

MINUTES OF DISCUSSION  
ON  
BASIC DESIGN STUDY  
FOR  
URBAN WATER SUPPLY PROJECT

In response to a request made by the Government of the Socialist Republic of the Union of Burma, the Government of Japan, through the Japan International Cooperation Agency (JICA) which is an official agency implementing the economic and technical cooperation program of the Government of Japan, has conducted a basic design study for the Urban Water Supply Project in Burma.

The Basic Design Study Team (BDST) headed by Dr. Y. Magara, Director, Department of Sanitary Engineering, the Institute of Public Health, Ministry of Health and Welfare, visited Burma from 8th September to 17th November 1984 and carried out a series of discussions, surveys and basic designs on nine towns, namely, Monywa, Pakokku, Pyawbwe, Pyinmana, Shwebo, Taungdwingyi, Thazi, Yamethin and Yenangyaung, from which a preliminary study had been carried out from 18th to

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30th June 1984 in close cooperation with the Burmese side headed by U Tin Htut, Director-General of General Affairs Department (GAD) in the Ministry of Home & Religious Affairs.

Both sides have agreed to recommend to their respective Governments and the authorities concerned to examine the results of the study attached herewith towards the realization of the Project.

GAD expressed its appreciation for the prompt implementation of the basic design on the Project by the Government of Japan, followed by the preliminary study; and BDST in return expressed its appreciation for the attention and cooperation given to it throughout its stay in Burma.

真柄恭基

(YASUMOTO MAGARA)  
Team Leader,  
Basic Design Study Team  
on Urban Water Supply Project,  
JICA.



( U TIN HTUT )  
Director-General,  
General Affairs Dept.  
Ministry of Home &  
Religious Affairs,  
Socialist Republic of  
the Union of Burma.

Dated Rangoon the 12th November 1984.

## A T T A C H M E N T S

1. The water supply project for the towns where the basic design has been carried out should be implemented within a short period in order to provide safe and clean water to the citizens as soon as possible.
2. The basic design has been carried out according to the design guidelines listed in Annex 1, which was agreed to between GAD and BDST.
3. The report of the basic design study shall include the items listed in Annex 2.
4. The draft of the basic design study report will be explained by JICA's mission in January 1985.
5. Following this, the basic design study report will be submitted to the Government of the Socialist Republic of the Union of Burma in February 1985.
6. The following of the detail design whose contents are listed in Annex 3 is a requisite for the successful implementation of the Project.
7. The Government of the Socialist Republic of the Union of Burma will upgrade the Project Implementation Committee in order to implement the Project within a limited time successfully.

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8. The Township Development Committees (TDC's) where a new water supply system is installed shall collect water charges and fees to cover not only for maintenance and operation costs but also for future extension of the systems and provision for waste water drainage facilities. The TDC's also, in collaboration with the Health authorities, conduct public campaigns on the citizens' participation in matters such as saving of water, watching of the systems and hygienic use of water for the maximum effectiveness of the cooperation between the Burmese and Japanese Governments.
9. The Burmese Government shall upgrade the educational and training levels of water supply engineers and/or technicians, both qualitatively and quantitatively, in order to promote the aims and objectives of the International Drinking Water Supply and Sanitation Decade (IDWSSD).
10. The Government of the Socialist Republic of the Union of Burma will take necessary measures listed in Annex 4 on condition that the grant aid by the Government of Japan will be extended to the Project.

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Annex 1

Guidelines for Designing of Water Supply System

1. Target Year ... 1990 Fiscal Year
2. Planned service area ... To be decided in each town.
3. Planned service population ... To be decided in each town.

Calculation formula is the following:-

$$Y = Y_0 (1+r)^X$$

Y: Population of planned year, after X years from the standard year.

Y<sub>0</sub>: Population in the standard year.

r: Average yearly increase in the standard year.

4. Planned Supply Amount

1) Planned daily average supply per capita (q<sub>1</sub>):  
15 gal. p.c.d. (70 liters) in principle.

2) Planned daily maximum supply per capita (q<sub>2</sub>):  
 $q_2 = q_1 \times K_1$  (K<sub>1</sub> : ratio of load)  
 $= q_1 \times 1.5$   
 $= 22.5$  gal. p.c.d. (105 liters)

3) Planned average supply per day (q<sub>3</sub>):  
 $q_3 = q_1 \times$  Planned service population

4) Planned daily maximum supply (q<sub>4</sub>):  
 $q_4 : q_2 \times$  Planned service population.

5. Planned amount of distribution (Q):

$$Q = K \times \frac{Q'}{24}$$

$$K: \frac{1}{\text{ratio of load}} = 1.5$$

Q': Planned maximum supply amount per day.

6. Water source: Ground water in principle.
7. Intake facility: Submersible pump in principle.
8. Transmission pipe: Cast iron pipe in principle.
9. Distribution reservoir (Underground)  
Effective volume: 2 hours of planned maximum supply amount per day.
10. Elevated Tank  
Effective volume: 30 min. of planned maximum supply amount per day.
11. Design of distribution pipe
  - 1) Calculation formula: Hazen & Williams Formula.
  - 2) Minimum dynamic pressure:  $0.4 \text{ Kg/cm}^2$
  - 3) Minimum diameter for distribution main: 75 m/m (3")
  - 4) Fire hydrant: The fire hydrant will not be set on the distribution main pipe.
  - 5) Type of distribution pipe: Cast iron pipe and/or galvanized steel pipe.
12. Water quality: According to WHO guidelines for drinking water quality.

Contents of Basic Design Study Report

1. Executive Summary
2. Background of the Project
3. General Description of the Project
4. Guidelines for designing of water supply system.
5. Detailed exposition of each town.
  - 1) Outline of the projected area.
  - 2) Planning of water system.
    - (1) Water service area
    - (2) Desired population
    - (3) Designed water demand.
    - (4) Water source.
  - 3) Water resource development plan.
    - (1) Hydrogeology
    - (2) Aquifer
    - (3) Storage and quality of ground water
    - (4) Well construction.
  - 4) Water Supply Facilities Plan.
    - (1) Wells
    - (2) Transmission
    - (3) Distribution
    - (4) Electric facilities.
6. Construction, Operation and Maintenance.
  - 1) Construction cost.
  - 2) Construction schedule.
  - 3) Implementation.
  - 4) Operation and maintenance.

7. Project and Grant Aid
  - 1) Subject of grant aid
  - 2) Basic specification and quantity of equipment and materials
    - (1) Equipment and materials for drilling
    - (2) Equipment and materials for wells
    - (3) Transformer and power transmission line
    - (4) Pipes and accessories.
  - 3) Specification and quality of grant aid.  
Equipment, materials and others.
8. Effect of the Project.
9. Problems concerning the Project.

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Contents of Detail Design

1. Survey

1-1 Ground Water Survey

Test drillings at two or three sites for each town shall be implemented to confirm the feasibility of ground water intake by wells. Following characteristics of the aquifer are requested to be verified.

- 1) Layer condition (electric and density well logging)
- 2) Yield&acirc;le.- of underground water
- 3) Water quality.

1-2 Topographic Survey.

- (1) Topographic survey by traverse and level shall be implemented to make a place (scale 1/5000) with 0.5 m of contour on plain areas or 1.0 m contour on hilly areas.
- (2) Detailed survey on the projected site(s) of ground reservoir. Scale 1:200.

1-3 Soil tests.

Standard penetration tests of the projected sites of ground reservoir and/or elevated tank.

Following items shall be decided by the test:-

- 1) Soil strength of reaction
- 2) Type of foundation.

1-4 Survey for river and railroad crossing.

2. Detail design of facilities.

1) Intake

(1) Type of well

- i. Diameter. ii. Depth of well. iii. Position of strainer. iv. Gravel wall. v. Pump.

(2) Structure of well.

2) Transmissions.

(1) Design of transmission line

(2) Structure design of crossings over river, railroad and others

(3) Protection of bend and water hammer

(4) Drawings.

3) Storage

(1) Study of type of storage tank

(2) Design criteria

- (i) load (ii) strength of materials  
(iii) soil condition

(3) Selection of foundations

(4) Analysis of structure stability

(5) Structural analysis

(6) Temporary and subsidiary construction works.

(7) Drawings

- (i) general view (ii) structural view  
(iii) bar arrangement (iv) pipe layout  
(v) others if necessary.

4) Distribution

(1) Network analysis

(2) Other designing jobs required in transmission.

- 5) Electric facilities
  - (1) Receiving plan
  - (2) Receiving facilities
  - (3) Transmission facilities
  - (4) Distribution facilities.
4. Preparation of specification for materials and equipment.
5. Accounting of materials and equipment.
6. Cost estimates
  - 1) Materials
  - 2) Equipment
  - 3) Labor
  - 4) Others.
7. Implementation plan
  - 1) Procedure of construction
  - 2) Management of construction
  - 3) Construction schedule.
8. Maintenance and Operation.
  - 1) Estimate of maintenance and operation costs
  - 2) Organization of maintenance and operation.
  - 3) Manual of maintenance and operation
    - (1) Maintenance and operation flow chart
    - (2) Record format of operation
    - (3) Record format of well operation.

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The following arrangements are requested to be undertaken by the Government of the Socialist Republic of the Union of Burma:-

1. To secure the necessary materials (i.e. cement, steel rods and so on) and acquire land for the Project.
2. To exempt from Customs duties, taxes and other levies which may be imposed on the supply for the Project.
3. To ensure prompt unloading, Customs clearance and prompt domestic transportation.
4. To provide and accord necessary permissions, licences and other authorizations required for the execution of the Project.
5. To bear all the expenses necessary for the implementation of the Project other than those to be borne by the Japanese grant aid.

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Minutes of Discussion  
on the  
Draft Final Report of the Basic Design Study  
for  
Urban Water Supply Project  
in the Socialist Republic of the Union of Burma

1. The Government of Japan has sent an Explanatory Team from the Japan International Cooperation Agency (JICA) to the Socialist Republic of the Union of Burma to present and explain the Basic Design Study Report (the Report) on the Urban Water Supply Project (the Project) from 21st February to 27th February 1985.
2. The Team held meetings with the Burmese Government officials and the Project staff to explain and discuss on the Report. As a result of the discussions, both parties have confirmed the following points:-
  - (a) The Burmese side has agreed in principle to the basic design proposed in the Report.
  - (b) The Final Report on the Project in English (10 copies) with amendments mutually agreed upon will be submitted to the Government of the Socialist Republic of the Union of Burma by the end of April 1985.
  - (c) Referring to the Attachments in the Minutes of Discussion dated 12th November 1984, particularly items 6 & 7, it is agreed that the detail design study should be carried out by the Japanese consultants and the Government of the Socialist Republic of the Union of Burma will upgrade the Project Implementation Committee in order to implement the Project within a limited time successfully.

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3. Referring to items 8, 9 & 10 in the Minutes of Discussion dated 12th November 1984, namely, the collection of water charges and fees by the Township Development Committees, the upgrading of the educational and training levels of water supply engineers and/or technicians by the Burmese Government and the bearing by the Burmese Government of all the expenses necessary for the implementation of the Project other than those borne by the Japanese grant aid, it is agreed that they are absolutely essential to the necessary implementation of the Project.

4. Referring to Annex 4 in the same Minutes of Discussion, it is also agreed that these are all major undertakings of the Burmese Government, particularly, with regard to the Burmese undertakings of its finance, the necessary funds will be made available during the construction period.

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A Note regarding technical cooperation is given below:-

Note:

The Burmese side would like to have a Technical Adviser for the Implementation of Water Supply Project and a Specialist for Water Supply Management during the time of the implementation of the Project.

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Urban Water Supply Project,  
JICA.



( U SOE MYINT )  
Director-General,  
General Affairs Department,  
Ministry of Home &  
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Socialist Republic of the  
Union of Burma.

Dated Rangoon the 26th February 1985.

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佐々木直義	調 整	国際協力事業団
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諫山末憲	施設計画	同 上
上出定幸	水理地質	同 上
田口雅幸	配管計画	同 上
末次一成	施工、積算	同 上
平本 弘	電気探査	同 上



ビルマ国側関係者リスト

U Tin Htut            Director General,  
                          General Affairs Department (GAD),  
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U Soe Myint            Deputy Director, GAD, MHRA  
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U Aung Shwe            Deputy Director, GAD, MHRA

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JICA