **Road Maintenance and Repair Outline 1978 (Japan Road Association)**

The Japan Road Association (JRA) also shows general descriptions of the major types of distress that may be encountered in both flexible (asphalt concrete) and rigid pavements (concrete) as shown in Table 14.2.4-2. Such distress will occur when the balance among bearing capacity of subgrade, traffic volume and pavement structure is lost.

**Table 14.2.4-2 Identification of Distress Types (JRA)**

Distress Type		Asphalt Surfaced Pavements	Jointed Reinforced Concrete Pavements
Breakage concerning with Surface Property	Local Crack	Hair Crack, Line Crack	Crack not reaching to the Bottom of the Slab
	Bump	Bump near Structure	Bump near Structure, Bump between Slabs
	Transformation	Rutting, Longitudinal Bump Corrugation, Dip, Bleeding	Longitudinal Bump
	Wearing	Raveling, Polishing, Scaling	Raveling, Polishing, Scaling
	Collapse	Pothole, Stripping, Aging	-----
	Joint Breakage	-----	Joint Filler Breakage Joint Edge Breakage
	Other	Tire Trace, Cut, Surface Expansion	Pothole
Breakage concerning with Structure	Allover Crack	Alligator Crack	Crack reaching to the Bottom of the Slab
	Buckling	-----	Blow up, Crushing
	Other	Soil Spouting, Frost Heave	Slab Lifting

### Maintenance Requirement

Generally, each national road authority has a different standard and/or guideline for the maintenance requirement. A standard commonly used for asphalt surfacing is shown in Table 14.2.4-3 for information.

**Table 14.2.4-3 Surface Defects – Road with Asphalt Surfacing**

Defect	Extent	Maintenance Treatment	Notes
Fretting or Stripping	< 10%	Local patching	Application of a proprietary rejuvenator may prevent further fretting.
	> 10%	Patching followed by surface dressing or slurry seal	
Bleeding or Fattening-up	< 10%	No action	Local application of heated fine aggregate may be required if poor skid resistance appears.
	> 10%	Additional tests required	
Loss of Texture	< 10%	No action	
	> 10%	Additional tests required	
Potholes	Any	Patching	Potholes are the result of other failures such as cracking and deformation.
Edge Failure	Any	Patch road and reconstruct the shoulder	

### (2) Unpaved Road (including DBST)

For the unpaved roads, which make up the bulk of the road network, an indicative guideline for the maintenance strategy is shown below:

- For Bituminous Surface Road
  - Pothole repair if pothole (> 300mm dia.) / km > 1
  - Edge break repair if edge break > 50 square meter / km (both sides of road)
  - Single seal if damage > 10% or raveling > 10% or texture depth < 0.3 mm



- For Gravel Roads
  - Grade road every 6 months if AADT < 100
  - Grade road every 4 months if 100 < AADT < 200
  - Grade road every 2 month if AADT > 200
  - Re-gravel with 250 mm of compacted material if surface thickness < 75 mm
  
- For Earth Roads
  - Grade road every 4 to 6 months

As a general guide, the above actions will maintain the unpaved road network in a fair to good trafficable condition. Other activities in routine maintenance are also required on an on-going basis.

*Note: DBST : Double Bituminous Surface Treatment*  
*AADT : Annual Average Daily Traffic*

## **14.3 MAINTENANCE SYSTEM DEVELOPMENT SCENARIOS**

### **14.3.1 Categorization of Maintenance Works**

#### **(1) Worldwide Tendency of Contract-out System**

As mentioned in Chapter 7, the Strategic Plan for Road Sector prepared by the MTR proposes that a system of autonomous agency be established to manage the road infrastructure, finance and operations. These agencies will fall under the aegis and overall policy direction of the MTR. The plan also urges that all works will be contracted out, however the MTR will determine an optimum fleet capable of servicing emergency situations.

In recent years, it is an increasing worldwide tendency to shift maintenance works to the private sector, as contractors have proved more cost effective and efficient than administration, particularly in the developing world. Some road agencies take a mixed approach; routine maintenance performed by force account (administration), the rest carried out by contracting.

Other road agencies are more quickly moving toward phasing out force account and outsourcing all the maintenance works. Maintenance works of rural roads have been carried out by local small scale contractors. This practice has turned out to be cost effective and efficient, and has positively impacted on poverty alleviation through generation of employment opportunities.

#### **(2) Necessity of Force Account System**

The Study Team realizes the worldwide tendency mentioned above, and believes that the majority of road maintenance works shall be carried by the private sector through contracting-out in the near future. The Study Team, however, also have an idea that the central

and local governments shall maintain the limited force account capacity, to execute some parts of required maintenance works based on the following reasons:

- The Government organization for road maintenance (The MTR as the central government and the MOPI as a local government) shall play the role as being road manager for the road network of the county including policy, planning, design, contract management, construction, maintenance, supervision and monitoring.
- The present capacity of the government organization for overseeing and guiding road infrastructure development is very limited and faces shortages of qualified staff. The capacity of those staff shall be developed through actual execution of road development project for their experiences. Particularly, staff shall be trained in contract management, supervision and monitoring the operation and maintenance of roads.
- The local private sector has not developed, nor achieved any impressive record in the field of road construction and maintenance. The private sector should be developed in terms of financial, technical and equipment capacity in order to prove cost effective and efficient works.

### **(3) Categorization of Maintenance Works**

As discussed in Chapter 14.2, road maintenance works are classified into routine, periodic and emergency maintenance for management and operation convenience. Maintenance works are also categorized according to their characteristics in terms of work frequency, work scale, construction method and administrative implementation type as follows. It is imperative to come up with a standard and harmonized definition and categorization of maintenance works and programs.

#### **Routine Maintenance**

The routine maintenance includes the operations required to be carried out once or more per year on a section of road. These operations are typically small scale or simple, but widely dispersed, require skilled or unskilled manpower and can be done with labor-based technology. The need for some of these can, to a degree, be estimated and planned and can sometimes be carried out on a regular basis e.g. pothole repair and re-grading of gravel roads.

#### **Periodic Maintenance**

The periodic maintenance includes the operations that are occasionally required on a section of road after a period of a number of years. They are normally large scale and require special equipment and skilled resources to implement, and usually necessitate the temporary deployment of those resources on the road section. These operations are costly and require specific identification and planning for implementation and often require design, e.g. overlay.

## Emergency Maintenance

Roads are often blocked by water courses, landslides or badly failed pavement section that can not be anticipated, but require immediate attention. These roads could be re-opened over their full length by initiating a program of spot repairs in advance of full reconstruction. Emergency maintenance means these repair operations such as spot repairs of pavement, construction of fords or causeways at river crossings and so on. It should be noted that the repairs of this nature are usually in response to extreme weather events.

The characteristics of maintenance works mentioned above are summarized in Table 14.3.1-1.

**Table 14.3.1-1 Categorization of Maintenance Works**

Maintenance Works	Basis of Contract	Work Scale	Equipment-based Construction	Labor-based Construction	Remarks
Routine	Yearly Basis	Small	Not required	Main	Regular base
Periodic	Project Basis	Large	Required	Sub	Periodic
Emergency	Spot/Project Basis	Small/Large	Not required/ Required	Sub/Main	Rapid response required

### (4) Force Account vs Contract-out System

Taking into consideration the fact mentioned above, the Study Team proposes a mixed approach toward the road maintenance system in accordance with characteristics of maintenance works;

TYPE 01 : Force Account

- Small scale and labor-based construction (routine maintenance)
- Rapid responses and emergency actions required (small emergency maintenance)

TYPE 02 : Contract-out

- Large scale and equipment-based construction (periodic maintenance)
- Large scale and time-consuming restoration work required (large emergency maintenance)

## 14.3.2 Type of Maintenance Contract

### (1) Contract Type

In consideration of categorization of maintenance works, the contract types adoptable in the Southern Sudan are proposed as shown in Table 14.3.2-1.

- G Type: Force account by the Government
- C Type: Contract-out
- P Type: Privatization with private company

**Table 14.3.2-1 Contract Type and Major Application**

Contract Type	Description	Major Application	Appropriate Works
<b>G Type</b> (Force Account by Government)	<ul style="list-style-type: none"> <li>The Government is responsible for financing and execution of works</li> </ul>	<ul style="list-style-type: none"> <li>Applicable to all types of works, but requires corresponding equipment and man-power</li> <li>Flexible to any type of work</li> <li>Immediate action against emergency is possible</li> </ul>	<ul style="list-style-type: none"> <li>Routine and emergency maintenance for all classes of roads</li> </ul>
<b>C Type</b> (Contract-out to Private Company)	<ul style="list-style-type: none"> <li>The Government is responsible for financing and works shall be contracted-out to private sector (local contractor, international contractor, J/V contractor, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>Preferable to equipment based works</li> <li>Require high/medium level of engineering</li> <li>Suitable for large size of contract</li> <li>Appropriate for short/ medium duration and/or continuation of contract</li> </ul>	<ul style="list-style-type: none"> <li>Periodic maintenance of highways</li> </ul>
<b>P Type</b> (Privatization)	<ul style="list-style-type: none"> <li>Private company is responsible for financing through toll etc. under a contract with the Government and execution of works with financial risk.</li> </ul>	<ul style="list-style-type: none"> <li>Appropriate only to profitable project</li> <li>Require high engineering and financial management</li> <li>Suitable only for large size contract</li> <li>Appropriate only for long term contract</li> </ul>	<ul style="list-style-type: none"> <li>Routine, periodic and emergency maintenance of heavy traffic section of highways.</li> </ul>

Considering the present capacity of private sector, the Government may be required to take a leadership to develop the capacity of local contractors. For example, the Government-led-company will be established, to undertake appropriate maintenance works under C type contracts.

P type contractor, private company or consortium, is responsible for financing maintenance works of special section or road under a certain contract with the Government, and execute maintenance works with financial risk.

## (2) Performance-based Contract

The basis of contract may be divided into input-based and performance-based, as discussed below:

### **Traditional Input-based Contract (Process Specification Based)**

Traditional Measurement Contract is based on a schedule of unit prices and estimates of quantities. The works to be performed are specified in the contract, and payments are based on the “input” – executed works measured. This is suitable for routine and periodic maintenances as well as rehabilitation or other construction works. This modality generally brings improvement over force account maintenance practices. For maintenance contracts, a problem lies that the contractor has the wrong incentive, which is to try to carry out the maximum amount of works, in order to maximize its turnover and profits.

## **Performance-based Contract (End-Result Specification Based)**

Performance-based Contract is managed based on the minimum conditions of roads, bridges and traffic assets that the contractor manages to comply with the performance standards defined in the contract. The contractor is paid on a monthly period and payment is based on the outcomes of the contractor's performance, not on the "input" – the amount of works executed. The nature of this type of contract allocates responsibility for work selection, design, and delivery solely to the contractor. Hence, the choice and application of technology and the pursuit of innovation in materials, processes and management are up to the contractor. If the performance standards are not achieved or maintained, deductions are made from the contract payment. It needs a certain level of knowledge at the employer side for established transparent checking and auditing procedures for wide and expanded applications.

The main reasons for contracting out road maintenance and implementing performance contract are:

- Reduce maintenance cost through the application of more effective and efficient technologies and work procedures,
- Provide transparency for road users, road administrations and contractors with regard to the conditions of which roads have to be maintained,
- Improve control and enforcement of quality standards, and
- Improve overall road conditions and road user satisfaction.

Most of the performance contract has been introduced recently and are still in a pilot stage in many countries. The following observations and lessons are reported based on the experiences gained with the performance contracts.

- Pilot schemes for contracting out road maintenance based on performance indicators should be carefully planned and implemented.
- Whenever circumstances permit, performance contract should be longer than five years and should include periodic maintenance in order to maximize the potential benefits.
- Well-qualified contractors and inspectors are key to the success of performance contracts.
- Proper performance monitoring and strict application of penalties for non-compliance have proven to be critical to the success of performance contracts.
- Performance contracts might not result in cost savings immediately.

Improper implementation of performance contracts could backfire and produce adverse effects, particularly under the circumstances that the lessons mentioned above are not performed sufficiently and successfully.

### **14.3.3 Proposed Development Strategy and Scenario**

#### **(1) Road Maintenance Policy and Institution**

The maintenance policy including the streamlined legal institution shall be established to define clear management responsibility, appropriate planning approach and sustainable financial mechanism.

Accordingly, the departments in charge of road maintenance of the MTR and MOPI shall be reorganized.

#### **(2) Maintenance Administration**

The simple administration system for road maintenance is proposed.

**The MTR;** Responsible for maintenance of National Roads  
(International and Interstate roads)

**The MOPI;** Responsible for maintenance of State Roads and County Roads

*Note: County Office is responsible for actual execution of maintenance works for County Roads under the direction of the MOPI.*

#### **(3) Implementation Arrangement**

The following implementation arrangement is proposed in consideration of financial preparation.

- The MTR and the MOPI may maintain limited force account workforce for routine maintenance and minimum emergency maintenance for 7–10 years.
- The MTR is responsible for road maintenance projects funded by Donors, by contracting-out to private sector, such as periodic maintenance of National Roads. The contract type based on the traditional input-based contract for 5–7 years, and performance-based contract thereafter are recommended considering the present capacity of local private sector.
- The maintenance of County Roads and minor State Roads is recommended to be executed through the force account by the MOPI, employing community and NGO as workforce under the guidance of engineers of the MOPI. The maintenance works shall be labor-based, using equipment of the MOPI.

#### **(4) Development Phasing**

Considering the socio-economic development of the Southern Sudan and transport development framework discussed in the previous chapters, the following development phasing is proposed.

**Short Term;** Establishment of Basic Road Maintenance System, 2009 – 2015 (7 years)  
This term is considered as a ground period to establish and develop the basic framework of road maintenance system including the following:

- Establishment of maintenance policy, legal framework and financial mechanism
- Reorganization of maintenance departments of the MTR and the MOPI
- Classification of road network
- Road inventory and condition survey
- Capacity development for public and private sectors

**Medium Term;** Development of Road Maintenance Technical Skill, 2016-2020 (5 years)  
This term is a period to develop the technical skill of road maintenance of public and private sectors, and also considered as a transition period from force account to contract-out system.

- Development of administration and management capacities for contract-out system
- Development of technical skill of public and private sectors
- Establishment of a policy and system to encourage private sector in undertaking road maintenance business
- Promotion of labor-based maintenance works for low class roads by community groups

**Long Term;** Expansion of Modern Maintenance System, 2021-2025 (5 years)  
This term is a period to develop and expand a private sector involvement in road maintenance field in order to develop a private sector-based market economy.

- Encouragement of performance-based contract
- Steering toward privatization contract
- Continuation of labor-based maintenance works, especially routine and emergency maintenance of County Roads by community groups

## **(5) Proposed Development Scenario**

Taking into consideration strategies mentioned above, the development scenario of road maintenance system is proposed, as graphically demonstrated in Table 14.3.3-1.

The following assumption is made in proposing the development scenario.

- The periodic maintenance of National Roads will be executed adapting the contract-out scheme based on traditional input-based contract to encourage private sector.

- The routine and emergency maintenance will be basically carried out through force account scheme by the Government, but recommended to employ community society as work force under the technical guidelines of the Government engineers.
- The performance-based contract shall be adopted after the administrative and technical capacity of public sector will be well developed, and capacity of private sector be sufficiently matured in terms of financial, technical and equipment aspects.

**Table 14.3.3-1 Proposed Development Scenario of Road Maintenance System**

Items		Responsible Agency	Short Term					Medium Term					Long Term					
			2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Policy and Institution	Establishment of Maintenance Policy	MTR	█	█														
	Reorganization of MTR	MTR		█	█													
	Reorganization MOPI	MOPI		█	█													
Maintenance Works	National Roads (International/ Interstate Roads)	Routine				G Type					C Type (2)							
		Periodic				C Type (1)					C Type (2)							
		Emergency							G Type									
	State Roads (Intrastate/ Intercountry Roads)	Routine				G Type					C Type (1)							
		Periodic				G Type					C Type (1)							
		Emergency							G Type									
	Country Roads (Intracountry/ Minor Roads)	Routine							G Type									
		Periodic							G Type					C Type (1)				
		Emergency							G Type									

Note;

G Type: Force Account by the Government  
 C Type (1): Contract-out based on Traditional Input-based Contract  
 C Type (2): Contract-out based on Performance-based Contract



## **14.4 PROPOSED MAINTENANCE SYSTEM**

### **14.4.1 Basic Policy in Establishing Effective Maintenance System**

#### **(1) Proposed Policy for Maintenance**

The Study Team recognizes that the recommendation may be agreeable and effective, but its realization will call for policy discussion at its high level of the Government and capacity development of public sector in charge of specified fields.

Therefore, the present administrative jurisdiction with achievable modification in the short term is respected and proposed in preparation of the practicable and effective road maintenance system. Upon successful progress of the proposed effective system, the autonomous agency system can be developed by shifting the proposed sections into each agency.

The basic policy in establishing the effective road maintenance system proposed by the Study Team is discussed hereunder.

#### **Public Sector;**

- 1) The MTR should play the role as a road manager for road network of the Southern Sudan.
- 2) The Department of Road Maintenance of the MTR is responsible for maintenance of Interstate and International Roads.
- 3) The Department of Road Maintenance of the MOPI is responsible for maintenance of the State Roads, County Roads and below.  
The County is responsible for actual execution of County Roads and below under the guidance of the MOPI.
- 4) The Departments of Road Maintenance of the MTR and the MOPI may retain a capacity to carry out routine and emergency maintenance works, within the Short Term for the former and the Medium or Long Term for the latter.

#### **Private Sector;**

- 1) The private sector should be responsible for delivering required maintenance services and works through competitive bidding.
- 2) The private sector may take charge of periodic maintenance of Interstate Roads and International Roads.
- 3) Community-based maintenance groups are recommended to execute routine maintenance of roads, especially County Roads and below under the guidance of the MOPI and Counties.

## 14.4.2 Role and Responsibility of Public Sector

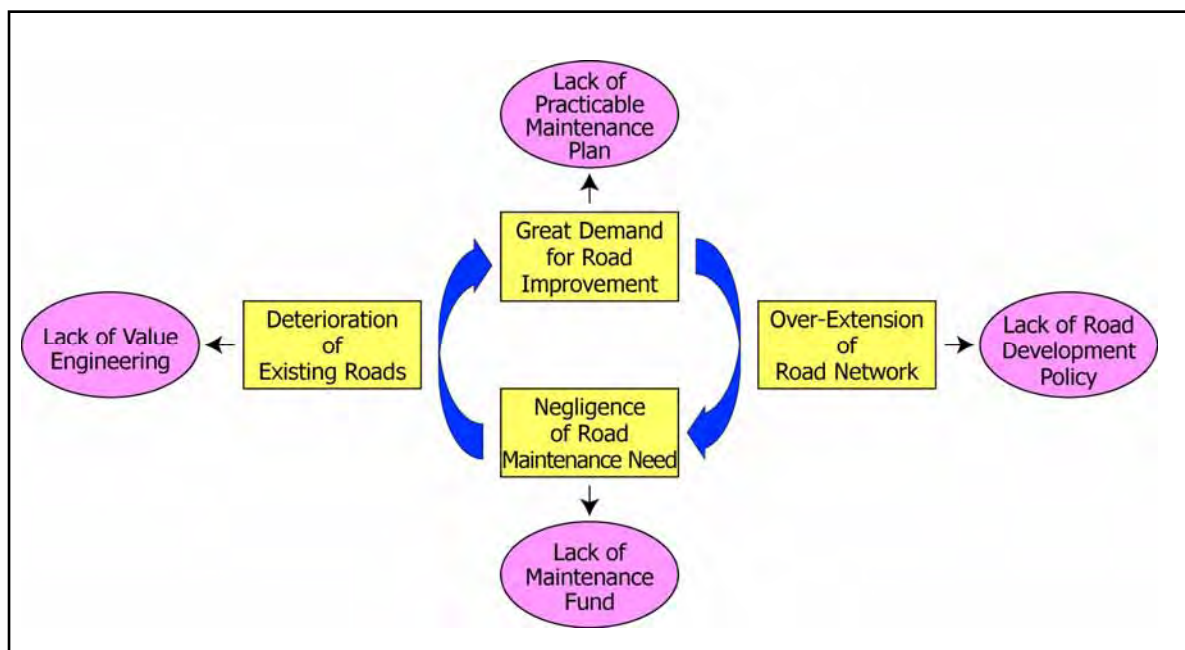
### (1) Road Deterioration and Government's Responsibility

The principal responsibility of the MTR is to play the roles as road manager that essentially encompasses numerous components including the following:

- Road Policy Maker
- Road Planner
- Road Project Executer

The objective of road manager is to develop the road network and to maintain serviceability of such public facilities in order to achieve socio-economic growth of the Southern Sudan.

To this end, causes of road deterioration or waste of public investment in view of road management should be clearly addressed. In developing countries, roads have been noticed to deteriorate faster than the expected rate due to several factors such as lack of maintenance fund, lack of road development policy, lack of practicable maintenance plan and lack of value engineering as illustrated in Figure 14.4.2-1.



**Figure 14.4.2-1 Vicious Circle of Road Network Deterioration**

The above figure, Vicious Circle of Road Network Deterioration, suggests the real reasons of road deterioration and tasks to be fulfilled by road manager or the Government.

As revealed in the Circle, one vicious factor will exist, and then another will break accordingly. Therefore, such vicious factor shall be carefully prevented to occur through fulfilling the responsibility of the Government.

The responsibility of the Government as the policy maker may include, among others, the following tasks:

- Formulation of Road Department Policy and Plan
- Establishment of Institutional Legislation
- Funding Arrangement
- Development of Private Construction Industry

As the road planner, the Government shall fulfill the following:

- Preparation of practicable plan for road improvement and maintenance plan
- Exercise of value engineering

Fund available for road development is always limited and restricted. The practicable plan, therefore, is immensely needed to maintain roads serviceable with maximum and effective utilization of limited fund. When a great demand of road improvement is given an exaggerated priority, the capital expenditure for road improvement or new construction becomes bigger, and the current expenditure for road maintenance is smaller than that required to maintain the roads at serviceable level.

Therefore, the principal responsibility of the Government is to prepare a practical plan balancing road improvement with maintenance, effectively utilizing available fund.

As an executing agency, the Government shall achieve the tasks of maintenance works in the following stages:

- Inspection Stage
- Planning Stage
- Budgeting Stage
- Execution Stage (Force Account, Contracting-out)
- Monitoring Stage

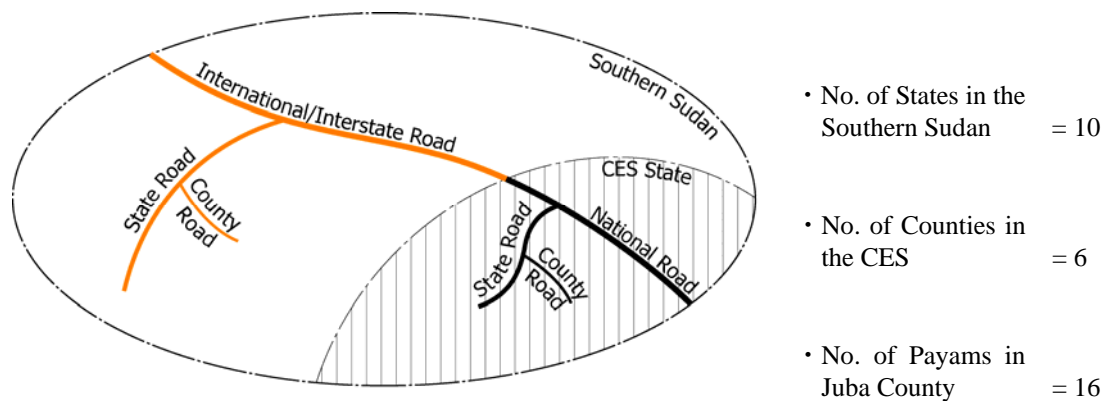
### 14.4.3 Organizational Structure and Function

#### (1) Organizational Structure and function of MTR

##### 1) Organizational Structure

In accordance with the proposed policy for maintenance in Section 14.4.1, the organizational structure and function are discussed hereunder.

The demarcation of road improvement work between the MTR (GOSS) and the MOPI (State) is presumed as shown in Table 14.4.3-1 according to the administrative road classification shown in Figure 14.4.3-1.



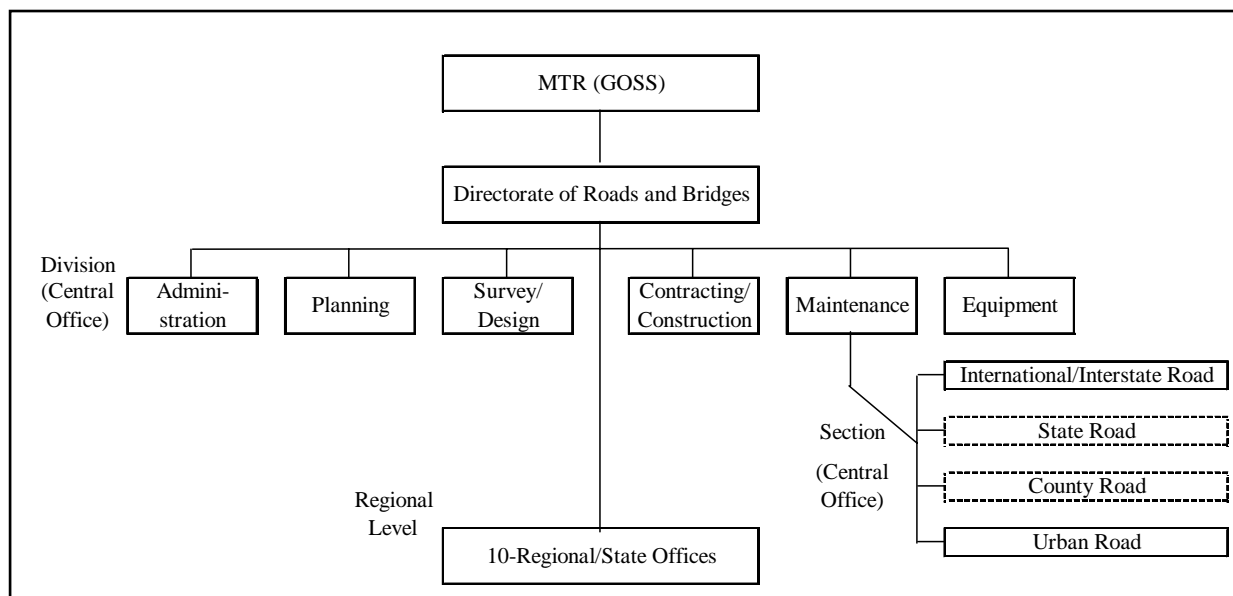
**Figure 14.4.3-1 Administrative Road Classification**

**Table 14.4.3-1 Proposed Jurisdiction of Road Improvement/Maintenance Work**

Road Type	Road Construction	Road Maintenance
International/Interstate Road	MTR	MTR
State Road	STATE	STATE
County Road	STATE <sup>1)</sup>	STATE <sup>1)</sup>

*Note<sup>1)</sup>: State is responsible for funding and planning, and County is responsible for actual execution of work under the guidance of the State,*

The present organizational structure of the Directorate of Roads and Bridges is recommended to be reorganized to effectively serve the professional functions, as shown in Figure 14.4.3-2.



**Figure 14.4.3-2 Proposed Structure of Directorate of Roads and Bridges, the MTR**

The Directorate of Roads and Bridges is recommended to consist of the following 6 Divisions in line with the professional specialty.

- Administration Division
- Planning Division
- Survey and Design Division
- Contracting and Construction Division
- Maintenance Division
- Equipment Division

The Maintenance Division may be divided into 4 sections:

- International/Interstate Road Section
- State Road Section
- County Road Section
- Urban Road Section

It is noted that State Road Section and County Road Section may not be required when each State will be capable of maintaining their respective roads.

It is recommended that the role and function for road maintenance should not be centralized to the central office of the MTR. It may be preferable to entrust some roles and functions to its respective local offices such as Regional/State Offices in accordance with types and scales of maintenance works. Such demarcation of role and function shall be carefully decided based on the technical capacity, man-power, and equipment. However, this idea may be implemented after the central office of the MTR will be reasonably developed at the required level of service.

## 2) Roles and Functions

The role and function of each Division under the Directorate of Roads and Bridges of the MTR is briefly described below.

### **Planning Division**

The roles of this Division are planning and budgeting of road construction and maintenance for International and Interstate Roads. The planning and budgeting will be done based on the survey result conducted by the Survey and Design Division described below. Procurement plan and budgeting of maintenance equipment and tools are also the responsibility of this Division.

### **Survey and Design Division**

The roles of this Division are preparation of design/maintenance standards, surveys (road inventory, condition, traffic and axle load survey), final design and cost estimate of works.

### **Contracting and Construction Division**

The roles of this Division are construction of road and preparation of tender document for contracting-out works including cost estimates.

### **Maintenance Division**

The roles of this Division are execution of maintenance and operation works, especially force account of routine and emergency maintenance works of the International/Interstate Roads.

### **Equipment Division**

The roles of this Division are maintenance of equipment and tools to be used for construction and maintenance works.

The conceptual idea of demarcation of roles and functions of the Central Office and Regional/State Office of the MTR is presented in Table 14.4.3-2.

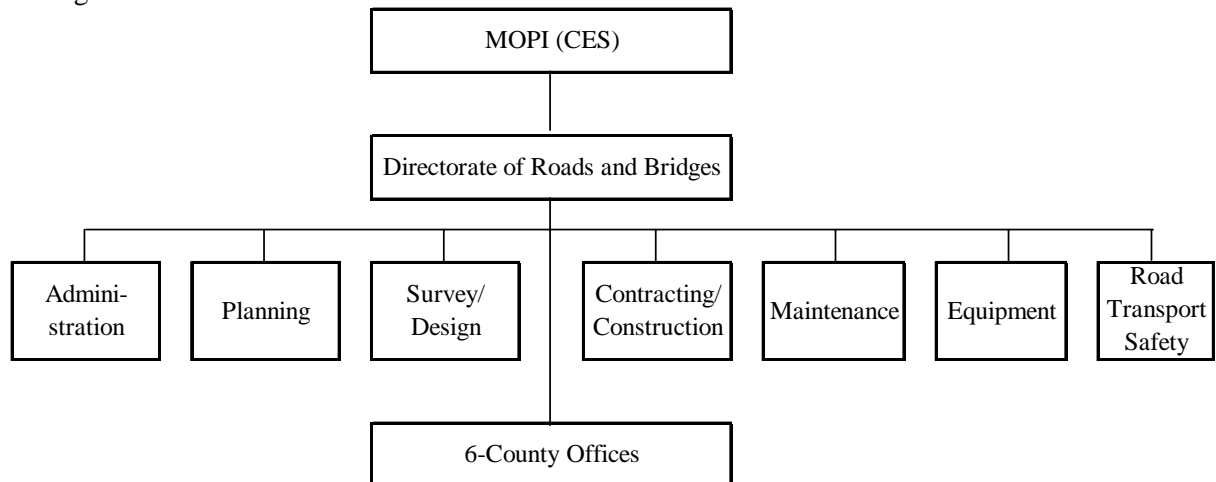
**Table 14.4.3-2 Demarcation of Roles and Functions between Central and Regional Office**

	MTR Central Office	MTR Regional Office
Policy and Planning	<ul style="list-style-type: none"> <li>• Formulation of Road Development Policy and Strategy</li> <li>• Planning and Budgeting of Road Development</li> </ul>	---
Inspection, Monitoring and Design	<ul style="list-style-type: none"> <li>• Formulation of Design, Construction and Maintenance Standards</li> <li>• Road Inventory, Condition Survey, Traffic Survey, Axle Load Survey</li> </ul>	<ul style="list-style-type: none"> <li>• Road Inventory/Inspection/Monitoring</li> <li>• Design and Cost Estimate of Maintenance Works</li> </ul>
Contracting	<ul style="list-style-type: none"> <li>• Contracting of Road Improvement Projects</li> <li>• Contracting of Large-sized Maintenance Projects</li> </ul>	<ul style="list-style-type: none"> <li>• Contracting of Medium/Small-sized Maintenance Projects</li> </ul>
Construction Work	<ul style="list-style-type: none"> <li>• Basically, all construction work shall be done through contracting-out</li> </ul>	---
Maintenance Work	<ul style="list-style-type: none"> <li>• Approval of Budgeting for Maintenance Work</li> </ul>	<ul style="list-style-type: none"> <li>• Responsible for execution of Maintenance Work</li> </ul>
Force Account Service	---	<ul style="list-style-type: none"> <li>• Force Account of Maintenance Works</li> </ul>
Maintenance Equipment and Tools	<ul style="list-style-type: none"> <li>• Approval of Budgeting of Equipment Procurement</li> <li>• Procurement Plan and Budgeting of Maintenance Equipment and Tools</li> </ul>	<ul style="list-style-type: none"> <li>• Minimum Equipment for Routine/Emergency Maintenance</li> </ul>

**(2) Organizational Structure and function of MOPI**

1) Organizational Structure

The organizational structure similar with the MTR is proposed for the MOPI as shown in Figure 14.4.3-3.



**Figure 14.4.3-3 Proposed Structure of Directorate of Roads and Bridges, MOPI**

2) Roles and Functions

The roles and functions of each section under the Directorate of Roads and Bridges, MOPI, are similar to those of the MTR.

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## **CHAPTER 15**

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# **I**MPLEMENTATION PLAN



## CHAPTER 15 IMPLEMENTATION PLAN

### 15.1 IMPLEMENTATION FRAMEWORK AND CAPACITY

In order to establish the Overall Implementation Plan of the Master Plan, the implementation framework and capacity, possible available funds and implementation priorities of projects proposed in the Master Plan are discussed hereunder.

#### (1) Implementation Time framework

According to Transport Sector Policy of the MTR, a two phase implementation strategy was employed for the effective processes of transport development in Southern Sudan.

- Recovery Phase ; 2007~2008
- Development Phase ; 2009~2011

The Study, however, proposes the following development phases to effectively implement the Juba Urban Transport Infrastructure.

- Short Term ; 2009~2015 (7 years)
- Medium Term ; 2016~ 2020 (5 years)
- Long Term ; 2021~ 2025 (5 years)
- Beyond Term ; 2026 ~

#### (2) Institution and Organization

The Master Plan covers various transport sectors, namely road network, public transport, traffic management and transport institution.

In order to systematically and effectively implement projects proposed in the Master Plan, appropriate institution and organization shall be established with a clear and streamlined jurisdiction, roles and responsibilities of the agencies concerned.

Chapter 13 and 14 discuss the project implementation system and road maintenance system including the organizational structure and infrastructure projects for the implementation of the Master Plan.

#### (3) Project Implementation Capacity

The administrative and technical capacity for the implementation of the Master Plan Projects shall be developed with efficient deployment of the government human resources.

In performing the actual consulting services, including planning, design, tendering and construction supervision, experienced engineers shall be employed.

The construction of projects shall be executed by professional and reliable contractors who shall be appointed through transparent tendering process and tender evaluation in terms of the financial, equipment and engineering capacities, and past performance of similar projects.

In all plans of project implementation, including consulting seminars and construction, an in-service and on-the-job training program shall be included for the government personnel deployed to the projects for immediate creation of their capacity.

#### **(4) Stage Construction and Project Costs**

- Arterial streets (4-circumferential streets and 6-radial streets) are planned to be constructed in two phases.
  - Initial Stage before Year 2025  
Roadway width; 2 lanes + 2 Multi-purpose lanes
  - Ultimate Stage after Year 2025  
Roadway width ; 4 lanes + 2 Multi-purpose lanes.The construction costs at the initial stage are estimated.
- The right-of-way required for the road width of ultimate stage shall be acquired at the initial stage of road construction. The land acquisition costs and compensation costs for relocation of project affected people are not included in the cost estimate.
- Engineering design and construction supervision cost are not considered in cost estimate.

## **15.2 ASSUMPTIONS ON FUNDS AVAILABLE FOR MASTER PLAN PROJECTS**

### **(1) Financial Status for 2008-2011**

The Expenditure Priorities and Funding Need for 2008-2011 prepared by the Ministry of Finance and Economic Planning identified the expenditure priority for 2008-2011, and revealed the overall GOSS financial needs and gap for the six top expenditure priorities as shown in Table 15.2-1, and summarizes as follows.

The estimated financial gap for 2008-2011 is derived from the difference between GOSS's expenditure needs and its estimated revenues for the period. Part of the gap is already filled in by existing donors' commitments, which is estimated to amount to just over 600million US\$. There are projects for which funds were committed in 2005-2007, and whose implementation is still on-going. The remainder of the gap constitutes the amount of new pledges that South Sudan is seeking from partners. This is estimated at 1,992 million US\$ for 2008-2011, or an average of just under 500million a year.

**Table 15.2-1 Overall GOSS Financial Needs and Gap**

Unit: Million US\$

Sector		2008	2009	2010	2011	Total	%
		Total	Total	Total	Total		
Financing Needs	Accountability	47	50	50	50	197	2%
	Economic Functions	42	50	50	50	192	2%
	Education	184	234	284	347	1,050	9%
	Health	198	218	252	269	937	8%
	Infrastructure	579	644	664	691	2,577	23%
	Natural Resources	125	169	184	195	672	6%
	Public Administration	145	145	145	145	580	5%
	Rule of Law	275	275	275	275	1,100	10%
	Security	607	612	609	592	2,420	21%
	Social & Humanitarian Affairs	106	100	100	75	381	3%
	Block Transfers to States	159	250	275	300	984	9%
	Reserves	18	50	50	50	168	1%
	<b>Total Financing Needs</b>	<b>2,485</b>	<b>2,798</b>	<b>2,937</b>	<b>3,039</b>	<b>11,258</b>	<b>100%</b>
Financial Gap	Total GOSS Revenue	1,732	2,391	2,316	2,223	8,662	
	Financial Gap	753	407	621	816	2,596	
	Committed Donor Funds	305	135	132	33	605	
	Net Financial Gap	448	271	488	784	1,992	

**(2) Assumptions on Fund Available for Master Plan Projects**

The fund available for the transport and road sector was assumed based on the Approved Budget of 2008 and Expenditure Priorities and Funding Needs for 2008-2011. Refer to Figure 15.2-1.

- Approved Budget 2008  
Transport and Roads ; 240 million SDG (120 million US\$)
- Expenditure Priorities and Funding Needs  
Priority Road Development ; 400.8 million US\$ in 2008  
443.9 million US\$ in 2009  
463.7 million US\$ in 2010  
490.8 million US\$ in 2011

The following assumptions are used to determine the future fund requirements for the road sector:

- Road Sector Fund Needs for 2009-2010  
(443.9 + 463.7) = 907.6 million US\$ / 2 years

- Road Sector Fund Needs for 2011~ 2025

Based on 490million US\$ in 2011(Expenditure Priorities and Funding Needs for the Road Sector, Ministry of Finance & Economic Planning), the fund needs of the road sector for the period 2011~2025 are projected on the assumption of an annual escalation of 7.5%, which is estimated in accordance with national economic growth and population increase. The five years totals are as follows:

- 2011-2015 ; 3,000 million US\$ / 5 years
- 2016~ 2020 ; 4,100 million US\$ / 5 years
- 2021~ 2025 ; 6,000 million US\$ / 5 years

The funds available for the implementation of the Road Network Development projects of Master Plan are then assumed on the presumption that 10 ~ 15% percent of the total road sector fund needs may be allocated to the projects, as follows:

- Fund for 2009-2010 ; 90 million US\$/2 years (10% of the total fund)
- Fund for 2011-2015 ; 420 million US\$/5 years (14% of the total fund)
- Fund for 2016-2020 ; 630 million US\$/5 years (15% of the total fund)
- Funds for2021-2025 ; 720 million US\$/5 years (12% of the total fund)

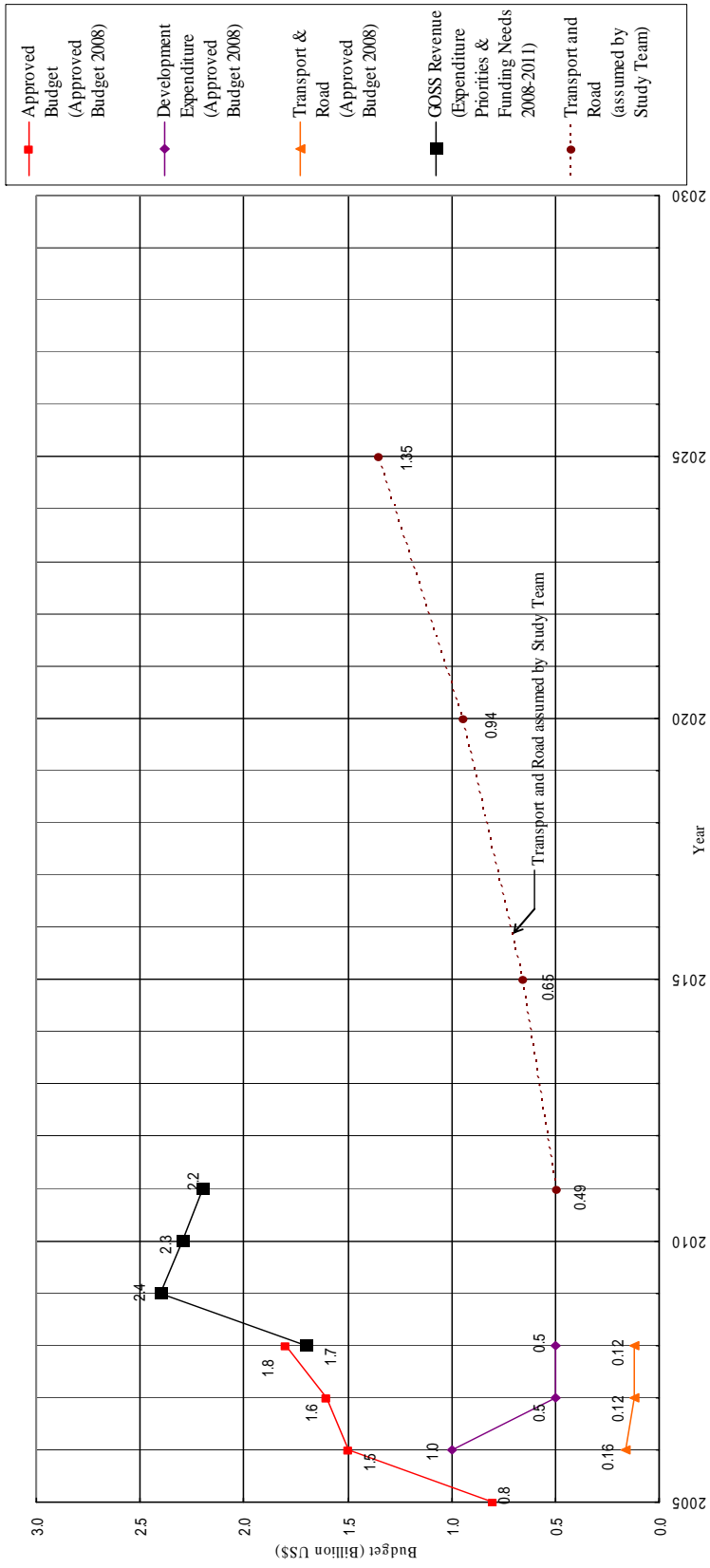


Figure 15.2-1 Assumed Budget for Transport and Road

### 15.3 IMPLEMENTATION PRIORITY AND SCHEDULE

#### (1) Critical Priorities in Implementation

The Study recommends the early implementation of local street rehabilitation and the radial and circumferential road network system construction as the critical priorities in implementation.

<b>Local Street Rehabilitation</b>	<b>Target Year</b>
• Juba Urban Road Rehabilitation	on-going
• Local Streets in Central Commercial District	2011 (initial improvement)
• Local Streets inside C-1	2015 (initial improvement)
• Local Streets inside C-2	2020 (initial improvement)
• Local Streets inside C-3	2025 (initial improvement)
• Local Street outside C-3	Beyond 2025
<b>Circumferential Street Construction</b>	<b>Target Year</b>
• C-1	on going
• C-2 (East and South)	2013
• C-2 (West and North)	2015
• C-3 (South)	2013
• C-3 (East)	2023
• C-3 (West, North)	2025
• C-4 (South)	Beyond 2025
• C-4 (North)	Beyond 2025
<b>Radial Street Construction</b>	<b>Target Year</b>
• R-1 ~ R-5 (Inside C-2)	2013
• R-1 ~ R-5 (Inside C-3)	2019
• R-1 ~ R-5 (Outside C-3)	Beyond 2025
• R-6 (Inside C-4)	2013 (Nile ~ C-4 : DBST)

<b>Nile Bridge Construction</b>	<b>Target Year</b>
• C-3 ( South, Br. No1)	2014
• C-3 ( North, Br. No2)	2025
• C-4 ( South, Br. No1)	Beyond 2025
• C-4 ( North, Br. No2)	Beyond 2025
• R-5	2020

The public transport and traffic management are undoubtedly in urgent need so that the highest priority was given.

<b>Public Transport</b>	;	Vehicle Registration	;	Start immediately
		Bus Terminal	;	Start immediately
<b>Traffic Management</b>	;	Enforcement	;	Start immediately
		Education	;	Start immediately

## (2) Implementation Schedule

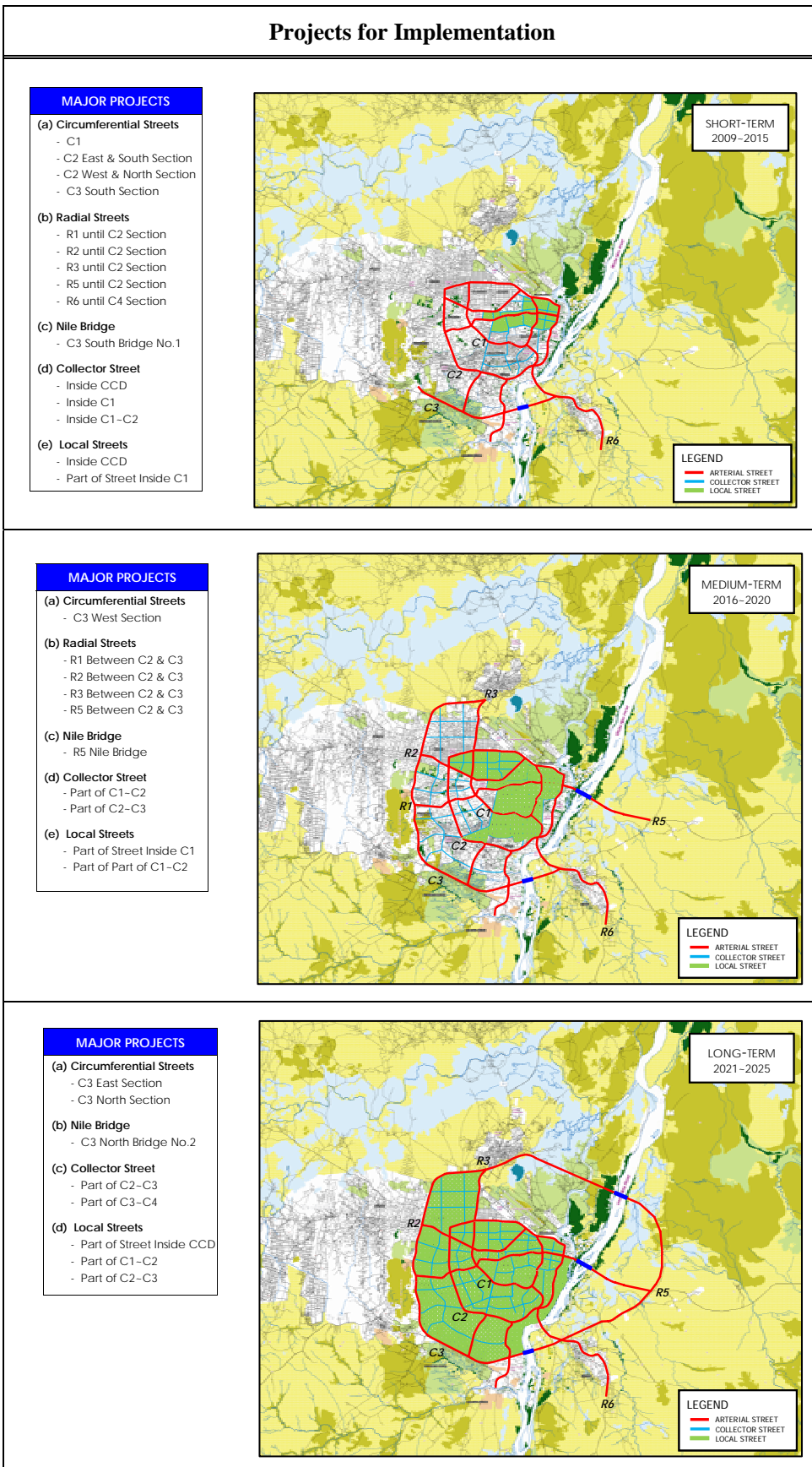
Table 15.3-1 shows the overall implementation schedule of the projects proposed in the Master Plan, prepared in consideration of critical priorities and assumed funds available for the Plan.

Figure 15.3-1 shows the proposed projects at different term periods.





## Projects for Implementation



**Figure 15.3-1 Proposed Projects at Different Term Periods**