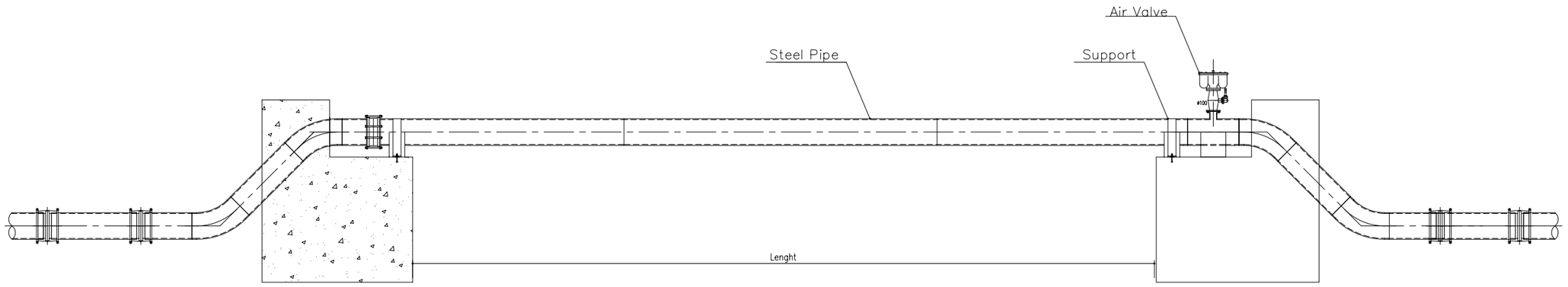


Typical Drawing of Pipe Bridge

PLACES

No	Length	Dwg–No	Pipe Diameter
No.01	10.7m	DM1–05	DIPø400
No.02	10.9m	DM1–06	DIPø400
No.03	13.5m	DM1–07	DIPø400
No.04	16.0m	DM1–10	DIPø400
No.05	8.0m	DM2–01	PVCø150
No.06	15.0m	DM2–03	PVCø150

MATERIAL LIST(DIPø400)

No	Description	Q'ty
No.01	Air Valve	1 pce
No.02	DIP Collar	4 pcs
No.03	SP 45°Flanged Spigot	4 pcs
No.04	All Flange Tee for Air Valve	1 pce
No.05	DIP Flanged Spigot	2 pcs
No.06	Steel Pipe	–

MATERIAL LIST(PVC ø150)

No	Description	Q'ty
No.01	Air Valve	1 pce
No.02	PVC Collar	4 pcs
No.03	SP 45°Flanged Spigot	4 pcs
No.04	All Flange Tee for Air Valve	1 pce
No.05	PVC Flanged Spigot	2 pcs
No.06	Steel Pipe	–

Lao People's Democratic Republic
Ministry of Communication, Transport, Post and Construction

The Basic Design Study on
The Project for the Vientiane Water Supply Development in Lao People's Democratic Republic

TITLE: Typical Drawing of Pipe Bridge

SCALE: NONE

DRAWING NO. Figure 2–63

APPROVED BY DATE

DESIGNED BY DATE

NIHON SUIDO CONSULTANTS CO., LTD. TOKYO, JAPAN

JAPAN INTERNATIONAL COOPERATION AGENCY

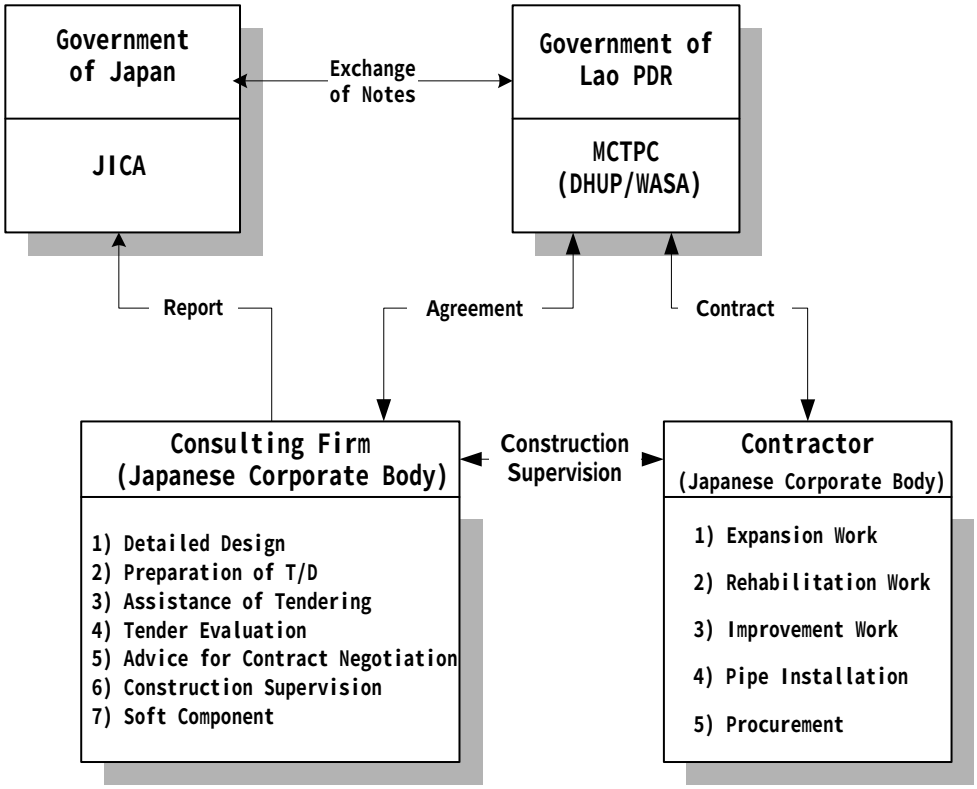
2-2-4 Implementation Plan

2-2-4-1 Implementation Policy

(1) Organization for the Implementation of the Project

The Project will be executed to comply with the requirements of the GOJ's Grant Aid. After the two governments exchange notes regarding the implementation of the Project, the GOL will select a consultant and contractor to implement the project. The consultant and contractor must be Japanese corporate bodies. Figure 2-64 outlines the implementation process for the project.

Figure 2-64 Project Implementation Process



(2) Implementing Agency

The agency responsible for implementing the project is the Ministry of Communication, Transport, Post and Construction; Department of Housing and Urban Planning; Water Supply Authority (MCTPC/DHUP/WASA). To ensure smooth implementation of the project, the MCTPC/DHUP/WASA will liaise and cooperate with the Vientiane Capital City Government, the relevant central government organization, and the NPVC (because the NPVC will be responsible for the operation and maintenance of water supply facilities once they are complete).

(3) Consulting Firm

The detailed design and construction supervision for the work financed by the GOJ must be carried out by a consulting firm that is a Japanese corporate body.

(4) Contractor for Construction Work

The construction work financed by the GOJ must be carried out by a contractor that is a Japanese corporate body.

The construction work includes the procurement of materials, expansion, rehabilitation, improvement, and pipe installation works. Therefore, the selected contractor should be a general construction company that has sufficient capacity and experience to undertake the work. The company should be capable of dispatching the necessary construction materials and equipment, and suitably qualified engineers.

(5) Necessity of Dispatching Japanese Engineers for Special Engineering Field

Although the construction work will be implemented by a general construction company, Japanese engineers should be assigned for specialist engineering tasks. The tasks that require input from Japanese engineers include the construction of the treatment plant, installation of electrical and mechanical equipment, test operations, and water proofing of structures and pipelines. Specific engineering fields that require dispatching of Japanese engineers are:

- formation of concrete framework to ensure the structures are water tight.
- installation of under-drainage systems for the filtration basins.
- installation of pumps.
- installation of electrical equipment.
- installation for chemical feeding facilities.
- installation of pipelines.

2-2-4-2 Implementation Conditions

Specific project implementation conditions for each facility are discussed in the following sections.

(1) Expansion and Rehabilitation of Kaolieo Treatment Plant

Prior to the expansion work at the Kaolieo Treatment Plant, the existing administration building, alum factory, and warehouse will be relocated by the NPVC. To maintain water supply throughout construction the expansion work will be implemented before the rehabilitation work. This means the expanded plant can operate while the existing plant is being rehabilitated.

The construction of the intake facility depends on the water level in the Mekong River. Construction should occur during December to April because this is when the water level of the Mekong River is the lowest.

(2) Improvement of Chinaimo Treatment Plant

To allow for construction of the new distribution clear water reservoir in the treatment plant premises, the existing distribution trunk main (with a diameter of 1,000 mm) will need to be relocated. During the pipe relocation work, the operation of the treatment plant will need to be suspended. Care will be taken to minimize the duration of the suspension.

(3) Km6 Booster Pumping Station

As discussed for the Chinaimo Treatment Plant improvement, care will be taken to minimize the duration of the suspension of pump operation.

(4) Installation of Transmission and Distribution Pipelines

Excavation of the trenches that accommodate the pipelines that will be aligned along the roads will disrupt traffic flow and access to the houses and shops located along the trench. Special care is therefore required when carrying out the pipe installation work along the roads that have relatively large traffic flows or have many houses/shops along the road.

To allow for quick backfilling of the trenches after the pipes are installed, restrain joints will be used, instead of concrete thrust blocks. This is because restrain joints can withstand the force of pulling pipes out. Also, concrete made thrust block require several days to set before trench backfilling can occur.

2-2-4-3 Scope of Works

Japan's Grant Aid will fund the expansion of the treatment plant, rehabilitation and improvement work, and installation of pipelines. The rehabilitation and improvement work includes the replacement of the existing pumps, valves and other equipment. The replacement works will be conducted by a Japanese contractor, however the costs required to dispose of the items to be replaced will be borne by the GOL.

A description of the GOL's obligations is provided in Chapter 2-3.

2-2-4-4 Consultant Supervision

(1) Construction Supervision

The selected consultant will perform the following supervisory work:

1) Check and approve shop drawings
2) Factory inspections of major equipment and materials
3) Construction supervision
4) Final inspection of the construction works
5) Test operation and inspection of facility performance
6) Inspection of construction materials
7) Reporting on construction progress to both the GOJ and the GOL
8) Provide advice regarding works being carried out by the GOL
9) Technology transfer to aid operation and maintenance of the facilities
10) Assist and advise the GOL with regards to the necessary procedures and responsibilities for execution of the Japan's Grant Aid Project

The project consists of a range of construction work types including expansion, rehabilitation and improvement of treatment plants, and installation of pipelines. To consistently and effectively supervise these various aspects of construction throughout the construction period, it is necessary to deploy one resident engineer for the duration of the construction period. In addition, various specialists will be required to supervise the construction of individual facilities.

(2) Project Manager

The general scope of work for the Project Manager is outlined here:

- Organize and attend an inception meeting prior to commencement of the construction work. The aim of this meeting will be to confirm the obligations of each party, the scope of the project, and the implementation schedule. The Lao implementation agencies, the consultant and the contractors should attend the inception meeting.
- Confirm the completion of the work on site and determine whether the project was completed satisfactorily.
- Assist the implementing agency with the hand over of the completed works to the GOL.

(3) Resident Engineer

The resident engineer will stay in Vientiane continuously and will supervise all the project work. The resident engineer will focus on ensuring quality control and timely progress. The resident engineer will assist and instruct the contractor and will prepare monthly progress reports for submission to the GOL. The general scope of work for the resident engineer is outlined here:

- Maintain tender documents, drawings, standards, specifications, results of surveys and soil

investigations, and documents prepared and submitted by the contractor.

- Check and approve the construction schedule/plan and shop drawings.
- Inspect and approve materials and equipment for the project.
- Inspect and approve construction work executed by the contractor.
- Monitor and manage the progress of construction work.
- Inspect safety provisions.
- Hold periodical meetings (and meetings as required) with the GOL, the consultant, and the contractor.
- Check and approve the as-built drawings.
- Assist the GOL with the work that the GOL is carrying out.

(4) Specialists

The following specialists will be assigned as necessary. These specialists will assist with technology transfer during the test operation period.

① **Electrical Specialist**

Role: Checking shop drawings, supervision, supervising test operations, instruction and advice concerning electrical equipment/facilities.

② **Mechanical Specialist**

Role: Checking shop drawings, supervision, supervising test operation, instruction and advice concerning mechanical equipment/facilities.

③ **Pipeline Specialist**

Role: Checking shop drawings, supervision, supervising pressure test, instruction and advice concerning installation of the pipelines.

④ **Equipment Specialist**

Role: Checking shop drawings, instruction and advice concerning installation of the equipment.

2-2-4-5 Procurement Plan

(1) Procurement Plan of Materials and Equipment

The countries where materials and equipment will be procured were selected based on a consideration of the following factors:

- The quality of the materials and equipment must conform to the requirements.
- For local materials and equipment, quality and capacity of supply should be at acceptable levels.
- Operation and maintenance should be simple. This includes the need for easy availability of spare parts.
- The products must be competitively priced.
- After-sale services must be available.

Table 2-8 indicates where the different construction products will be procured from.

Table 2-8 Procurement Plan for Construction Materials

Name of Material	Source of Procurement			Remarks
	Japan	Lao PDR	Third Countries	
1. Construction Material				
Ready Mixed Concrete		○		
Sand and Gravel		○		
Cement		○		
Steel Bar		○		
Formwork Wooden Plate		○		
Wood		○		
Steel Sheet Pile and H-shape Steel Pile		○		Thailand made piles will be procured in Lao PDR
Galvanized Steel Plate		○		
Paints		○		
Lubricant		○		
Fuel		○		
Water Stops	○			
Filter Sand		○		
Scaffolding and Support			Thailand	
2. Equipment				
Pumps	○			
Water Treatment Equipment including Chemical Feeding Equipment	○			
Electrical Equipment	○			
Electrical Panels			Thailand	
Lighting equipment			Thailand	
Cables and Cable Pipes			Thailand	
Monitoring and Control Devises	○			
Air Conditioner, Inter Phone, etc		○		Thailand made equipment will be procured in Lao PDR
Pipe Material（DCIP）	○		China	Restrain joints will be procured from Japan
Pipe Material（PVC）	○		Thailand	Restrain joints will be procured from Japan
Valves	○		Thailand	Special valves will be procured from Japan

(2) Transportation Plan

The methods of transporting the construction products from the source of procurement to the construction site are explained below:

1) Materials/Equipment Procured in Japan

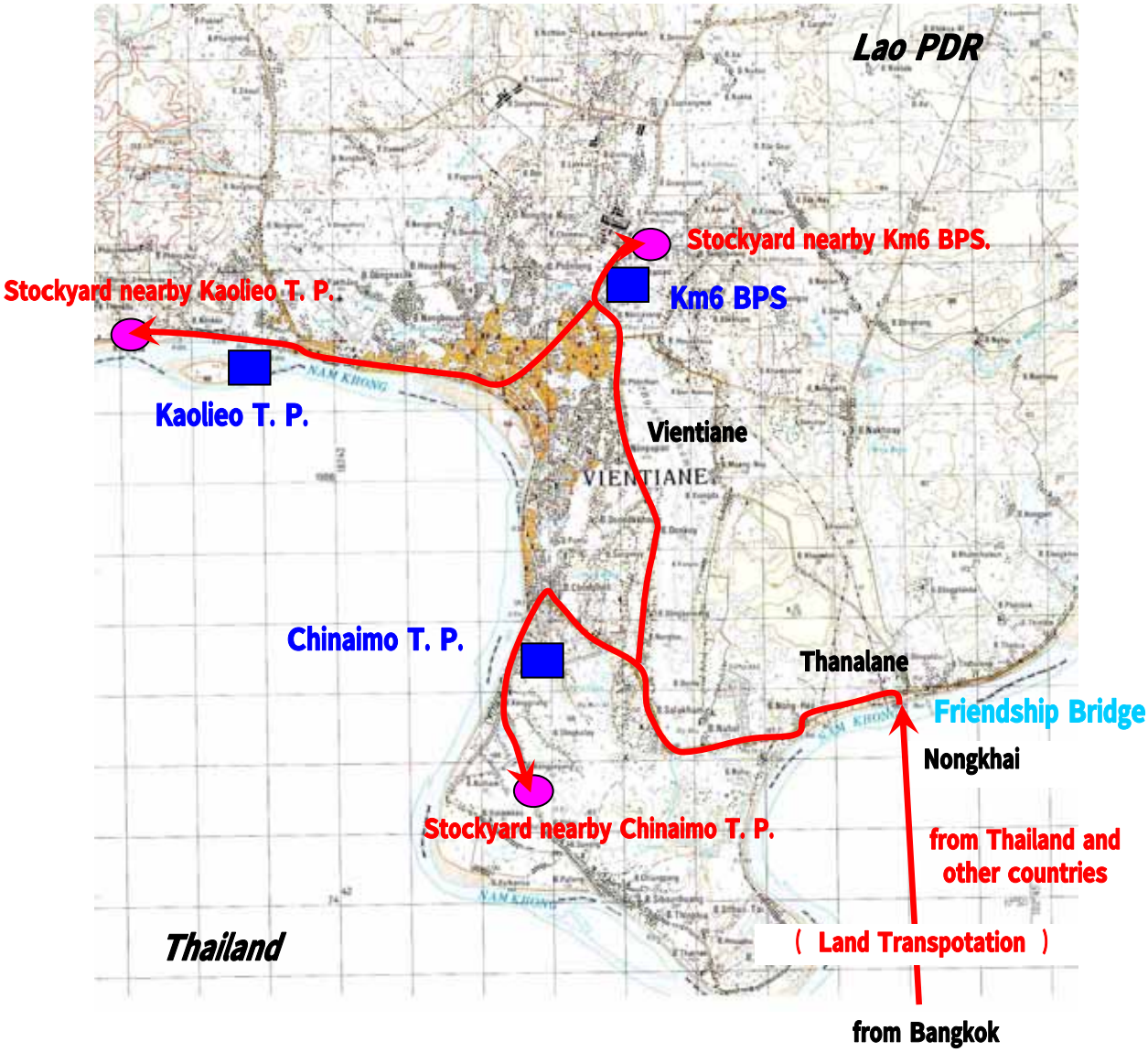
i) Delivered to Yokohama Port (Japan) by respective manufacturers.
ii) Sea transportation from Yokohama (Japan) to Bangkok Port (Thailand).
iii) Overland transportation by truck from Bangkok Port to Thanalane City via the Friendship Bridge which crosses the Mekong River.
iv) After customs clearance at Thanalane City, the products will be transported overland by truck from Thanalane City to the respective stock yards in Vientiane.

2) Materials/Equipment Procured in China
i) Delivered to Shanghai or Chin Tao Port (China) by respective manufacturers.
ii) Sea transportation from these ports (China) to Bangkok Port (Thailand).
iii) Overland transportation by truck from Bangkok Port to Thanalane City via the Friendship Bridge which crosses the Mekong River.
iv) After customs clearance at Thanalane City, the products will be transported overland by truck from Thanalane City to the respective stock yards in Vientiane.

3) Materials/Equipment Procured in Thailand
i) Overland transportation by truck to Thanalane City via the Friendship Bridge which crosses the Mekong River.
ii) After customs clearance at Thanalane City, the products will be transported overland by truck from Thanalane City to the respective stock yards in Vientiane.

The route for the overland transportation through Thailand and Lao PDR is shown on Figure 2-65.

Figure 2-65 Route of Overland Transportation



2-2-4-6 Quality Control Plan

The quality control of the construction works is to be conducted in light of the technical specifications prepared by the consultants during the detailed design work, and the major control work items are listed in Table 2-9 together with indicators, control methods, and standards to be adopted. JIS or other equivalent International Standards are, in principle, to be used for the quality control.

Table 2-9 Major Work Items and Methods for Quality Control

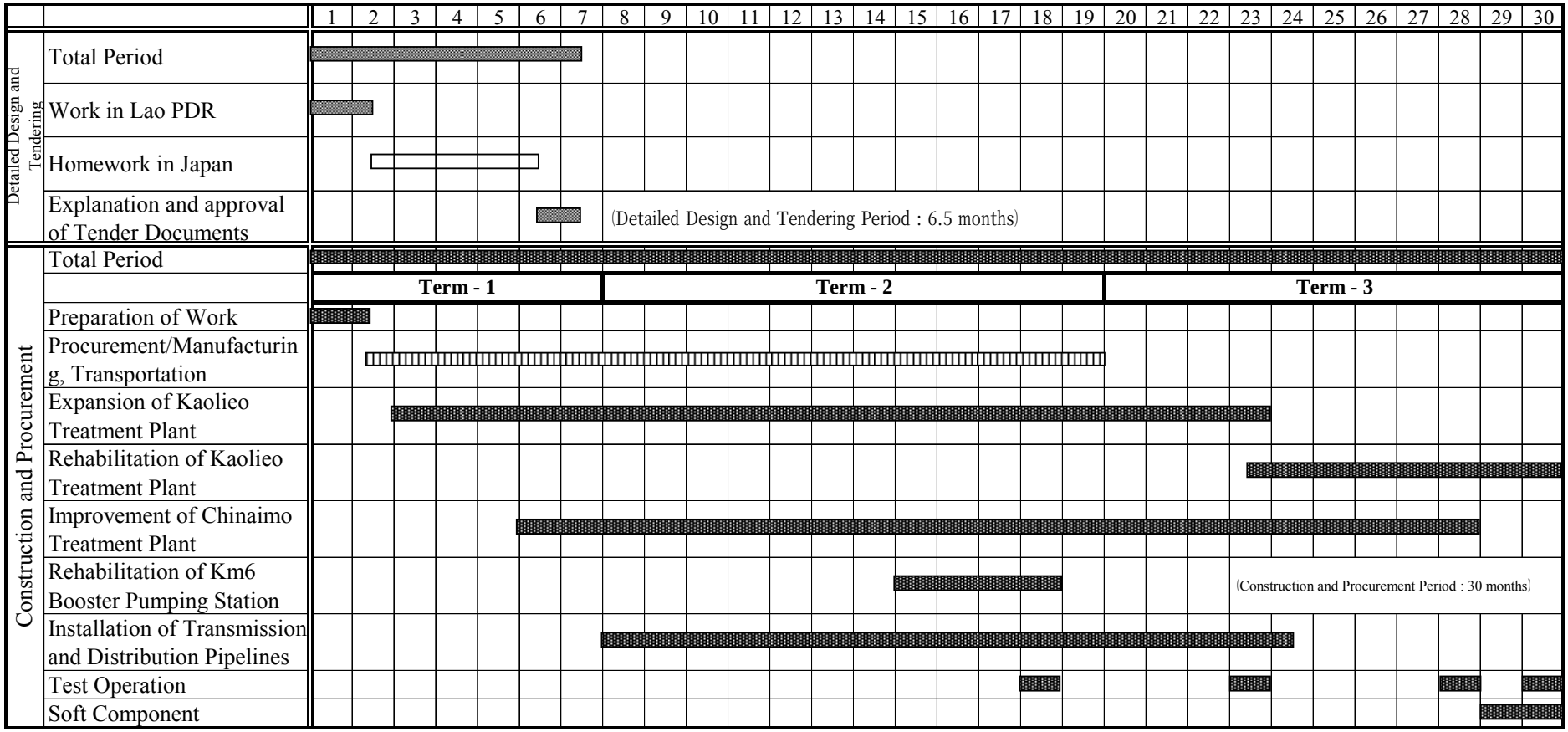
Category	Control Item	Control	Method of Control	Applicable Standards	Frequency of Test	Records	Remarks
Pump Facilities	Pump	Conform to the Standards	Observation Shop-Drawing Test Report	JIS B 8301 JIS B 8302	When Received Factory Inspection	Record Test Result Table Approval Drawings	In the presence of Consultant
Pipe Material	Ductile Cast Iron Pipe	Conform to the Standards	Shop-Drawing	JIS G 5526 JIS G 5527	For each pipe laying section	Approval Drawings	
		Type	Observation		For each type、when received	Record	In the presence of Consultant
Pipe Laying Work	Joint	Joint Condition	Observation	—	During the course of Jointing Work	Report	In the presence of Consultant
			Pressured Leakage Test	No leakage observed	For each pipe laying section	Test Result Table	In the presence of Consultant
			Ultra Sonic Test		At one time for every 10 joints	Test Result Table	
Concrete Material	Reinforcing Bars	Type of Re-bar （deformed, round）	Observation	JIS G 3112 JIS G 3117	When received for each type		In the presence of Consultant
		Conform to the Standards	Test Report			Test Result Table	
	Cement	Type of Cement	Observation	JIS R 5210	When received.	Record	In the presence of Consultant
		Conform to the Standards	Test Report			Test Result Table	
	Water	Piped Water or Clear River Water	Observation	—	When mixed	Concrete Mixture Table	In the presence of Consultant
		Water Quality （River Water）	Water Quality Test	JIS A 5308 Appendix 9	Before mixture design	Test Result Table	
	Aggregates	Maximum diameters of Aggregates	Observation	Reinforced Concrete：25mm	When Received.	Record	In the presence of Consultant
		Grain Size	JIS A 1102	JIS A 5005	Before mixture design	Test Result Table	
	Concrete Mixture	Conform to the Standards	Test Report	JIS A 6201-6207	When received	Test Result Table	When necessary.
	Storage of Materials	Place and Storage Conditions	Observation	—	When necessary.	Report	In the presence of Consultant
Concrete Placing Work	Concrete Design Mixture （Major Structures）	Test Mixture	Confirmation of Quality	28 day strength：21N/mm2 Slump:10.0±2.5cm Air Content:±1.5% W/C Ratio : less than 65% (less than 55% for water retaining structure Cement:: more than 270kg/m3)	1 time before placing	Test Result Table	In the presence of Consultant
	On-site Concrete Mixture	Water Content of Small Aggregate Surface	JIS A 1111,1125	—	Each mixing	Test Result Table	In the presence of Consultant
		Grain Size of Aggregate	JIS A 1102	JIS A 5005	When received	Test Result Table	
		Temperatures of Water and Aggregates	Temperature Measurement	—	Each mixing	Test Result Table	In the presence of Consultant
		Water and Cement Volumes		Error: less than 1 %			
	Slump	Conform to the Specifications	JIS A 1101	10.0±2.5cm	Each placing	Test Result Table	In the presence of Consultant
	Air	Conform to the Specifications	JIS A 1128	±1.5%	Each placing	Test Result Table	In the presence of Consultant
	Compressive	Laboratory	—	Approval of Consultant	Prior to the test	—	

Category	Control Item	Control	Method of Control	Applicable Standards	Frequency of Test	Records	Remarks
	Strength	Sampling	JIS A 1132	7day Strength: 3 pcs 28day strength：3pcs	Every 50m3 placing or 1 time per day 1time for one consecutive placing work	—	In the presence of Consultant
		Conform to the Specifications	JIS A 1108	Design Strength= 21 N/mm2	Every 50m3 placing or 1 time per day 1time for one consecutive placing work	Test Result Table	
	Leakage Test（Reservoir）	Conform to the Specifications	Water Level Measurement, Observation	No water level draw-down after 24 hours	After the structure is constructed	Test Result Table	In the presence of Consultant

2-2-4-7 Implementation Schedule

The implementation schedule is shown in Figure 2-66. The detailed design and tendering period will be approximately 6.5 months and procurement and construction will be 30 months.

Figure 2-66 Implementation Schedule



2-3 Obligations of Recipient Country

2-3-1 Land Acquisition

The construction works (i.e. construction of the intake facilities, the treatment facilities, and the distribution pumping station/reservoirs) will take place within the existing NPVC premises. Therefore, land acquisition will not be required. The NPVC has already given approval for the construction of these facilities on their premises.

For the expansion of the Kaolieo Treatment Plant, the existing administration building, water tariff collection office, warehouse, and alum factory will need to be relocated by the GOL to a secure space. The NPVC has indicated that the water tariff collection office will be relocated to a site outside of the Plant.

The GOL needs to provide the following land space for the consultant/contractor office, temporary stockyard, and for dumping of excess soil:

- Around Kaolieo Treatment Plant： about 2ha
- Around Chinaimo Treatment Plant： about 1ha
- Around Km6 Booster Pumping Station： about 0.4ha

2-3-2 Disposal of Equipment that is removed during the Rehabilitation Work

As a part of rehabilitation work, existing pumps, valves and other equipment will be removed for replacement. The removal of the equipment will be conducted by contractors. However the disposal costs should be borne by the GOL.

2-3-3 Additional Power Supply to Treatment Plant and Pumping Station

Additional power needs to be supplied to the Kaolieo and Chinaimo Treatment Plants and the Km6 booster pumping station. The GOL is responsible for supplying this additional power. The power should be a dual source supply so that emergency generators do not need to be installed. The power receiving facilities at each site will be installed by the GOJ. The additional power that is required to be supplied to each site is shown below:

- Kaolieo Treatment Plant： 2,150 kVA
- Chinaimo Treatment Plant： 3,000 kVA
- Km6 Booster Pumping Station： 100 kVA

2-3-4 Procurement and Installation of Small Size Distribution Pipes and House Connections

The project will expand the treatment plants and will improve transmission and distribution of the water through the trunk mains. Therefore, additional treated water will be supplied to the service area. Supply of water from the trunk mains to the customers is the responsibility of the GOL. This includes the procurement and installation of the smaller sized distribution pipes and house connections. The total number of house connections in 2007 is predicted to be approximately 56,700. This means that approximately an additional 9,000 house connections will be required.

2-3-5 Required Staff Assignment for Adequate Operation and Maintenance

The expansion of the treatment plants, the increased length of pipeline and the increased number of house connections means that additional staff will be required to ensure sound operation and maintenance. The number of staff required is described in the following section.

2-3-6 Issuing of Construction Permission

During the field survey of the Basic Design Study, the GOL provided written approval for the construction work associated with the expansion, rehabilitation, and improvement of the treatment plants, booster pumping stations, and pipe installation. Before the contractor starts construction the GOL will need to issue the contractor with construction permission. It is requested that there is no delay in issuing this permission.

2-3-7 Others

In addition to the above obligations, the GOL is responsible for:

- Providing facilities for the distribution of electricity, water supply, drainage and other incidental facilities.
- Issuing public notices regarding the effects of construction work.
- Bearing the following commissions to the Japanese bank for banking services based upon the B/A;
    - ✧ Advising commission of A/P
    - ✧ Payment Commission.
- Bearing the payment of commissions to the Lao bank for banking services.
- Ensuring tax exemption and custom clearance for the products at the port of disembarkation.
- Exempting Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in Lao PDR with respect to the supply of the products and services under the verified contracts.
- Providing Japanese nationals, whose service may be required in connection with the supply of the products and the services under the verified contract, such facilities as may be necessary for their entry into and stay

within Lao PDR for the performance of their work.

- Maintaining and properly and effectively using the facilities contracted and equipment provided under the Grant.
- Bearing all the expenses, other than those to be borne by the Grant, necessary for construction of the facilities as well as for the transportation and installation of the equipment

2-3-8 Suggestions Concerning Dongmark Khay Project

- The scope of the project was reviewed and revised to take into account the Dongmark Khay project. The Dongmark Khay project is proposed by the GOL. It is suggested that the GOL implements the Dongmark Khay project without delay and ensures that it is implemented to a quality standard that ensures its sustainability.
- The treatment of wastewater and sludge from the Dongmark Khay Treatment Plant needs special attention to ensure that any adverse environmental impacts are mitigated.
- The service area of the Dongmark Khay Treatment Plant is the northern part of the city, including the Dongdok area. Development of the transmission and distribution system in the Dongmark Khay Treatment Plant service area is the responsibility of the GOL. When planning the transmission and distribution system, the possibility of direct distribution from the plant should also be considered.
- The operation and maintenance plan included in this report was prepared without consideration for the Dongmark Khay project because details regarding the operation and maintenance and the financial plan for the Dongmark Khay project are not available. It is suggested that the GOL conducts a careful financial analysis and establishes operation and maintenance strategies to ensure the sustainability of the Dongmark Khay project.

2-4 Project Operation Plan

2-4-1 Operation and Maintenance after Completion of the Project

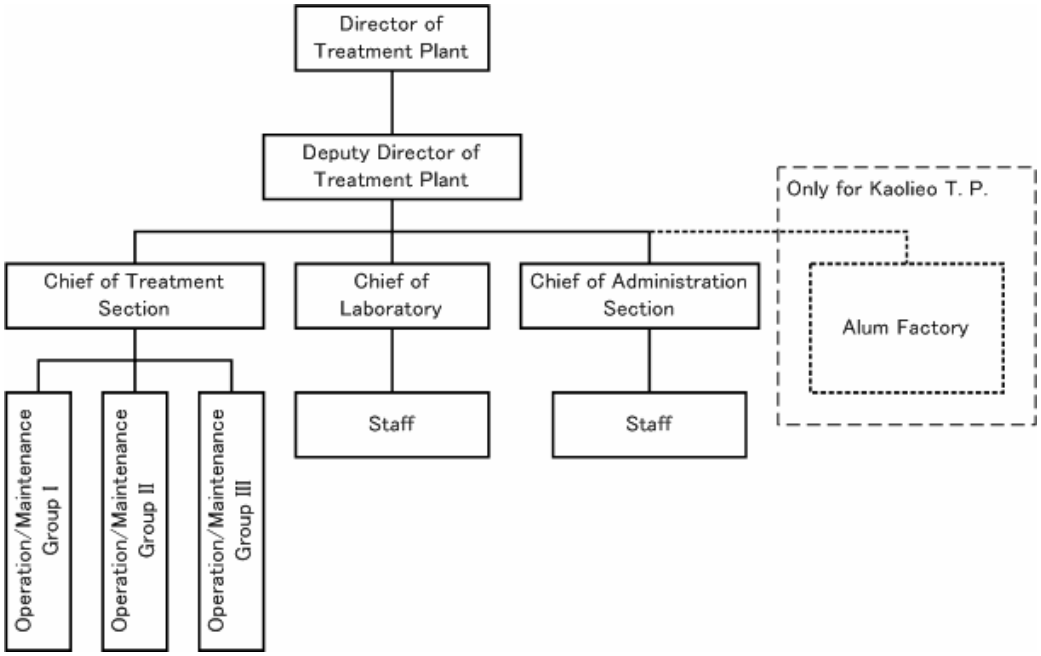
Operation and maintenance after the project is complete is the responsibility of the NPVC. It will not be necessary for the NPVC to establish a new section or division within the existing organization to undertake the operation and maintenance activities because the project expands, rehabilitates, and improves the existing facilities. However additional staff will be required in the following fields:

a) operation and maintenance crew for the expanded Kaolieo Treatment Plant (40,000 m3/day); and
b) meter readers for the increased number of house connections.

The existing Kaolieo Treatment Plant (20,000 m3/day) is operated and maintained by three groups and each group

is composed of eight staff. To operate and maintain the expanded portion of the treatment plant (40,000 m3/day), the number of staff in each group will need to be increased from eight to ten. In addition a mechanical or electrical engineer should be employed as the "Chief of Treatment Section". The organization chart for the treatment plant is shown in Figure 2-67.

Figure 2-67 Organization Chart for Chinaimo/Kaolieo Treatment Plants



The Deputy Director positions for each of the two existing treatment plants have been vacant for a long time, but they were recently filled. However, the Chief of the Treatment Section positions for the two existing plants are still vacant. It is recommended that these positions be filled by suitably qualified engineers or technicians.

The number of house connections in 2007 is predicted to be 57,000. It is expected that about 9,000 meters will be installed by the year 2007 to service the increased number of connections. Based on current meter reading efficiency, 10 additional meter readers will be required by 2007.

The total number of NPVC staff in 2004 was approximately 400. The additional staff required to service the expanded operation and maintenance needs represents four percent of the existing workforce. Therefore, there will not be a significant impact to the NPVC.

2-4-2 Operation and Maintenance Capacity of the NPVC

The quality of treated water being produced from the Kaolieo and Chinaimo Treatment Plants complies with the WHO water quality guidelines. Therefore, it is expected that the existing level of operation and maintenance work carried out at the Kaolieo and Chinaimo Treatment Plants is at adequate levels (although there are problems

at the Kaolieo Treatment Plant relating to the age and poor condition of the equipment). The proposed works apply a similar level of water treatment technology as is used at the existing systems. Therefore, the existing staff will be able to operate and maintain the proposed treatment plants without any difficulties. To help ensure suitable operation and maintenance, relevant training will be required before the plants begin operation.

2-4-3 Status of Leakage and Water Tariff Collection

2-4-3-1 Status of Leakage

(1) Leakage Ratio

The leakage ratio declined between 2002 and 2004 by more than 30 percent. The ratio in 2004 was less than 30 percent. To assist the NPVC with leakage reduction, the AFD commenced the second phase of their leakage reduction project in March 2004. The objectives of the project were to:

a) Prevent and reduce leakage.

b) Reduce wastage especially at large government institutions.

As part of this project, the NPVC requested the AFD to recommend a method of distribution system valve control which will prevent extreme high pressure within the service area. The NPVC also requested a plan for partial water supply (intermittent water supply area by area) to be used in the event of serious water shortages.

(2) Actions for Leakage Reduction

i) Technical Aspects

It is recommended that efforts be concentrated on the repair of above ground leakage (i.e. where wet parts are observed on the ground surface although the leakage point exists underground). These above ground leakages will be found through an inspection process being conducted as a part of the AFD second phase leak reduction project. It is also recommended that malfunctioning meters be replaced and that oversized water meters be replaced with meters of an adequate size. These actions will remarkably contribute to leakage reduction.

To help avoid situations of extreme high pressure, the NPVC has started to control pressure in the service area as a part of the AFD second phase leak reduction project. Avoiding extreme high pressure will help to reduce leakage. In addition it is recommended that installation of pipes and leak repair work be implemented in accordance with technical specifications. It is also recommended that improvements to the NPVC supervising system be implemented.

ii) Public Relation

The general public will know where many leakage points occur. When the public informs the NPVC of a leakage point location, immediate repair action should be taken. Prompt actions by the NPVC will enhance mutual cooperation between the NPVC and the public.

It is also important that the NPVC continues their campaign(from March 2004) promoting water conservation and wastage control, because this is one of the most effective ways of increasing efficiency of the water supply system.

2-4-3-2 Status of Tariff Collection

Table 2-10 shows collection rates for water tariffs in the years 2002 and 2003. The total tariff invoiced was calculated by multiplying the total quantity of water invoiced by the average tariff. The tariff collection rate was determined by comparing the total invoiced amount with the actual water tariff income. The results of these calculations show that the tariff collection rate was 95 percent in 2002 and 94 percent in 2003. These rates are higher than many other developing countries.

Table 2-10 Water Tariff Collection Rate

		2002	2003
Invoiced Water Quantity	m3/year	29,636,213	31,377,583
Average Water Tariff	Kip/m3	550	550
Total Invoiced Amount	Kip	16,299,917,150	17,257,670,650
Actual Water Tariff Income	Kip	15,527,275,211	16,141,442,380
Water Tariff Collection Rate	%	95%	94%

2-4-4 Cost Estimates for the Project

2-4-4-1 Project Costs

Case 1 The case that the construction of duplication parts will be implemented after No.1 road project

The total project costs are estimated to be 2,955 Million Yen (borne by GOJ: 2,916 million Yen, borne by GOL: US$ 360,300) based on the conditions described below. The period of construction is 30 months. The breakdown of the project cost is shown below.

(1) Project Cost Borne by the GOJ

Unit：million Yen

Cost Item		Cost					
		Design Period	Term 1	Term 2	Term 3	Sub-total	Total
Construction of Facilities	Expansion of Kaolieo T.P.		275	1,064	3	1,342	2,706
	Rehabilitation of Kaolieo T.P.		0	0	422	422	(173)
	Improvement of Chinaimo T.P.		55	213	193	461	
	Rehabilitation of Km6 Booster Pumping St.		0	31	0	31	
	*Transmission and Distribution Pipeline		0	331 (120)	119 (53)	450 (173)	
Equipment	Laboratory at Kaolieo T.P.		0	0	2	2	2
Engineering Services (D/D, Tendering and S/V including Soft Component)		43	40	53	72	208	208

* ( ) indicates the duplicated part

It is noted that the above cost estimate is provisional and will be subject to further examination by the GOJ prior to grant approval.

Case 2 The case that the construction of duplication parts will be implemented before No.1 road project

The total project costs are estimated to be 2,911 Million Yen (borne by GOJ: 2,872 million Yen, borne by GOL: US$ 360,300) based on the conditions described below. The period of construction is 30 months. The breakdown of the project cost is shown below.

(1) Project Cost Borne by the GOJ

Unit：million Yen

Cost Item		Cost					
		Design Period	Term 1	Term 2	Term 3	Sub-total	Total
Construction of Facilities	Expansion of Kaolieo T.P.		274	1,066	3	1,343	2,662
	Rehabilitation of Kaolieo T.P.		0	0	426	426	
	Improvement of Chinaimo T.P.		55	213	195	463	
	Rehabilitation of Km6 Booster Pumping St.		0	31	0	31	
	Transmission and Distribution Pipeline		0	305	94	399	
Equipment	Laboratory at Kaolieo T.P.		0	0	2	2	2
Engineering Services (D/D, Tendering and S/V including Soft Component)		43	40	52	73	208	208

It is noted that the above cost estimate is provisional and will be subject to further examination by the GOJ prior to grant approval.

(2) Project Cost Borne by the GOL

The cost borne by Lao PDR Side US$ 360,300

1)	Land Acquisition for Km6 Booster Pumping Station	US$ 6,100
2)	Land Rental Fee for Stockyard and Site Office	US$ 110,400
3)	Installation of Gates and Fence	US$ 4,000
4)	Power Supply (Dual Source), including water supply and drainage	US$ 43,700
5)	Relocation of Adiministration Building and Alum Factory	US$ 133,100
6)	Other Administrative Costs in Lao PDR side	US$ 63,000

It should be noted that costs borne by the Lao side does not include costs required for Dongmark Khay project and relating transmission and distribution system developments.

(3) Conditions for Cost Estimates

1) Date of Estimates: As of February, 2005

2)	Exchange Rates:	$1 USD = 107.038 Yen	
3)	Period of Construction:	Three Terms	
		Detailed Design and Tendering:	6.5 months
		Procurement/Construction	30.0 months
4)	Others:	The Project should be implemented in accordance with the procedures of Japan's Grant Aid Scheme.	

2-4-4-2 Operation and Maintenance Costs

2-4-4-2-1 Financial Situation of the NPVC

(1) Financial Situation

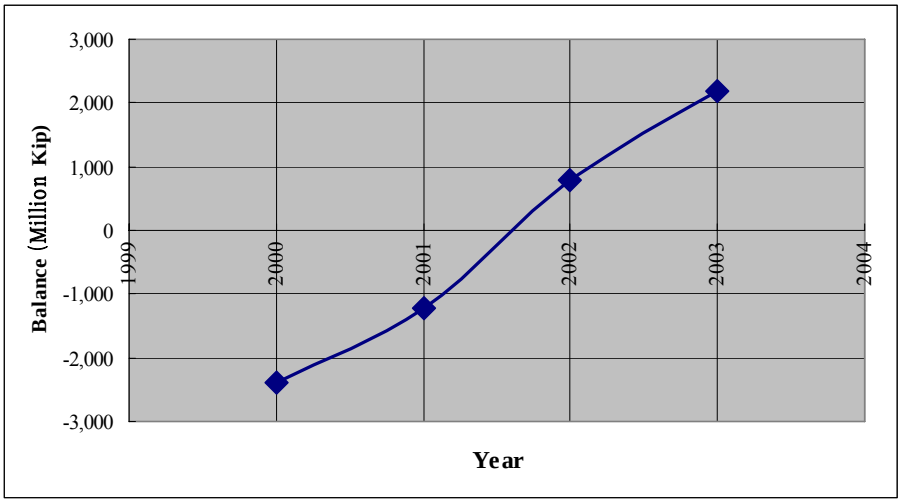
NPVC financial information is shown in Table 2-11 for the period between 2000 and 2003. It can be seen that revenue increased remarkably during 2002, as compared to 2000. This was because of an incremental increase in the average unit price of water from 260 Kip/m3 in 2000 to 547 Kip/m3 in 2002. There was also a slight increase in the volume of water supplied (water supplied in 2002 was 118 percent more than in 2000) but it is the incremental price increase that accounts for the remarkable increase in revenue. For the same period (2000 – 2003), production costs increased by 143 percent. Therefore, the gross profit increased by 218 percent for the three year period. The growth in profit continued throughout the year 2003. The financial situation will be further improved because an additional water tariff increase was implemented during 2004 (as described below).

Table 2-11 NPVC Financial Situation from 2000 to 2003

Year			2000	2001	2002	2003
No	Description	A/C number	Kip	Kip	Kip	Kip
I	**Income**		**12,271,763,089**	**16,001,968,928**	**19,977,874,771**	**20,960,893,408**
1	Income (water sales)	7131	6,409,602,225	10,298,908,368	15,527,275,211	16,141,442,380
2	Income (connection)	7132	1,889,288,381	2,070,099,939	2,026,892,017	2,093,439,288
3	Income (undertake project)	7134	2,657,239,853	2,139,850,030	995,547,237	999,164,301
4	Income (material sales)	731	378,138,859	161,197,998	105,346,226	57,494,812
5	Income (vehicle rental)	732	56,307,471	69,908,765	61,764,161	92,137,800
6	Income (meter rental)	733	594,251,503	1,046,741,984	1,097,666,222	1,184,413,233
7	Various Products of current Management	758	13,387,916	13,142,500	12,467,300	10,526,765
8	Profits on exchange	763	73,055,311	85,062,386	56,020,756	171,802,674
9	Other financial income	768	108,658,395	68,206,396	55,852,232	114,215,809
10	Sale of fixed assets	771	12,450,000	30,000	2,300,000	35,600,000
11	Penalties Imposed	772	42,395,899	48,820,562	36,743,409	60,656,346
12	Other Exceptional profits	778	36,987,276	0	0	0
II	**Expenditure**		**15,173,229,057**	**19,072,958,732**	**21,587,869,024**	**21,369,118,197**
A	**Purchase Material and equipment**		**8,316,527,285**	**10,995,759,485**	**11,157,122,306**	**8,830,635,177**
1	Purchase Raw materials principal (foreign)	6111	916,226,223	1,386,932,837	2,016,751,790	1,684,116,280
2	Purchase Raw materials Auxiliary (foreign)	6112	753,241,650	825,065,030	1,241,854,120	912,887,230
3	Purchase Pipe (foreign)	61120	2,032,207,143	2,667,599,749	1,252,382,741	838,127,808
4	Purchase Spare part (foreign)	61122	0	420,609,249	107,945,082	160,839,900
5	Purchase Raw materials Auxiliary (local)	61312	0	1,888,050	13,098,700	0
6	Purchase Pipe (local)	61320	842,949,497	710,825,756	1,193,244,437	2,242,873,982
7	Purchase Fuel for stock (local)	61321	652,443,363	777,585,399	651,855,903	596,584,600
8	Purchase spare parts (local)	61322	66,164,300	80,808,857	77,311,000	77,402,800
9	Purchase construction material (local)	61323	209,786,358	259,740,068	268,970,730	362,711,195
10	Purchase tools (local)	61324	43,285,280	68,133,150	52,923,000	181,370,750
11	Purchase office supplies (local)	61325	377,348,625	442,250,300	267,569,575	517,208,330
12	Purchase Electricity (not stock able)	6172	2,422,874,846	3,354,321,040	4,013,215,228	1,145,852,564
13	Purchase tools (not stock able)	6173	0	0	0	77,884,988
14	Purchase office supplies (not stock able)	6174	0	0	0	32,774,750
B	**Service Expense and administrations**		**6,856,701,772**	**8,077,199,247**	**10,430,746,718**	**12,538,483,020**
1	Location of vehicle	621	197,435,616	389,014,061	755,596,929	1,110,728,911
2	Insurance charges	6231	13,677,069	11,226,292	12,246,743	15,007,918
3	Insurance social security charges	6232	0	15,684,403	118,713,929	159,498,521
4	External Remittances	6245	88,694,270	58,896,595	68,162,774	85,772,658
5	Water meter service	6246	10,218,177	21,413,191	36,779,899	109,900,358
6	Transport Charges on purchases	6251	23,672,580	19,337,580	32,157,800	12,574,500
7	Travel	6255	46,243,810	87,280,410	103,517,712	90,470,880
8	Sports Charges	6256	58,579,500	23,819,630	26,837,600	38,972,000
9	Expenditure for training	6258	37,278,943	19,303,575	37,566,278	94,977,744
10	Mission, Meetings, Receptions	626	32,593,173	33,710,355	63,418,875	58,752,781
11	General Sub-contractor	627	1,144,834,205	1,076,017,818	1,311,802,508	1,621,123,811
12	Newspaper, Advertising, P T T	6281	76,848,197	116,522,799	198,673,958	232,336,825
13	General Management charges	6288	92,062,526	178,461,573	275,252,490	579,512,481
14	Import Taxes	631	357,789,600	259,787,600	238,627,900	180,057,500
15	Registration Rights and stamp	637	19,141,289	40,065,271	90,779,237	46,562,308
16	Salary and labors	641	1,051,328,151	1,464,723,089	2,226,969,116	2,499,643,163
17	Premiums and bonus	642	83,448,482	169,709,618	123,685,174	129,795,857
18	Other allocations	643	73,420,104	125,930,062	115,692,688	105,396,407
19	office guard Expenses	645	163,133,901	290,045,197	245,490,945	273,897,085
20	Charges of social security	647	15,197,000	48,548,000	53,307,955	52,409,746
21	Other Social charges	648	99,269,776	154,149,795	354,743,607	576,085,018
22	Loan Interest charges	661	1,070,227,902	1,000,912,763	958,767,000	943,361,443
23	Losses on foreign Exchanges	663	140,537,195	315,427,749	196,171,268	120,658,438
24	Other financial charges	668	13,030,453	12,376,508	20,847,112	22,367,116
25	Gift Expenses	673	720,000	1,729,000	2,510,000	0
26	Losses on bad debts	674	197,355,677	0	13,548,632	0
27	Exceptional charges	678	4,085,897	3,979,322	24,196,000	8,424,620
28	Depreciation of fixed assets in use	682	1,398,772,441	1,577,724,909	1,972,357,612	2,246,796,621
29	Endowment to provisions for risks and charges	684	347,105,838	403,434,968	752,324,977	1,123,398,310
30	Imposts on profits	69	0	157,967,114	0	0
III	**Reduction expense**		**521,431,077**	**1,851,312,097**	**2,387,754,809**	**2,583,279,621**
1	Stock Adjustment raw materials (principal)	6011	-302,148,350	-423,437,763	379,888,667	-371,292,500
2	Stock Adjustment raw materials (auxiliary)	6012	-1,407,538,120	-1,489,126,718	-1,780,506,525	-1,950,982,441
3	Stock Adjustment Pipes	6020	-82,859,394	470,394,728	-454,624,680	158,534,207
4	Stock Adjustment Fuel gasoline	6021	-17,644,864	412,785,870	-1,193,523	-8,566,157
5	Stock Adjustment Spare parts	6022	-166,172,051	368,154,779	-138,872,629	29,960,031
6	Stock Adjustment Construction material	6023	21,005,774	21,337,433	6,276,502	-30,089,550
7	Stock Adjustment Tools	6024	-10,464,039	-28,902,773	-3,756,095	-7,711,000
8	Stock Adjustment office supplies	6025	31,600,800	196,271,960	7,623,388	-46,444,746
9	Stock Adjustment Material of branch office	608	1,614,836,492	1,447,029,850	2,182,724,140	2,396,140,215
10	Production Immobilized	702	83,225,411	56,154,394	261,935,494	80,439,109
11	Production (Undertake project)	7034	511,526,762	517,322,805	1,419,583,685	1,885,312,709
12	Charges of acquisitions of fixed assets	744	246,062,656	303,327,532	508,676,385	447,979,744
	All total expense		**14,651,797,980**	**17,221,646,635**	**19,200,114,215**	**18,785,838,576**
	Loss/Benefit for the year		**-2,380,034,891**	**-1,219,677,707**	**777,760,556**	**2,175,054,832**

Figure 2-68 shows financial balance of the NPVC from 2000 to 2003.

Figure 2-68 Financial Balance of the NPVC（2000～2003）



(2) Structure of Water Tariff

The water tariff in Vientiane was drastically revised in 2004. The last tariff increase was in 2002, when the average tariff was increased from 269 Kip/m3 to 550 Kip/m3. In 2004, the water tariff was increased using a two staged approach, as shown below. The tariff increases were approved by the central and Vientiane municipal government.

First Stage： Average tariff was increased from 550 to 750 Kip/m3 in March to June of 2004

Second Stage: Average tariff was increased from 750 to 950 Kip/m3 in July to December 2004

These tariff increases were recommended in the re-structuring plan prepared by the World Bank in 2003. The increases were based on the Tariff Policy prepared by WASA in 2003. The previous JICA M/P & F/S also recommends a future tariff schedule. The JICA tariff schedule recommended that the average water tariff be set at $0.07 USD in 2006 and $0.1 USD in 2007. These tariffs target full cost recovery. The planned tariff level is 950 Kip/m3 (the equivalent to $0.09 USD). This is almost reaching the scheduled 2007 water tariff.

Until the year 2000, the water tariff structure was divided into five groups. In the year 2001, these five categories were combined into four categories. From the year 2004, three categories were established as follows:

Group 1: domestic, governmental organization/institutions

Group 2: commercial, industry

Group 3: foreigner, embassy, international agency, foreign company

Figures 2-69 to 2-71 show the changes in the unit water tariff compared to the monthly water consumption.

Figure 2-69 Unit Water Tariff Change by Monthly Water Consumption for Group 1

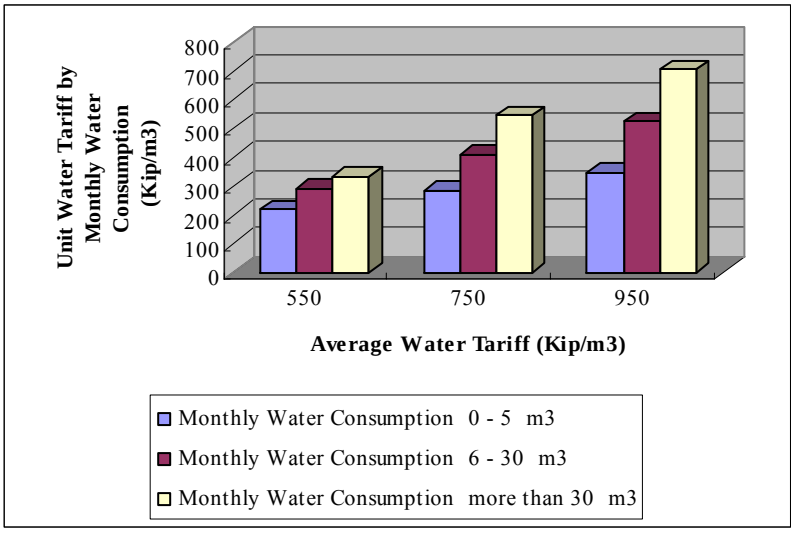


Figure 2-70 Unit Water Tariff Change by Monthly Water Consumption for Group 2

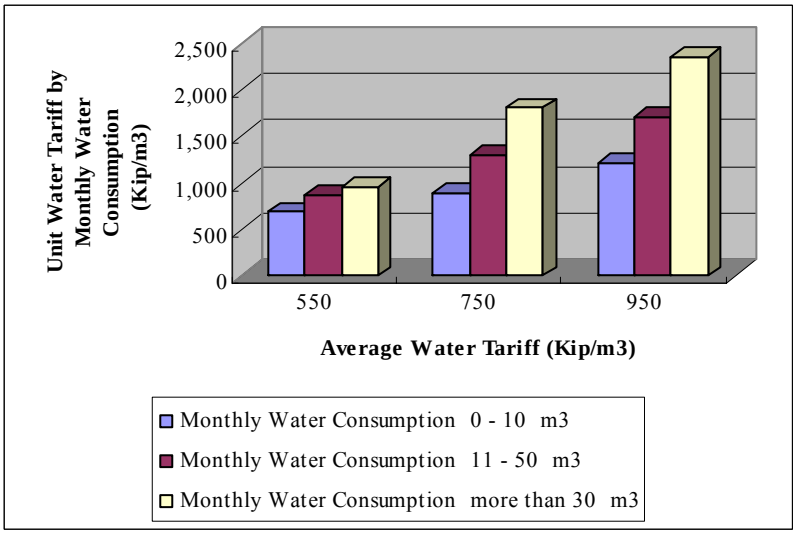
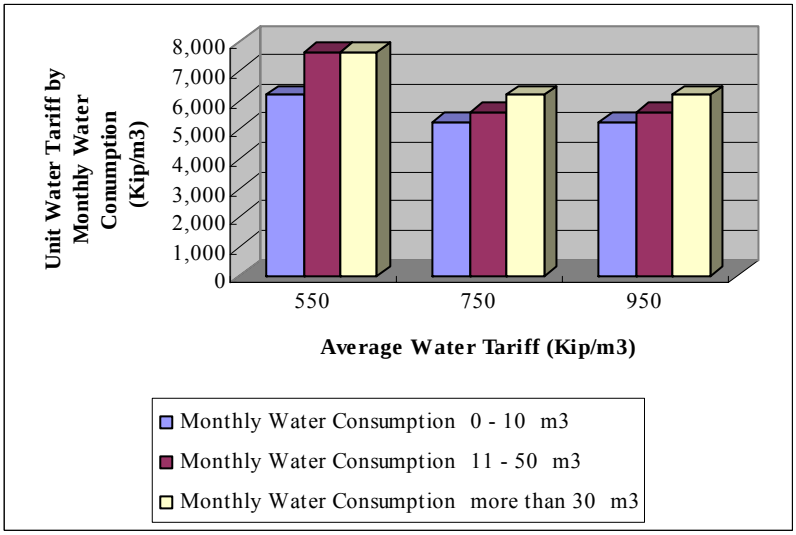


Figure 2-71 Unit Water Tariff Change by Monthly Water Consumption for Group 3



As shown on Figure 4-5, water tariff for Group 3 (foreigners and foreign companies) will slightly decrease.

2-4-4-2-2 Operation and Maintenance Costs

When the project is complete, NPVC's total supply capacity will be 140,000 m3/day (excluding the Dongmark Khay project). This capacity is almost equivalent to the predicted daily maximum water demand during 2007. This means that the NPVC will not be able to meet the daily maximum water demand after the year 2007 but it will meet the daily average water demand. The daily average water demand in 2009 will be approximately 140,000 m3/day. Therefore, the treatment plant will be operated at the maximum design capacity (140,000 m3/day) throughout the year from 2009. This means operation and maintenance costs for the project should be calculated using 2009 as the base year. The predicted operation and maintenance costs for 2004 to 2009 are shown in the following table.

Increase in Operation and Maintenance Costs		Cost Increase（1,000US$/year）
Power cost increase	Expansion of Kaolieo Treatment Plant	158
	Improvement of Chinaimo Treatment Plant	190
	Rehabilitation of Km6 Booster Pumping Station	83
Chemical cost increase	Expansion of Kaolieo Treatment Plant	129
Salary increase	Expansion of Kaolieo Treatment Plant	4
	Increase in number of meter readers	12
Total increase		576

Operation and maintenance costs will increase by $576 thousand USD/year once the project is complete. However, the water tariff will also increase because the system will be able to supply more water. The increased income is estimated to be about $924 thousand USD/year, assuming the average tariff is 950 Kip/m3 and the leakage ratio is 30 percent. Therefore, the increased income will be more than enough to cover the increased operation and maintenance costs.

2-5 Other Relevant Issues

(1) Necessity of Soft Component (Technical Assistance)

The project scope includes expansion and rehabilitation of the Kaolieo Treatment Plant, improvement of the Chinaimo Treatment Plant, rehabilitation of the Km6 Booster Pumping Station, and improvement of the transmission and distribution system.

To help meet the project aims and to help ensure the long term successful operation of the water supply system,

the following two aspects need to be incorporated into the project (this is called the 'Soft Component'):

- Plant Operation and Maintenance System Improvement.
- Transmission and Distribution Control.

The above two components are required because:

- Plant Operation and Maintenance System Improvement

After the expansion work of the Kaolieo Treatment Plant is complete, there will be two systems within the one treatment plant: the existing system (with a capacity of 20,000 m3/day); and the new system (with a capacity of 40,000 m3/day). This means that the operating staff will need to operate and maintain two systems simultaneously. The local staff therefore need to be appropriately skilled in adequate operation and maintenance of the entire filtration plant.

- Transmission and Distribution Control

Currently the water transmission from the existing Chinaimo Treatment Plant to the elevated tanks in the city and the water distribution to the city are not clearly separated. The transmission and distribution of water is conducted by a single pumping system and a single trunk main. This means fluctuations in water distribution (due to fluctuations in hourly demand) occur which means water transmission is not stable. Water transmission and distribution from the existing Chinaimo Treatment Plant will be separated by the proposed improvement works which will help achieve stable water transmission and distribution.

Once the project is complete, a "Transmission Pump Operation Plan" will be required. This will be prepared by monitoring the water level at each of the elevated tanks. Also, a "Distribution Pump Operation Plan" will be prepared by monitoring water quantity and pressure in the distribution trunk main.

(2) Relationship among On-going JICA Technical Cooperation Project Concerning Capacity Development, JICA Senior Overseas Volunteers, and the Soft Component

JICA is currently implementing a technical cooperation project called "Capacity Development Project of Urban Water Supply (UWS) Authorities in Lao PDR". The project started during September 2003 and is scheduled for completion during August 2006. As part of this project representatives from the Lao waterworks are being trained to be trainers. Also, a bilingual textbook (English and Lao) is being prepared. The trained trainer will be able to use this textbook to train their staff to understand the basic concepts of water supply technologies. Waterworks terminology (in English and in Lao) will also be prepared to assist with the training. Managerial training will also be conducted for Lao waterworks staff.

The target group for the Soft Component includes engineers, technicians, and operating staff who are involved with treatment plants and pumping facilities. The technology transfer process (through the Soft Component) will be smoothly delivered because the staff will have basic technical skills obtained through the JICA technical cooperation project.

In addition to the JICA technical cooperation project, two senior overseas volunteers were dispatched in April 2004, for two years. One volunteer is in charge of UFW Control and has been assigned to the NPVC headquarters. The other volunteer is in charge of Plant Operation and Management has been assigned to Chinaimo Treatment Plant.

The volunteer at Chinaimo Treatment Plant assists plant staff to prepare routine work plans (including daily, monthly, and yearly work plans). The aim is that the staff will be able to prepare the plans by themselves and implement the work according to the plans. The level of operation and maintenance at both the treatment plants will be further improved by transferring the experiences from Chinaimo to Kaolieo Treatment Plant and by supporting Lao staff through the Soft Component.

(3) Objectives of the Soft Component

The objectives of the Soft Component are as follows:

- Plant Operation and Maintenance System Improvement

To smoothly establish adequate plant operation and maintenance systems at the completion of the project.

- Transmission and Distribution Control

To establish stable water transmission and distribution by ensuring adequate pump operation.

The aim of the Soft Component is to support the smooth start-up of the new facilities and to support the longer term efficiency and sustainability of the systems.

(4) Expected Benefits of the Soft Component; and Evaluation of these Benefits

The Soft Component aims to achieve the benefits listed in the table below. The table also indicates how to evaluate the progress towards attaining those benefits.

Field	Benefit	Aspects of Benefit Evaluation
Improvement of Plant Operation and Maintenance Systems	To establish adequate plant operation and maintenance systems smoothly at the completion of the Project	1. Daily recording of plant operations including water quantity (raw, filtered, distributed), water quality (raw, treated), quantity of chemical fed, number of operated and duration of pump operations. 2. Chemical feeding status. Chemical feeding rate is determined by daily water quality analysis. The chemical feeding should be executed accordingly. 3. Routine operation and maintenance work. Daily, weekly, monthly, and yearly operation and maintenance plans will be prepared and will include check sheets. Routine work should be executed in accordance with the plans. 4. A form for recording problems and repairs will be prepared and used. 5. Monthly operation reports containing the above mentioned records will be provided to the NPVC headquarters. 6. An integrated database regarding plant operation will be established and used.
Transmission and Distribution Control	To establish stable water transmission and distribution through appropriate pump operation	1. Hourly and daily water levels will be recorded for the elevated tanks during the first week of every month. 2. A transmission pump operation plan will be prepared based on the water level data at the elevated tanks. 3. Flow through the transmission pumps will be controlled according to the pump operation plan. 4. Hourly and daily pressure will be recorded in the low pressure supply area during the first week of every month. 5. A distribution pump operation plan will be prepared, based on comparisons of the pump discharge pressure and the pressure in the low pressure supply area. 6. Pressure in the distribution pumps will be controlled according to the pump operation plan. 7. The valve of the transmission and distribution system will be controlled by monitoring flow, pressure, and electrical performance.

(5) Plan of the Soft Component Inputs

1) Plant Operation and Maintenance System Improvement

A Japanese Engineer who has experience covering all aspects of treatment plant operation and maintenance will be assigned to the project.

2) Transmission and Distribution Control

A Japanese Engineer who is experienced in pump operation and has knowledge of mechanical and electrical systems associated with water pumps will be assigned to the project.

(6) Consultants Services for Soft Component

It is not expected that there would be any local consulting firms that have the skills or expertise required to successfully implement the Soft Component of this project. Therefore, the Soft Component will be implemented by Japanese consultants who have extensive experience in water supply plant and pumping station operation.

(7) Implementation Schedule of Soft Component

The purpose of the Soft Component is to ensure that NPVC staff can operate the constructed facilities adequately. Therefore the Soft Component will be implemented at the end of the project period, once the major facilities have been completed.

(8) Outputs of Soft Component

The outputs of the Soft Component are:

- Plant Operation and Maintenance System Improvement

A plant operation and maintenance manual will be prepared that will include the necessary recording forms, the contents of the monthly report, forms for recording flow data and information etc.

- Transmission and Distribution Control

A control manual will be prepared that will include the necessary recording forms, the form for setting the pump operation schedule, instructions for pump/valve control, etc.

The following two reports will be prepared with regards to the Soft Component:

- Progress Report; and
- Completion Report.

These reports will be prepared in accordance with JICA's "Soft Component Guidelines for Consultants" (April 2004). The progress report will be submitted to the GOL and to JICA as a part of the project's Monthly Progress Report.

(9) Obligations of Recipient County Concerning Soft Component

The GOL must identify and assign staff from the treatment plant and pumping station who will be the target group for the Soft Component. This target group must be assigned before the Soft Component can start

Chapter 3

Project Evaluation and Recommendations

Chapter 3 Project Evaluation and Recommendations

3-1 Project Effect

The direct benefit from this project is summarized in the following table.

Current Status	Measures in the Project	Benefit by the project
The current water supply system in Vientiane is getting worse and worse, due to the high demand of water trigger by the population increase, the improvement of life standard, and the expansion of industry and living area. To cope with this situation, two existing water facilities, which have 100,000 m3/day capacity, are overworking to create 114,794 m3/day water.	Expansion of Kaolieo Treatment Plant to a capacity of 40,000 m3/day	Increase of the water supply ratio from 38.5 % (2003, before project) to 47.0% (2010, after project).
Kaolieo Treatment Plant was constructed in 1963, and rehabilitated in 1983. More than 20 years has passed since last rehabilitation, electrical and mechanical equipment and constructions are too old to work properly	Rehabilitation of the existing Kaolieo Treatment Plant to achieve its 20,000 m3/day capacity	By the renewal of old electrical and mechanical equipment and constructions, it is expected to assure the stable water supply in Vientiane City.
Currently, most of elevated tanks in Vientiane city are not filled with water even in the night, causing the difficulties in water supply. This is because low amount of water supply and non-clear separation of transmission/distribution pipelines	Improvement of the existing Chinaimo Treatment Plant including separation of the transmission/distribution pipelines, construction of a new distribution reservoir (with a capacity of 7,500 m3) and construction of a new pumping station	Assure the stable water supply corresponding to the demand change throughout the day.

In addition to the direct benefit from this project listed above, stable water supply would contribute to the improvement of public health in Vientiane city, and be expected to activate the social and economic activities by the improved infrastructure. Implementation of soft components would cause the following benefits.

- Technical staff and operators in Kaolieo Treatment Plant are expected to understand and run the treatment

system correctly. This makes the treatment plant run and maintain correctly.

- Technical staff and operators in Kaolieo Treatment Plant and Chinaimo Treatment Plant are expected to understand and run the transmission and distribution treatment system correctly. This makes the transmission and distribution system run and maintain correctly.

Following indicators are suggested to evaluate the benefit of the project.

	2003 (before project)	Mythology	2010 (after project)
Service Population	251,549	NPNL data	370,269
Average daily Supply (m3/day)	78,251	NPNL data	109,957
Water supply ratio (%)	38.5	NPNL data	47.0

3-2 Recommendations

To be sustainable project, Lao PDR side should be considered the following recommendations.

(1) Procurement and Installation of Small Size Distribution Pipes and House Connections

By this project, transmission and distribution pipeline will be constructed and more water from expanded treatment plant would be supplied through the pipeline. However, to increase the water supply ratio, it is important to install the small size distribution pipes and house connections to each household. Therefore, budget for the installation and well planned construction work are essential.

(2) Required Staff Assignment for Adequate Operation and Maintenance

The expansion of the treatment plants, the increased length of pipeline and the increased number of house connections means that additional staff will be required to ensure sound operation and maintenance.

Appendices

Appendix 1 Member List of the Study Team

1-1 1st Field Investigation

Official Member

1. ***Leader: Mr. Makoto Aoki***
   Deputy Director General, and Director of the Office of Technical Coordination and Examination, Grant Aid Management Department, JICA

2. ***Planning Management: Mr. Kohei Sato***
   Water and Sanitation Team, Project Management Group 1, Grant Aid Management Department, JICA

Consultants Member

3. ***Chief Consultant/Management Program Specialist: Mr. Takemasa Mamiya***
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4. ***Water Supply Engineer: Mr. Takehiko Oga***
   Nihon Suido Consultants, Overseas Services Department

5. ***Facilities Planner: Mr. Eiichi Ishii***
   Nihon Suido Consultants, Overseas Services Department

6. ***Equipment Planner: Mr. Kozo Obara***
   Nihon Suido Consultants, Overseas Services Department

7. ***Procurement and Execution Program/Cost-Estimator: Mr. Isamu Sato***
   Nihon Suido Consultants, Overseas Services Department

8. ***Coordinator: Mr. Shozo Mori***
   Nihon Suido Consultants, Overseas Services Department

1-2 2nd Field Investigation

Official Member

1. ***Leader: Mr. Shuichi Ikeda***
   Deputy Resident Representative, Laos Office, JICA

2. ***Techinical Advisor: Mr. Yoshiki Omura***
   Senior Advisor (Water Supply Development), Institute for International Cooperation, JICA

Consultants Member

3. ***Management Program Specialist: Mr. Shinkichi Kobayashi***
   Nihon Suido Consultants, Overseas Services Department

4. ***Facilities Planner: Mr. Eiichi Ishii***
   Nihon Suido Consultants, Overseas Services Department

1-3 Draft Final Explanation Mission

Official Member

1. ***Leader: Mr. Yoshiki Omura***
Senior Advisor (Water Supply Development), Institute for International Cooperation, JICA

2. ***Planning Management: Mr. Yutaka Fukase***
Water Resources Development and Environmental Management Team,
Project Management Group III, Grant Aid Management Department, JICA

Consultants Member

3. ***Chief Consultant/Management Program Specialist: Mr. Takemasa Mamiya***
Nihon Suido Consultants, Overseas Services Department

4. ***Facilities Planner: Mr. Eiichi Ishi***i
Nihon Suido Consultants, Overseas Services Department

Appendix 2 Study Schedule

2-1 1st Field Investigation

Basic Design Study on The Project for Vientiane Water Supply Development

STUDY TEAM ITINERARY

No.	Date		JICA Members		Consultant Members					
			Leader	Planning Management	Chief Consultant/ Management Program Specialist	Water Supply Engineer	Procurement and Execution Program/Cost-Estimator	Facilities Planner	Equipment Planner	Coordinator
			Mr. M. Aoki	Mr. K. Sato	Mr. T. Mamiya	Mr. T. Oga	Mr. I. Sato	Mr. E. Ishii	Mr. K. Obara	Mr. S. Mori
1	07/03/04	Sat			TYO->BKK					
2	07/04/04	Sun			BKK->VTN, Preparation for Site Investigation					
3	07/05/04	Mon		TYO->BKK	Site Investigation					
4	07/06/04	Tue		BKK->VTN*, Courtesy Call on Japanese Embassy, JICA Laos Office, WASA, and NPNL				Site Investigation		
5	07/07/04	Wed		Courtesy Call on MCTPC (Vice Minister), CPC and Discussion with WASA and NPNL				Site Investigation		
6	07/08/04	Thu	TYO->BKK->URT	Discussion with WASA and NPNL				Site Investigation		
7	07/09/04	Fri	URT->SVK	Discussion for M/D				Site Investigation		
8	07/10/04	Sat	SVK->VTN	Site Investigation						
9	07/11/04	Sun	Team Meeting							
10	07/12/04	Mon	Discussion for and Signing on M/D, Report to Japanese Embassy, JICA Laos Office, and AFD					Site Investigation		
11	07/13/04	Tue	Report to CPC, VTN->BKK->*					Site Investigation		
12	07/14/04	Wed	-> Tokyo		Site Investigation, Discussion with Laos Side, Discussion with Related Organizations such as AFD, Discussion with the Study Teams of Related Projects such as the Road Improvement Project by JICA, Information and Data Collection					
13	07/15/04	Thu								
14	07/16/04	Fri								
15	07/17/04	Sat								
16	07/18/04	Sun								
17	07/19/04	Mon								
18	07/20/04	Tue								
19	07/21/04	Wed								
20	07/22/04	Thu								
21	07/23/04	Fri								
22	07/24/04	Sat								
23	07/25/04	Sun								
24	07/26/04	Mon								
25	07/27/04	Tue								
26	07/28/04	Wed								
27	07/29/04	Thu								
28	07/30/04	Fri								
29	07/31/04	Sat								
30	08/01/04	Sun								
31	08/02/04	Mon								
32	08/03/04	Tue			Explanation of the Investigation Outlines to MCTPC and NPNL					
33	08/04/04	Wed			Explanation of the Investigation Outlines to Japanese Embassy and JICA Office					
34	08/05/04	Thu			Vientiane -> Bangkok					
35	08/06/04	Fri			Bangkok -> Tokyo					

[Abbreviation]
MCTPC: Ministry of Communication, Transport, Post and Construction
CPC: Committee for Planning and Cooperation
WASA: Water Supply Authority
NPNL: Nam Papa Nakhone Louang

2-2 2nd Field Investigation

No	Data		Schedule	
1	2/22/05	Tue	18:45 Tokyo (JL 707) → 23:45 Bangkok	
2	2/23/05	Wed	08:15 Bangkok (TG 690) → 09:25 Vientiane Courtesy Call to JICA Office Site Investigation (Dongmark Khay Plant, Dongdok Plant, Chinaimo Plant)	
3	2/24/05	Thu	Courtesy Call/Discussion with MCTPC/DHUP, WASA Courtesy Call/Discussion with NPNL Courtesy Call/Discussion with Embassy of Japan in Lao PDR	
4	2/25/05	Fri	Discussion with NPN, WASA, MCTPC/DHUP	
5	2/26/05	Sat	Site Investigation: Kaolieo Plant, Phonegtong Tank, Dongdok Tank, Dongmark Kai Project Site, etc. Team Meeting	
6	2/27/05	Sun	Team Meeting	
7	2/28/05	Mon	Courtesy Call/ Discussion with AFD M/D Discussion with MCTPC/DHUP, WASA, NPNL M/D Discussion with JICA Office, NPNL	
8	3/1/05	Tue	MD Discussion with NPNL MD Signning Data Collection	
9	3/2/05	Wed	Report to JICA Office and Embassy of Japan Data Collectioning	
10	3/3/05	Thu	Mr. Omura 10:30 Vientiane (TG691) → 11:35 Bangkok 19:50 Bangkok (TG315) → 22:45 Delhi	Data Collecting
11	3/4/05	Fri		Data Collectiong Reporting to NPNL, DHUP, WASA JICA Office
12	3/5/05	Sat		10:30 Vientiane (TG691) → 11:35 Bangkok
13	3/6/05	Sun		08:30 Bangkok (JL708) → 16:10 Tokyo

2-3 Draft Final Explanation Mission

No	Data		Schedule	
			Mr. Omura, Mr. Mamiya, Mr. Ishii	Mr. Fukase
1	5/23/05	Mon	15:45 Tokyo (JL 703) → 20:15 Bangkok	
2	5/24/05	Tue	08:15 Bangkok (TG 690) → 09:25 Vientiane Courtesy Call to JICA Office, Embassy of Japan	
3	5/25/05	Wed	Courtesy Call to MCTPC/DHUP, WASA, NPNL, AFD	
4	5/26/05	Thu	Explanetion and Disscussion about Draft Final Report	15:45 Tokyo (JL 703) → 20:15 Bangkok
5	5/27/05	Fri	Discussion about M/D Discussion with Basic Design Study Team of Road Improvement at JICA Office Field Survey (Nam Gum, Dongmark Khay)	08:15 Bangkok (TG 690) → 09:25 Vientiane
6	5/28/05	Sat	Field Survey (AFD Project Site, Kaolieo Treatment Plant)	
7	5/29/05	Sun	Field Survey (Soda Mattress, Chinaimo Treatment Plant)	
8	5/30/05	Mon	Signing on M/D Meeting with NPNL on progress of Dongmark Khay Project	
9	5/31/05	Tue	Report to JICA Office and Embassy of Japan	10:30 Vientiane (TG691) → 11:35 Bangkok
10	6/1/05	Wed	10:30 Vientiane (TG691) → 11:35 Bangkok	08:30 Bangkok (JL708) → 16:10 Tokyo
11	6/2/05	Thu	08:30 Bangkok (JL708) → 16:10 Tokyo	

Appendix 3 List of Parties Concerned in the Recipient Country

3-1 1st Filed Investigation

Ministry of Foreign Affairs

Department of International Cooperation

Prof. D. Bountheuang Mounlasy	Director General
Mr. Naoto Okawa	Aid Coordination & Management Advisor

Ministry of Communication Transport Post and Construction (MCTPC)

Mr. Sommad Pholsena	Vice Minister
Mr. Khamlouat Sidlakone	Vice Minister
Mr. Math Sounmara	Director General of Planning

Cabinet

Dr. Bounleuam Sisoulath	

Department of Road

Mr. Dedsongalam Thammadong	Coordinator
Mr. Katsuro Kondo	Planning Advisor to the Cabinet Office In Infrastructure Development

Department of Housing and Urban Planning (DHUP)

Dr. Somphone Dethoudom	Director General
Mr. Pinhsengmaniranh	Staff

Water Supply Authority (WASA)

Mr. Noupheuak Virabouth	Director
Mr. Souvannaseng Xaymontry	Senior Official
Mr. Sowannaseng	Technical Staff
Mr. Yasuhiro Kawashima	JICA Expert

Vientiane Capital City

Mr. Bounchan Sinthavong	Vice Governor

Department of Planning and Cooperation

Ms. Siphone Soukhaphonh	Director General

Department of Communication, Transport, Post and Construction

Dr. Thongdam Xayphrakassa	Director General
Mr. Phoulthaphone Kholpauya	Chief
Mr. Amphavanh Manivanh	Technical Staff

Nam Papa Vientiane Capital City (NPVC)

Mr. Daophet Bouapha	General Manager
Mr. Somlith Silaphet	Deputy General Manager (Technical)
Mr. Saisamone Thammavongsa	Project Engineer
Mr. Sisamone Kongmany	Project Manager
Mr. Sisagoune	Engineering Section
Mr. Vienghouay Vannarath	Manager of Leak Detection & Control
Mr. Pinkeo Saycocie	Deputy Project Manager
Mr. Khampheuy Vongsakhamphoui	Director of Training Center
Mr. Khambay Vongxayarath	Director of Engineering
Mr. Kamfane Keokhammy	Director of Engineering
Mr. Naymany Sengphouvong	Deputy Director of Chinaimo Treatment Plant
Mr. Buakeo Phimphonsavath	Director of Procurement

French Development Agency (AFD)

Mr. Victor Paulin	Director in charge

Safege (Consultants in charge of 2nd phase leakage prevention project)

Mr. Claude Nicolas	Project Manager

BCEOM (Consultants in charge of AFD Training Center)

Mr. Robert Pezet	

Saur (Consultants in charge of AFD Training Center)

Mr. Eric Remy	
Mr. Michel Frajman	

Embassy of Japan in Laos

Mr. Itsuo Hashimoto	Ambassador Extraordinary and Plenipotentiary
Mr. Kazunori Kawada	First Secretary

JICA Laos Office

Mr. Hidetaka Nishiwaki	Resident Representative
Mr. Shunsuke Sakudo	Assistant Resident Representative

Grant Aid Management Department, JICA HQ

Mr. Kenshiro Tanaka	Professional Engineering

Consultant Team for Basic Design Study of the Vientiane Municipality Road Project

Mr. Minoru Miura	Katahira & Engineers International
Mr. Hidetaka Sagara	Katahira & Engineers International
Mr. Naoki Kodera	Katahira & Engineers International
Mr. Tadashi Sato	Katahira & Engineers International
Mr. Masaaki Kurokawa	Katahira & Engineers International
Mr. Ryohei Watanabe	Katahira & Engineers International
Mr. Masaki Ishii	CTI Engineering International Co., Ltd.
Mr. Kiyofumi Minami	Nihon Suido Consultants Co., Ltd.

3-2 2nd Filed Investigation

Ministry of Communication Transport Post and Construction (MCTPC)

Department of Housing and Urban Planning (DHUP)

Dr. Somphone DETHOUDOM	Director General
Mr. Samone VIMANY	Deputy Director
Ms. Phonvong EHANTHAVONG	Director of WSD

Water Supply Authority (WASA)

Mr. Noupheuak VIRABOUTH	Director
Mr. Yasuhiro KAWASHIMA	JICA Expert
Mr. Wataru TAKASHIMA	JICA Expert
Mr. OKADA	JICA Coordinator

Vientiane Capital City

Mr. Bounchanh SINTHAVONG	Vice Governor

Department of Communication Transport Post and Construction

Dr. Thongdam XAYPHRAKASSA	Director General

Nam Papa Vientiane Capital City (NPNL)

Mr. Daophet BOUAPHA	General Manager
Mr. Somlith SILAPHET	Deputy General Manager (Technical)
Mr. Sisangovane SIRITHASACK	Project Manager
Mr. Saisamone THAMMAVONGSA	Project Engineer
Mr. Sisamone KONGMANY	Project Manager
Mr. Veune Sengdala	Engineering Section

French Development Agency (AFD)

Mr. Etienne WOITELLIER	Director
Mr. Victor PAULIN	Project Officer
Ms. Chanthapha NOUANETHONG	Assistant Projects

Embassy of Japan in Laos

Mr. Ken Nakamura	2nd Secretary

JICA Laos Office

Mr. Senya Moriguchi	Resident Representative
Mr. Shuichi Ikeda	Deputy Resident Representative
Mr. Hiroshi Murayama	Assistant Resident Representative
Mr. Yohei Sano	Assistant Resident Representative
Ms. Yoko Hattori	Assistance Resident Representative

Appendix 4

4-1 Minutes of Discussion

Minutes of Discussions
on
The Basic Design Study
on
The Project for the Vientiane Water Supply Development
in
Lao People's Democratic Republic

In response to the request from the Government of Lao People's Democratic Republic (hereinafter referred to as 'Lao PDR'), the Government of Japan decided to conduct a Basic Design Study on the Project for the Vientiane Water Supply Development (hereinafter referred to as "the Project"), and entrusted the study to Japan International Cooperation Agency (hereinafter referred to as 'JICA').

JICA sent to Lao PDR the Basic Design Study Team (hereinafter referred to as 'the Team'), which was headed by Mr. Makoto Aoki, Deputy Director General, Grant Aid Department, JICA, and was scheduled to stay in the country from July 6th to 13th, 2004.

The Team held a series of discussions with the concerned officials of the Government of Lao PDR and conducted a field survey in the study area.

In the course of discussions and field survey, both parties confirmed the main items described on the attached sheets. The Team will proceed to further work and prepare the Basic Design Study Report.

Vientiane, July 12th, 2004

Mr. Makoto Aoki
Leader
Basic Design Study Team
Japan International Cooperation Agency,
Japan

Dr. Somphone Dethoudom
Director General
Department of Housing and Urban Planning
Ministry of Communication, Transport, Post and Communication,
Lao PDR

Dr. Thongdam Xayphrakassa
Director General,
Department of Communication, Transport, Post and Construction
Vientiane Capital City,
Lao PDR

ATTACHMENT

1. Objective of the Project

The objective of the Project is to improve the water supply services in Vientiane in order to supply safe and sufficient water supply for the residents.

2. Responsible and Implementing Organization

Responsible organization:

Ministry of Communication, Transport, Post and Construction via Water Supply Authority, Department of Housing and Urban Planning

Implementing organization:

Department of Communication, Transport, Post and Construction of Vientiane Capital City via State owned enterprise of Nam Papa Vientiane Capital City

3. Site of the Project

The site of the Project is as shown in Annex-1 (page5).

4. Items requested by the Government of Lao PDR

After discussions with the Team, the items described in Annex-2 (Page6) were finally requested by Lao side. JICA will assess the appropriateness of the request and will report the findings to the Government of Japan.

5. Japan's Grant Aid Programme

Lao side has understood the system and characteristics of Japan's Grant Aid Programme as described by the Team shown in Annex-3 (Page7).

6. Necessary measures to be taken by the Lao side

Lao side will take the necessary measures, as described in Annex-4 (Page12), for smooth implementation of the Project on condition when the Japan's Grant Aid is implemented.

7. Further Schedule of the Study

a. The consultant members of the Team will proceed with further studies in Lao PDR until August 5th, 2004.

b. JICA will prepare the Draft Final Report in English and dispatch a mission in order to explain its contents in (or around) October, 2004.

c. In case the contents of the report are accepted in principle by the Government of Lao PDR, JICA will complete the final report and send it to the Lao side by January 2005.

8. Other relevant issues

a. Coordination with AFD

The Lao side and the Japanese side confirmed that the major part of distribution system would be improved by AFD. Both Sides agreed that distribution pipelines which are included in the final request of the project would be reviewed taking account of improvement plan prepared by the AFD and some pipelines might be excluded based on the result of Basic Design Study.

b. Coordination with Road Improvement Project

The Lao side and the Japanese side confirmed to take necessary coordination for avoiding re-excavation of improved roads for pipe installation between the Project and "Basic Design Study on Vientiane Capital City Road Improvement Project (I and II).

c. Water right

The Lao side agreed to obtain written confirmations issued by the concerned organization and provide it to the Team for additional raw water intake from the Mekong River.

d. Securing the land

The Lao side confirmed to secure the land for the water supply facilities including the land for distribution pumping station and reservoir in the Chinaimo Treatment Plant by the time of the explanation of Draft Final Report.

e. Permission for installation

The Lao side confirmed to obtain the permission from the concerned organization and provide it to the Team for installation of pipe, as show in Annex 1, in the right of way.

f. No further EIA

The Lao side and the Japanese side confirmed unnecessariness of further EIA, since the EIA was approved during the last JICA Social Development Study. The Japanese side recommend to the Lao side to disclose the result of the EIA.

g. Intake level

The Lao side requested and the Japanese side agreed that the Team will review the data of low water level in year 2004 of Mekong River provided by the Lao side and the Team will examine Intake Level at the Existing Chinaimo Water Treatment Plant.

h. Proper use

The Lao side and the Japanese side confirmed that the water supply facilities to be constructed by the Project would properly be operated and maintained on the basis of the financial condition which will be achieved by appropriate tariff structure and adequate tariff collection. Lao side also confirmed to install small distribution pipelines which would be branched to respective house connection conforming to the treatment plant capacity increased.

i. Reduction of leakage and wastage

Lao side agreed to continue its effort to reduce leakage and wastage by implementing necessary measures.

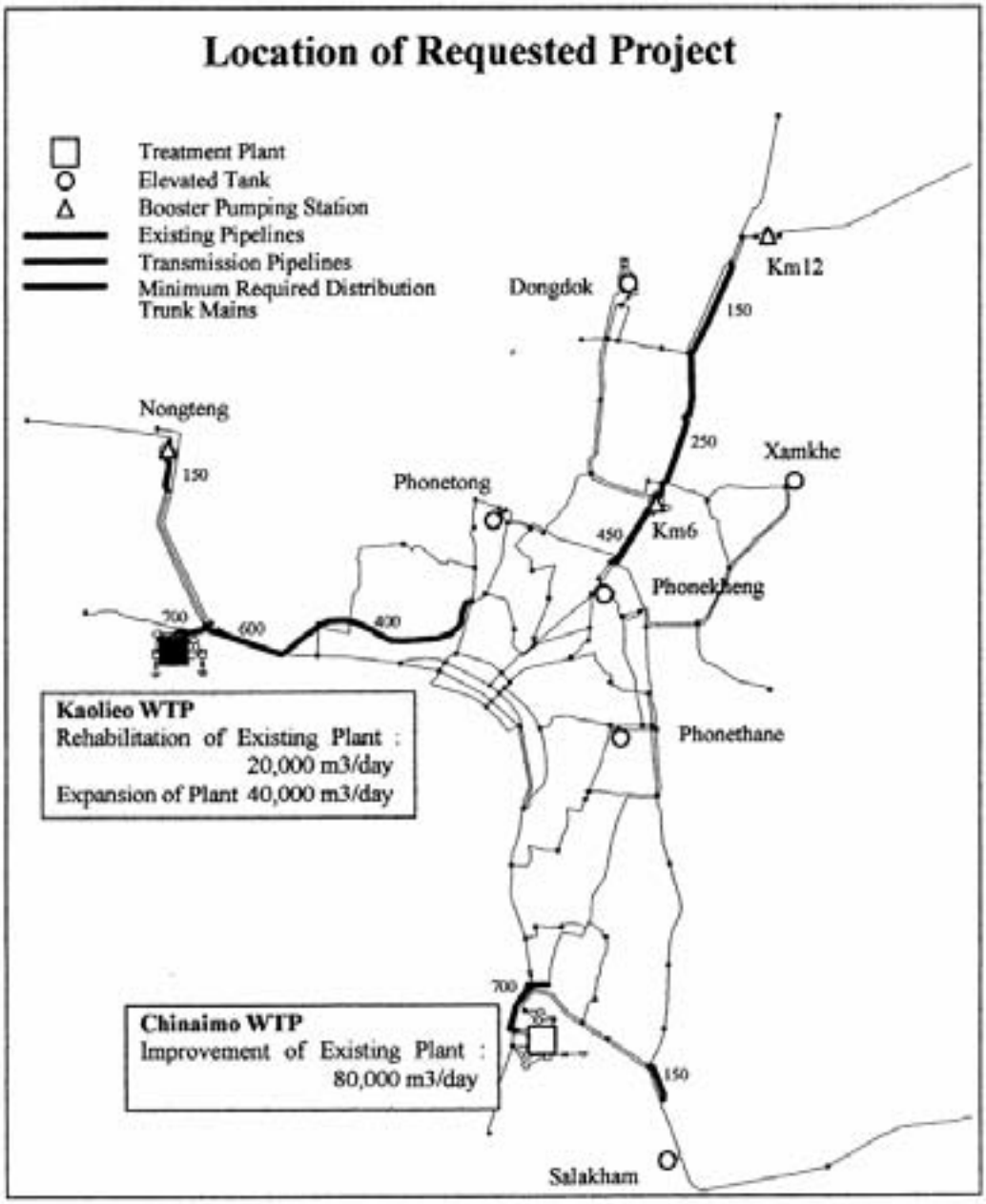
j. Counterparts and office space

The Lao side agreed to assign full-time counterparts and provide office space to the Team during their stay in Lao PDR.

k. Safety and security

The Lao side agreed to take any necessary measures deemed necessary to secure the safety of the member of the Team.

Annex-1 **Location of the Project**



Annex-2 **Items Requested by the Government of Lao**

- Expansion of the Kaolieo Treatment Plant, 40,000 m3/day
- Rehabilitation of the existing Kaolieo Treatment Plant, with a production capacity of 20,000 m3/day
- Improvement of the Chinaimo Treatment Plant, with a production capacity of 80,000 m3/day
    - Expansion of reservoirs (10,000 m3) including additional distribution pumping facilities
    - Installation of a transmission pipeline from the Chinaimo Treatment Plant to the existing transmission pipelines (separation of transmission and distribution system)
- Improvement of the Km6 BP Station
- Installation of 2.6 km of transmission mains
- Installation of 14.6 km of distribution mains

Annex-3 Japan's Grant Aid Scheme

1 Japan's Grant Aid Scheme

The Grant Aid scheme provides a recipient country with non-reimbursable funds to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principles in accordance with the relevant laws and regulations of Japan. The Grant Aid is not supplied through the donation of materials as such.

(1) Grant Aid Procedures

Japan's Grant Aid scheme is executed through the following procedures.

Application	(Request made by a recipient country)
Study	(Basic Design Study conducted by JICA)
Appraisal & Approval	(Appraisal by the Government of Japan and Approval by Cabinet)
Determination of Implementation	(The Notes exchanged between the Governments of Japan and the recipient country)

Firstly, the application or request for a Grant Aid project submitted by a recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to determine whether or not it is eligible for Grant Aid. If the request is deemed appropriate, the Government of Japan assigns JICA (Japan International Cooperation Agency) to conduct a study on the request.

Secondly, JICA conducts the study (Basic Design study), using (a) Japanese consulting firm(s).

Thirdly, the Government of Japan appraises the project to see whether or not it is suitable for Japan's Grant Aid Scheme, based on the Basic Design study report prepared by JICA, and the results are then submitted to the Cabinet for approval.

Fourthly, the project, once approved by the Cabinet, becomes official with the Exchange of Notes (E/N) signed by the Governments of Japan and the recipient country.

Finally, for the implementation of the project, JICA assists the recipient country in such matters as preparing tenders, contracts and so on.

(2) Basic Design Study

1) Contents of the Study

The aim of the Basic Design study (hereafter referred to as "the Study"), conducted by JICA or

a requested project (hereafter referred to as "the Project") is to provide a basic document necessary for the appraisal of the Project by the Government of Japan. The contents of the Study are as follows:

- Confirmation of the background, objectives, and benefits of the requested Project and also institutional capacity of agencies concerned of the recipient country necessary for the Project's implementation.

- Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, social and economic point of view.

- Confirmation of items agreed upon by both parties concerning the basic concept of the Project.

- Preparation of a Basic Design of the Project

- Estimation of cost of the Project

The contents of the original request are not necessarily approved in their initial form as the contents of the Grant Aid project. The Basic Design of the Project is confirmed considering the guidelines of Japan's Grant Aid Scheme.

The Government of Japan requests the Government of the recipient country to take whatever measures are necessary to ensure its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization in the recipient country actually implementing the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country through the Minutes of Discussions.

2) Selection of Consultants

For smooth implementation of the Study, JICA uses (a) registered consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms. The firm(s) selected carry(ies) out a Basic Design Study and write(s) a report, based upon terms of reference set by JICA.

The consulting firm(s) used for the Study is(are) recommended by JICA to the recipient country to also work on the Project's implementation after the Exchange of Notes, in order to maintain technical consistency.

(3) Japan's Grant Aid Scheme

Exchange of Notes (E/N)

Japan's Grant Aid is extended in accordance with the Notes exchanged by the two Governments concerned, in which the objectives of the Project, period of execution, conditions and amount of the Grant Aid, etc., are confirmed.

"The period of the Grant Aid" means the one fiscal year which the Cabinet approves the Project for. Within the fiscal year, all procedures such as exchanging of the Notes, concluding contracts with (a) consulting firm(s) and (a) contractor(s) and final payment to them must be completed.

However, in case of delays in delivery, installation or construction due to unforeseen factors such as natural disaster, the period of the Grant Aid can be further extended for a maximum of one fiscal year at most by mutual agreement between the two Governments.

Under the Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased.

When the two Governments deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country.

However, the prime contractors, namely, consulting constructing and procurement firms, are limited to "Japanese nationals". (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

Necessity of "Verification"

The Government of recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. This "Verification" is deemed necessary to secure accountability to Japanese taxpayers.

Undertakings required to the Government of the Recipient Country

In the implementation of the Grant Aid project, the recipient country is required to undertake such necessary measures as the following:

① To secure land necessary for the sites of the Project and to clear, level and reclaim the land prior to commencement of the construction,
② To provide facilities for the distribution of electricity, water supply and drainage and other incidental facilities in and around the sites,
③ To secure buildings prior to the procurement in case the installation of the equipment,

④ To ensure all the expenses and prompt execution for unloading, customs clearance at the port of disembarkation and internal transportation of the products purchased under the Grant Aid,

⑤ To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts,

⑥ To accord Japanese nationals, whose services may be required in connection with the supply of the products and services under the Verified Contracts, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.

"Proper Use"

The recipient country is required to operate and maintain the facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign staff necessary for this operation and maintenance as well as to bear all the expenses other than those covered by the Grant Aid.

"Re-export"

The products purchased under the Grant Aid should not be re-exported from the recipient country.

Banking Arrangements (B/A)

a) The Government of the recipient country or its designated authority should open an account in the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"). The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.

b) The payments will be made when payment requests are presented by the Bank to the Government of Japan under an Authorization to Pay (A/P) issued by the Government of the recipient country or its designated authority.

Authorization to Pay (A/P)

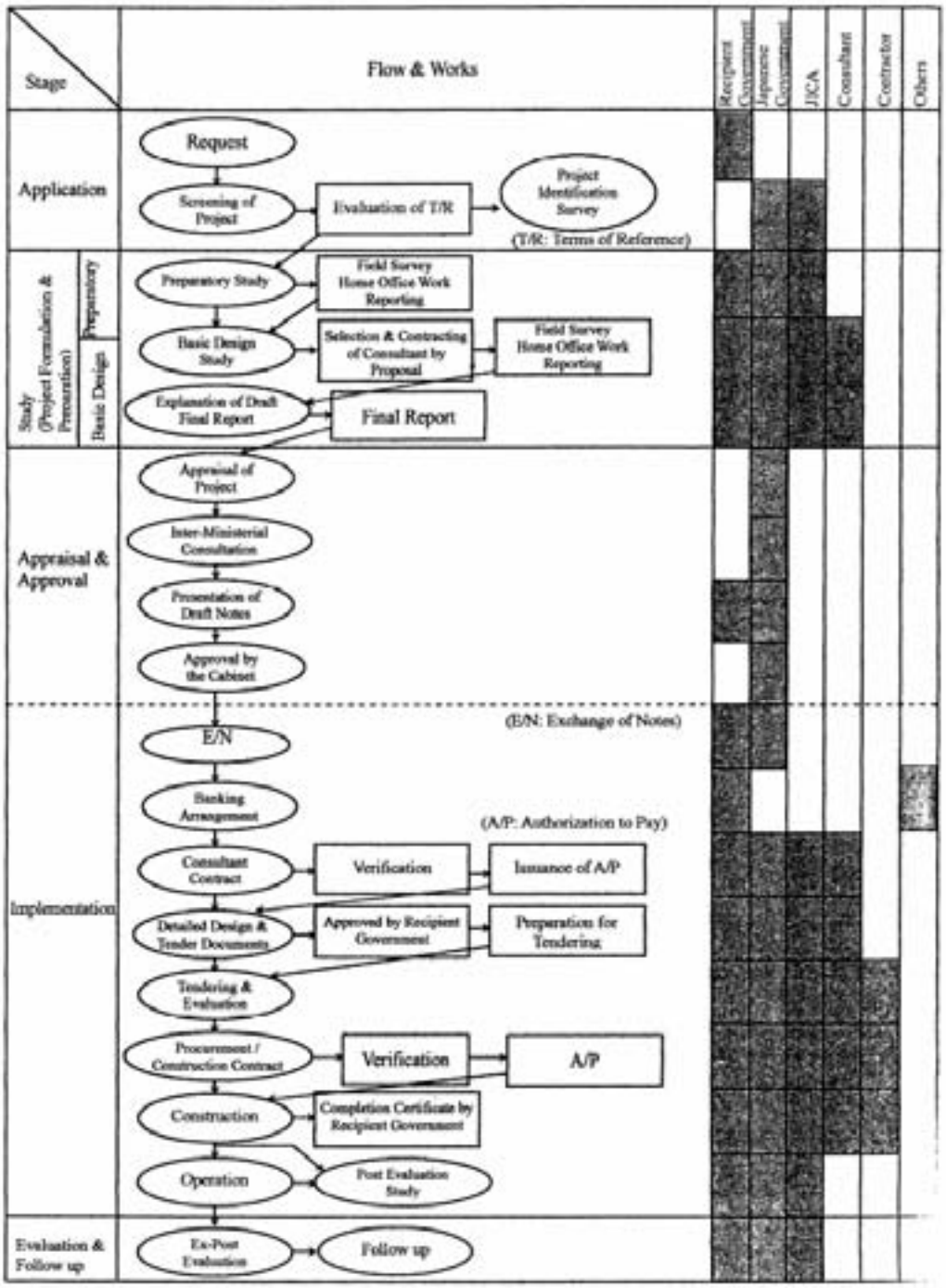
The Government of the recipient country should bear an advising commission of an Authorization to Pay and payment commissions to the Bank.

2 Grant Aid Procedures

Japan's Grant Aid procedure is as shown on attached figures,

- Flow Chart of Japan's Grant Aid Procedures
- Major Undertakings to be taken by Each Government

Flow Chart of Japan's Grant Aid Procedures



Annex-4 Necessary Measures To Be Taken by the Lao Side

Major Undertakings to be taken by Each Government

No.	Items	To be covered by Grant Aid	To be covered by Recipient
1	To secure land		•
2	To clear, level and reclaim the site when needed		•
3	To construct gates and fences in and around the site		•
4	To construct the parking lot	•	
5	To construct roads		
	1) Within the site	•	
	2) Outside the site		•
6	To construct the buildings	•	
7	To provide facilities for the distribution of electricity, water supply, drainage and other incidental facilities		
	1) Electricity		
	a. The distributing line to the site		•
	b. The drop wiring and internal wiring within the site	•	
	c. The main circuit breaker and transformer	•	
	2) Water Supply		
	a. The city water distribution main to the site		•
	b. The supply system within the site (receiving and elevated tanks)	•	
	3) Drainage		
	a. The city drainage main (for storm, sewer and others) to the site		•
	b. The drainage system (for toilet sewer, ordinary waste, storm drainage and others)	•	
	4) Telephone System		
	a. The telephone trunk line to the main distribution frame/panel (MDF) of the building		•
	b. The MDF and the extension after the frame/panel	•	
	5) Furniture and Equipment		
	a. General furniture		•
	b. Project equipment	•	
8	To bear the following commissions to the Japanese bank for banking services based upon the B/A		
	1) Advising commission of A/P		•
	2) Payment commission		•
9	To ensure unloading and customs clearance at port of disembarkation in recipient country		
	1) Marine (Air) transportation of the products from Japan to the recipient country	•	
	2) Tax exemption and custom clearance of the products at the port of disembarkation		•
	3) Internal transportation from the port of disembarkation to the project site	•	
10	To accord Japanese nationals, whose service may be required in connection with the supply of the products and the services under the verified contract, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work		•
11	To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the verified contracts		•
12	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant		•
13	To bear all the expenses, other than those to be borne by the Grant, necessary for construction of the facilities as well as for the transportation and installation of the equipment		•

(B/A: Banking Arrangement, A/P: Authorization to pay)

4-2 Minutes of Discussion of the 2nd Filed Investigation Concerning Dongmark Khay Project

Minutes of Discussion
on
The results of the Second Site Survey of the Basic Design Study
on
The Project for the Vientiane Water Supply Development
in
Lao People's Democratic Republic

Japan International Cooperation Agency (hereinafter referred to as "JICA") has dispatched to Lao People's Democratic Republic (hereinafter referred to as "Lao PDR") the second Basic Design Study Team (hereinafter referred to as "the Team"), which is headed by Mr. Shuichi Ikeda, Deputy Resident Representative, JICA Laos Office, and is scheduled to stay in the country from February 23rd to March 5th, 2005. The Team discussed with Lao PDR side regarding the following issues:

1) Confirmation of the background, objectives, component, scale, implementation schedule and budgetary arrangement of the Dongmark Khay Project.
2) Confirmation of impact of the Dongmark Khay Project to scope of the Project for the Vientiane Water Supply Development requested as a Japan's grant aid project (hereinafter referred to as "the requested Project").

The Team held a series of discussions with the officials concerned of the Government of Lao PDR and conducted a site survey.

In the course of discussions and site survey, both parties confirmed and agreed the main issues described on Attachemnt. The Team will proceed to further work and prepare the Basic Design Study Report.

Vientiane, March 1st, 2005

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ATTACHMENT

1. Dongmark Khay Project

1.1 The Team discussed with Ministry of Communication, Transport, Post and Construction (hereinafter referred to as "MCTPC") and State owned enterprise of Nam Papa Vientiane Capital City (hereinafter referred to as "NPNL") and confirmed the following.

JICA conducted the Study on Vientiane Water Supply Development Project (hereinafter referred to as "the 2004 JICA study"), which was completed in January 2004. Based on the conclusion of the 2004 JICA study, the Basic Design Study for the Japan's Grant Aid (the first site survey) was conducted in the Lao PDR from July to August 2004. The Lao PDR side informed the Basic Design Team of the Dongmark Khay Project during the first site survey, which was not included in the 2004 JICA study.

Upon receiving the information from Lao PDR side, the Team was dispatched to confirm the details of the Dongmark Khay Project and to study its impact to scope of the requested Project.

1.2 Through discussions with Lao officials on the Dongmark Khay Project, the Team found the following:

a) The purpose of the Dongmark Khay water treatment plant is mainly to meet very urgent domestic demands in the northern part of the existing service area. It is also expected to response to the Ministry of Industry's request dated July 27, 2004 to meet industrial and domestic water demand in the industrial zone at least 50% of 45,000 m^3/day by 2020. The request from the Ministry of Industry does refer to neither any confirmation nor endorsement of purchase of water.

b) The Dongmark Khay Project components and cost estimates are as follows (quoted in US$1,000):

Package - 1

Intake facilities (including electrical /mechanical works):	500
Water treatment plant:	1,600
14.5 km transmission pipeline to Dongdok / Phonegtong tanks*	2,231
Engineering services:	200
Total:	4,531

(* Phonegtong tank will be connected via the existing transmission main.)

Package - 2

Distribution and service mains:	1,318

(to be funded by Vientiane Capital City and NPNL.)
schedule not available

(It should be noted that in the following sections c) through h) the project should refer to Package-1 only.)

c) The Lao PDR side is planning to obtain a loan from a private investor for Dongmark Khay Project financing but loan conditions are still under consideration by Prime Minister's Office.

d) The investor will be responsible for financing the Dongmark Khay Project, construction of the facilities, training operators, and handing-over the completed facilities to NPNL.

e) A committee will be organized by the governor of Vientiane Capital City for management of the Dongmark Khay Project including settlement of possible cost over-run.

f) NPNL will directly supervise construction works of the Dongmark Khay Project with assistance of private consultants.

g) Vientiane Capital City received a written confirmation dated 22 September 2004 by the Ministry of Agriculture and Forestry of technical feasibility on supplying

raw water of 20,000 m3/day through the KM6 irrigation canal. Although NPNL expects very small operation and maintenance cost to be allocated for drinking water use, no discussion has been held on cost allocation with the Ministry of Agriculture and Forestry yet.

h) Time Schedule

The Lao PDR side explained that the Dongmark Khay Project was in process of government approval and expected to complete within 15 months after government approval issued.

2. Revision of Basic Design

The Team was provided with information/data by Lao PDR side. Both sides understood the Dongmark Khay Project and the requested Project, if implemented, would serve the common purpose of benefiting citizens of Vientiane through sustainable safe water supply. Both projects can complement each other in achieving the common purpose, if they are carefully adjusted to avoid redundant capital investments.

2.1 Both sides agreed that 2010 water demands would be applied in hydraulic analysis of distribution networks. As a guide of water alocation from Dongmark Khay water treatment plant, both sides found the following allocation might be practical:

Thangon and its surrounding area:	2,000 m3/day
Industrial zone*:	5,000 m3/day
Dongdok / Phonegtong elevated tanks:	13,000 m3/day
Total production of Dongmark Khay plant:	20,000 m3/day

*The industrial zone is of 3,000 ha covering the area from KM19 of Route 13 at the north and extending approx. 15 km southward. Because of lack of reliable information, 2010 industrial and domestic demands in the zone were assumed for hydraulic analysis purpose as interpolated 2010 industrial demand, or equivalent to approximately 40% of 2015 industrial demand forecast in the 2004 JICA Study. In view of the present industrial demand level of almost non-existent, this volume will practically serve domestic demands at the beginning and gradually supply to original purpose as industrial demand grows in the zone.

2.2 The Team will recommend capacity increase of Kaolieo WTP by 40,000 m^3/day as proposed in the 2004 JICA Study. The Team's brief engineering review, however, concluded that construction of KM6 transmission booster station would be unnecessary because of intended supply to Dongdok / Phonegtong elevated tanks from the Dongmark Khay plant although further detailed analysis is required. (The booster station was aimed at directly conveying clear water to Dongdok reservoir.) On the other hand, the existing KM6 distribution booster pump needs improvement, and Chinaimo plant might need further increase of distribution pumping and water storage capacities.

3. Implementation Schedule

The team explained, and Lao PDR side accepted that the requested Project, if approved by the Japanese government, would be planned to complete within the Japanese fiscal year 2008. Lao PDR side emphasized urgent need of domestic water in the capital city, and the Team agreed to convey Lao PDR side's request of earlier commencement of the requested Project.

4. Tentative Schedule of Basic Design

The Team explained and Lao PDR side agreed the tentative schedule as follows:

- JICA will dispatch a mission to explain the contents of Draft Final Report in May or June 2005.
- JICA will complete the final report and send it to Lao PDR side by the end of June 2005.

5. Coordination with AFD study

The Lao PDR side and Japanese side confirmed that the major part of distribution system improvement would be implemented by AFD assistance, and recognized importance of coordination among Lao PDR, JICA and AFD. Both sides confirmed therefore that Lao PDR should be responsible for coordination and keeping AFD informed of the Dongmark Khay Project and the requested Project and vice versa.

6. Other Issues

6.1 Visit to the proposed Dongmark Khay plant site

The Team visited the subject site and found that the sludge disposal and filter wash waste discharge might cause a negative impact to the surrounding paddy fields. The Team, therefore advises NPNL to review thoroughly the planned sludge/wash waste disposal method.

6.2 Pumping System

The Team recommends separation of the transmission pumping system to Dongdok / Phonegtong elevated tanks from the distribution one in the Dongmark Khay project.

6.3 Poverty Reduction

NPNL emphasized the following:

In accordance with the poverty eradication policy of the Vientiane Capital City, NPNL has a task to increase served population to 80-100% by the year 2020 among population in the City and its suburbs.

Appendix 5 Cost Estimation Borne by the Recipient Country

The cost borne by Lao PDR Side		US$ 360,300
1)	Land Acquisition for Km6 Booster Pumping Station	US$ 6,100
2)	Land Rental Fee for Stockyard and Site Office	US$ 110,400
3)	Installation of Gates and Fence	US$ 4,000
4)	Power Supply (Dual Source), including water supply and drainage	US$ 43,700
5)	Relocation of Adiministration Building and Alum Factory	US$ 133,100
6)	Other Administrative Costs in Lao PDR side	US$ 63,000

It should be noted that costs borne by the Lao side does not include costs required for Dongmark Khay project and relating transmission and distribution system developments.

Appendix 6 References

No	Title	Media	Original/ Copy	Insurance	Year
1	Schedule Table for AFD Training Center Project Consultants	Schedule Table	Copy	BCEOM、SAUR	2004
2	PROGRAMME DE RECHERCHE DE FUITES DANS LES RESEAUX D'EAU POTABLE DE VIENTIANE	Book	Copy	Safege	2004
3	Letter on tariff change about NPVC	Letter	Copy	NPVC	2004
4	New Tariff about NPVC	Tariff	Copy	NPVC	2004
5	Schedule for activities by the senior volunteer	Book	Copy	Mr. Shigeo Ohashi	2004
6	Plan for activities by the senior volunteer	Schedule Table	Copy	Mr. Suzuki	2004
7	Water Data on Production and Leakage	Data	Copy	NPVC	2004
8	VIENTIANE URBAN INFRASTRUCTURE AND SERVICES PROJECT, Memorandum of Understanding of Inception Mission	Book	Copy (Extraction)	VUDAA	2002
9	Vientiane Municipality Road Project (Phase 2) Inception/ MD before dispatch the team	Book	Copy	Katahira & Engineers International Co., Ltd, CTI Engineering Co., Ltd	2004
10	Population in Vientiane City (2003)	Data	Copy	NSC	2004
11	Map for ADB Waste Water Project	Map	Copy	VUDAA	2004
12	Running Record of Kaolieo and Chinaimo Treatment Plant	Data	Copy	NPVC	2004
13	Water level of Mekong River	Data	Copy	MCTPC	2004
14	Rainfall data in Vientiane	Data	Copy	IWD	2004
15	Vientiane Municipality Road Project, Road 2 and Road 2B, from Golden Palace to Donenoun Junction	Map	Copy	Communication Design and Research Institute (CDRI)	2000
16	Standard Drawings for Lao Water Supply State Enterprise (NPNL)	Map	Copy	NPVC	2001
17	Etude Complementaire Pour L'Alimentation en eau de 3 Zones Villageoises	Book	Copy	AFD	2004
18	Hong Wattay-2 Main Drainage Channel Improvement and T2 Road Rehabilitation Project Volume III Drawings (draft)	Map	Copy	VUDAA	2004
19	Piping Works of AFD Project, Branch from the Existing 450mm at Shikai Intersection	Video	-	NPVC	2004