Appendices

Appendix 1：Member List of the Study Team

No.	Name	Job Title	Occupation
1	Mr. Shigeyuki MATSUMOTO	Team Leader	Director Water Resources Management Division I, Water Resources and Disaster Management Group, Global Environment Department, JICA
2	Mr. Shogo ASAOKA	Water Supply Facility Planning	Water Resources Management Division I, Water Resources and Disaster Management Group, Global Environment Department, JICA
3	Mr. Ryuji OGATA	Cooperation Planning	Technical Advisor Water Resources Management Division I, Water Resources and Disaster Management Group, Global Environment Department, JICA
4	Ms. Sayako TOKUDA	Cooperation Planning	Deputy Director Grant Aid Project Management Division 3, Financial Cooperation Implementation Department, JICA
4	Mr. Toshifumi OKAGA	Chief Consultant / Operation & Maintenance Planning	Senior Project Manager Engineering Department TEC INTERNATIONAL
5	Mr. Masashi KAWAMURA	Deputy Chief Consultant /Water Supply Facility Planning	Water Supply Engineer Engineering Department TEC INTERNATIONAL
6	Mr. Katsutoshi IWASAKI	Transmission and Distribution System Planning	Water Supply Engineer Engineering Department TEC INTERNATIONAL
7	Mr. Isao MASUI	Pump Facility and Equipment Planning	Water Supply Engineer Engineering Department TEC INTERNATIONAL
8.	Ms. Shoko YAMADA	Environment and Social Consideration	Environmental Engineer Engineering Department TEC INTERNATIONAL
9.	Mr. Norio TANAKA	Cost Estimation /Construction planning	Water Supply Engineer Engineering Department TEC INTERNATIONAL

Appendix 2：Study Schedule

Preparatory survey

Date		Member						
		Officials	Chief Consultant / Operation & Maintenance Planning	Deputy Chief Consultant /Water Supply Facility Planning	Transmission and Distribution System Planning	Pump Facility and Equipment Planning	Environment and Social Consideration	Cost Estimation /Construction planning
		Matsumoto, Asaoka, Ogata	Okaga	Kawamura	Iwasaki	Masui	Yamada	Tanaka
3-Mar-13	Sun	Leaving for Yangon, Arriving at Yangon						
4-Mar-13	Mon	Meeting with YCDC, Embassy of Japan and JICA Myanmar Office						
5-Mar-13	Tue	Field Survey in Nyaunghnapin Phase I WTP						
6-Mar-13	Wed	Field Survey in Yegu P/S and Yankin Township						
7-Mar-13	Thu	Discussion on M/D and Signing of M/D			Leaving for Yangon, Arriving at Yangon			
8-Mar-13	Fri	Signing of M/D and Report to Embassy of Japan			Meeting with YCDC and Preparation of survey			
9-Mar-13	Sat	Arriving at Tokyo	Supervision of sub-contract (Topographic, Soil, Trial Excavation and Underground survey)					
10-Mar-13	Sun					Leaving for Yangon, Arriving at Yangon		
11-Mar-13	Mon		Explanation on Survey contents and schedule to YCDC and selection of CPs (pm)					
12-Mar-13	Tue		Interview and field survey in Nyaunghnapin WTP					
13-Mar-13	Wed		Field survey in Yankin Township		Structural survey of the existing P/S	Survey of pump equipment		
14-Mar-13	Thu		Compilation of the result	Survey in Yegu P/S	Survey of water flow and water pressure	Compilation of the result for pump equipment		Leaving for Yangon, Arriving at Yangon
15-Mar-13	Fri		〃	Distribution network plan	Planning of rehabilitation of P/S			Meeting with YCDC and Preparation of survey
16-Mar-13	Sat		Compilation of the result (layout of P/S and distribution network plan)					Confirmation of local companies
17-Mar-13	Sun		〃				Assignment from other project	〃
18-Mar-13	Mon		Meeting with YCDC, report and discussion on layout of P/S and Yankin distribution network plan					
19-Mar-13	Tue		Study on design policy	Confirmation of pipeline route	Survey of water flow and water pressure	Compilation of WH analysis condition	Hearing and field survey in Nyaunghnapin WTP and Yankin Township	
20-Mar-13	Wed		〃	〃	〃	〃	Study on concerned items	Collection of cost estimation information
21-Mar-13	Thu		Study on design policy and additional survey (Nyaunghnapin phase I WTP and Yankin Township)				Interview to YCDC	〃
22-Mar-13	Fri		〃				〃	〃
23-Mar-13	Sat		Field survey of Hlawga P/S				Compilation of the result	Compilation of the result
24-Mar-13	Sun		Study on design policy and additional survey (Nyaunghnapin phase I WTP and Yankin Township)				Discussion on concerned items	Discussion on cost estimation and procurement
25-Mar-13	Mon		Meeting with YCDC (Contents of technical note, presentation and study on design policy) (pm)				〃	Confirmation of current condition in Yankin Township
26-Mar-13	Tue		Preparation of returning report and outline report of the result of field survey					〃
27-Mar-13	Wed		〃					Field survey in Nyaunghnapin WTP
28-Mar-13	Thu		Overall meeting (Confirmation of the scope of the work, implementation schedule)				Confirmation of the environmental impact	〃
29-Mar-13	Fri		Report to JICA Myanmar office and preparation of returning report and outline report of the result of field survey				〃	〃
30-Mar-13	Sat		Leaving for Tokyo (Yamada: Calculation of the reduction impact of electricity consumption)					
31-Mar-13	Sun		Arriving at Tokyo (Yamada: assignment in the other project in Myanmar from 1st April)					

Explanation of Outline Design

Date			Schedule	
			Officials	Okaga/Kawamura
1	21st July	Sun	-	Moving (Tokyo→Bangkok→Yangon)
2	22nd	Mon	Moving (Tokyo→Bangkok→Yangon)	Field survey (Yankin)
3	23rd	Tue	Meeting with JICA Myanmar office and YCDC	
4	24th	Wed	Site visiting 1 (Rehabilitation route for distribution pipe with outer dia. 1,050mm and the target area for replacement of distribution network) Site visiting 2 (Nyaunghnapin WTP) Meeting with Yangon Region Government	
5	25th	Thu	Meeting with YCDC and Discussion on MD	
6	26th	Fri	Signing of MD Report to JICA Myanmar Office Report to Embassy of Japan Moving (Yangon→Bangkok→Tokyo)	
7	27th	Sat	Arriving at Tokyo	

Appendix 3: List of Parties Concerned in the Recipient Country

<Myanmar side>

1. YCDC (Yangon City Development Committee)

Mr. Soe Si, Committee Member (7)
Mr. Maung Maung Win, Regal Adviser
Mr. Myint Oo, Chief Engineer (Head of Department of Water and Sanitation)
Mr. Kyaw Than, Head of Department (Department of Budget and Account)
Mr. Aung San Win, Deputy Chief Engineer (Department of Water and Sanitation)
Mr. Kan Myint, Deputy Chief Engineer (Department of Water and Sanitation)
Mr. Myo Thein, Assistant Chief Engineer (Department of Water and Sanitation)
Mr. Thein Min, Assistant Chief Engineer (Department of Water and Sanitation)
Mr. Thet Lwin, Assistant Chief Engineer (Department of Water and Sanitation)
Mr. Htin Lin Kha, Exective Engineer (Department of Water and Sanitation)
Mr. Wai Lwin, Engineer (Department of Water and Sanitation)
Mr. Zaw Min, Assistant Engineer (Department of Water and Sanitation)
Mr. Aung Ko Oo, Engineer (Department of Water and Sanitation)
Ms. Aye Aye Mar, Assistant Engineer (Department of Water and Sanitation)

2. Yangon Region Government
Mr. Myint Swe, Chief Minister
Mr. Myint, Mayor/YCDC Chairman

<Japanese Side>

1. Embassy of Japan

Hideaki Matsumoto, Counsellor
Go Nakaya, Second Secretary

2. JICA Myanmar Office

Masahiko Tanaka, Chief Representative
Akihito Sanjo, Senior Representative
Noriko Sakurai, Project Formulation Advisor
Myat Thuzar @Tina, Program Officer

Appendix 4: Minutes of Discussions

1. Preparatory Survey

MINUTES OF DISCUSSIONS
ON
THE PREPARATORY SURVEY
ON
THE PROJECT FOR URGENT IMPROVEMENT OF WATER SUPPLY SYSTEM FOR YANGON CITY IN THE REPUBLIC OF THE UNION OF MYANMAR

In response to the request from the Government of the Republic of the Union of Myanmar (hereinafter referred to as "Myanmar"), the Government of Japan decided to conduct a Preparatory Survey on the Project for Urgent Improvement of Water Supply System for Yangon City (hereinafter referred to as "the Project") and entrusted the survey to the Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA sent to Myanmar the Preparatory Survey Team (hereinafter referred to as "the Team"), which is headed by Mr. Shigeyuki Matsumoto, Director, Water Resources Management Division I, Water Resources and Disaster Management Group, Global Environment Department, JICA, and is scheduled to stay in the country from March 3, 2013 to March, 31, 2013.

The Team held discussions with the officials concerned of the Government of Myanmar and conducted a field survey at the survey area.

In the course of discussions and field survey, both parties confirmed the main items described in the attached sheets.

Yangon, 8 March, 2013

Shigeyuki Matsumoto
Leader
Preparatory Survey Team
Japan International Cooperation Agency (JICA)

U Soe Si
Committee Member
Yangon City Development Committee
The Republic of the Union of Myanmar

1

ATTACHMENT

1. Objective of the Project

1) To improve the operation ratio of distribution pumps in Nyaunghnapin water treatment plant
2) To reduce leakage ratio of distribution network in Yankin township

2. Project site

The Project site is Yangon city as shown in **Annex-1**.

3. Responsible and Implementing Agency

The Responsible and Implementing Agency is Yangon City Development Committee (hereinafter referred to as "YCDC"). The organization chart of YCDC is shown in **Annex-2**

4. Items requested by the Government of Myanmar

After discussions between the Myanmar side and the Team (hereinafter referred to as "the both sides"), the items described in **Annex-3** were requested by the Myanmar side.

The both sides confirmed that the appropriateness of the request would be examined in accordance with the further studies and analysis in Japan, and the final components of the Project would be decided by the Japanese side.

5. Japan's Grant Aid Scheme

5-1) The Myanmar side understands the Japan's Grant Aid Scheme explained by the Team, as described in **Annex-4**.

5-2) The Myanmar side will take the necessary measures, as described in **Annex-5**, for smooth implementation of the Project, as a condition for the Japanese Grant Aid to be implemented.

6. Schedule of the Survey

6-1) The consultant members of the Team will conduct studies in Myanmar until March 31, 2013.

6-2) JICA will prepare the draft preparatory survey report in English and dispatch a mission in order to explain its contents to the Myanmar side around July, 2013.

6-3) In case that the contents of the report are accepted in principle by the Myanmar side, JICA will finalize the report and send it to the Myanmar side around September 2013. The Myanmar side understands that execution of the Preparatory Survey (hereinafter referred to as "the Survey") does not necessary imply the Japanese Government's commitment of the project implementation.

7. Other relevant issues

7-1) Target year

The target year of the Project is basically set up as the year immediately after the construction because Japan's grant aid aims to implement the project components to meet the urgent and immediate needs in the Project area. The capacity of Nyaunghnapin pump station and the pipe size of the distribution pipeline to the Mayangon Township for the Project should be consisted with the existing facilities and equipment though consistency with the Master plan for Water, Sewerage and Drainage should be also considered. The pump capacity of the existing pump station is 45MGD and the diameter of the existing pipeline is 1,000mm.

The target year of the distribution pipe network in the Yankin township is set at 2025 because of the difficulty of the stepwise expansion of pipe capacity.

7-2) Scope of the Project

The Myanmar side agreed that the cost of the Project should not exceed the upper limit of amount agreed on E/N which would be concluded during the Survey period. Based on the result of the Survey, the scope of the Project will be decided in consideration of the priority of following three (3) components and consistency with the upper limit of the Project cost agreed on E/N. The both sides agreed that the scope of the Project would be finally adjusted by adding/ reducing area of replacement of distribution network in Yankin township if all of following three (3) components should be included in the Project based on the result of the Survey.

- The rehabilitation of the pumps in Nyaunghnapin pump station including protection against water hummer, check valve and renovation of substructure of pump house.
- The replacement of 1,000mm transmission pipe to Mayangon township
- The replacement of distribution networks considered for Zone 3 of Yankin Township which consists of three (3) DMAs.

7-3) Rehabilitation of substructure of the pump house

Due to big flood in 2012, the ground water intruding flow into the sub-structure of pump station has been increasing much and the size and extent of the cracks on the walls of the station have been getting serious. In addition, no measure has not provided for its foundation to protect it from unequal settlement. Therefore, it is necessary to conduct a study on the unequal settlement to confirm if such foundation layers settled unequally. In case that the unequal settlement is found as a result of the Survey, a study should be conducted for comparison between the rehabilitation plan of the existing station and the construction of new station plan in neighboring yards in technical and economic aspects.

7-4) Branch pipelines of diameter less than 350 mm and the service connection in Yankin Township

Responsibility of JICA and Myanmar side on the procurement and installation of the branch pipelines of diameter less than 350 mm and the service connection including water meters and necessity of its replacement will be examined by the Team so that the effectiveness of the Project is optimized. The conclusion on the issue will be made through the discussion between both sides.

7-5) Measures to be taken by the Myanmar side

The Myanmar side agreed to facilitate the Survey by following activities.

- Provision of necessary data related to the Survey
- Making appointment with related government officers
- Coordination of relevant agency
- Accompany with the Team member for site visit
- Other necessary facilitation for the Team

7-6) Training by OJT

The training for pump operation and maintenance will be carried out by an engineer of a pump supplier through OJT. The Primary Operation and Maintenance Training Program and outline for curriculum and schedule will be formulated by the Team.

7-7) Technical assistance ("Soft Component" of the Project)

The Myanmar side requested technical assistance activities throughout the Project. The Team will prepare a plan of technical transfer for "piping and district metered area (DMA) setting" to the staff of YCDC as soft component of the Project throughout the study period.

7-8) Tax exemption

The both sides confirmed that the tax exemption including Value Added Tax (VAT), custom duty, and any other taxes and fiscal levies in Myanmar which is to be arisen from the Project activities will be ensured by the Myanmar side. The Myanmar side will take any procedures necessary for tax exemption, and in case that tax exemption is not secured, the cost of tax will be covered by the Myanmar side.

7-9) Coordination with other projects

The both sides confirmed that the Project would be coordinated with any other project supported by JICA, other development partners, NGOs, and Myanmar official organizations rather than making duplication.

7-10) Environmental Impact Assessment (EIA)

The both sides confirmed that the Myanmar side is responsible for taking any measures to complete EIA, in case that the Survey indicates necessity of EIA for implementing the Project.

Annex-1	Project Sites Map
Annex-2	Organization Charts
Annex-3	Items Requested by the Myanmar Side
Annex-4	Japan's Grant Aid Scheme

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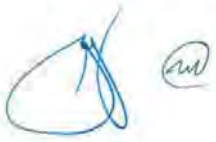
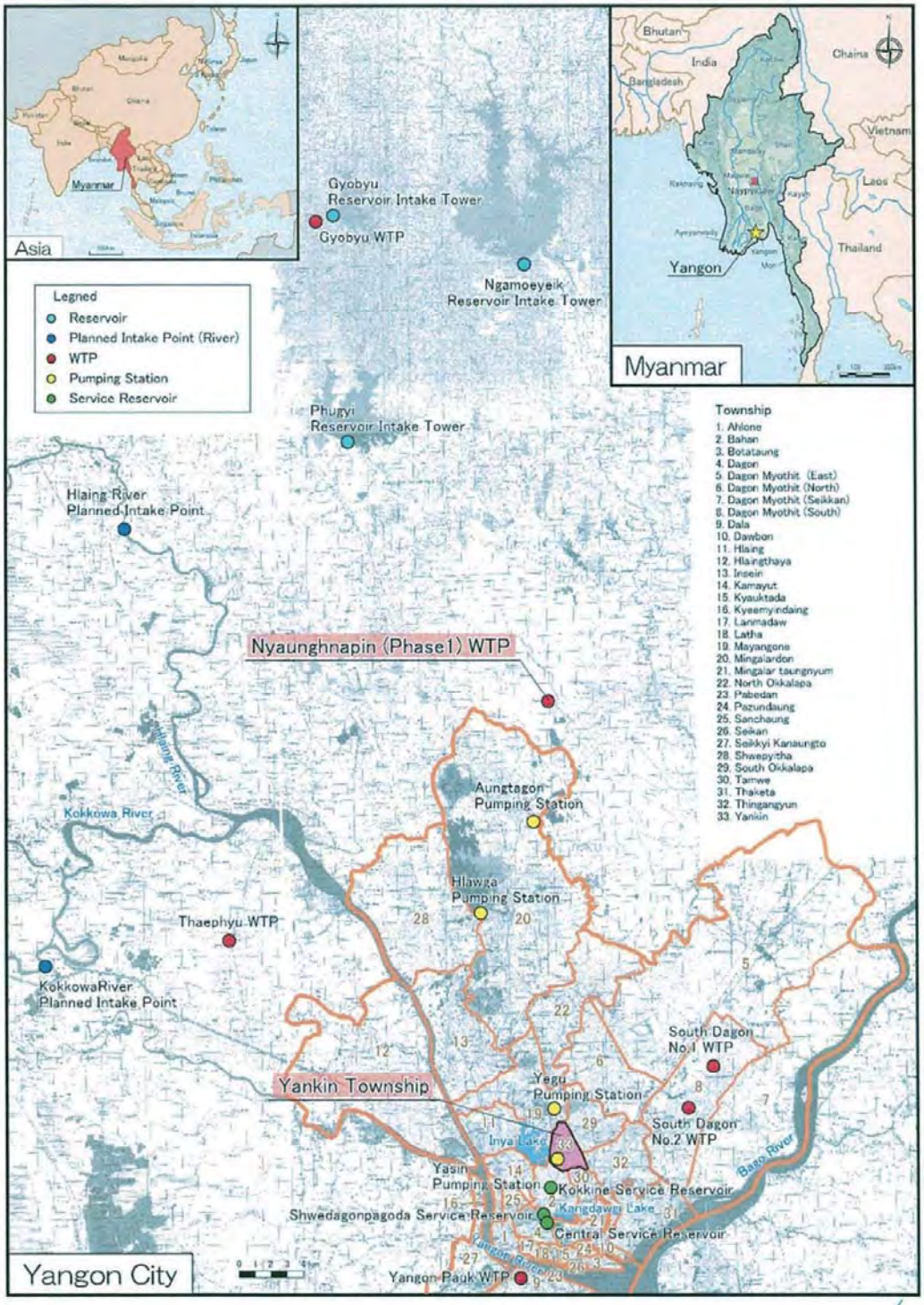
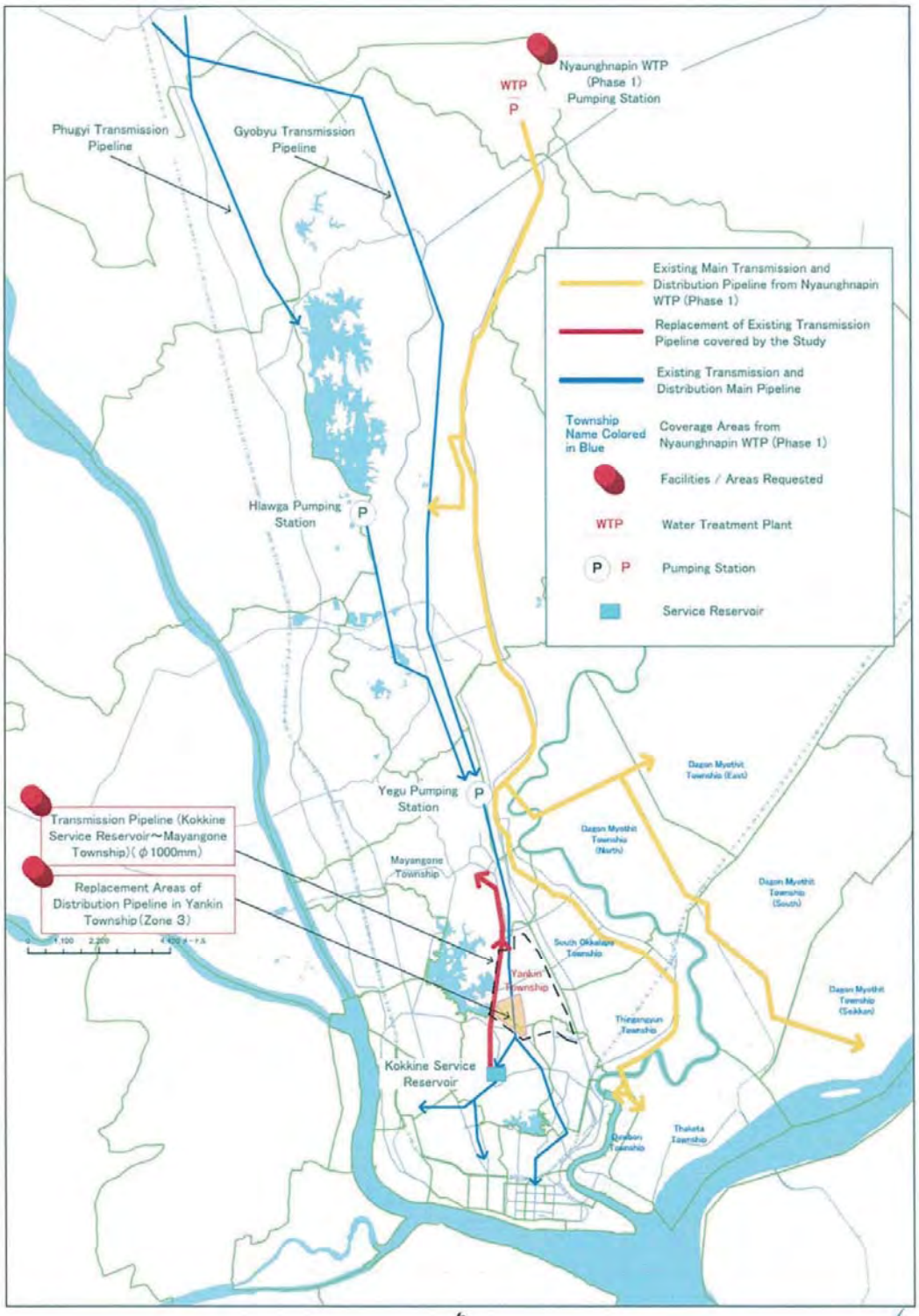
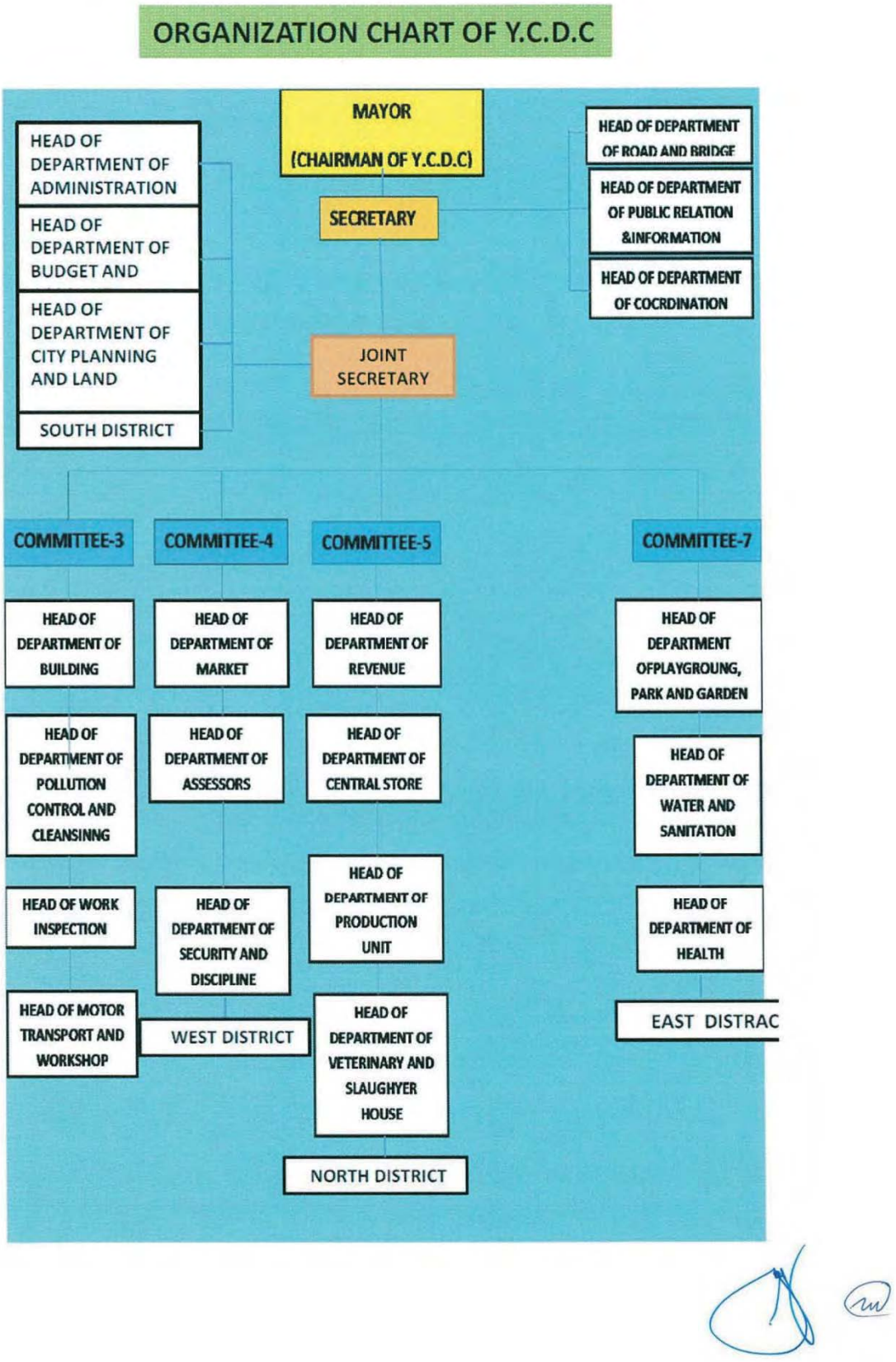


Annex-1: Project Sites Map



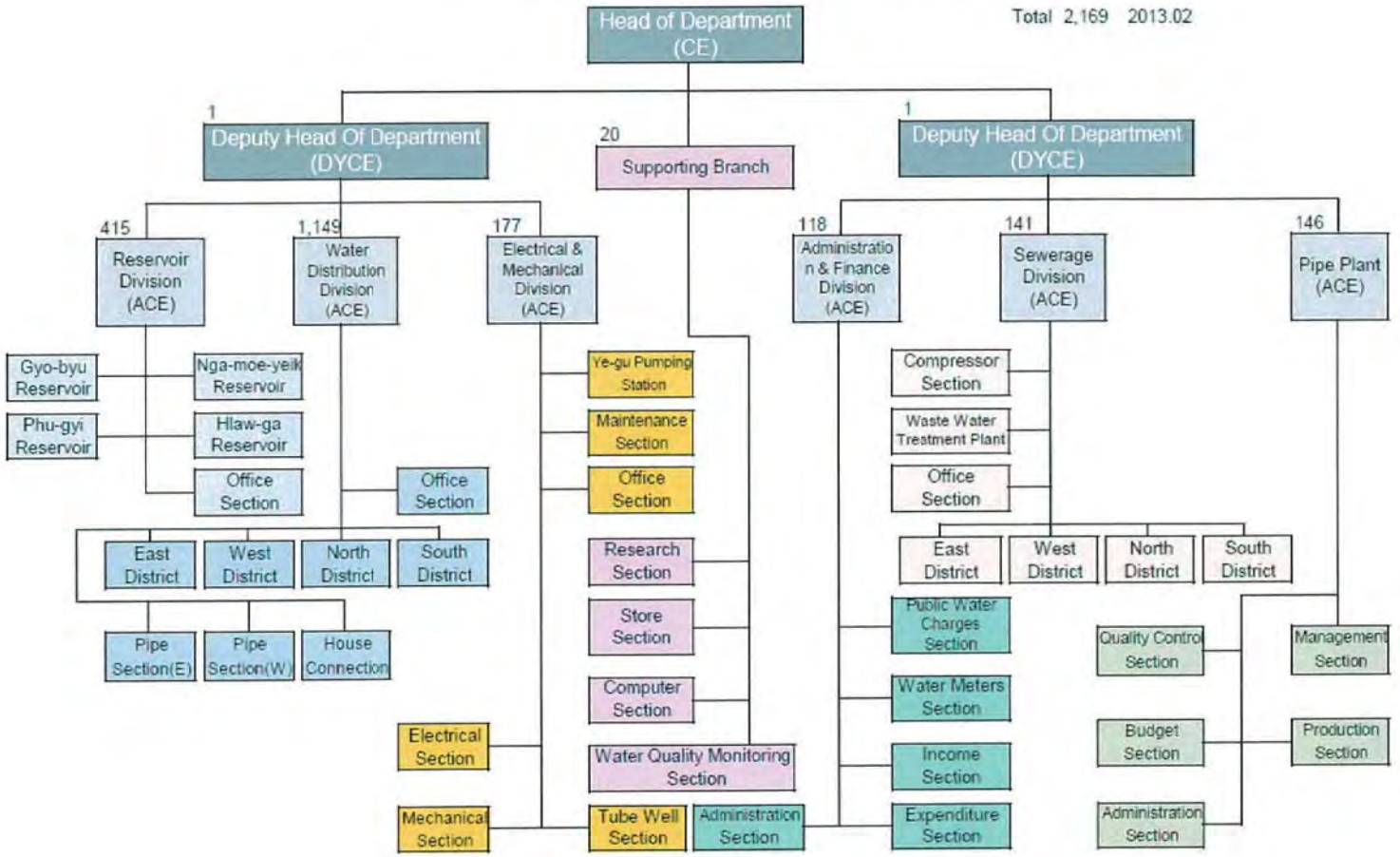

Nyaunghnapin WTP
(Phase 1)
Pumping Station
WTP
P
Phugyi Transmission
Pipeline
Gyobyu Transmission
Pipeline
Existing Main Transmission and
Distribution Pipeline from Nyaunghnapin
WTP (Phase 1)
Replacement of Existing Transmission
Pipeline covered by the Study
Existing Transmission and
Distribution Main Pipeline
Township
Name Colored
in Blue
Coverage Areas from
Nyaunghnapin WTP (Phase 1)
Facilities / Areas Requested
WTP
Water Treatment Plant
P
Pumping Station
Service Reservoir
Hlawga Pumping
Station
P
Yegu Pumping
Station
P
Transmission Pipeline (Kokkine
Service Reservoir~Mayangone
Township)(φ 1000mm)
Replacement Areas of
Distribution Pipeline in Yankin
Township (Zone 3)
Mayangone
Township
Yankin
Township
Kokkine Service
Reservoir
Dagon Myothit
Township (East)
Dagon Myothit
Township
(North)
Dagon Myothit
Township
(South)
Dagon Myothit
Township
(Sekkan)
South Okkalapa
Township
Thingangyun
Township
Thaketa
Township
Dyobon
Township

ınex-2: Organization Charts



Appendix-12

Organization Chart of The Department of Water & Sanitation



Annex-3: Items Requested by the Myanmar Side

(1) Rehabilitation of pump station in Nyaunghnapin water treatment plant Phase I
1) Replacement of pump sets 2) Replacement of check valve 3) Installation of air relief valve and pressure buffer vessel 4) Renovation of substructure of pump house
(2) Replacement of old transmission and distribution pipes in Yankin Township
1) Replacement of old transmission pipe with 1,000mm diameter over 60 years 2) Replacement of old distribution pipes with 700mm and 350mm diameter 3) Replacement of old distribution pipes with less than 350mm diameter, water meters and service connection
(3) Technical assistance (soft component)

Annex-4: JAPAN'S GRANT AID SCHEME

The Government of Japan (hereinafter referred to as "the GOJ") is implementing the organizational reforms to improve the quality of ODA operations, and as part of this realignment, JICA was reborn on October 1, 2008. After the reborn of JICA, following the decision of the Government of Japan (hereinafter referred to as "the GOJ"), Grant Aid for General Project is extended by JICA.

Grant Aid is non-reimbursable fund to a recipient country 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 (Attachment 1)

Japanese Grant Aid is conducted as follows-

- Preparatory Survey (hereinafter referred to as "the Survey")
  - The Survey conducted by JICA
- Appraisal & Approval
  -Appraisal by the GOJ and JICA, and Approval by the Japanese Cabinet
- Determination of Implementation
  -The Notes exchanged between the GOJ and a recipient country
- Grant Agreement (hereinafter referred to as "the G/A")
  -Agreement concluded between JICA and a recipient country
- Implementation
  -Implementation of the Project on the basis of the G/A

2. Preparatory Survey

(1) Contents of the Survey

The aim of the Survey is to provide a basic document necessary for the appraisal of the Project by JICA and the GOJ. The contents of the Survey are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of agencies concerned of the recipient country necessary for the implementation of the Project.
- Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, financial, social and economic point of view.
- Confirmation of items agreed on by both parties concerning the basic concept of the Project.
- Preparation of a outline design of the Project.
- Estimation of costs of the Project.

The contents of the original request by the recipient country are not necessarily approved in their initial

form as the contents of the Grant Aid project. The Outline Design of the Project is confirmed considering the guidelines of the Japan's Grant Aid scheme.

JICA 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 Survey, JICA uses (a) registered consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms.

(3) Result of the Survey

The Report on the Survey is reviewed by JICA, and after the appropriateness of the Project is confirmed, JICA recommends the GOJ to appraise the implementation of the Project.

3. Japan's Grant Aid Scheme

(1) The E/N and the G/A

After the Project is approved by the Cabinet of Japan, the E/N will be singed between the GOJ and the Government of the recipient country to make a plead for assistance, which is followed by the conclusion of the G/A between JICA and the Government of the recipient country to define the necessary articles to implement the Project, such as payment conditions, responsibilities of the Government of the recipient country, and procurement conditions.

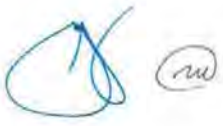
(2) Selection of Consultants

The consultant firm(s) used for the Survey Will be recommended by JICA to the recipient country to also work on the Project's implementation after the E/N and the G/A, in order to maintain technical consistency.

(3) Eligible source country

Under the Japanese Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased. When JICA and the Government of the recipient country or its designated authority 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, constructing and procurement firms, and the prime consulting firm are limited to "Japanese nationals". (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

(4) 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 JICA. This "Verification" is deemed necessary to secure accountability to Japanese taxpayers.

(5) Major undertakings to be taken by 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 Attachment 2

(6) Proper Use

The Government of recipient country is required to maintain and use the facilities constructed and the 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.

(7) Export and Re-export

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

(8) 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"). JICA 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 JICA under an Authorization to Pay (A/P) issued by the Government of the recipient country or its designated authority.

(9) Authorization to Pay (A/P)

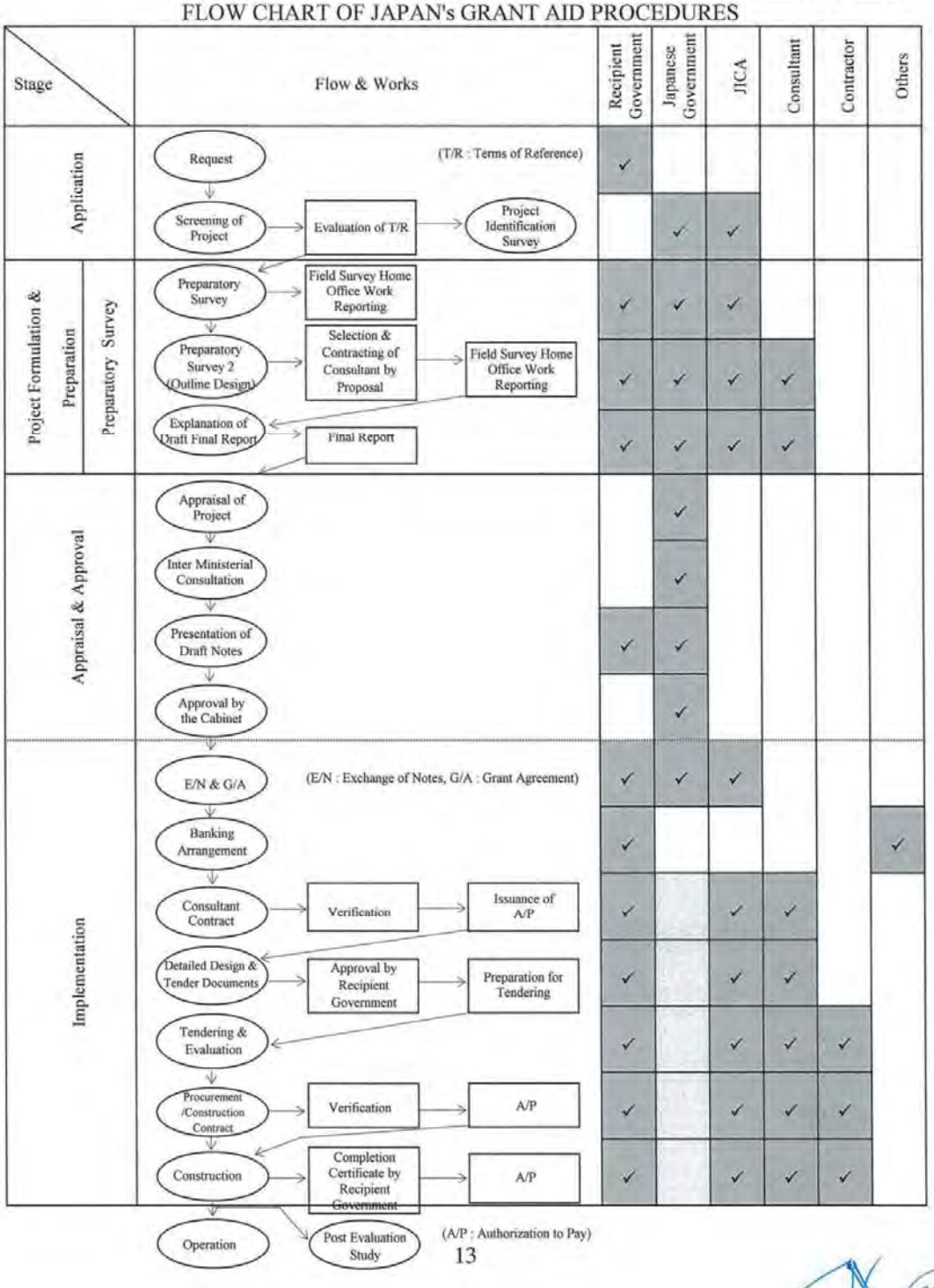
The Government of the recipient country should bear an advising commission of an Authorization to Pay and payment commissions to the Bank.

(10) Social and Environmental Considerations

A recipient country must ensure the social and environmental considerations for the Project and must follow the environmental regulation of the recipient country and JICA socio-environmental guideline.

Attachment 1 for Annex-4

FLOW CHART OF JAPAN's GRANT AID PROCEDURES



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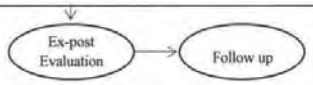
Evaluation & Follow up		✓		✓			

Attachment 2 for Annex-4

Major Undertakings to be taken by Each Government

NO	Items	To be covered by the Grant	To be covered by Recipient side
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 building	●	
7	To provide facilities for the distribution of electricity, water supply,		
	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/or elevated	●	
	3)Drainage		
	a.The city drainage main (for storm, sewer and others) to the		●
	b.The drainage system (for toilet sewer, ordinary waste, storm drainage and others) within the site	●	
	4)Gas Supply		
	a.The city gas main to the site		●
	b.The gas supply system within the site	●	
	5)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	●	
	6)Furniture and Equipment		
	a.General furniture		●
	b.Project equipment	●	
8	To bear the following commissions to a bank of Japan for the banking services based upon the B/A		
	1) Advising commission of A/P		●
	2) Payment commission		●
9	To ensure prompt unloading and customs clearance at the port of disembarkation in recipient country		

	1) Marine(Air) transportation of the products from Japan to the recipient country	•	
	2) Tax exemption and customs 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 services 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 contract		•
12	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid		•
13	To bear all the expenses, other than those to be borne by the Grant Aid, 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, N/A: Not Applicable)

2. Explanation of Outline Design

MINUTES OF DISCUSSIONS
ON
THE PREPARATORY SURVEY
ON
THE PROJECT FOR URGENT IMPROVEMENT OF WATER SUPPLY SYSTEM IN YANGON CITY IN THE REPUBLIC OF THE UNION OF MYANMAR

In response to the request from the Government of the Republic of the Union of Myanmar (hereinafter referred to as "Myanmar"), the Government of Japan decided to conduct a Preparatory Survey on the Project for Urgent Improvement of Water Supply System in Yangon City (hereinafter referred to as "the Project") and entrusted the survey to the Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA sent to Myanmar the Preparatory Survey Team (hereinafter referred to as "the Team"), which is headed by Mr. Shigeyuki Matsumoto, Director, Water Resources Management Division I, Water Resources and Disaster Management Group, Global Environment Department, JICA, and is scheduled to stay in the country from July 22, 2013 to July 26, 2013.

The Team held discussions with the officials concerned of the Yangon City Development Committee (hereinafter referred to as "YCDC") and conducted a field survey at the survey area.

In the course of discussions and field survey, YCDC understood the main items of requirements for the implementation of the Project explained by the Team as described in the attached sheets.

Yangon, 26 July, 2013

Shigeyuki Matsumoto
Leader
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ATTACHMENT

1. Component of the Draft Final Report

The Myanmar side agreed and accepted in principle the main component of the draft final report explained by the Team. The Project sites map and component of the Project are respectively shown in **Annex-1** and **Annex-2.**

2. Responsible and Implementation Agency

The Responsible and Implementing Agency is YCDC.

3. Japan's Grant Aid Scheme

3-1) The Myanmar side understands the Japan's Grant Aid Scheme explained by the Team, as described **Annex-3.**

3-2) The both sides will take necessary measures, as described in **Attachment 2 of Annex-3**, subject to the measures described in 7-3), for smooth implementation of the Project, as condition for the Japan's Grant Aid to be implemented.

4. Submission of the Final Report

JICA will complete the final report in accordance with the confirmed items in consultation of YCDC and send it to the Government of Myanmar by September, 2013.

7. Other relevant issues

7-1) Cost Estimate

The Team explained to the Myanmar side the cost estimate as described in **Annex-4**. Both sides agreed that the cost estimate should never be duplicated or released to any outside parties other than Myanmar concerned officials until signing of all the contract(s) for the Project.

7-2) Scope of the Project

The Myanmar side agreed that the cost of the Project should not exceed the maximum amount agreed on E/N which was concluded in May, 2013. Based on the result of the Survey, the scope of the Project has been decided in consideration of the priority of following three (3) components and consistency with the upper limit of the Project cost agreed on E/N as follows:

- The rehabilitation of the pumps/motors in Nyaunghnapin pump station including protection equipment against water hummer, check valve and construction of pump house.
- The replacement of 1,050mm transmission and distribution pipe to Mayangon township
- The replacement of pilot distribution networks considered for part of Zone 2 and 3 of Yankin Township which consists of one (1) DMA.

7-3) Measures to be taken by the Myanmar side

The Myanmar side agreed to facilitate the Project by following activities.

- Provision of necessary data related to the Project
- Secure the project sites and provision of general information on the security
- Commission for banking arrangement (B/A) and authorization to pay (A/P)
- To ensure prompt unloading and customs clearance at the port of disembarkation in recipient country through tax exemption and customs clearance of the products at the port of disembarkation
- 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 contract
- To bear all the expenses, other than those to be borne by the Grant Aid such as allocation of YCDC engineers
- To prepare stockyard for procured materials for replacement of the transmission and distribution pipes in Yankin township
- To obtain necessary official procedure/permission for utilization of roads for replacement of the transmission and distribution pipes in Yankin township
- To obtain permission on data communication system for water distribution monitoring
- Provision of office space for central control room for distribution monitoring system

  Other necessary facilitation for the Project

7-4) On the Job Training (OJT) for pump operation and piping in Yankin township

The training for pump operation and maintenance as well as piping in Yankin township will be carried out by engineers of a pump supplier and a pipe supplier through OJT. The Primary Operation and Maintenance Training will be conducted following the Training Program and outline for curriculum and schedule prepared by the Supplier.

7-5) Technical assistance ("Soft-Component" of the Project)

Technical assistance will be conducted in accordance with the prepared technical transfer plan for "distribution data management and distribution management" to the staff of YCDC by the Consultant.

7-6) Staff allocation for OJT and Soft-Component

YCDC will timely assign appropriate number of qualified staffs as described below for implementing OJT and Soft-Component of the Project and provide its training venue, necessary expenses for daily allowance and travel allowance.

- Appropriate experience on distribution management of water supply
- Basic operation skills of computer as well as MS-Excel and MS-Word
- Sufficient time for participation in the training

- High willingness on participation in the training

7-7) Tax exemption

The both sides confirmed that the tax exemption including Value Added Tax (VAT), custom duty, and any other taxes and fiscal levies in Myanmar which is to be arisen from the Project activities will be ensured by the Myanmar side. The Myanmar side will take any procedures necessary for tax exemption, and in case that tax exemption is not secured, the cost of tax will be covered by the Myanmar side.

7-8) Coordination with other projects

The both sides confirmed that the Project would be coordinated with any other project supported by JICA, other development partners, NGOs, and Myanmar official organizations rather than making duplication.

7-9) Environmental Impact Assessment (EIA)

- Environmental Checklist

The environmental and social considerations including major impacts and mitigation measures for the Project are summarized in the Environmental Checklist attached as **Annex-5** and the both sides confirmed the contents of the Environmental Checklist.

- Monitoring for Environmental and Social considerations

Monitoring for Environmental and Social considerations will be conducted by YCDC in accordance with the Monitoring Plan for the Project agreed in the Report. The results will be provided to JICA by filling in the Monitoring Form attached as **Annex-6**, as part of progress reports during the construction phase.

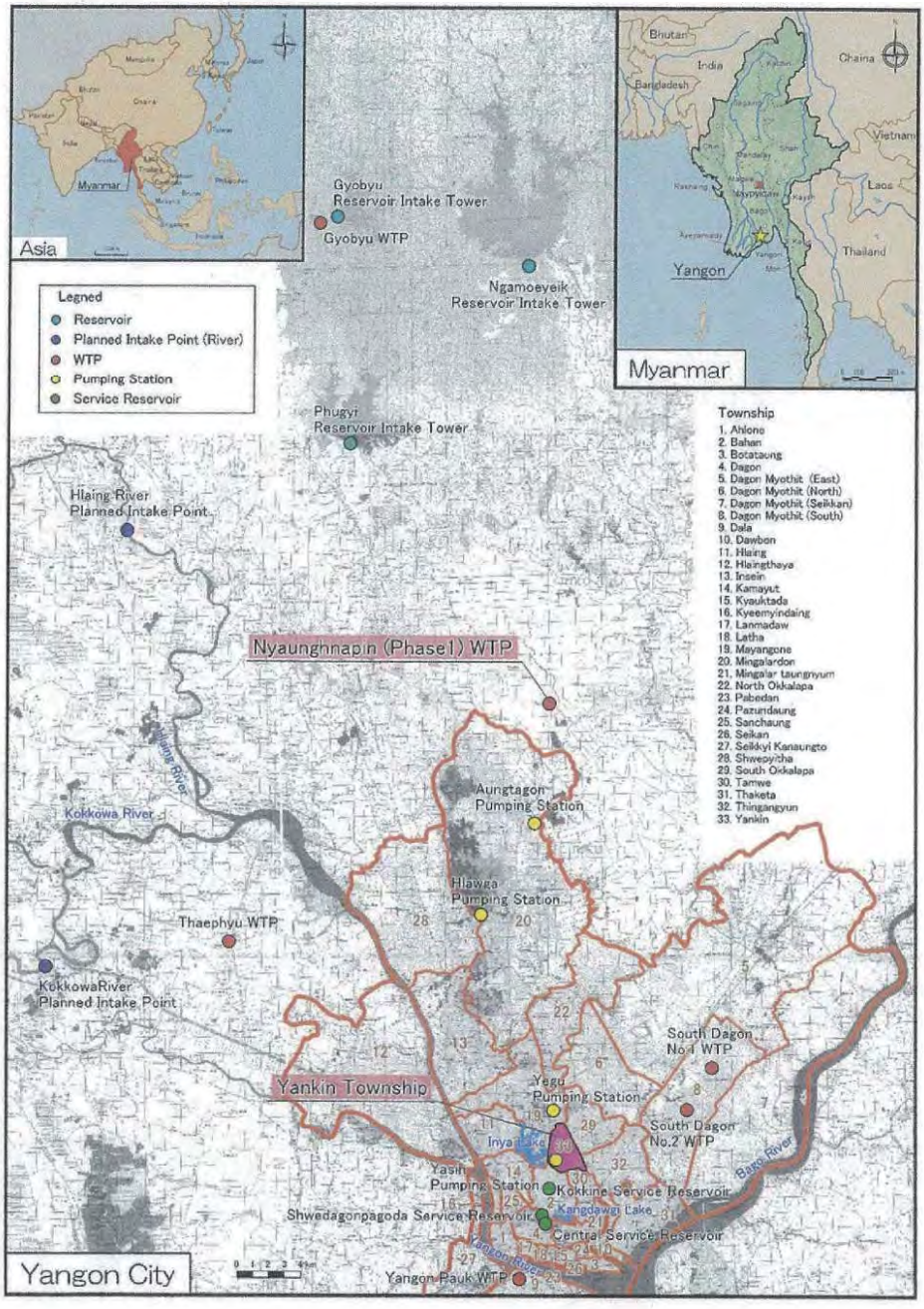
7-10) Electricity and gas supply

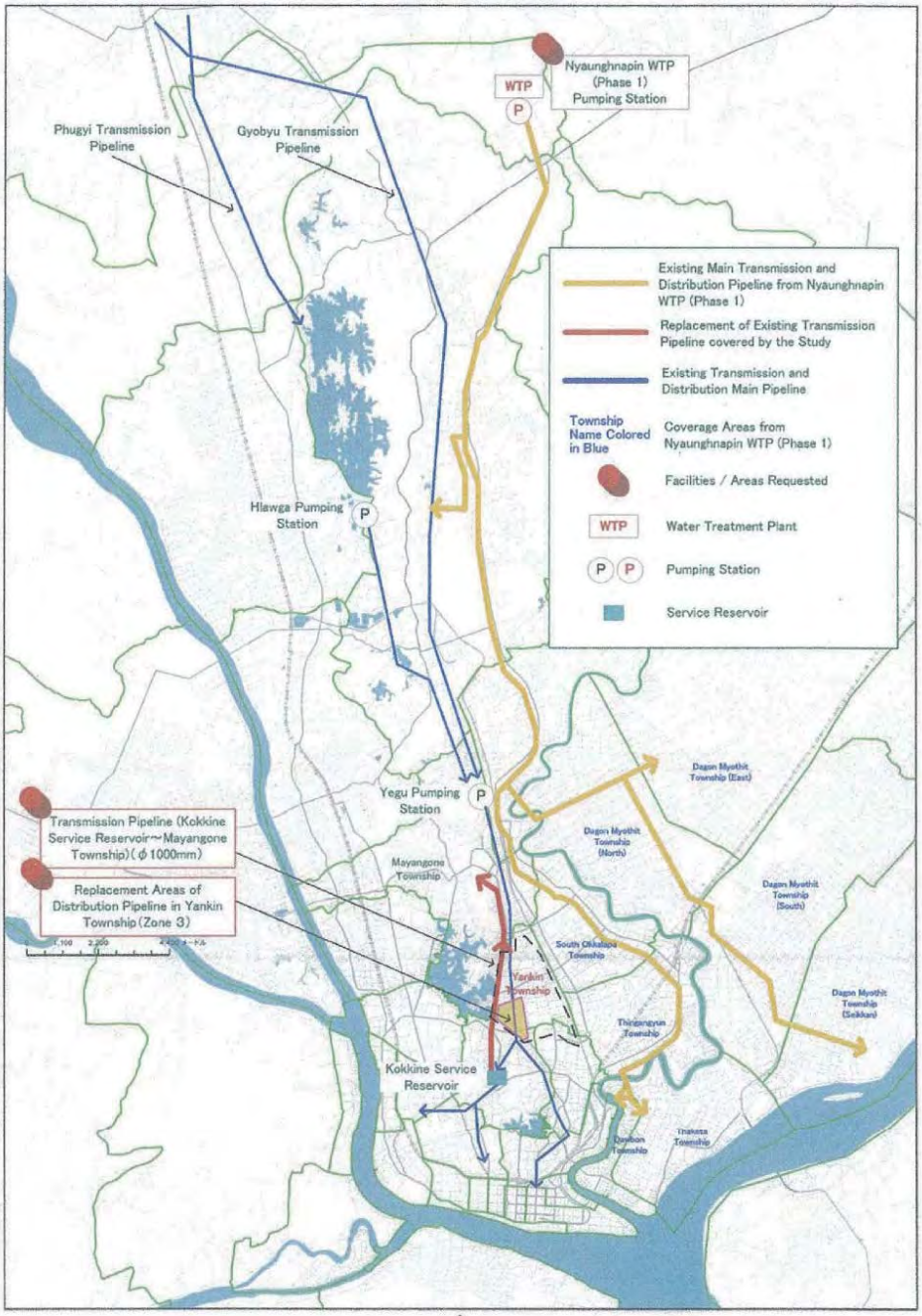
Both sides confirmed that the distribution line up to the existing sub-station in the Nyaunghnapin water treatment plant already existed and no further work by YCDC would be necessary.

Both sides confirmed that city gas supply to the Project site would not be necessary.

Annex-1	Project Sites Map
Annex-2	Components of the Project
Annex-3	Japan's Grant Aid Scheme
Annex-4	Cost borne by the Japanese and the Myanmar sides
Annex-5	Environmental Checklist
Annex-6	Monitoring Form

Annex-1: Project Sites Map




Nyaunghnapin WTP
(Phase 1)
Pumping Station
WTP
P
Phugyi Transmission
Pipeline
Gyobyu Transmission
Pipeline
Existing Main Transmission and
Distribution Pipeline from Nyaunghnapin
WTP (Phase 1)
Replacement of Existing Transmission
Pipeline covered by the Study
Existing Transmission and
Distribution Main Pipeline
Township
Name Colored
in Blue
Coverage Areas from
Nyaunghnapin WTP (Phase 1)
Facilities / Areas Requested
WTP
Water Treatment Plant
P P
Pumping Station
Service Reservoir
Hlawga Pumping
Station
P
Yegu Pumping
Station
P
Transmission Pipeline (Kokkine
Service Reservoir~Mayangone
Township)(φ1000mm)
Replacement Areas of
Distribution Pipeline in Yankin
Township(Zone 3)
Mayangone
Township
Yankin
Township
Kokkine Service
Reservoir
Dagon Myothit
Township (East)
Dagon Myothit
Township
(North)
Dagon Myothit
Township
(South)
Dagon Myothit
Township
(Seikkan)
South Okkalapa
Township
Thingangyun
Township
Dawbon
Township
Thaketa
Township

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Annex-2: Components of the Project

Component to be planned under the Project

1. Construction of the pump station for water transmission and distribution of Nyaunghnapin 1st phase water treatment plant	
(1) Construction for pump station building	- Foundation pile work - Building work - Building mechanical and electrical works such as lighting, crane, floor drain pump, etc.
(2) Renewal of pump/motor	- Manufacturing and installation work for 4 sets of pump/motor - Manufacturing and installation work for electrical facilities and wiring works - Manufacturing and installation work for ancillary pipe, valves, etc.
(3) Outdoor piping	- Manufacturing and installation work for pump suction pipe, discharge pipe, valves, water hammer protection equipment, etc.
2. Renewal of water distribution pipeline to Mayangon and Yankin Township	- Manufacturing and laying work for ductile iron pipe (outside dia.: 1050mm) and branch pipe (300mm and 200mm) for Mayangon Township - Manufacturing and laying work for pipe network in Yankin Township (400mm, 350mm, 200mm etc.), including water meter and monitoring system
3. Soft-Component for technical support	- Water distribution data management and distribution management

Annex-3: JAPAN'S GRANT AID SCHEME

The Government of Japan (hereinafter referred to as "the GOJ") is implementing the organizational reforms to improve the quality of ODA operations, and as part of this realignment, JICA was reborn on October 1, 2008. After the reborn of JICA, following the decision of the Government of Japan (hereinafter referred to as "the GOJ"), Grant Aid for General Project is extended by JICA.

Grant Aid is non-reimbursable fund to a recipient country 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 (Attachment 1)

Japanese Grant Aid is conducted as follows-

- Preparatory Survey (hereinafter referred to as "the Survey")
  - The Survey conducted by JICA
- Appraisal & Approval
  -Appraisal by the GOJ and JICA, and Approval by the Japanese Cabinet
- Determination of Implementation
  -The Notes exchanged between the GOJ and a recipient country
- Grant Agreement (hereinafter referred to as "the G/A")
  -Agreement concluded between JICA and a recipient country
- Implementation
  -Implementation of the Project on the basis of the G/A

2. Preparatory Survey

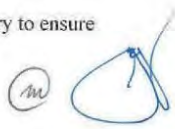
(1) Contents of the Survey

The aim of the Survey is to provide a basic document necessary for the appraisal of the Project by JICA and the GOJ. The contents of the Survey are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of agencies concerned of the recipient country necessary for the implementation of the Project.
- Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, financial, social and economic point of view.
- Confirmation of items agreed on by both parties concerning the basic concept of the Project.
- Preparation of a outline design of the Project.
- Estimation of costs of the Project.

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

JICA 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 Survey, JICA uses (a) registered consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms.

(3) Result of the Survey

The Report on the Survey is reviewed by JICA, and after the appropriateness of the Project is confirmed, JICA recommends the GOJ to appraise the implementation of the Project.

3. Japan's Grant Aid Scheme

(1) The E/N and the G/A

After the Project is approved by the Cabinet of Japan, the E/N is singed between the GOJ and the Government of the recipient country to make a plead for assistance, which is followed by the conclusion of the G/A between JICA and the Government of the recipient country to define the necessary articles to implement the Project, such as payment conditions, responsibilities of the Government of the recipient country, and procurement conditions.

(2) Selection of Consultants

The consultant firm(s) used for the Survey Will be recommended by JICA to the recipient country to also work on the Project's implementation after the E/N and the G/A, in order to maintain technical consistency.

(3) Eligible source country

Under the Japanese Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased. When JICA and the Government of the recipient country or its designated authority 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, constructing and procurement firms, and the prime consulting firm are limited to "Japanese nationals". (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

(4) 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 JICA. This "Verification" is deemed necessary to secure accountability to Japanese taxpayers.

(5) Major undertakings to be taken by 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 Attachment 2

(6) Proper Use

The Government of recipient country is required to maintain and use the facilities constructed and the 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.

(7) Export and Re-export

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

(8) 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"). JICA 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 JICA under an Authorization to Pay (A/P) issued by the Government of the recipient country or its designated authority.

(9) Authorization to Pay (A/P)

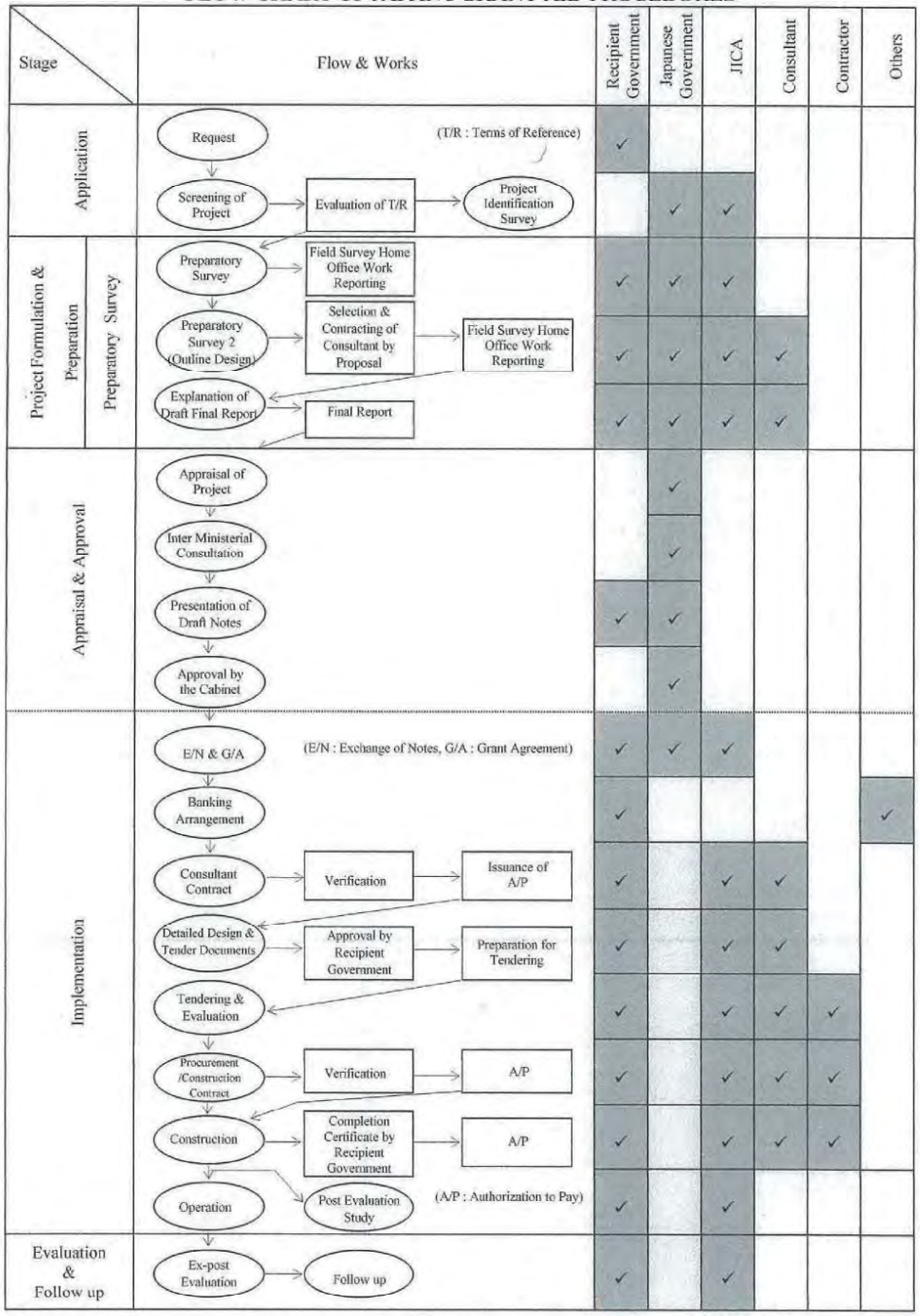
The Government of the recipient country should bear an advising commission of an Authorization to Pay and payment commissions to the Bank.

(10) Social and Environmental Considerations

A recipient country must ensure the social and environmental considerations for the Project and must follow the environmental regulation of the recipient country and JICA socio-environmental guideline.

Attachment 1 for Annex-3

FLOW CHART OF JAPAN's GRANT AID PROCEDURES



Attachment 2 for Annex-3

Major Undertakings to be taken by Each Government

NO	Items	To be covered by the Grant	To be covered by Recipient side
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 building	●	
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/or 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) within the site	●	
	4)Gas Supply		
	a.The city gas main to the site		●
	b.The gas supply system within the site	●	
	5)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	●	
	6)Furniture and Equipment		
	a.General furniture		●
	b.Project equipment	●	
8	To bear the following commissions to a bank of Japan for the banking services based upon the B/A		
	1) Advising commission of A/P		●
	2) Payment commission		●
9	To ensure prompt unloading and customs clearance at the port of disembarkation in recipient country		
	1) Marine(Air) transportation of the products from Japan to the recipient country	●	

	2) Tax exemption and customs 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 services 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 contract		•
12	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid		•
13	To bear all the expenses, other than those to be borne by the Grant Aid, 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, N/A: Not Applicable)

Annex-4: Cost borne by the Japanese and the Myanmar sides

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Annex-5: Environmental Check List

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
1 Permits and Explanation	(1) EIA and Environmental Permits	(a) Have EIA reports been already prepared in official process? (b) Have EIA reports been approved by authorities of the host country's government? (c) Have EIA reports been unconditionally approved? If conditions are imposed on the approval of EIA reports, are the conditions satisfied? (d) In addition to the above approvals, have other required environmental permits been obtained from the appropriate regulatory authorities of the host country's government?	(a) N (b) - (c) - (d) -	(a) The laws and regulations related to EIA are under preparation in Myanmar. The necessity of EIA report is not yet clear for the Project. Environmental and social considerations at IEE level was implemented in F/S stage according to JICA Guidelines. (b) - (c) - (d) -
	(2) Explanation to the Local Stakeholders	(a) Have contents of the project and the potential impacts been adequately explained to the Local stakeholders based on appropriate procedures, including information disclosure? Is understanding obtained from the Local stakeholders? (b) Have the comment from the stakeholders (such as local residents) been reflected to the project design?	(a) N (b) -	(a) The laws and regulations do not stipulate the stakeholder meeting in Myanmar. The stakeholder meeting according to JICA Guidelines will be held in July 2013.
	(3) Examination of Alternatives	(a) Have alternative plans of the project been examined with social and environmental considerations?	(a) Y	(a) For pumping station, the alternatives for reconstruction and for rehabilitation were examined. For distribution pipe with dia. 1,050 mm, the alternatives for replacement or for new installation were examined. From the environmental and social considerations, the generation of solid waste, impacts on social infrastructure (mainly for traffic disturbance) and water use were examined.
2 Pollution Control	(1) Air Quality	(a) Is there a possibility that chlorine from chlorine storage facilities and chlorine injection facilities will cause air pollution? Are any mitigating measures taken? (b) Do chlorine concentrations within the working environments comply with the country's occupational health and safety standards?	(a) N (b) -	(a) The chlorine storage facility is not included in the Project. (b) -
	(2) Water Quality	(a) Do pollutants, such as SS, BOD, COD contained in effluents discharged by the facility operations comply with the country's effluent standards?	(a) -	(a) The water treatment plant is not included in the Project.
	(3) Wastes	(a) Are wastes, such as sludge generated by the facility operations properly treated and disposed in accordance with the country's regulations?	(a) -	(a) The waste will not be generated by the operation of the project facilities.
	(4) Noise and Vibration	(a) Do noise and vibrations generated from the facilities, such as pumping stations comply with the country's standards?	(a) -	(a) The standards for noise and vibration are not yet established in Myanmar. The standards of IFC (70 dB) shall be applied till the standards will be established. The pumping station will be located within water treatment plant and 500 m away from

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
				the boundary. The noise and vibration level may not exceed the IFC standards.
	(5) Subsidence	(a) In the case of extraction of a large volume of groundwater, is there a possibility that the extraction of groundwater will cause subsidence?	(a) N	(a) The extraction of water is not included in the Project.
3 Natural Environment	(1) Protected Areas	(a) Is the project site or discharge area located in protected areas designated by the country's laws or international treaties and conventions? Is there a possibility that the project will affect the protected areas?	(a)N	(a) Protected area does not exist in the Project area.
	(2) Ecosystem	(a) Does the project site encompass primeval forests, tropical rain forests, ecologically valuable habitats (e.g., coral reefs, mangroves, or tidal flats)?(b) Does the project site or discharge area encompass the protected habitats of endangered species designated by the country's laws or international treaties and conventions?(c) If significant ecological impacts are anticipated, are adequate protection measures taken to reduce the impacts on the ecosystem?(d) Is there a possibility that the amount of water used (e.g., surface water, groundwater) by project will adversely affect aquatic environments, such as rivers? Are adequate measures taken to reduce the impacts on aquatic environments, such as aquatic organisms?	(a)N (b)N (c)- (d)N	(a) These are not included in the Project area. (b) These are not included in the Project area. (c) The project activities are construction of pumping stations in the existing water treatment plant, the installation of distribution pipes along the road, and these do not provide any impacts on ecology. (d) These are not included in the Project area.
	(3) Hydrology	(a) Is there a possibility that the amount of water used (e.g., surface water, groundwater) by the project will adversely affect surface water and groundwater flows?	(a)N	(a) It is not included in the Project.
4 Social Environment	(1) Resettlement	(a) Is involuntary resettlement caused by project implementation? If involuntary resettlement is caused, are efforts made to minimize the impacts caused by the resettlement? (b) Is adequate explanation on compensation and resettlement assistance given to affected people prior to resettlement? (c) Is the resettlement plan, including compensation with full replacement costs, restoration of livelihoods and living standards developed based on socioeconomic studies on resettlement? (d) Is the compensations going to be paid prior to the resettlement? (e) Is the compensation policies prepared in document? (f) Does the resettlement plan pay particular attention to vulnerable groups or people, including women, children, the elderly, people below the poverty line, ethnic minorities, and indigenous peoples? (g) Are agreements with the affected people obtained prior to resettlement? (h) Is the organizational framework established	(a)N (b)- (c)- (d)- (e)- (f)- (g)- (h)- (i)- (j)-	(a) The land acquisition is not required for the project and involuntary resettlement may not be occurred. The temporal land acquisition due to construction may be required but the land should be public area. (b)- (c)- (d)- (e)- (f)- (g)- (h)- (i)- (j)-

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
		to properly implement resettlement? Are the capacity and budget secured to implement the plan? (i) Are any plans developed to monitor the impacts of resettlement? (j) Is the grievance redress mechanism established?		
	(2) Living and Livelihood	(a) Is there a possibility that the project will adversely affect the living conditions of inhabitants? Are adequate measures considered to reduce the impacts, if necessary?(b) Is there a possibility that the amount of water used (e.g., surface water, groundwater) by the project will adversely affect the existing water uses and water area uses?	(a)N (b)N	(a) The Project will not adversely affect the living conditions as there is no involuntary resettlement nor land acquisition. The traffic disturbance may be expected to provide impacts on people's daily life and the mitigation measures are described in (1) Impacts during Construction of Category 5 Others. (b) Intake of water is not included in the Project.
	(3) Heritage	(a) Is there a possibility that the project will damage the local archeological, historical, cultural, and religious heritage? Are adequate measures considered to protect these sites in accordance with the country's laws?	(a)N	(a) There are four heritage buildings in Yankin Township (2 Pagodas, 2 Hindu temples) but not within the Project site.
	(4) Landscape	(a) Is there a possibility that the project will adversely affect the local landscape? Are necessary measures taken?	(a)N	(a) The distribution pipes are under the road and pumping station is inside the water treatment plant, thus there is no impact on the landscape.
	(5) Ethnic Minorities and Indigenous Peoples	(a) Are considerations given to reduce impacts on the culture and lifestyle of ethnic minorities and indigenous peoples? (b) Are all of the rights of ethnic minorities and indigenous peoples in relation to land and resources respected?	(a)- (b)-	(a) There are no ethnic minorities and indigenous peoples within the Project site and no impact is expected. (b)-
	(6) Working Conditions	(a) Is the project proponent not violating any laws and ordinances associated with the working conditions of the country which the project proponent should observe in the project? (b) Are tangible safety considerations in place for individuals involved in the project, such as the installation of safety equipment which prevents industrial accidents, and management of hazardous materials? (c) Are intangible measures being planned and implemented for individuals involved in the project, such as the establishment of a safety and health program, and safety training (including traffic safety and public health) for workers etc.? (d) Are appropriate measures taken to ensure that security guards involved in the project not to violate safety of other individuals involved, or local residents?	(a)- (b)Y (c)Y (d)Y	(a) Laws and regulations related to working conditions are not yet established. (b) The safety considerations should be prepared by the construction company which should meet the requirement of ILO standards to secure the safety of working conditions. (c) The safety training such as wearing working clothes and work shoes, use of temporally toilet, traffic safety and public health should be provided by the construction company. (d) The education such as behavior and tongue to the citizen, the action to the complaint etc. should be provided to the security guard by the construction company.

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
5 Others	(1) Impacts during Construction	(a) Are adequate measures considered to reduce impacts during construction (e.g., noise, vibrations, turbid water, dust, exhaust gases, and wastes)? (b) If construction activities adversely affect the natural environment (ecosystem), are adequate measures considered to reduce impacts? (c) If construction activities adversely affect the social environment, are adequate measures considered to reduce impacts? (d) If the construction activities might cause traffic congestion, are adequate measures considered to reduce such impacts?	(a)Y (b)N (c)N (d)Y	(a) For the noise, vibration, dust and exhaust gases, the measures such as consideration of construction time, properly maintenance of construction vehicle, idling off and installation of mufflers should be taken. The excavated soil should be disposed of at the existing landfill. (b) No impact is expected. (c) No impact is expected. (d) During construction, the traffic disturbance may be expected. The mitigation measures such as prior notice of construction, provision of proper notice at site and alternative routes should be taken in cooperation with traffic police.
	(2) Monitoring	(a) Does the proponent develop and implement monitoring program for the environmental items that are considered to have potential impacts?(b) What are the items, methods and frequencies of the monitoring program?(c) Does the proponent establish an adequate monitoring framework (organization, personnel, equipment, and adequate budget to sustain the monitoring framework)?(d) Are any regulatory requirements pertaining to the monitoring report system identified, such as the format and frequency of reports from the proponent to the regulatory authorities?	(a)Y (b)- (c)Y (d)-	(a) The monitoring system is not yet developed in Myanmar so that the proposed monitoring shall be implemented according to the JICA Guidelines. (b) No items, methods nor frequencies are stipulated. The monitoring of the complaints and actions to the complaint, noise and air quality shall be implemented. (c) The monitoring will be implemented during construction period and the responsible organization is the construction company under the supervision of YCDC. During operation period, the pipes are installed underground so that no impacts may be occurred. The pumping station is the replacement of existing one so that the existing monitoring can be applied. (d) The monitoring system is not yet developed, the report is sent to YCDC only.
6 Note	Reference to Checklist of Other Sectors	(a) Where necessary, pertinent items described in the Dam and River Projects checklist should also be checked.	(a)-	(a)-
	Note on Using Environmental Checklist	(a) If necessary, the impacts to transboundary or global issues should be confirmed (e.g., the project includes factors that may cause problems, such as transboundary waste treatment, acid rain, destruction of the ozone layer, or global warming).	(a)-	(a)-

1) Regarding the term "Country's Standards" mentioned in the above table, in the event that environmental standards in the country where the project is located diverge significantly from international standards, appropriate environmental considerations are required to be made.
In cases where local environmental regulations are yet to be established in some areas, considerations should be made based on comparisons with appropriate standards of other countries (including Japan's experience).
2) Environmental checklist provides general environmental items to be checked. It may be necessary to add or delete an item taking into account the characteristics of the project and the particular circumstances of the country and locality in which the project is located.

Annex-6: MONITORING FORM

·If environmental reviews indicate the need of monitoring by JICA, Contractor of the project undertakes monitoring for necessary items that are decided by environmental reviews. The Contractor undertakes monitoring based on regular reports including measured data submitted by the project proponent. When necessary, the project proponent should refer to the following monitoring form for submitting reports.

·When monitoring plans including monitoring items, frequencies and methods are decided, project phase or project life cycle (such as construction phase and operation phase) should be considered.

< Construction Phase>

1. Responses/Actions to Comments and Guidance from Government Authorities and the Public

Monitoring Item	Monitoring Results during Report Period
Number and contents of formal comments made by the public	
Number and contents of responses from YCDC	

2. Pollution

· Noise / Vibration

Item	Unit	Measured Value (Mean)	Measured Value (Max.)	Country's Standards	Referred International Standards	Remarks (Measurement Point, Frequency, Method, etc.)
Noise level at WTP	dB					
Noise level at Kabar Aye Pagoda Road	dB					

- Air Pollution

Item	Unit	Measured Value (Mean)	Measured Value (Max.)	Country's Standards	Referred International Standards	Remarks (Measurement Point, Frequency, Method, etc.)
NO_2	ug/m3					
SO_2	ug/m3					
TSP	ug/m3					

THE PROJECT
FOR
URGENT IMPROVEMENT OF
WATER SUPPLY SYSTEM IN YANGON CITY IN THE REPUBLIC OF THE UNION OF MYANMAR

Report on Soft Component Plan

Contents

1. Background of Soft Component

The Grant Aid Project “The Project for Urgent Improvement of Water Supply System in Yangon City in the Republic of the Union of Myanmar” targets at Yangon City in the Republic of the Union of Myanmar and contributes to improvement of water supply service by implementation of the purpose of improvement of transmission and distribution P/S in Nyaunghnapin Phase I WTP, replacement of distribution pipeline from Kokine reservoir to Mayangon Township and replacement of distribution network in pilot area of Yankin Township.

The renewal of water distribution pipeline in pilot area in Yankin Township targets small area; however, is situated as pilot project for formulation of prototype to install and renew the existing distribution network and house connection in the future. The new technologies such as establishment of DMA and monitoring system are included in the Project and it is necessary to make YCDC staff understand new technologies as appropriate items for distribution management.

1) Current Condition

Yankin Township is located near Yegu P/S which is main P/S of YCDC. Except for the area with low water pressure, water pressure and distribution water amount in Yankin Township are sufficient compared with other Township. On the other hand, the leakages by the aged distribution pipe and high water pressure are occurred frequently. The average leakage rate in the City is approximately 50%; however, the one in Yankin Township is assumed to be higher than 50%.

The installation of the existing distribution network was planned based on the land development plan. Therefore, the network analysis was not carried out and extension of new pipeline was implemented as patch work. In the case that diameter of pipe is not suitable and/or the pipe route is complicated, the water supply service is carried out in the worst condition regarding distribution network design.

Moreover, it is necessary to confirm whether chlorine that is dosed in Yegu P/S is effective or not. Especially, in this area where the number of leakages is large, the internal water pressure is lost in the time of water supply interruption and it is assumed that bacteria intrude into pipe.

2) Necessity of Soft Component

In this project, distribution facilities and DMA is constructed in the pilot area of Yankin Township and distribution system is improved. Moreover monitoring equipment to understand distribution condition such as water flow, water pressure and residual chlorine is set. It is possible to carry out the daily distribution data management by using this monitoring equipment; however, as for an effective utilization of the obtained data from this equipment, the experience in the department of water and sanitation of YCDC is insufficient.

In this situation, after construction and handover of this Project, distribution data can be obtained; however, understanding of NRW is difficult and it is likely that distribution management on patchwork basis is carried out. In this Project, staff of the department of water and sanitation in YCDC shall be trained to get knowledge regarding effective operation and maintenance to keep sustainability of the appropriate distribution management.

As above reasons, the project impact is not maximized unless management and utilization of distribution data is continuously implemented. Therefore, the technical assistance shall be carried out by soft component and it is necessary to strengthen ability regarding operation and maintenance system.

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2. Objectives of soft component

The objectives of soft component are to upgrade skills in Department of water supply and sanitation in YCDC for distribution management.

3. Output of soft component

The outputs and activities of soft component are shown below. Through this soft component, YCDC will be able to analyze distribution data which is obtained in real time by monitoring system installed, and calculate non-revenue water mount. Meanwhile the sustainability of distribution condition will be improved by construction of new water supply facilities as a hardware countermeasure. As a result of it, the adequate water distribution management can be achieved.

Output1: Hydraulic conditions of water transmission and distribution systems can be better understood.

- Analysis and utilization of distribution data

Output2: Water transmission and distribution data can be utilized in managing water distribution management and non-revenue water management.

- Using the data in water distribution management and non-revenue water management

4. Confirmation of Achievement

Table 5.1 shows confirmation method of achievement of soft component. The number of target trainees is 10 from YCDC south region sales office, Yankin Township office and pipeline management sector (east), and the technical support will be given to trainees and the goal is that all trainees pass all performance indicators.

1) Distribution management data

In the field of distribution management data, firstly, water flow, pressure and residual chlorine data collected by the installed monitoring system are checked. Moreover, it is checked if trainees understood that importance of monitoring system and operation and maintenance of its work. According to the result of tabulation, it is checked if trainees can understand the variety of daily distribution condition. The acquisition level of utilization method of distribution network model formulated by consultant and its simulation method is checked and case study which is assumed the case that installed pipe is replaced, is conducted and the result of distribution network formulation is examined.

2) Distribution management

Distribution data tabulated in the b) and the charged water amount collected daily (Metered water) is compared and it is judged if trainees can calculate non-revenue water amount. The collection method of data is also judged.

Table 5.1 Confirmation method of output of soft component

Field	Output	Confirmation items of achievement
Distribution management data	Hydraulic conditions of water transmission and distribution is understood.	Trainees can understand the importance of monitoring work on operation and maintenance. Trainees can collect, tabulate, analyze and chart the required distribution data appropriately. Trainees can understand the result of tabulation
Distribution management	Distribution data is utilized for distribution management and non-revenue water control.	Trainees can calculate non-revenue water amount by comparison between distribution data and charged water amount (Metered water).

5. Activities of soft component

Table 5.2 shows the contents of the detailed activity.

Table 5.2 Contents of the detailed activity for soft component

No.	Items	Input	
		Japanese side	No. of trainees for Myanmar side
1)	Preparation		
①	Domestic preparation (1 expert)		
D-1	Preparation of transfer of technology plans	1 man×1 day＝1 man-day	—
D-2	Test preparation, questionnaire preparation, training text (draft) Preparations	1 man×4 days＝4 man-day	—
	Passage	1 man ×1 day＝1 man-day	—
②	Implementation preparations and introductory technical briefing (1 expert)		
②-1	Training room establishment, C/P meeting, implementation preparations, briefing preparations	1 man×4 days＝4 man-day	2men×4 days＝8 man-day CE andACE
②-2	Selection of trainees (pre-test training, questionnaire, evaluation, selection)	1 man×3 days＝3 man-day	2 men×3 days＝6 man-day
②-3	Implementation briefing	1 man×1 day＝1 man-day	20 men×1 day＝20 man-day
Sub total		**14 man-day**	**34 man-day**
2)	Water distribution management data (Distribution management expert 1)		
②	Analysis and utilization of water distribution data		
①-1	Purpose of collection of distribution water data and introduction of its equipment, and explanation of normal and abnormal data (Explanation of water flow meter, water pressure gauge and residual chlorine meter (class))	1 man×2 days＝2 man-day	10 men×2 days＝20 man-day
②-2	Collection of water distribution data (Explanation of data collection method of water flow transferred to monitoring equipment and data	1 man×3 days＝3 man-day	10 men×3 days＝30 man-day

No.	Items	Input	
		Japanese side	No. of trainees for Myanmar side
	acquisition method (class and practice))		
③-3	Analysis and utilization of water distribution data (Analysis of variety of hour, day and season for water flow and water pressure collected (class and practice))	1 men×2 days＝2 man-day	10 men×2 days＝20 man-day
Sub total		**7 man-day**	**70 man-day**
3)	Water distribution management (Distribution management expert1)		
①	Using data for water distribution management and non-revenue water control (Explanation of management for water flow and water pressure based on evaluation result of distribution water and analysis of non-revenue water comparing with collected water tariff data (class and practice))	1 man×2 days＝2 man-day	10 men×2 days＝20 man-day
Sub total		**2 man-day**	**20 man-day**
4)	General report (1 expert)		
①	Technology transfer seminar		
①-1	Technology transfer seminar preparations	1 man×2 days＝2 man-day	10 men×2 days＝20 man-day
①-2	Technology transfer seminar	1 man×1 day＝1 man-day	20 men×1 day＝20 man-day
②	Preparation of reports and provision of manual		
②-1	Soft component evaluation	1 man×1 day＝1 man-day	―
②-2	Preparation and submission of general report	1 man×1 day＝1 man-day	―
Sub total		**5 man-day**	**40 man-day**
	Passage	**1 man-day**	―
Total		**29 man-day**	**164 man-day**

To ensure that the training is successful, the trainees need to have appropriate knowledge beforehand.

YCDC and Japanese consultant must select the trainees carefully. The following are the necessary conditions for selection of trainees:

① Should have experience in water distribution management
② Should be familiar with basic operations of the computer
③ Should be familiar with basic operations of basic software (MS-Excel and MS-Word)
④ Should be able to devote adequate time for training (at least 3 hours per day)
⑤ Should have interest in the training program

Since there is no training room in YCDC, it is necessary to ensure training space in the Yankin Township office or YCDC. YCDC bears travelling expense to the training place and daily allowance, if necessary.

6. Procurement method of implementation resources of soft component

In this soft component, distribution management experts (Japanese consultant) are dispatched for 1.13 months in the total and the training will be implemented by the type of direct support. The necessary qualifications of water distribution management expert to be dispatched to Myanmar are as below.

a) Has fully understood pipeline network hydraulics
b) Can establish transmission and distribution operation plan
c) Has the skills to manage training programs to Myanmar's side experts

The expert shall have language ability to communicate with Myanmar expert in addition to hydraulics knowledge and experience regarding establishment of transmission and distribution operation plan and understand the problems on operation and maintenance of transmission and distribution system in developing countries.

Moreover, as this soft component is implemented after the project work such as design in Japan, construction and construction supervision is completed, it is adequate that the experts belonging to Japanese consultant, who has the proper technology obtained through construction stage, implements the soft component. . Staff assignment plan is shown in Table 5.3.

Table 5.3 Staff Assignment Plan

Field	No. of persons	Belonging to	Description
Water distribution management experts	1	Japan	The water distribution management technology of Japan is to suit the technical level of the trainees and conditions on site. The following items are to be implemented: ・ Preparation of text for training, implementation of training ・ Preparation and evaluation of tests and homework reports ・ Provision of various formats ・ Implementation of seminars ・ Data collection, editing and modeling ・ Evaluation

7. Soft component implementing stages

The construction work of the facilities under this Project will be implemented in 15 months. The implementation of the soft component will require distribution amount and water pressure data measured in the planned facilities. Accordingly, the soft component will be implemented after facilities for which data can be collected are completed. The monitoring system can transmit distribution water flow and pressure data measured in DMA to the central monitoring station and the all staff in charge of the monitoring system are trained on the operation method of the computer system by Japanese supplier in OJT. The number of required man-days shown in the table of detailed activity plan is as given below. The implementation plan is shown in Table 5.4, while the detailed activity plan is shown in Table 5.5.

- No. of actual work days: 29 days (domestic preparations 5 days x 1 person = 5 man-days, on-site 24 days x 1 person = 24 man-days)

- Equivalent man-months: Domestic preparation time: 0.47 MM X 1 persons = 0.47MM, dispatch period: 1.13MM x 1 person=1.13 MM (24 days x (7/5) 1persons=34 man-days, 34/30=1.13MM)

Table 5.4 Implementation Plan of Soft Component

No	Activities	Japan	In Myanmar 1st month	In Myanmar 2nd month
1)	Preparations			
①	Domestic preparations			
②	Implementation preparations and introductory technical briefing			
2)	Water distribution management data			
①	Analysis and utilization of water distribution data			
3)	Water distribution management			
	Using data for water distribution management and non-revenue water control			
4)	General report			
①	Technology transfer seminar			
②	Preparation of reports and provision of manual			

Table 5.5 Detailed Activity Plan

Main items	No.	Activity / Days	Total days	Remark
1) Preparation	1)	Preparation		
	①	Domestic preparation (1 expert)		
	D-1	Preparation of transfer of technology plans	1	
	D-2	Test preparation, questionnaire preparation, training text (draft) preparations	4	
		Moving	1	
	②	Implementation preparations and introductory technical briefing (1 expert)		
	②-1	Training room establishment, C/P meeting, implementationpreparations, briefing preparations	4	
	②-2	Selection of trainees (pre-test training, questionnaire, evaluation, selection)	3	pre-test training, questionnaire
	②-3	Implementation briefing	1	Technical transfer plan report
		Sub total	14	
3) Water distribution management data	3)	Water distribution management data (Distribution management expert1)		
	①	Analysis and utilization of water distribution data		
	①-1	Introduction of purpose of collection of distribution water data and its equipment, and explanation of normal and abnormal data	2	
	①-2	Collection of water distribution data	3	
	①-3	Analysis and utilization of water distribution data	2	
		Sub total	7	
4) Water distribution management	4)	Water distribution management (Distribution management expert1)		
	①	Using data for water distribution management and non-revenue water control		
	①-1	Distribution control by using of water flow meter and pressure gauge	2	
		Sub total	2	
5) General report	5)	General report (1 expert)		
	①	Technology transfer seminar		
	①-1	Technology transfer seminar preparations	2	
	①-2	Technology transfer seminar	1	
	②	Preparation of reports and provision of manual		
	②-1	Soft component evaluation	1	
	②-2	Preparation and submission of general report	1	General report
		Sub total	5	
Moving		Moving	1	
		Total	29	

8. Outcomes

The following reports and outcomes are to be prepared and submitted:

Report & Outcomes	Description	Timing
Transfer of technology plan (in English)	Description, achievement target, detailed schedule, implementation method, etc. of soft component	At the start
Completion Report (in English with Japanese summary)	General report including description of transfer of technology, results of upgrading skills, training evaluation, transfer of technology manual and photo	At completion
Distribution data collection	Input distribution data	At completion
Manuals (in English and language of Myanmar)	Distribution data input and management manual	At completion
Others	Teaching records, outputs, training texts	At completion

9. Duties of Myanmar side

a) Feasibility

The department of water supply and sanitation in YCDC has realized the importance of operation and maintenance with utilizing of monitoring equipment in the future. Therefore, sustainability of this duty is basically secured. Moreover, this realization has been had by a chief engineer and a deputy chief engineer level; therefore, this realization is shared with staffs in South sales office, Yankin Township office and pipe management sector (east) who are the target trainees.

b) Factors causing obstacles and its countermeasures

The factor causing obstacles is reassignment of trainees. The countermeasure is to request to hold trainees in the same sector. However, in case that it is difficult to find time for additional working time due to daily duty, recommendation to YCDC is made so that trainees can be appointed as responsible persons for implementation of monitoring system operation.

c) Continual activities

In order to achieve the objectives of Soft Component, YCDC shall submit monthly distribution management report to decision maker based on the obtained contents.