NO

Oromia Water Resources Bureau

Oromia National Regional State

The Federal Democratic Republic of Ethiopia

BASIC DESIGN STUDY REPORT
ON
THE PROJECT FOR RURAL WATER SUPPLY
IN OROMIA REGION
IN
THE FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA

November 2008

JAPAN INTERNATIONAL COOPERATION AGENCY

KOKUSAI KOGYO CO., LTD.

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Oromia Water Resources Bureau
Oromia National Regional State
The Federal Democratic Republic of Ethiopia

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Preface

In response to a request from the Government of the Federal Democratic Republic of Ethiopia, the Government of Japan decided to conduct a basic design study on the Project for Rural Water Supply in Oromia Region in the Federal Democratic Republic of Ethiopia and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Ethiopia a study team from February 26 to June 10, 2008.

The team held discussions with the officials concerned of the Government of Ethiopia, and conducted a field study at the study area. After the team returned to Japan, further studies were made. Then, a mission was sent to Ethiopia in order to discuss a draft basic design, and as this result, the present report was finalized.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of the Federal Democratic Republic of Ethiopia for their close cooperation extended to the teams.

Novenmber 2008

Ariyuki MATSUMOTO
Vice President
Japan International Cooperation Agency

November 2008

Letter of Transmittal

We are pleased to submit to you the basic design study report on the Project for Rural Water Supply in Oromia Region in the Federal Democratic Republic of Ethiopia.

This study was conducted by Kokusai Kogyo Co., Ltd., under a contract to JICA, during the period from February 2008 to November 2008. In conducting the study, we have examined the feasibility and rationale of the project with due consideration to the present situation of Ethiopia and formulated the most appropriate basic design for the project under Japan's Grant Aid scheme.

Finally, we hope that this report will contribute to further promotion of the project.

Very truly yours,

Hiroshi TAKASHIMA
Project manager,
Basic design study team on
The Project for Rural Water Supply in Oromia Region
in the Federal Democratic Republic of Ethiopia
Kokusai Kogyo Co., Ltd.

Summary

1. Background of the Project

The Federal Democratic Republic of Ethiopia (hereafter, “Ethiopia”) is located in the northeastern part of Africa, and covers an area of approximately 1,104,000 ㎢ (approx. 3 times the size of Japan) with a population of 79 million (World Bank, 2007). The Oromia Region, the target region, is located in the center of Ethiopia with an estimated area slightly smaller than Japan at 353,690 ㎢) and a population of 25 million people (CSA, 2004) - the largest region by area and population in Ethiopia. However, the water supply facility ratio in this region remains at 46.7% (urban 87.5%, rural 40.18%). Hence, residents have been forced to spend time to transport unsanitary water from a water source to their residence, which can take nearly a whole day. This has been the cause of economic stagnation, decline in school attendance and increasing occurrence of water borne illnesses.

In order to improve this situation, the Ethiopian government has set a target for every person in Ethiopia to have access to safe water by 2012 in accordance with the Universal Access Program (UAP) of 2005. The project objective is to supply clean water to the 90,000 people in 46 villages in three Zones, West Showa, Horo Guduru and Jima, resulting in an improved living environment for those people.

2. Result of the Study and Contents of the Project

(1) Summary of Result of the Basic Design Study

Based on the above background, Japan International Cooperation Agency (JICA) decided to send a basic design study team to Ethiopia form February 26, 2008 to June 10, 2008 and from October 4 to 11, 2008. The team conducted natural condition surveys (field survey, water quality analysis, geophysical prospecting and test boring) and social condition surveys (hearings at target village and investigation of implementing agency ability).

The summary of results of the field survey and study in Japan are as below.

(2) Summary of basic design of Japanese Assistance request (Water supply facilities)

The following is a comparison of project content between the request of OWRB and result of the Basic Design Study regarding water supply facilities

Table 1 Comparison of project request and result (Water supply facilities)

Implementation (No. of Village)				Request of OWRB				Result of Basic Design Study			
				West Showa	Horo Guduru	Jima	Total	West Showa	Horo Guduru	Jima	Total
No. of Woreda				7	6	4	17	7	6	4	17
Well	Hand Pump	-	Level-1	4	18	28	50	8	21	29	58
	Motorized Pump	(New)	Level-2	4	3	3	10	2	2	3	7
	Motorized Pump	(Rehabilitation)		0	0	1	1	0	0	0	0
	Motorized Pump	(New & Rehabilitation)		0	1	1	2	0	1	1	2
Spring	On-Spot	-	Level-1	6	0	0	6	8	1	0	9
	Gravity	-	Level-2	1	3	0	4	1	2	0	3
	Motorized Pump	-		3	2	0	5	1	2	0	3
Zonal Total				18	27	33	78	20	29	33	82

(3) Summary of basic design of Japanese Assistance request (Maintenance equipment)

The comparison of project content between the request of OWRB and result of the Basic Design Study regarding maintenance equipment is as follows. The change from the request is 17 motorbikes (1 for each of the 17 Woreda) from the original 20 motorbikes (1 for each of the 3 zones and 17 Woredas).

Table 2 Comparison of project request and result (Maintenance equipment)

Maintenance Equipment		Request of OWRB		Result of Basic Design Study	
Item	Motorbike	20	(3 Zone+17 Woreda)	17	(17 Woreda)
	Pick-up truck	3	(3 Zone)	3	(3 Zone)
	Tools for hand pump maintenance	50	(same No. of Hand Pump)	-	
	GPS	20	(3 Zone+17 Woreda)	20	(3 Zone+17 Woreda)
	Geophysical survey equipment (resistance)	3	(3 Zone)	3	(3 Zone)
	Survey equipment (total station)	3	(3 Zone)	3	(3 Zone)
	Water analysis kit (pH, TDS, Temp, EC)	20	(3 Zone+17 Woreda)	20	(3 Zone+17 Woreda)

(4) Soft component

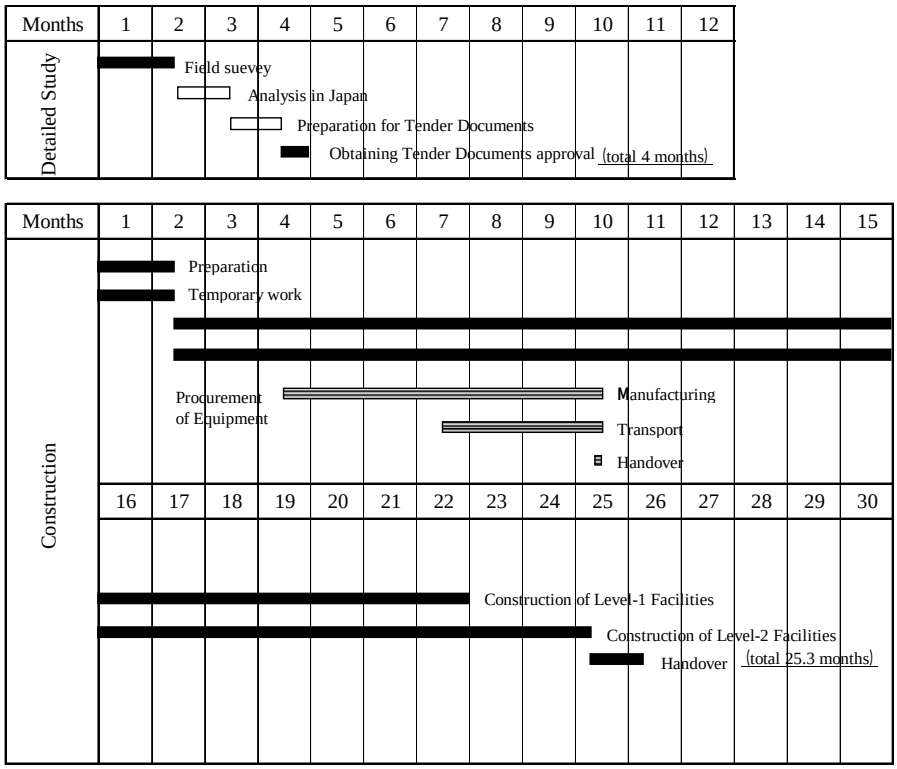
In order for the built water supply facilities to be continuously used by villagers (the beneficiaries), the “Establishment of structure for operation and maintenance” and “acquisition of operation and maintenance” are indispensable. However, the capability of villagers for operation and maintenance seems partially insufficient. Therefore, soft component activity shall be introduced to support the improvement of their capacity.

3. Implementation Schedule and Project Cost Estimation

(1) Implementation Schedule

The implementation schedule of this project is shown below.

Table 3 Implementation schedule



(2) Project Cost Estimation

This cost estimation is provisional and would be further examined by the Government of Japan for the approval of the Grant. The following cost shall be borne by the Government of Ethiopia.

Table 4 Cost borne by the Government of Ethiopia

Description	Estimated Cost (Birr)
Construction of a power line at the Galessa site	60,000
Construction of fences for facilities	772,000
Allowance costing for Soft Component work	425,000
Tax for Equipment to be procured	1,344,000
Commissions of an Authorization to Pay(A/P)	70,000

Total Amount 2,671,000 Birr (Approximately 32 million JPY)

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for the project for Rural Water Supply in Oromia Region

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Abbreviations

AfDB	African Development Bank
BoFED	Bureau of Finance and Economic Development
CSA	Ethiopian Central Static Agency
DTH	Down the Hole
EC	Electric Conductivity
EEPC	Ethiopia Electric Power Corporation
EU	European Union
EWTEC	Ethiopia Water Technology Center
GDP	Gross Domestic Product
GNI	Gross National Income
GSP	Galvanized Steel Pipe
HICE	Household, income, consumption and expenditure survey
JICA	Japan International Cooperation Agency
MDGs	Millennium Development Goals
MoFED	Ministry of Finance and Economic Development
MoWR	Ministry of Water Resources
NGO	Non Governmental Organization
O&M	Operation and Maintenance
ODA	Official Development Assistance
ONRS	Oromia National Regional State
OWRB	Oromia Water Resource Bureau
PASDEP	A Plan to Accelerate Sustained Devolopment to End Poverty
PDM	Project Design Matrix
PE	Polyethylene Pipes for Water Supply
PPP	Pubric Private Partnership
PRSP	Poverty Reduction Strategy Paper
PVC	Poly Vinyl Chloride Pipes for Water Supply
RC	Reinforced Concrete
SDPRP	Sustainable Development and Poverty Reduction Program
UAP	Universal Access Program
VES	Vertical Electrical Sounding
VWC	Village Water Committee
WASH	Water, Sanitation and Hygiene
WATSAN	Water and Sanitation

WHO	World Health Organization
WC	Water Committee
WWO	Woreda Water Office
ZWRO	Zonal Water Resource Office

Chapter 1. Background of the Project

Chapter 1. Chapter 1 Background of the Project

1-1 Background

The Oromia Region is located in the center of Ethiopia with an estimated area slightly smaller than Japan at 353,690 ㎢) and a population of 25 million people (CSA, 2004) - the largest region by area and population in Ethiopia.

However, the water supply facility ratio in this region remains at 46.7% (urban 87.5%, rural 40.18%). Hence, residents have been forced to spend time to transport unsanitary water from a water source to their residence, which can take nearly a whole day. This has been the cause of economic stagnation, decline in school attendance and increasing occurrence of water borne illnesses.

In order to improve this situation, the Ethiopian government has set a target for every person in Ethiopia to have access to safe water by 2012 in accordance with the Universal Access Program (UAP) of 2005.

The project objective is to supply clean water to the 90,000 people in 46 villages in three Zones, West Showa, Horo Guduru and Jima, resulting in an improved living environment for those people.

1-2 Natural Conditions

The target area consists of three zones, West Showa, Horo Guduru and Jima, which are adjacently located in the western part of Oromia region. The area has gradual range of hills at an elevation of 1,500m to 2,500m, and steep range of mountains at an elevation of higher than 3,000m. West Showa and the eastern part of Horo Guduru is an area of low rainfall and the midwestern part of Horo Guduru and the midwestern part of Jima is an area of high rainfall. The annual average rainfall in the area is 700mm to 1,900 mm. There is a short rainy season from March to April with relatively low precipitation, and the main rainy season from May to October.

The geological formations in the target areas are composed of five main types, Precambrian crystalline rock, Mesozoic sedimentary rock, Tertiary volcanic rock and Quaternary sedimentary rock and volcanic rock. Although the groundwater potential in the Precambrian crystalline rock is less, there are quite a few aquifers in the earth's shallow subsurface at depth range of G.L. -10 m to -50 m. Thus, it is possible to develop a hand pump borehole in the area. There is a possibility that there is an aquifer in the deep layer of the Mesozoic sedimentary rock at depth range of G.L. -80 m to -130 m. Aquifers in the Tertiary volcanic rock, Quaternary sedimentary rock and volcanic rock are commonly found as fissure water in cracks and joints in the earth's shallow subsurface.

Chapter 2. Contents of the Project

Chapter 2. Contents of the Project

2-1 Basic Concept of the Project

2-1-1 Over Goal and Project Goal

The Oromia Region, which is the target region of this Project, is located in the center of Ethiopia with an estimated area slightly smaller than Japan at 353,690km2 and a population of 25 million people (CSA 2004) – the largest region by area and population in Ethiopia.

However, the water supply facility ration in this region remains at 46.7% (urban 87.5%, rural 40.18%, 2007). Hence, residents have been forced to spend time to transport unsanitary water from a water source to their residence, which takes approximately almost day time. This has been the cause of economic stagnation, decline in school attendance and increasing occurrence of water borne illnesses.

In order to improve this situation, the Ethiopia government has set a target for every person in Ethiopia to have access to safe water by 2012 in accordance with the Universal Access Program (UAP) of 2005.

The project objective is to supply clean water to the 90,000 people (2007) in 46 villages in three Zones (West Showa, Horo Guduru and Jima) in the Oromia Region resulting in an improved living environment for those people.

2-1-2 Basic Concept of the Project

To achieve the project's principal objectives a soft component consisting of various activities will be carried out in conjunction with the construction of water supply facilities. This shall bring about not only the construction of water supply facilities in the project target area, but also strengthen the capacity of the beneficiaries, zone and region to operate and maintain the facilities.

The project endeavors to construct water supply facilities with deep wells or springs as their water source, provide maintenance and survey equipment.

The table below gives the contents of original request, followed by a summary of the Project descriptions in the Project Design Matrix (PDM).

Table 2-1 Contents of original request (Water Supply Facilities)

Name of Zones / Number of Kebeles		Well as source				Spring as source		
		Level-1	Level-2			Level-1	Level-2	
		Hand Pump	New	Existing	New & Existing	On-spot	Gravity	Pumping
West Showa	7	4	4	0	0	6	1	3
Horo Guduru	6	18	3	0	1	0	3	2
Jima	4	28	3	1	1	0	0	0
Total	17	50	10	1	2	6	4	5

Table 2-2 Contents of original request (Equipment)

Item	Q'ty		Remark (Allocation)
Motorbike	20	Unit	17 woredas & 3 zones
Pick-Up Truck	3	Unit	3 zones
Tools for hand pump maintenance	50	Set	Same as the number of hand pump
GPS	20	Unit	17 woredas & 3 zones
Geophysical survey equipment (resistance)	3	Unit	3 zones
Survey equipment (Total Station)	3	Unit	3 zones
Water Analysis Kit (pH, TDS, Temp, EC)	20	Unit	17 woredas & 3 zones

Table 2-3 Project Design Matrix (PDM)

Project title: The Project for Rural Water Supply in Oromia Region
Duration: Sep 2009～March 2012, Target area：3 zones (17 Woreda) in Oromia Region
Target group：Traget Villagers As of July 2008

Narrative Summary	Objective Verification Indicators	Means of verification	Important Assumption
Super Goal To improve the sanitary surroundings of residents in Oromia region	Reduction in waterborne disease.....A	・Statistical data of health and sanitary affairs ・Poll of residents	
Project Purpose To increase population which are stably supplied safe water in the target area	Population which get safe water .....B	・User register of Water Committee	Water sources are not dried up over the long term
Outputs 1. Water supply facilities are constructed in the target area	1-1. Rate of development of water supply facilities.....C 1-2. Decrease of time for drawing water..D	1-1. Ledger of facilities 1-2. Poll of residents	Rapid population increase and migration do not occur
2. Operation and maintenance system is established, and water supply facilities are operated and managed by residents	2-1. Activities of Water Committee ..... E 2-2. Rate of collection water charge .....F 2-3. Rate of use of water supply facilitiesG	2-1. Activities records of Water Committee 2-2. Book of collection of water charge 2-3. Operation record of facilities register of user	
3. Improving service and training skills for operation and maintenance by OWRB, ZWRO and WWO	3-1. Number of times of visiting sites by implementing and related organizations ...H 3-2. Satisfaction rating to service by implementing and related organizations…I	3-1. Activities records of Water Committee implementing and related organizations 3-2. Poll of residents	

Activities	Input	
<u>Japanese side</u> 1-1. Construction of hand pumps with boreholes 1-2. Construction of water supply facilities including motorized pumps with boreholes 1-3. Construction of on-spot water supply facilities at spring 1-4. Construction of water supply facilities with motorized pumps at spring 2-1. Operation and maintenance system by residents is established 2-2. Training residents operation and maintenance skills 3-1. Training of operation and maintenance skills to implementing and related organizations 3-2. Establishment of repairing system and supply system of spare parts by implementing and related organizations <u>Ethiopian side</u> 1-1. Explanation of the project for residents 1-2. Acquisition of water rights and land at facility construction sites 1-3. Construction and maintenance of access roads by residents, and implementing and related organizations 1-4. Implementation of tax exemption on procurement materials and equipment 2-1. Support for establishment of Water Committee 2-2. Training of Water committee hygiene education 2-3. Monitoring and support for water Committee	（Japanese side） ・ Construction of water supply facilities ・ Procurement of equipment ・ Soft component ・ Consultant service （Ethiopian side） ・ Securement of budget and counter part staff members ・ Acquisition of water rights and land of facilities ・ Construction and maintenance of access road ・ Construction of fences around facilities ・ Construction of drainages and embankments at water sources ・ Securement of space for procurement equipment ・ Implementation of tax exemption	Unforseen drought and groundwater recession do not occur Acquisition of water rights and land of facilities Excessive cost escalation do not occur

2-2 Basic Design of the Requested Japanese Assistance

2-2-1 Design Policy

2-2-1-1 Basic Policy

(1) Design of target village

Target villages shall be selected amongst those villages that made a request that meets the criteria for the following facilities which refers to 2-2-2 Basic Plan.

1) Hand pump well and on-spot spring facilities (Level-1)
2) Motorized well and spring, gravity spring facilities (Level-2)

(2) Completion year of the project

Completion year of the Project is set to 2011. And the target year of the Project is set to 2016.

(3) Water supply population

The population of those receiving water supply in the each target village shall be estimated 101,000 persons for 2016 based on the Oromia Water Resource Bureau (hereinafter, OWRB) rate of increase of 2.3% per year for 90,000 persons for 2007.

(4) Basic water supply quantity

A basic water supply quantity of 15 liters/capita/day shall be applied in accordance with a standard of UAP and the actual water demand.

(5) Well drilling success ratio

The success ratio of the wells was calculated using the drilling results from three zones (West Showa, Horo Guduru and Jima) containing data for 77 wells as follows,

Table 2-4 Drilling results and success ratio

Zone	No. of Drilling wells	Successful wells	Unsuccessful wells	Success Ratio (%)
West Showa	27	23	4	85.2
Horo Guduru	30	25	5	83.3
Jima	20	11	9	55.0
Total	77	59	18	-

(6) Alternative villages

Alternative villages will be selected from a list submitted by OWRB on July 2, 2008. These villages are to be prioritized on the list.

(7) Road accessibility of alternative villages, hydrogeological survey and geophysical survey

The final selection of alternative villages is carried out in accordance with the results of the Detailed Design investigations outlined below.

1) Road accessibility survey

Accessibility of drilling machines and maintenance trucks between main road and well point and/or village.

2) Hydrogeological survey

If it is deemed that a location has a low possibility for ground water development, the location shall be eliminated from the list of alternative villages.

3) Geophysical survey

Electrical prospecting will be carried out according to positions selected through the road accessibility survey and hydrogeological survey.

(8) Population per hand pump well facility and on-spot spring water facility (Level-1)

The population of each water facility shall be adopted based on the village data confirmed with OWRB during the JICA preliminary study in 2007.

The standard population of each alternative village shall be given consideration according the following respective priorities, in this order:

1) Decision of OWRB, following discussion
2) A water supply facility to be adopted for all communities in a village
3) The scale and spread of the village
4) Adopts the OWRB standard of 200~300 persons/facility

(9) Population per motorized pump facility (Level-2)

The population of each water facility shall be based on the data confirmed with OWRB during the JICA preliminary study in 2007.

Some villages proposed the installation of water faucets at public buildings (e.g. schools, churches, clinics). The facility design (e.g. capacity of the reservoir tank, length of distribution pipelines) will be considered for extension of the water supply network by the Ethiopian side in the future within the following limits:

1) Village community and ORWB (included ZWRO, WWO) have requested the JICA basic design study team to adopt water faucets at the above public buildings.

2) There is solvency of operation and maintenance cost by villagers in accordance with the result of the socio-economic survey of the Basic Design survey.

(10) Selection of village for hand pump well facility (Level-1)

The Selection of village for hand pump well facility (Level-1) which are requested by OWRB are to be decided based on the following criteria which was confirmed at the inception meeting in February 2008 between JICA Basic Design Study Team and OWRB.

1) Planning of the other projects by the other donor in the target area

Since OWRB is distributing similar projects in the target area as a result of confirmation between JICA Basic Design Study Team and OWRB, there is no duplication of the project by the other donors in the target area.

2) Accessibility survey

Access is an important criterion in the selection of villages because this determines whether or not drilling or construction machines can enter a site. Hence, an accessibility survey is to be carried out by the Basic Design Study. Villages that are deemed inaccessible will be eliminated.

3) Hydro-geological survey

If it is deemed that a location has a low possibility for ground water development based on geological and topographical maps, and the results of existing drilling data, the site shall be eliminated.

4) Geophysical survey

Regarding sites that the above-mentioned surveys have cleared, and which are to be investigated for underground water basin, lineament etc. by geographical feature decipherment. Sites will be selected after geophysical surveys have been carried out on promising sites for groundwater

5) Water quality analysis

Water quality analysis will be conducted, at the time of drilling, on successful wells which obtained a certain amount (12 litres per minute). Water quality standards shall follow that of the

Ethiopia Standard. However, for items which affect human health, WHO guidelines will be followed.

(11) Selection of villages for on-spot spring facility (Level-1)

Villages for on-spot spring facility (Level-1) which were requested by OWRB are to be selected based on the water quantity tests during the field surveys by the Basic design study, when water quantity of springs is lowest in the latter part of the dry season; and also based on the following criteria, which was confirmed at the inception meeting in February 2008 between JICA Basic Design Study Team and OWRB:

1) Overlapping projects by other donors in the target area

It has been confirmed by consulting with OWRB, which allocates similar projects in the target area, that there is no duplication of projects by other donors in the target area.

2) Water quality analysis

Water quality test were conducted during the Basic Design Study. Water quality standards shall follow that of the Ethiopia Standard. However, for items which affect human health, WHO guidelines will be followed.

(12) Selection of villages for motorized pump well facility (Level-2)

The Selection of villages for motorized pump well facilities (Level-2) which were requested by OWRB are to be decided based on the following criteria which was confirmed at the inception meeting in February 2008 between JICA Basic Design Study Team and OWRB.

1) Overlapping projects by other donors in the target area

It has been confirmed by consulting with OWRB, which allocates similar projects in the target area, that there is no duplication of projects by other donors in the target area.

2) Accessibility survey

Access is an important criterion in the selection of villages because this determines whether or not drilling or construction machines can enter a site. Hence, an accessibility survey is to be carried out by the Basic Design Study. Villages that are deemed inaccessible will be eliminated.

3) Hydro-geological survey

If it is deemed that a location has a low possibility for ground water development based on

geological and topographical maps, and the results of existing drilling data, the site shall be eliminated. About the sites that the above-mentioned surveys cleared, which are to be investigated for underground water basin, lineament etc. by geographical feature decipherment. Sites will be selected after geophysical surveys have been carried out on promising sites for groundwater

4) Geophysical survey

Regarding sites that the above-mentioned surveys have cleared, and which are to be investigated for underground water basin, lineament etc. by geographical feature decipherment. Sites will be selected after geophysical surveys have been carried out on promising sites for groundwater

5) Test Drilling and Yield test

After the drilling point has been decided, a drilling and a yield test shall be conducted by the Basic Design Study. The volume of water found is one of the judgment conditions in site selection. In cases where the trial drilling does not find the required volume of water, the scheme shall be eliminated form the motorized pump well facility (Level-2) and either designated as the hand pump well facility (Level-1) or shifted to an alternative village.

6) Water quality analysis

Water quality test were conducted during the Basic Design Study. Water quality standards shall follow that of the Ethiopia Standard. However, for items which affect human health, WHO guidelines will be followed.

7) Socio-Economic survey (Cost of operation and maintenance)

Cost of operation and maintenance for the motorized pump well facilities (Level-2) are higher than for the hand pump well facilities (Level-1). Some facilities have stopped being used by beneficiaries in developing countries due to lack of funds to cover the cost of operation and maintenance. In order to utilize the facilities sustainably, a socio-economic survey will be undertaken to determine how much the residents will be able to pay as a water fee. In the event the amount is lower than cost of operation and maintenance, the scheme shall be changed to the hand pump well facility (Level-1) or shifted to alternative village.

(13) Selection of villages for motorized and gravity spring facility (Level-2)

The Selection of villages for motorized and gravity spring facilities (Level-2) which were requested by OWRB are to be decided based on the following criteria which was confirmed at the

inception meeting in February 2008 between JICA Basic Design Study Team and OWRB.

1) Overlapping projects by other donors in the target area

It has been confirmed by consulting with OWRB, which allocates similar projects in the target area, that there is no duplication of projects by other donors in the target area.

2) Accessibility survey

Access is an important criterion in the selection of villages because this determines whether or not drilling or construction machines can enter a site. Hence, an accessibility survey is to be carried out by the Basic Design Study. Villages that are deemed inaccessible will be eliminated.

3) Yield test

Yield test of the spring source shall be conducted by the Basic Design Study. The volume of water found at the spring source is one of the judgment conditions in site selection. In cases where the spring source does not comply with the required volume of water, the scheme shall be eliminated form the motorized and gravity spring facility (Level-2) and either designated as an on-spot spring facility (Level-1) or shifted to an alternative village.

4) Water quality analysis

Water quality tests were conducted on the Basic Design Study. Water quality standards shall follow that of the Ethiopia Standard. However, for items which affect human health, WHO guidelines will be followed.

5) Socio-Economic survey (Cost of operation and maintenance)

Cost of operation and maintenance for the motorized pump well facilities (Level-2) are higher than for the hand pump well facilities (Level-1). Some facilities have stopped being used by beneficiaries in developing countries due to lack of funds to cover the cost of operation and maintenance. In order to utilize the facilities sustainably, a socio-economic survey will be undertaken to determine how much the residents will be able to pay as a water fee. In the event the amount is lower than cost of operation and maintenance, the scheme shall be changed to the on-spot spring facility (Level-1) or shifted to alternative village.

(14) Selection of scheme for hand pump well facility (Level-1)

Water source of this facility is deep well, and water is pumped up with a hand pump and supplies water from there to a direct bucket or a polyethylene tank. To ensure the facility is

hygienic and easy to use, the area around the hand pump will have a platform and drain made from concrete.

(15) Selection of scheme for on-spot spring facility (Level-1)

Water source of this facility is a spring coming from the ground slope face. To avoid water pollution caused by muddy rainwater and livestock excreta, the area around the spring water source is sealed in by an intake facility which is built with reinforcement concrete slabs and a stone masonry wall. Spring water is collected and conveyed by the intake and pipes to a ground reservoir tank with faucets, which is built in a similar fashion to that of the intake.

Collection and conveyance of spring water is not motorized, but is constantly fed by gravity.

(16) Selection of scheme for motorized pump and gravity facility (Level-2)

Water source of these facilities are deep wells or springs originating from the ground slope face. Water is conveyed by transmission pipe line thorough a reservoir tank and then goes through distribution pipe lines up to the public faucet (Water Points).

Collection (Rising) and conveyance of water is to be carried out by gravity or by a generator powered pump (commercial electricity will only be used at special sites).

2-2-1-2 Policy of Natural Conditions

(1) Condition of climate

The period from June to October in the Project area is the rainy season, and the road conditions are muddy. Therefore, a plan of the implementation schedule and construction method of this Project shall consider the circumstances of the rainy season.

(2) Hydro geological and geophysical conditions

The project area has stratum conditions such as Tertiary Volcanic rock, which is relatively well consolidated, and Mesozoic sedimentary rocks. Wells can be drilled using the down-the-hole hammer method (DTH method). However, since there are also many disintegrated rocks, the mud circulation rotary method for well drilling is also required in this area. Hence, these drilling methods will be used properly according to the geological conditions.

In addition, the model of Hand pump used will be either Afridev or India Extra Deep, according to the groundwater level.

2-2-1-3 Policy of Social Conditions

A sense of ownership should be cultivated among villagers, as well as how to maintain sanitary

conditions in order to utilize the facility as a sustainable water source. Activities to educate the villagers along these lines will be carried out as part of the soft component (i.e. Technical Assistance).

2-2-1-4 Policy of Construction Conditions

(1) Procurement

There are small shops in the zone capitals which sell some smaller items. However, selection and quality are limited. As a result, this project plans to procure material and equipment from Addis Ababa, the capital of Ethiopia.

(2) Obtaining relevant approval from authorities

The Ethiopia side agrees to obtain the necessary permission and rights from the relevant authorities for facility construction so as not to interfere with the project.

(3) Work force

An investigation and survey of local contractors in Ethiopia will be conducted and, accordingly, the work force (labor force) in connection with the general works of the drilling and construction will be Ethiopian.

However, the Japanese contractor may employ engineers from a third country, if the contractor so requires.

2-2-1-5 Policy of utilization of local contractor

There are local drilling and construction companies which are recognized to be of high grade in terms of their engineering capacity and which are able to execute general drilling and construction works. Nevertheless, these companies are unable to carry out the controls needed for quality, schedule and safety assurance. On the other hand, if capable Japanese contractors that meet these standards were to conduct the drilling and construction work the cost would rise to an unmanageable level. Therefore, in order to maintain appropriate cost, a policy is set to use local contractors where Japanese contractors will take responsibility to oversee the well drilling and construction work.

2-2-1-6 Policy of Operation and Maintenance

(1) Village level

Some target villages already have a Village Water Committee (hereinafter, VWC); however, many of them are no longer functional for various reasons including broken down facilities and

such. During the implementation stage, initiating the soft component activities will help to strengthen such components as restructuring the organization, and improving methods for water fee collection and control.

(2) Related Agencies (ZWRO, WWO)

Currently, related agencies (ZWRO, WWO) are not carrying out services to villages and O&M for existing facilities sufficiently due to budgetary, personnel, and equipment restrictions.

2-2-1-7 Policy of Facility Design

The villagers shall take responsibility for maintenance of the facilities as much as possible. Equipment and spare parts deemed to be available from the distributer shall be adopted.

However, it is feasible that a practical approach be taken towards new material and construction methods (e.g. concrete structures, PVC and PE pipe), based on discussion with OWRB to reduce operation and maintenance needs as well as environmental impact.

2-2-1-8 Policy of Construction Method and Schedule

(1) Method of well drilling

The mud circulation rotary method and the down-the-hole hammer (DTH) methods will be adopted; both commonly used in Ethiopia. Therefore, geographical conditions will be considered when selecting a particular method for a project site.

(2) Schedule

The civil pipeline works become the main work (critical path) of the General schedule of this project. Therefore, special attention will be paid to ability of the contractor and amount of equipment available in order to set an economical duration of the project.

2-2-2 Basic Plan

2-2-2-1 Scheme selection of motorized pump facilities (Level-2)

(1) Item of selection

1) Overlapping projects by other donors in the target area

It has been confirmed by consulting with OWRB, which allocates similar projects in the target area, that there is no duplication of projects by other donors in the target area.

2) Yield test

Yield test of deep well and spring water sources shall be conducted by pumping test for deep well, by amount measurement test for spring as set out in the Basic Design Study. The required water volume and result of yield tests are as follows:

Table 2-5 Required water volume (Well and Spring)

	Zone	Woreda	ID No.	Village	Planed water supply population (2007)	Planed water supply population (2016)	Doestic use (m3/day)	Public use (m3/day)	Daily water consumption (m3/day)		Inffective water volume (fc: 0.15) (m3/day)		Average daily supply (m3/day)		**Maximum daily supply (fc: 1.2) (m3/day)**	
									Doestic use	Domestic and public use	Doestic use	Domestic and public use	Doestic use	Domestic and public use	**Doestic use**	Domestic and public use
					①	②=①x (1+2.3%)[9]	③=②x 0.015MCD	④=Public use	⑤=③	⑥=③+④	⑦=⑤x 15%	⑧=⑥x 15%	⑨=⑤+⑦	⑩=⑥+⑧	**⑪=⑨x 120%**	⑫=⑩x 120%
1	West Showa	Dandi	S-13	Galessa	1,111	1,363	20.4	1.3	20.4	21.7	3.1	3.3	23.5	25.0	**28.2**	30.0
2		Ambo	S-16	Goromti	2,500	3,068	46.0	3.5	46.0	49.5	6.9	7.4	52.9	56.9	**63.5**	68.3
3		Ejere	S-11	Gorba	1,684	2,066	31.0	3.1	31.0	34.1	4.7	5.1	35.7	39.2	**42.8**	47.1
4		Toke Kutaye	S-03	Kolba	1,144	1,404	21.1	1.3	21.1	22.4	3.2	3.4	24.3	25.8	**29.1**	30.9
5	Horo Guduru	Hababo Guduru	H-15	Dadu	3,306	4,057	60.9	21.1	60.9	82.0	9.1	12.3	70.0	94.3	**84.0**	113.2
6		Jardega Jarte	H-13	Jardega	1,653	2,028	30.4	24.8	30.4	55.2	4.6	8.3	35.0	63.5	**42.0**	76.2
7		Abay Chomen	H-10	Mazoria Achane	2,975	3,651	54.8	15.3	54.8	70.1	8.2	10.5	63.0	80.6	**75.6**	96.7
8		Jardega Jarte	H-02A	Wayami	2,384	2,925	43.9	0.0	43.9	43.9	6.6	6.6	50.5	50.5	**60.6**	60.6
9		Jardega Jarte	H-06	Akayu	1,983	2,433	36.5	0.0	36.5	36.5	5.5	5.5	42.0	42.0	**50.4**	50.4
10		Jima Ganat	H-04	Gembo	1,983	2,433	36.5	0.0	36.5	36.5	5.5	5.5	42.0	42.0	**50.4**	50.4
11		Jima Ganat	H-23	Hagaya	1,653	2,028	30.4	8.7	30.4	39.1	4.6	5.9	35.0	45.0	**42.0**	54.0
12	Jima	Dedo	J-21	Bilu Harsu	2,310	2,835	42.5	7.1	42.5	49.6	6.4	7.4	48.9	57.0	**58.7**	68.4
13		Sokoru	J-07	Deneba	8,767	10,758	161.4	12.5	161.4	173.9	24.2	26.1	185.6	200.0	**222.7**	240.0
14		Omo Nada	J-14	Asendabo Yadi	4,200	5,154	77.3	58.7	77.3	136.0	11.6	20.4	88.9	156.4	**106.7**	187.7
15		Omo Nada	J-15	Bonaya	2,000	2,454	36.8	14.7	36.8	51.5	5.5	7.7	42.3	59.2	**50.8**	71.1
合計					39,653	48,657	729.9		729.9		109.49		839.39		**1,007.3**	

Note : **Rate of population increase 2.3%**
: **Bore hole Spring**

Table 2-6 Result of Yield tests (Well and Spring)

	Zone	Woreda	ID No.	Vilaage	Coordinats (UTM)		Well depth	Static water level	Dynamic water level	Discharge	Remarks
					E	N	(m)	(GL-m)	(GL-m)	(L/min.)	
1	West Showa	Dano	S-08	Ayeru	312,731	974,452	118.4	5.6	29.0	300.0	Alternative village due to water quality test
2		Jibat	S-17	Guyu Aere	-	-	-	-	-	-	Alternative village due to inaccessible road
3		Dandi	S-13	Galessa	406,322	1,009,708	151.8	53.4	71.5	240.0	Success
4		Ambo	S-16	Goromti	377,558	984,015	150.0	80.9	111.8	420.0	Success
5		Ejere	S-11	Gorba	423,972	1,017,391	-	-	-	94.2	Success
6		Dano	S-01	Kalacha Jibat	315,401	968,890	-	-	-	13.8	Alternative village due to unsatisfaction discharge
7		Toke Kutaye	S-03	Kolba	358,118	997,813	-	-	-	63.6	Success
8		Jaldu	S-19	Boni Jawi	414,183	1,017,836	-	-	-	17.4	Alternative village due to unsatisfaction discharge
9	Horo Guduru	Hababo Guduru	H-15	Dadu	338,577	1,070,865	52.8	6.4	20.9	450.0	Success
10		Jardega Jarte	H-13	Jardega	283,543	1,085,178	150.0	82.2	94.8	720.0	Success
11		Abay Chomen	H-10	Mazoria Achane	315,367	1,068,328	170.0	115.5	135.6	360.0	Success
12		Hababo Guduru	H-05	Chala Foka	330,530	1,100,600	170.0	-	-	-	Alternative village due to no groundwater
13		Jardega Jarte	H-02A	Wayami	320,518	1,024,066	-	-	-	43.2	Success
14		Jardega Jarte	H-06	Akayu	293,153	1,091,478	-	-	-	25.2	Success
15		Jima Ganat	H-04	Gembo	298,270	1,030,073	-	-	-	31.2	Success
16		Abe Dongoro	H-17	Dalachoo	256,443	1,057,216	-	-	-	20.4	Alternative village due to unsatisfaction discharge
17		Jima Ganat	H-23	Hagaya	300,316	1,025,074	-	-	-	66.0	Success
18	Jima	Dedo	J-21	Bilu Harsu	285,062	827,478	70.0	3.5	20.4	300.0	Success
19		Sokoru	J-07	Deneba	320,274	867,688	37.0	13.7	21.2	324.0	Success
20		Omo Nada	J-14	Asendabo Yadi	302,303	858,962	90.0	40	50	240.0	Presumption by drilling work
21		Omo Nada	J-15	Bonaya	285,616	834,258	100.3	6.7	38.6	870.0	Success
22		Sokoru	J-04	Natri	335,869	901,701	55.0	6.9	15.2	46.8	Alternative village due to unsatisfaction discharge

Note : Bore Hole Spring

3) Criteria and results of water quality analysis

The criteria and results of water quality analysis are shown below. The water quality analysis was entrusted to the laboratory in Addis Ababa and was completed.

As a result of the water analysis, the water source of S-08 Ayeru (West Showa) is judged to have poor water quality (not drinkable), and the well failed for the following reasons.

- Fluorite : 8.6 mg/L is higher than the Ethiopian Standard (3.0 mg/L)
- TDS : 2,168 mg/L is higher than the Ethiopian Standard (1,776 mg/L)
- Nitrate (Na) : 760.0 mg/L is higher than the Ethiopian Standard (358 mg/L)
- EC : 3,320 mS/cm is over the permissible range.

The water source of S-16 Goromti (West Showa) has a value (1.5mg/L) of fluoride which exceeds the WHO guideline, but it is below the Ethiopian Standard (2.58 mg/L). Therefore, it is judged drinkable water (successful well).

The water source of S-03 Kolba and S-22 Dagale Garita has a value of Hardness 630.0 mg/L and 657.3 mg/L which are higher than the Ethiopian Standard, but those water sources have actually been drunk by residents from ancient times and it also does not cause any health impairment. Therefore, those water sources are also judged as drinkable spring water.

Table 2-7 Standard of water quality for this project

Name of Constituent	Symbol	Ethiopian Standard		WHO Guideline		Remarks
		Allowable	Upper Limit	Allowable	Acceptable	
Boron	B	0.3 mg/L	-	0.5 mg/ℓ	-	
Chromium	Cr	0.003 mg/L	-	0.05 mg/ℓ	-	
Copper	Cu	5 mg/L	-	2 mg/L	1 mg/L	
Fluoride	F	3.0 mg/L	-	1.5 mg/L	-	
Manganese	Mn	0.8 mg/L	-	0.4 mg/L	0.1 mg/L	
Nitrate	NO3	50 mg/L	-	50 mg/L	-	
Nitrite	No2	6 mg/L	-	3 mg/L (0.2 mg/L)	-	
Aluminum	Al	-	0.4 mg/L	-	0.2 mg/L	
Ammonia	Nh3	-	2 mg/L	-	1.5 mg/L	
Chloride	Cl	-	533 mg/L	-	250 mg/L	
Total Hardness	-	-	392 mg/L	-	-	
Total Iron	Fe	-	0.4 mg/L	-	0.3 mg/L	
pH	pH	-	6.5-8.5	-	-	
Sodium	Na	-	358 mg/L	-	200 mg/L	
Potassium	K	-	-	-	-	
Sulfate	SO4	-	483 mg/L	-	250 mg/L	
TDS	TDS	-	1776 mg/L	-	1000 mg/L	
Calcium	Ca	-	-	-	-	for reference
Magnesium	Mg	-	-	-	-	
Hydrogen sulfide	-	-	0.07mg/L	-	-	
Alkalinity	-	-	-	-	-	for reference
Escherichia coli	-	Not Objectionable	-	0	-	
Color	-	-	22 TCU	-	15 TCU	
Smell	-	-	Not Objectionable	-	-	
Taste	-	-	Not Objectionable	-	-	
Turbidity	NTU	-	7 NTU	-	5 NTU	
Temperature	T	-	-	-	-	for reference
Ele.Conductivity	EC	-	-	-	-	for reference

Table 2-8 Result of Water quality analysis

Village ID.No	Site name	Source of sample	Date of collection	Temperature	Total Dissolved Solid	Electric Conductivity	pH	Ammonia	Sodium	Potassium	Total Hardness	Calcium	Magnesium	Total Iron	Manganese	Fluoride	Chloride	Nitrite	Nitrate	Sulphate	Boron	Aluminum	Chromium	Copper	Color	Turbidity	Bacteria
				T	TDS	EC	pH	NH3	Na	K	Hardness	Ca	Mg	Fe	Mn	F	Cl	NO2	NO3	SO4	B	Al	Cr	Cu	Color	Turbidity	Bacteria
Test Method				Instrument	Gravimetric	Instrumental	Instrumental	Nessler	Flame Photometer	Flame Photometer	Complex Metric Titration	Titration	Titration	Ferrover	Periodate Oxidation	Spadns	Argentio metric Titration	Diazotization	Cadmium Reduction	Sulfaver 4	Carmine method	Direct air-acetylene flame method	Direct air-acetylene flame method	Direct air-acetylene flame method	Platinum-cobalt standard	Absorptometric	Coliform Detection Sheets *
Unit				^{o}C	mg/l	µS/cm	-	mg/l	mg/l	mg/l	mg CaCO3/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	ppm	ppm	ppm	ppm	-	NTU	-
Ethiopian Standard				-	1776	-	6.5-8.5	2	358	-	392	-	-	0.4	0.8	3	533	6	50	483	0.3	0.4	0.003	5	-	7	Not detected
WHO Guideline				-	1000	-	-	1.5	200	-	-	-	-	0.3	0.4	1.5	250	3	50	250	0.5	0.2	0.05	2	-	5	0
S-01	Kalacha Jibat	Spring	2008/4/14	22.7	26	38	6.02	0.09	2.8	0.4	12.6	3.36	1.02	0.07	0.02	0.40	5.96	0.01	0.48	0.76	0.13	<0.1	<0.1	<0.1	Colorless	1	++
S-03	Kolba	Spring	2008/4/20	25.0	762	1,160	6.93	1.33	36.0	1.8	630.0	181.40	42.8	Trace	0.07	0.73	16.88	0.13	4.19	171.84	<0.15	<0.1	<0.1	<0.1	Colorless	Trace	+
S-07	Kilbe	Spring	2008/4/15	16.6	102	170	6.90	0.21	5.0	2.0	75.6	21.00	5.61	0.07	Trace	Trace	6.95	Trace	10.41	0.38	<0.15	<0.1	<0.1	<0.1	Colorless	1	-
S-11	Gorba	Spring	2008/4/16	20.0	148	237	7.89	0.17	9.8	1.3	105.0	32.76	5.61	0.16	0.02	0.47	7.94	0.06	10.13	1.33	<0.15	<0.1	<0.1	<0.1	Colorless	4	+++
S-19	Bonj Jawi	Spring	2008/4/15	19.0	132	214	7.08	0.08	4.5	1.8	94.5	26.88	6.63	0.04	Trace	0.15	11.90	Trace	25.93	0.48	0.17	<0.1	<0.1	<0.1	Colorless	Trace	-
S-21	Dobi	Spring	2008/3/21	28.1	240	382	7.03	0.11	19.5	2.1	170.1	51.24	10.2	0.04	Trace	0.54	9.93	0.00	0.44	3.05	<0.15	<0.1	<0.1	<0.1	Colorless	4	+++
S-22	Dagale Gatira 2	Spring	2008/3/19	23.5	784	1,148	7.30	0.14	21.5	2.7	657.3	193.20	42.3	0.03	Trace	0.50	14.90	0.63	9.47	318.44	<0.15	<0.1	<0.1	<0.1	Colorless	Trace	++
S-23	Dagale Gatira 1	Spring	2008/3/19	21.1	232	366	7.22	0.19	17.0	2.9	165.9	47.00	11.7	0.03	Trace	0.35	9.93	Trace	0.53	7.04	0.23	<0.1	<0.1	<0.1	Colorless	3	+++
S-25	Meti	Spring	2008/3/20	20.4	278	419	8.20	0.16	18.0	2.1	210.0	57.12	16.3	0.05	Trace	0.62	5.96	0.01	0.52	0.76	<0.15	<0.1	<0.1	<0.1	Colorless	4	+
S-26A	Komborcha	Spring	2008/3/22	22.1	162	256	6.49	0.17	7.9	2.2	117.6	33.60	8.16	0.07	Trace	0.48	9.93	0.01	1.44	0.57	<0.15	<0.1	<0.1	<0.1	Colorless	22	++
H-02A	Sego	Spring	2008/4/5	19.8	30	48	6.22	0.11	1.2	0.4	21.0	5.04	2.04	0.05	Trace	Trace	5.93	0.01	5.82	0.29	<0.15	<0.1	<0.1	<0.1	Colorless	1	++
H-04	Gembo	Spring	2008/4/4	19.7	202	325	7.39	0.15	8.7	2.1	163.8	42.84	13.77	0.08	Trace	0.20	4.97	0.11	1.49	0.57	<0.15	<0.1	<0.1	<0.1	Colorless	5	-
H-06	Akayu	Spring	2008/4/2	19.7	22	32	5.71	0.07	0.6	0.4	12.6	2.52	1.53	0.03	Trace	0.22	3.97	0.01	2.78	0.29	<0.15	<0.1	<0.1	<0.1	Colorless	Trace	-
H-17	Dalachoo	Spring	2008/4/10	24.1	68	98	6.31	0.39	6.3	1.5	35.7	9.24	3.06	0.04	Trace	0.49	5.96	0.02	2.78	0.67	<0.15	<0.1	<0.1	<0.1	Colorless	8	+
H-23	Hagaya	Spring	2008/3/4	19.8	196	304	7.59	0.17	7.1	2.0	149.1	36.10	14.28	0.03	Trace	0.55	5.96	0.01	10.63	0.19	<0.15	<0.1	<0.1	<0.1	Colorless	Trace	+
S-08	Ayeru	Well	2008/4/22	27.0	2,168	3,320	7.33	0.42	760.0	18.0	172.2	45.26	14.28	0.19	Trace	8.60	150.90	0.02	0.12	266.08	<0.15	<0.1	<0.1	<0.1	Colorless	6	+
S-13	Galessa	Well	2008/4/18	18.1	156	237	7.82	0.06	7.7	2.0	111.3	34.44	6.12	Trace	0.05	0.20	6.95	0.01	2.14	Trace	<0.15	<0.1	<0.1	<0.1	Colorless	1	+
S-16	Goromiti	Well	2008/5/27	16.1	212	326	7.24	0.29	33.5	9.7	84.0	22.68	6.63	0.03	Trace	2.58	7.94	0.40	11.30	2.09	0.28	<0.1	<0.1	<0.1	Colorless	Trace	+
J-04	Natri	Well	2008/5/8	22.7	210	321	7.39	0.04	10.7	5.1	153.3	42.80	11.22	0.12	Trace	0.80	5.00	0.01	1.39	0.29	0.04	<0.1	<0.1	<0.1	Colorless	7	++
J-07	Deneba	Well	2008/4/23	23.3	246	374	7.60	0.12	14.0	5.2	180.6	55.40	10.2	0.47	Trace	0.66	5.96	0.63	0.90	0.19	<0.15	<0.1	<0.1	<0.1	Colorless	4	+
J-14	Asendabo yadi	Well	2008/5/21	-	268	409	7.62	0.13	40.5	8.4	132.3	35.28	10.71	0.07	0.05	0.90	5.96	Trace	0.20	0.29	0.04	<0.1	<0.1	<0.1	Colorless	Trace	-
J-15	Bonaya	Well	2008/5/8	23.3	182	274	7.37	0.05	11.9	3.3	123.9	33.60	9.69	0.11	0.08	Trace	7.00	0.01	0.89	0.29	0.04	<0.1	<0.1	<0.1	Colorless	35	+
J-21	Bilu Harso	Well	2008/4/28	22.7	176	265	7.20	0.06	11.7	3.1	119.7	33.60	8.67	0.29	0.10	Trace	3.97	0.01	0.10	1.05	0.04	<0.1	<0.1	<0.1	Colorless	13	+
H-10	Mazoria Achane	Well	2008/4/24	20.0	64	100	6.50	0.08	1.9	3.4	46.2	10.92	4.59	0.01	Trace	0.04	6.95	0.04	0.28	0.38	<0.15	<0.1	<0.1	<0.1	Colorless	3	++
H-13	Jardega	Well	2008/5/20	19.5	150	229	7.75	1.13	9.9	5.0	102.9	25.20	9.69	0.09	Trace	0.22	4.97	Trace	0.11	1.05	0.18	<0.1	<0.1	<0.1	Colorless	Trace	++
H-15	Dadu	Well	2008/4/19	21.6	206	310	7.23	0.14	12.4	3.7	138.6	33.60	13.26	0.23	0.07	0.59	7.90	0.13	0.19	5.52	<0.15	<0.1	<0.1	<0.1	Colorless	3	+

Exceeding Ethiopian Standard Exceeding WHO Guideline * Bacteria= +: Below 10 Counts, ++: Above 10 Below 20 Counts, +++: Above 10 Counts

4) Amount villagers are willing to pay

In the existing water facilities, there are methods of roughly dividing costs (1) pay water fee to VWV for each Polyethylene tank (20Litre tank) at water faucet and (2) payment of a monthly water fee to VWC by registered villagers. Furthermore, the field investigation found that a water fee is not collected where there is no motorized pump system or from a traditional water source. However, the salaries of the water supply staff who manage the water faucets is collected by villagers.

Water fees of the existing water supply facilities are as follows:

Table 2-9 Water fee for the existing water supply facility

Zone	Village ID	Woreda	Village Kebele	Scheme Level	Water Source	Existing Water Facility	Water Fee
West showa	S-08	Dano	Ayeru	2	Well	Hand pump	0.05/20ℓ
	S-07	Jeldu	Kilbe	1	Spring	Hand pump	for repair
	S-24	Ambo	Gosu Qura	1	Well	Hand pump	for repair
Horo Guduru	H-15	Hababo Guduru	Dadu	2	Well	Motorized Pump	0.20/20ℓ 8.00/ m3
	H-10	Abay Chomen	Gutena Beguru	2	Well	Spring	0.20/20ℓ
	H-4	Jima Ganat	Gembo	2	Spring	Spring	0.50/20ℓ
	H-18	Abe Dongoro	Tulu Gelan	2	Well	Motorized Pump	0.50/20ℓ
Jima	J-07	Sokoru	Deneba	2	Well	Motorized Pump	0.10/20ℓ 3.00/month
	J-14	Omonada	Asendabo	2	Well	Motorized Pump	0.15/20ℓ 0.25/30ℓ 10.00/m3
	J-15	Omonada	Bonaya	2	Well	Motorized Pump	0.20/20ℓ
	J-01	Omonada	Ale	1	Well	Motorized Pump	0.25/20ℓ
	J-04	Sokoru	Natri	2	Well	Motorized Pump	0.20/20ℓ

Note: Result of interview with VWC

As a result of asking the leaders of target villages and communities about the amount of payment to the water supply facility completed by the project, found that in many cases that communities were willing to pay a higher amount for water supply than villages. Many villages in both Level-1 and Level-2 villages wish to pay monthly. Moreover, the most villages wished to pay 0.25 birr per Polyethylene tank (20 L), and wish to pay less than 1.50~5.00 birr in monthly payments. Amount communities and target villages are willing to pay is as follows:

Table 2-10 Amount communities are willing to pay

pay per polyethylene tank（per 20ℓ）			monthly payment		
Amount	Number of communities		Amount	Number of communities	
Birr	Level-1	Level-2	Birr	Level-1	Level-2
0.10	4	-	1.50～5.00	24	16
0.20	2	2	5.00～10.00	5	5
0.25	6	3	10.00～15.00	4	3
-	-	-	15.00～	2	-
Total	9	5	Total	35	24
Ratio	21%	17%	Ratio	79%	83%

Table 2-11 Amount target villages are willing to pay (Level-2)

Zone	village ID	Woreda	Village Kebele	Requested form of payment	Poly-Tank (20L)	Monthly
West Showa	S-08	Dano	Ayeru	Monthly	0.20	3.00
	S-17	Jibat	Guyu Aere	Monthly	0.25	7.50
	S-13	Dendi	Galessa	Monthly	0.10	3.00
	S-16	Ambo	Goromti	Monthly	0.50	3.00
	S-11	Ejere	Gorba	Monthly	0.10	3.00
	S-01	Dano	Kelcha Jibat	Monthly	0.10	3.00
	S-03	Toke Kutaye	Kolba	Monthly	0.10	1.00
	S-19	Jeldu	Boni Jawi	Monthly	0.50	1.00
Horo Guduru	H-15	Hababo Guduru	Dadu	Monthly	0.50	5.00
	H-13	Jardega Jarte	Jardega	Monthly	0.20	6.00
	H-10	Abay Chomen	Gutena Meguru	Monthly	0.30	6.00
	H-05	Hababo Guduru	Chala foka	Monthly	0.10	2.00
	H-02A	Jardega Jarte	Sego	Monthly	0.10	2.00
	H-06	Jardega Jarte	Akayu	Monthly	0.50	2.00
	H-04	Jima Ganat	Gembo	Monthly	0.24	4.00
	H-23	Jima Ganat	Hagaya	Monthly	0.50	3.00
	H-17	Abe Dongoro	Dalachoo	20 L Tank or Monthly	0.20	3.00
Jima	J-21	Dado	Bilu Harsu	Monthly	-	10.00
	J-07	Sokoru	Deneba	20 L Tank	0.25	-
	J-14	Omonada	Asendabo	20 L Tank or Monthly	0.25	5.00
	J-15	Omonada	Bonaya	Monthly	0.25	-
	J-04	Sokoru	Natri	Monthly	0.20	6.00

5) Payable water fee by villagers

The amount villagers are able to pay as a water fee was calculated based on 5% of the annual income of 80% of households in the village. In addition, international organizations, such as the World Bank, calculate expenses concerning water supplies in developing countries as less than 3% to about 7% of household incomes.

◆ Income survey

➢ Survey method

There is a complete count survey (complete enumeration), which tries to get to know the

whole parent population's appearance, and a sampling survey, which aims at the group who is the target of the income survey. Income survey of this Basic Design Study was conducted using the sampling survey method.

- Extraction method of samples

Extraction methods of samples are the random sampling method and the purposive selection method. Since the purposive selection method is an investigation which limits the candidate for extraction using a surveyor's intention and experience etc., it is deficient in objectivity. Therefore, since random sampling is objective, this method was adopted in main enumeration.

- Result of income survey

An income survey was conducted in order to assertain the target villager's household budget restraints and a proper water supply unit price (payable water fee). In Ethiopia, CSA carried out the household budget survey (Household income, consumption and expenditure survey: hereinafter, HICE) for 9,564 households in 2004-2005, and data of the household consumption expenditure open to the public.

According to HICA 2004-2005, the average of the annual expenditure per household in the Oromia region is 8,943 birr.

It is thought that there is generally little savings in a developing country, and it can consider that expenditure is almost the same as disposable income. Therefore, it can be considered that the average annual earnings per family of the Oromia region are 8,943 birr.

The result of the socio economical survey, the average of the total annual-earnings per family came to 8,236 birr, was similar to the above-mentioned HICA 2004-2005 survey. Therefore, an annual average income figure of 8,236 birr was adopted.

Since the maxim, the minimum, and the median were not announced in the HICE2004-2005 survey, it could not be compared in detail, but the frequency distribution chart which expresses general income distribution as follows was obtained.

Table 2-12 Income distribution charts of the target villages

Number of sample	209
annual maximum income (Birr/household)	80,000
Annual minimum income (Birr/household)	300
Annual average income (Birr/household)	8,236
Median of total annual income (Birr/household)	4,300

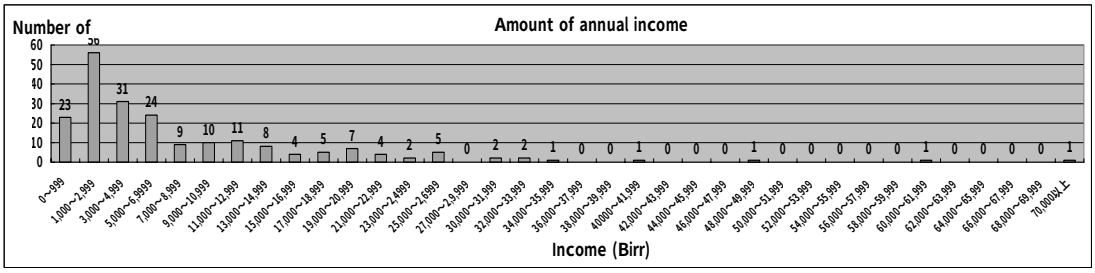


Figure 2-1 Annual total income of household in the target village

Moreover, as a result of analyzing the logarithm of a household income, log normal distribution was seen. Therefore, we decided to consider that the Basic Design Study data is effective as income data, and to adopt it as a presumed base of a water fee (playable water fee by villagers)

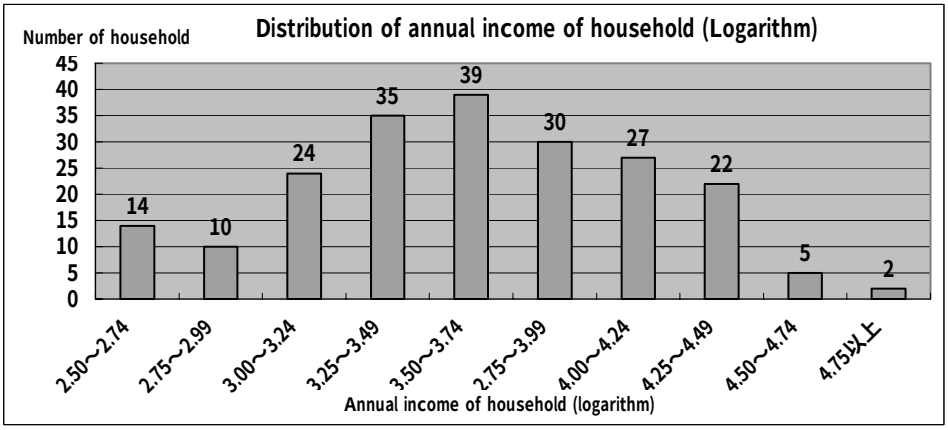


Figure 2-2 Frequency distribution of annual total income per household (Logarithm)

- Population and number of households of target villages

Welfare Monitoring (WM2004-2005) was carried out by CSA for 12,160 households in the investigation. The whole Oromia region has a population of about 25,600,000 (estimated), and the rural part, which includes the target zones, has a population of about 23,000,000 (estimated).

The average number of household members in Ethiopia has decreased from 5 persons to 4.82 persons compared with 1995-1996 when WM investigation began. However, according to the WM 2004-2005 investigation, the average number of household members of the whole Oromia region has most number at 5.2 persons. Therefore, the average number of household members of the Basic Design Study is set to 5 persons according to the result of WM 2004-2005 investigation.

6) Water consumption by villagers

The daily water consumption by villagers is as follows,

Table 2-13 Daily water consumption by villagers (Level-2)

Daily water consumption				Number of times for drawing water per day
(Liter/household/day)		(Liter/person/day)		
Dry Season	Rain Season	Dry Season	Rain Season	Annual average
86.3 L	58.5 L	11.8 L	7.7 L	3.4

It is presumed that the present villagers' water amounts of consumption are numbers less than the actual villager's required water amounts since the existing water sources are restricted. Hence, 15 liters/capita/day is an appropriate basic water supply quantity.

7) Cost for operation and maintenance

◆ Selection of facility type

In principle, there are three methods to supply power for motorized pumps, a) Commercial electric line, b) Engine Generators, c) Solar panels. The characteristics of each are shown as below,

Table 2-14 Comparison table of power generation

	Commercial Electric Line	Engine Generator	Solar Panel power system
Merit	• Electric fee is cheap	• Stable power supply • Stable voltage	• Low operation and maintenance cost • Not discharge CO2
Demerit	• Necessary initial investment to install cable, etc • There are many power failures • Unstable voltage	• Necessary fuel • A running cost is high to buy fuel • Necessary to maintain consumption parts • Spare parts are necessary to repair	• Generation is restricted to daytime • The production of electricity is influenced by the amount of isolation • Initial cost is high • Solar module life is as short as 10-15 years • Solar module is few production of electricity as about 60W per piece • Unsuitable for operating high head pumps • Expertise is required for repair • Distribution of spare parts is not established

The high-output motorized pump is needed in the water supply facility which performs pumping with motorized pump among the water supply schemes of this project for the reason the groundwater level is low or the vertical interval of ground level is high.

Electric power suitable for such motorized pump systems is commercial electric power and/or engine generator. However, since the commercial electric power is supplied by water-powered plant generation, according to the season, it's a production of electricity is unstable, and seasons with water shortages had many power failures for long periods. Therefore, although from a perspective of controlling maintenance commercial electric power is very effective, as it cannot supply stable power to water facilities, in this project engine generator pumping systems will be used except for some target villages.

In order that motorized pumps at S-13 Galessa can keep the water fee to a price which villagers can afford, engine generators shall be installed as a standby power supply when the commercial electric power fails.

Solar panel power system is very effective for reduction of the operation cost, environmental impact, CO2, etc. However, this system is not adopted for this project for the reasons of power shortage and the service network for repair at the time of trouble, out of order, etc. are not ready.

◆ Facility planning

Attentions was payed to the following points when facilities planning was carried out:

- In order to hold down cost of operation and maintenance to a minimum, water supply facilities will not use the largest possible scale of power, like the following examples.
  ① Booster pump system is not used
  ② Measurements of the amount of water supply and of water level in reservoir tank are performed visually using a flow meter. Electric measurement devices will not be used.
- Complicated water supply systems and high technology equipment are used as little as possible so that villegers can carry out the operation and maintenance. The following are examples:
  ① Transmission and distribution pipe lines will not use a network system.
  ② Measurements of the amount of water supply and of water level in reservoir tank are performed visually using a flow meter. Electric measurement devices will not be used
  ③ Engine generators and motorized pumps have been adopted in line with the model which has spread in Ethiopia.
  ④ In order to make the generator house operator-friendly, there will be no partition walls installed.

- In order to suppress initial investment (construction costs), the plan included the use of as much local materials and construction methods as possible. Specifically, pipes, valves, steel material and concrete material which can be supplied in local markets as much as possible.
- A plan of adopting products able to be procured at local markets, such as a polyethylene water tank. Faucet, is considered to hold down initial investment expenses,

The facilities planning for each scheme is shown below.

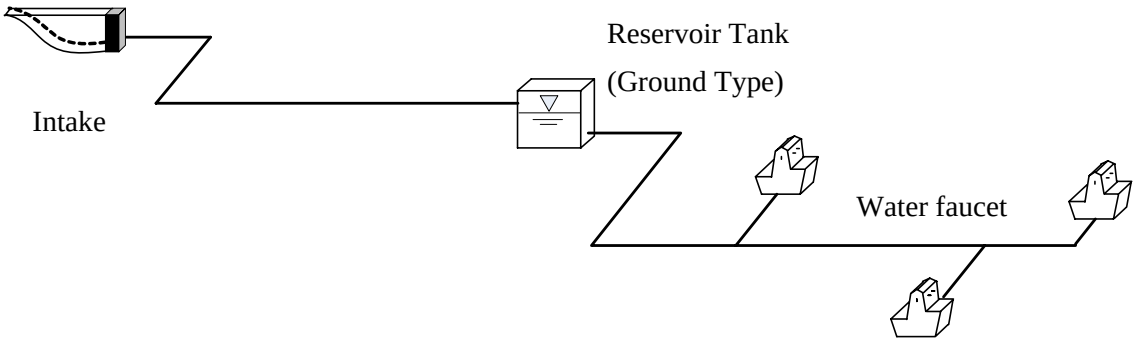


Figure 2-3 Concept of water supply facility (Spring source, gravity)

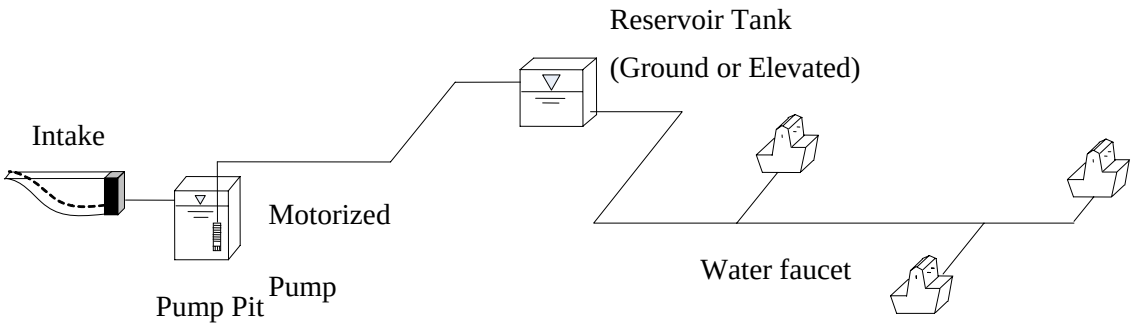


Figure 2-4 Concept of water supply facility (Spring source, motorized pump)

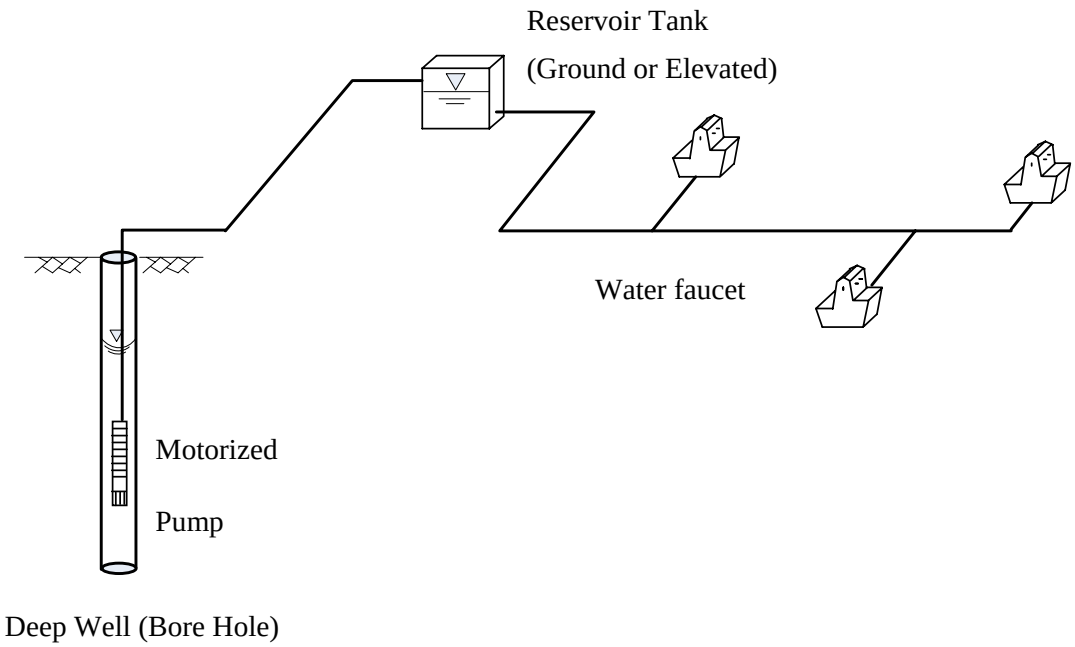


Figure 2-5 Concept of water supply facility (Well source, motorized pump)

◆ Cost of operation and maintenance

Cost of operation and maintenance of level-2 facilities whose calculation was made with the unit price in 2007 is as follows. In calculating of the cost of operation and maintenance, the following indispensable items for operation and maintenance of facility were added up.

① Repairing machines (generator, pump, etc.) ..... 5% of equipment (savings)
② Fixtures for facility ..... 100% of fixture cost (savings)
③ Fuel ..... 100% of fuel cost
④ Personnel expense for maintenance ..... ea. facility
⑤ Personnel expense for water fee collection ..... ea. public faucet
⑥ Sundry expenses ..... Communication, Office cost

Table 2-15 Monthly cost of operation and maintenance Level-2 (2007)

Village ID	Woreda	Village Kebele	Cost (Birr)
S-13	Dandi	Galessa	7,286
S-16	Ambo	Goromti	13,643
S-11	Ejere	Gorba	8,315
S-03	Toke Kutaye	Kolba	380
H-15	Hababo Guduru	Dadu	12,133
H-13	Jardega Jarte	Jardega	18,783
H-10	Abay Chomen	Mazoria Achane	29,560
H-02A	Jardega Jarte	Sego	8,549
H-06	Jardega Jarte	Akayu	8,097
H-04	Jima Ganat	Gembo	945
H-23	Jima Ganat	Hagaya	1,425
J-21	Dedo	Bilu Harsu	11,557
J-07	Sokoru	Deneba	23,948
J-14	Omo Nada	Asendabo Yadi	32,280
J-15	Omo Nada	Bonaya	14,129

8) Conclusion

Examination and analysis of operation and maintenance aspects verified the feasibility in the target villages which succeeding at the yield test and water quality analysis.

However, concerning S-13 Galessa, it is possible to maintain and operate this facility on the condition that OWRB installs and supplies commercial electric lines to the pump control house for motorized pump within this project schedule.

(2) Selection results

A summary of selection results are shown in table and the diagram.

Table 2-16 Result of the selected village (Level-2)

No.		Zone	Woreda	ID No.	Village	Water source	Discharge	Water quality	Ability of O&M	Water supply facility Level-1、2		Type of intake		Result	Measure	Remarks
Requested	Changed						(l/min.)			Requested	Changed	Requested	Changed			
1	-	West Showa	Dano	S-08	Ayeru	BH	300.0	Exclusive	Success	2 →	1	Motorized pump	Hand pump	Exclusive	alternative	due to water quality
2	-		Jibat	S-17	Guyu Aere	BH	-	-	-	2 →	1	Motorized pump	Hand pump	Exclusive	alternative	inaccessible
3	1		Dandi	S-13	Galessa	BH	240.0	Success	provisionally	2 →	2	Motorized pump	Motorized pump	-	-	use power line
4	2		Ambo	S-16	Goromti	BH	420.0	Success	Success	2 →	2	Motorized pump	Motorized pump	-	-	
5	3		Ejere	S-11	Gorba	Spring	94.2	Success	Success	2 →	2	Motorized pump	Motorized pump	-	-	
6	-		Dano	S-01	Kalacha Jibat	Spring	13.8	Success	-	2 →	1	Motorized pump	On spot	-	Changing scheme	unsatisfactory discharge
7	4		Toke Kutaye	S-03	Kolba	Spring	63.6	Success	Success	2 →	2	Gravity	Gravity	-	-	
8	-		Jaldu	S-19	Boni Jawi	Spring	17.4	Success	-	2 →	1	Motorized pump	On spot	-	Changing scheme	unsatisfactory discharge
9	5	Horo Guduru	Hababo Guduru	H-15	Dadu	BH	450.0	Success	Success	2 →	2	Motorized pump	Motorized pump	-	-	
10	6		Jardega Jarte	H-13	Jardega	BH	720.0	Success	Success	2 →	2	Motorized pump	Motorized pump	-	-	
11	7		Abay Chomen	H-10	Gutena Beguru	BH	360.0	Success	Success	2 →	2	Motorized pump	Motorized pump	-	-	
12	-		Hababo Guduru	H-05	Chala Foka	BH	-	-	-	2 →	1	Motorized pump	Hand pump	Exclusive	alternative	no groundwater
13	8		Jima Rare	H-02A	Sego	Spring	43.2	Success	Success	2 →	2	Gravity	Gravity	-	-	
14	9		Jardega Jarte	H-06	Akayu	Spring	25.2	Success	Success	2 →	2	Motorized pump	Motorized pump	-	-	
15	10		Jima Ganat	H-04	Gembo	Spring	31.2	Success	Success	2 →	2	Gravity	Gravity	-	-	
16	-		Abe Dongoro	H-17	Dalachoo	Spring	20.4	Success	-	2 →	1	Motorized pump	On spot	-	Changing scheme	unsatisfactory discharge
17	11		Jima Ganat	H-23	Hagaya	Spring	66.0	Success	Success	2 →	2	Gravity	Gravity	-	-	
18	12	Jima	Dedo	J-21	Bilu Harsu	BH	300.0	Success	Success	2 →	2	Motorized pump	Motorized pump	-	-	
19	13		Sokoru	J-07	Deneba	BH	324.0	Success	Success	2 →	2	Motorized pump	Motorized pump	-	-	
20	14		Omo Nada	J-14	Asendabo Yadi	BH	240.0	Success	Success	2 →	2	Motorized pump	Motorized pump	-	-	
21	15		Omo Nada	J-15	Bonaya	BH	870.0	Success	Success	2 →	2	Motorized pump	Motorized pump	-	-	
22	-		Sokoru	J-04	Natri	BH	46.8	Success	-	2 →	1	Motorized pump	Hand pump	Exclusive	alternative	unsatisfactory discharge

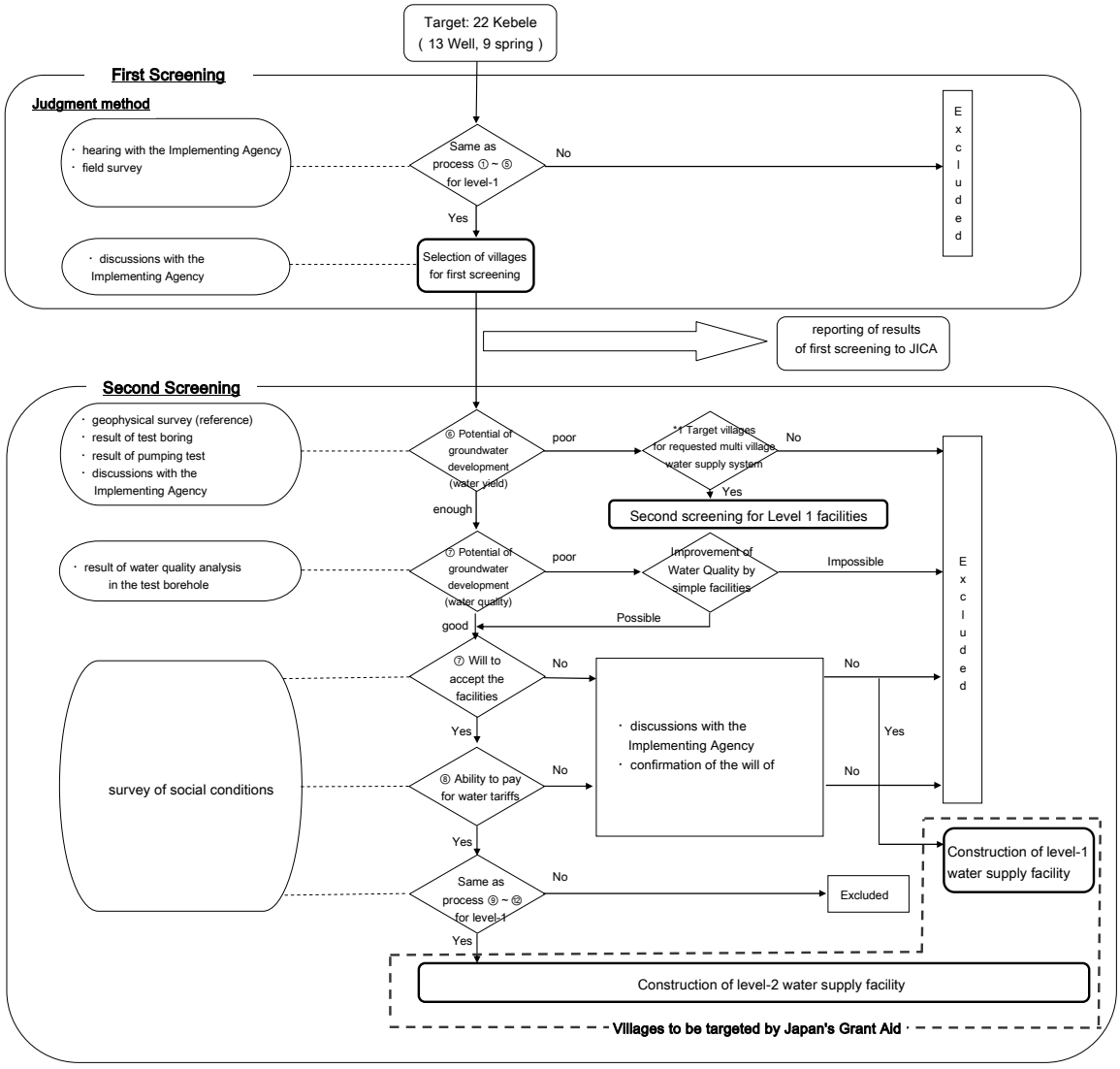


Figure 2-6 Selection results of Level-2 facilities

2-2-2-2 Scheme selection of hand pump well and on-spot spring facilities (Level-1)

(1) Item of selection

1) Overlapping projects by other donors in the target area

It has been confirmed by consulting with OWRB, which allocates similar projects in the target area, that there is no duplication of projects by other donors in the target area.

2) Yield test

The results of yield test are as follow.

Table 2-17 Result of yield test (Leve-1 Spring)

	Zone	Woreda	ID No.	Village	Coordinates (UTM)		Discharge	Remarks
					E	N	(L/min.)	
1	West Showa	Dano	S-01	Kalacha Jibat	315401	968890	13.8	Changing to on spot facility
2		Jaldu	S-19	Boni Jawi	414183	1017836	17.4	Changing to on spot facility
3		Ambo	S-07	Kilbe	401724	1025178	300.0	
4		Ambo	S-21	Dobi	369735	1000032	7.5	
5		Toke Kutaye	S-23	Degale Garita 1	379608	999741	45.0	
6		Toke Kutaye	S-25	Meti (Boke)	347244	992883	4.4	
7		Toke Kutaye	S-26A	Toke Kombolcha	341034	990034	24.4	
8		Ambo	S-22	Degale Garita 2	376585	997480	105.0	
9	Horo Guduru	Abe Dongoro	H-17	Dalachoo	256443	1057216	20.4	Changing to on spot facility

3) Criteria of water quality analysis

Water quality standard applies the same standard as a 2-2-2-1 Scheme selection of motorized pump facilities (Level-2).

4) Results of water quality analysis

The water quality analysis was done at the spring source.

Result of water quality analysis are as shown in the table 2-8 Result of water quality analysis.

5) Accessibility and Hydro-geological survey

The hand pump well and on-spot spring facilities (Level-1) were performing well drilling at the time of this project. An accessibility survey is needed to ensure drilling machines can enter the site. A hydro-geological survey is also required. It was found as a result of performing site exploration that it was possible to access all of the villages.

Also, the sites cleared by the Hydro-geological survey, which are to be investigated for underground water basin lineament, etc, were checked by geophysical survey. Well drilling is performed in this project at those points based on the geophysical survey. Results of the geophysical survey are as follows.

Table 2-18 Result of geophysical survey for Hand pump well facilities (Level-1)

	Zone	Woreda	ID No.	Village	No. of sites	Coordinates (UTM)		EL	Driliing depth	Suevey No.
						E	N	(m)	(m)	
1	West Showa	Ambo	S-24	Gosu Qora	1	373268	990191	2203.7	90m	S24-1
2		Jaldu	S-12	Kolu Gelan	3	398563	1032139	2799.4	80m	S12-1
		"	"	"		397628	1030397	2787.7	80m	S12-2
		"	"	"		397557	1031287	2799.6	90m	S12-3
3	Horo Guduru	Jima Ganat	H-08	Bedo Gidami	3	292734	1042464	2277.6	100m	H08-1
		"	"	"		293056	1042578	2268.3	90m	H08-2
		"	"	"		292817	1043209	2276.0	80m	H08-3
4		Jima Ganat	H-09	Kelala Didmtu	3	294197	1046173	2246.6	80m	H09-1
		"	"	"		294687	1046252	2239.4	80m	H09-2
		"	"	"		294853	1046848	2235.6	90m	H09-3
5		Hababo Guduru	H-14	Loya Dilelo	2	334360	1062088	2308.0	60m	H14-1
		"	"	"		333496	1061498	2299.9	60m	H14-2
6		Abay Chomen	H-07	Genji Ketala	2	312355	1062694	2251.6	70m	H07-2
		"	"	"		311586	1063473	2247.2	75m	H07-3
7		Jima Rare	H-21	Burka Hobo	3	318668	1028563	2220.3	90m	H21-1
		"	"	"		317826	1028165	2224.5	90m	H21-2
		"	"	"		317583	1029455	2228.8	100m	H21-3
8		Jardega Jarte	H-22	Haro Habo	2	281442	1090044	2290.3	90m	H22-2
		"	"	"		281055	1089594	2267.9	70m	H22-3
9		Abe Dongoro	H-18	Tulu Gana	3	246864	1059115	1363.0	60m	H18-1
10	Jima	Kersa	J-08	Bulbul No.2	9	287773	855260	1731.8	70-90m	J08-1
		"	"	"		287892	854841	1713.2	70-90m	J08-2
		"	"	"		287257	854206	1725.8	70-90m	J08-3
		"	"	"		291188	854315	1746.8	70-90m	J08-4
		"	"	"		291955	853094	1711.0	70-90m	J08-5
		"	"	"		291539	854783	1755.6	70-90m	J08-6
		"	"	"		289334	854841	1792.8	70-90m	J08-7
		"	"	"		291985	853268	1713.8	70-90m	J08-8
		"	"	"		287327	854085	1720.4	70-90m	J08-9
11		Omo Nada	J-01	Ale	3	294231	843413	1793.3	90m	J01-1
		"	"	"		294926	843329	1794.1	100m	J01-2
		"	"	"		294675	842734	1826.2	100m	J01-3
12		Sekoru	J-09	Bore	4	314993	858084	1725.8	80m	J09-1
		"	"	"		315097	858861	1728.9	75m	J09-2
		"	"	"		312650	857804	1762.3	100m	J09-3
		"	"	"		314015	857812	1728.2	85m	J09-4
13		Sekoru	J-12	Dobi	4	331425	894070	1947.5	130m	J12-1
		"	"	"		332716	893905	2003.3	130m	J12-2
		"	"	"		332245	893604	1977.7	130m	J12-3
		"	"	"		331464	893691	1946.5	130m	J12-4
14		Sekoru	J-10	Cheka Walaka	1	324836	863369	1905.7	90m	J10-1
15		Omo Nada	J-18	Gudeta Bula	2	312634	857614	1765.1	90m	J18-1
		"	"	"		312276	856107	1763.0	115m	J18-2
16		Omo Nada	J-19	Waktola	2	305936	848091	1719.9	100m	J19-1
		"	"	"		305883	848790	1728.3	100m	J19-2
17		Omo Nada	J-20	Toli Sebeta	1	295978	847120	1784.7	100m	J20-1
18		Kersa	J-03	Marewa	2	269231	849392	1825.8	100-110m	J03-1
		"	"	"		269293	849981	1786.9	100-110m	J03-2

6) Amount villagers are willing to pay

Amount villagers are willing to pay is as follows:

Table 2-19 Amount villagers are willing to pay in the target villages (Level-1)

Zone	Village ID	Woreda	Village Kebele	Requested form of payment	Poly-Tank (20ℓ)	Monthly
West Showa	S-12	Jeldu	Kolu Gelan	Monthly	0.13	2.67
	S-07	Jeldu	Kilbe	Monthly	0.13	2.00
	S-24	Ambo	Goso Qura	Monthly	0.20	10.00
	S-21	Ambo	Dobi	Monthly	0.10	2.00
	S-23	Ambo	Degale Gatera 1	Monthly	0.05	1.50
	S-25	Toke Kutaye	Meti	Monthly	0.05	1.00
	S-26A	Toke Kutaye	Toke Kombolcha	Monthly	0.10	2.00
	S-22	Ambo	Degale Gatera 2	Monthly	0.50	1.50
Horo Guduru	H-08	Jima Ganat	Gidame Dbesho	Monthly	0.08	2.00
	H-09	Jima Ganat	Kalala Didmtu	Monthly	0.10	2.50
	H-14	Hababo Guduru	Loya Dilalo	Monthly	0.10	3.00
	H-07	Abay Chomen	Ganji Ketala	Monthly	0.18	3.50
	H-21	Jimma Rare	Burka Loge	Monthly	0.10	2.67
	H-22	Jardega Jarte	Haro Abo	Monthly	0.15	2.00
	H-18	Abe Dongoro	Tulu Gana (Tulu Gelan)	Monthly	0.15	5.00
Jima	J-08	Kersa	Bulbul	20 L Tank or Monthly	0.19	8.50
	J-01	Omonada	Ale	Monthly	0.25	5.00
	J-09	Sokoru	Bore	20 L Tank	0.20	-
	J-12	Sokoru	Dobi	20 L Tank	0.15	4.00
	J-10	Sokoru	Chaka Walaka	Monthly	0.15	3.00
	J-18	Omonada	Gudeta Bula	Monthly	0.25	10.00
	J-19	Omonada	Waktola	Monthly	0.25	11.25
	J-20	Omonada	Tolisebeta	Monthly	0.25	10.00
	J-03	Kersa	Marewa	Monthly	0.23	10.50

7) Cost for operation and maintenance

Cost of operation and maintenance of level-2 facilities, calculated with the 2007 unit price, is as follows. In calculation of the cost of operation and maintenance, the following items considered indispensable for operation and maintenance of the facilities were added up.

① Repair facility (pipe, faucet, etc.)..... 5% of equipment (savings)

② Fixtures for facility..... 100% of fixture cost(savings)

③ Personnel expense for maintenance..... ea. facility

④ Personnel expense for water fee collection..... ea. Facility

⑤ Sundry expenses..... Communication, Office costs

Table 2-20 Monthly cost of operation and maintenance for Hand pump well (Level-1)

（Birr/facility）

Item	Cost
Repair & Fixtures	23
Personnel expense for maintenance	100
Personnel expense for water fee collection	100
Sundry expenses	25
Total	248

As of the year 2007

Table 2-21 Monthly cost of operation and maintenance for On-spot spring (Level-1)

（Birr/facility）

Item	Cost
Repair & Fixtures	90
Personnel expense for maintenance	100
Personnel expense for water fee collection	100
Sundry expenses	20
Total	310

As of the year 2007

8) Conclusion

Examination and analysis of operation and maintenance aspects verified the feasibility in the target villages.

(2) Selection results

A summary of selection results are shown in table and the diagram.

Table 2-22 Result of the selected village (Level-1)

No.		Zone	Woreda	ID No.	Village	Water source	Discharge (l/min.)	Water quality	Ability of O&M	Water supply facility Level-1、2		Type of intake		Result	Measure	Remarks
Requested	Changed									Requested	Changed	Requested	Changed			
-	1	West Showa	Dano	S-08	Ayeru	BH	300.0	Excluded	-	2 →	1	Motorized pump	Hand pump	Excluded	alternative	due to water quality
-	2		Jibat	S-17	Guyu Aere	BH	-	-	-	2 →	1	Motorized pump	Hand pump	Excluded	alternative	inaccessible
-	3		Dano	S-01	Kalacha Jibat	Spring	13.8	Success	Success	2 →	1	Motorized pump	On spot	-	Changing scheme	unsatisfactory discharge
-	4		Jaldu	S-19	Boni Jawi	Spring	17.4	Success	Success	2 →	1	Motorized pump	On spot	-	Changing scheme	unsatisfactory discharge
1	5		Jaldu	S-12	Kolu Galan	BH	-	-	Success	1	1	Hand pump	Hand pump	-	-	
2	6		Ambo	S-07	Kilbe	Spring	300.0	Success	Success	1	1	On spot	On spot	-	-	
3	7		Ambo	S-24	Goso Qura	BH	-	-	Success	1	1	Hand pump	Hand pump	-	-	
4	8		Ambo	S-21	Dobi	Spring	7.5	Success	Success	1	1	On spot	On spot	-	-	
5	9		Toke Kutaye	S-23	Degale Garita 1	Spring	45.0	Success	Success	1	1	On spot	On spot	-	-	
6	10		Toke Kutaye	S-25	Meti (Boke)	Spring	4.4	Success	Success	1	1	On spot	On spot	-	-	
7	11		Toke Kutaye	S-26A	Toke Kombolcha	Spring	24.4	Success	Success	1	1	On spot	On spot	-	-	
8	12		Ambo	S-22	Degale Garita 2	Spring	105.0	Success	Success	1	1	On spot	On spot	-	-	
-	13	Horo Guduru	Hababo Guduru	H-05	Chala Foka	BH	-	-	-	2 →	1	Motorized pump	Hand pump	Excluded	alternative	no groundwater
-	14		Abe Dongoro	H-17	Dalachoo	Spring	20.4	Success	Success	2 →	1	Motorized pump	On spot	-	Changing scheme	unsatisfactory discharge
9	15		Jima Ganat	H-08	Badho Gidami	BH	-	-	Success	1	1	Hand pump	Hand pump	-	-	
10	16		Jima Ganat	H-09	Kalala Didmtu	BH	-	-	Success	1	1	Hand pump	Hand pump	-	-	
11	17		Hababo Guduru	H-14	Loya Dilalo	BH	-	-	Success	1	1	Hand pump	Hand pump	-	-	
12	18		Abay Chomen	H-07	Ganji Ketala	BH	-	-	Success	1	1	Hand pump	Hand pump	-	-	
13	19		Jima Rare	H-21	Burka Hobo	BH	-	-	Success	1	1	Hand pump	Hand pump	-	-	
14	20		Jardega Jarte	H-22	Haro Abo	BH	-	-	Success	1	1	Hand pump	Hand pump	-	-	
15	21		Abe Dongoro	H-18	Tulu Gana	BH	-	-	Success	1	1	Hand pump	Hand pump	-	-	
16	22	Jima	Karsa	J-08	Bulbul No.2	BH	-	-	Success	1	1	Hand pump	Hand pump	-	-	
17	23		Omo Nada	J-01	Ale	BH	-	-	Success	1	1	Hand pump	Hand pump	-	-	
-	24		Sokoru	J-04	Natri	BH	46.8	Success	Success	2 →	1	Motorized pump	Hand pump	Excluded	alternative	unsatisfactory discharge
18	25		Sokoru	J-09	Bore	BH	-	-	Success	1	1	Hand pump	Hand pump	-	-	
19	26		Sokoru	J-12	Dobi	BH	-	-	Success	1	1	Hand pump	Hand pump	-	-	
20	27		Sokoru	J-10	Chaka Walaka	BH	-	-	Success	1	1	Hand pump	Hand pump	-	-	
21	28		Omo Nada	J-18	Gudeta Bula	BH	-	-	Success	1	1	Hand pump	Hand pump	-	-	
22	29		Omo Nada	J-19	Waktola	BH	-	-	Success	1	1	Hand pump	Hand pump	-	-	
23	30		Omo Nada	J-20	Tolisebeta	BH	-	-	Success	1	1	Hand pump	Hand pump	-	-	
24	31		Karsa	J-03	Marewa	BH	-	-	Success	1	1	Hand pump	Hand pump	-	-	

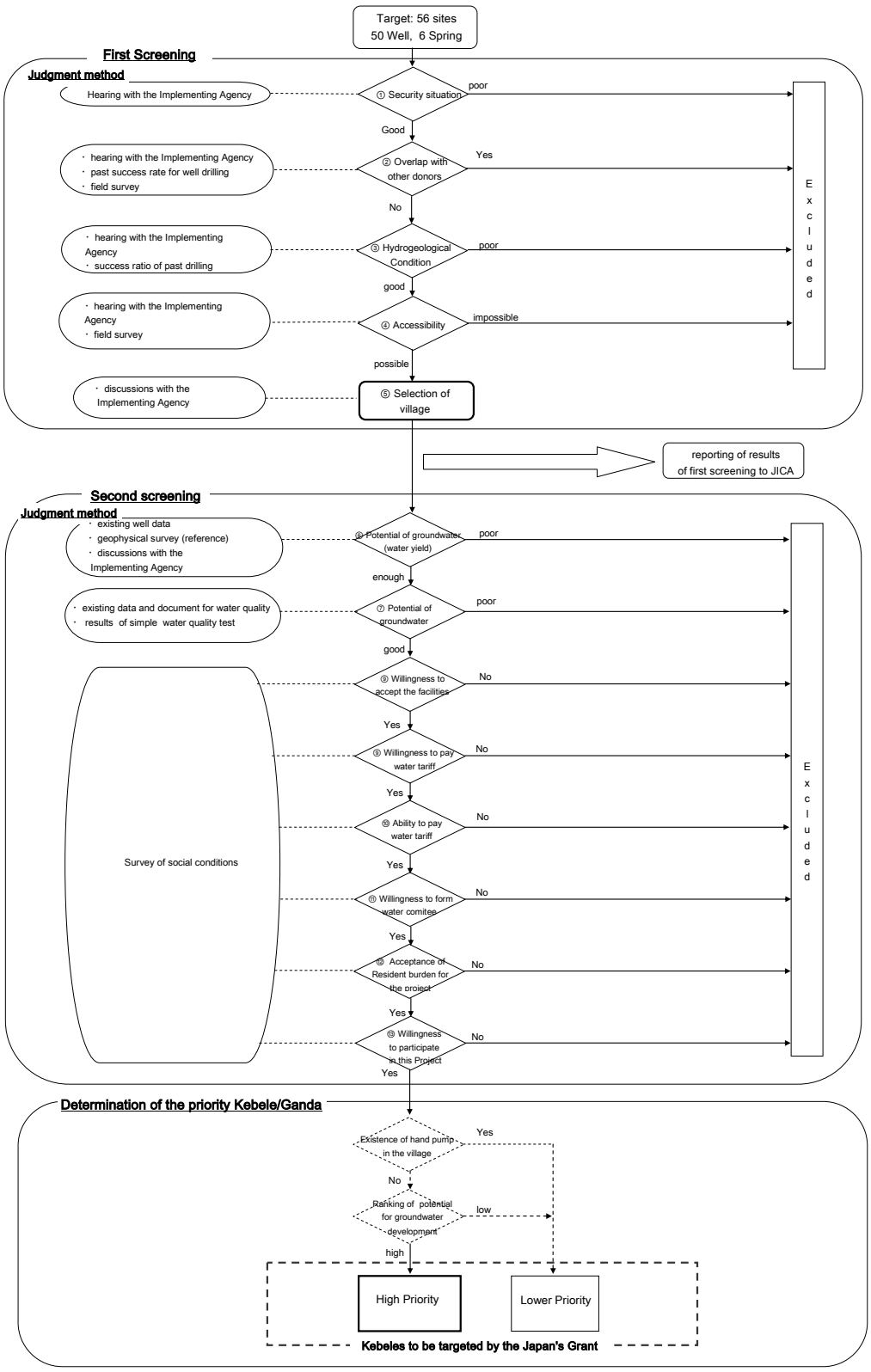


Figure 2-7 Selection results of Level-1 facilities

2-2-2-3 Selection of alternative villages

Villages which were excluded based on examination and analysis in the Basic Design Study will be adopted and prioritized as alternative (candidate) villages as part of a list submitted by OWRB to the JICA Study Team in September 2008. The water supply scheme of the alternative (candidate) villages will be deep well with hand pump well facility (Level-1).

The final selection of the alternative villages will be decided according to the criteria set forth in the Detailed Design Study. If the location is (1) deemed inaccessible, or underperforms in (2) the Hydro geological survey and (3) Geophysical survey, it will shift to the next priority village. Therefore, the criteria are as follows.

(1) Road accessibility allows the drilling machine (truck) and incidental vehicles to enter from the main road to the well point.
(2) Hydro geological survey is successful.
(3) Geophysical survey is successful.

In addition, the access survey is also conducted for other villages that appear in the alternative village list at the time of the Detailed Design Study. Should it be deemed inaccessible, the village will be deleted from the alternative list and not added.

2-2-2-4 Summary of basic design of Japanese Assistance request (Water supply facilities)

The comparison of the project contents of water supply facilities between the request of OWRB and result of the Basic Design Study is as follows.

Table 2-23 Comparison of project request and results (Water supply facilities)

Implementation (No. of Village)				Request of OWRB				Result of Basic Design Study			
				West Showa	Horo Guduru	Jima	Total	West Showa	Horo Guduru	Jima	Total
No. of Woreda				7	6	4	17	7	6	4	17
Well	Hand Pump	-	Level-1	4	18	28	50	8	21	29	58
	Motorized Pump	(New)	Level-2	4	3	3	10	2	2	3	7
	Motorized Pump	(Rehabilitation)		0	0	1	1	0	0	0	0
	Motorized Pump	(New & Rehabilitation)		0	1	1	2	0	1	1	2
Spring	On-Spot	-	Level-1	6	0	0	6	8	1	0	9
	Gravity	-	Level-2	1	3	0	4	1	2	0	3
	Motorized Pump	-		3	2	0	5	1	2	0	3
Zonal Total				18	27	33	78	20	29	33	82

2-2-3 Summary of basic design of Japanese Assistance request (Maintenance equipment)

The comparison of the project contents of water supply facilities between the request of OWRB and result of the Basic Design Study is as follows

The change from the request is 17 motorbikes (1 each of the 17 Woredas) from 20 motorbikes (1 each of the 3 zones and 17 Woredas)

Table 2-24 Comparison of project request and result (Maintenance equipment)

Item		Specification	Q'ty (no.)	
			request	result
Maintenance equipment	Motorbike	170 ㎤ Single Cylinder, Off road type	20	17
	Pick-up Truck	4 wheel drive, Double cabins	3	3
Survey equipment	GPS	Portable type by dry battery	20	20
	Geophysical survey equipment	Terrameter (1,000 mA, 800 Vp-p)	3	3
	Survey equipment	Total station Distance 1,000m	3	3
	Water analysis Kit	Portable type pH, TDS, Temp, EC	20	20

2-2-4 Layout for Water Supply Facilities

Layouts for Water Supply Facilities for this project are as shown below,

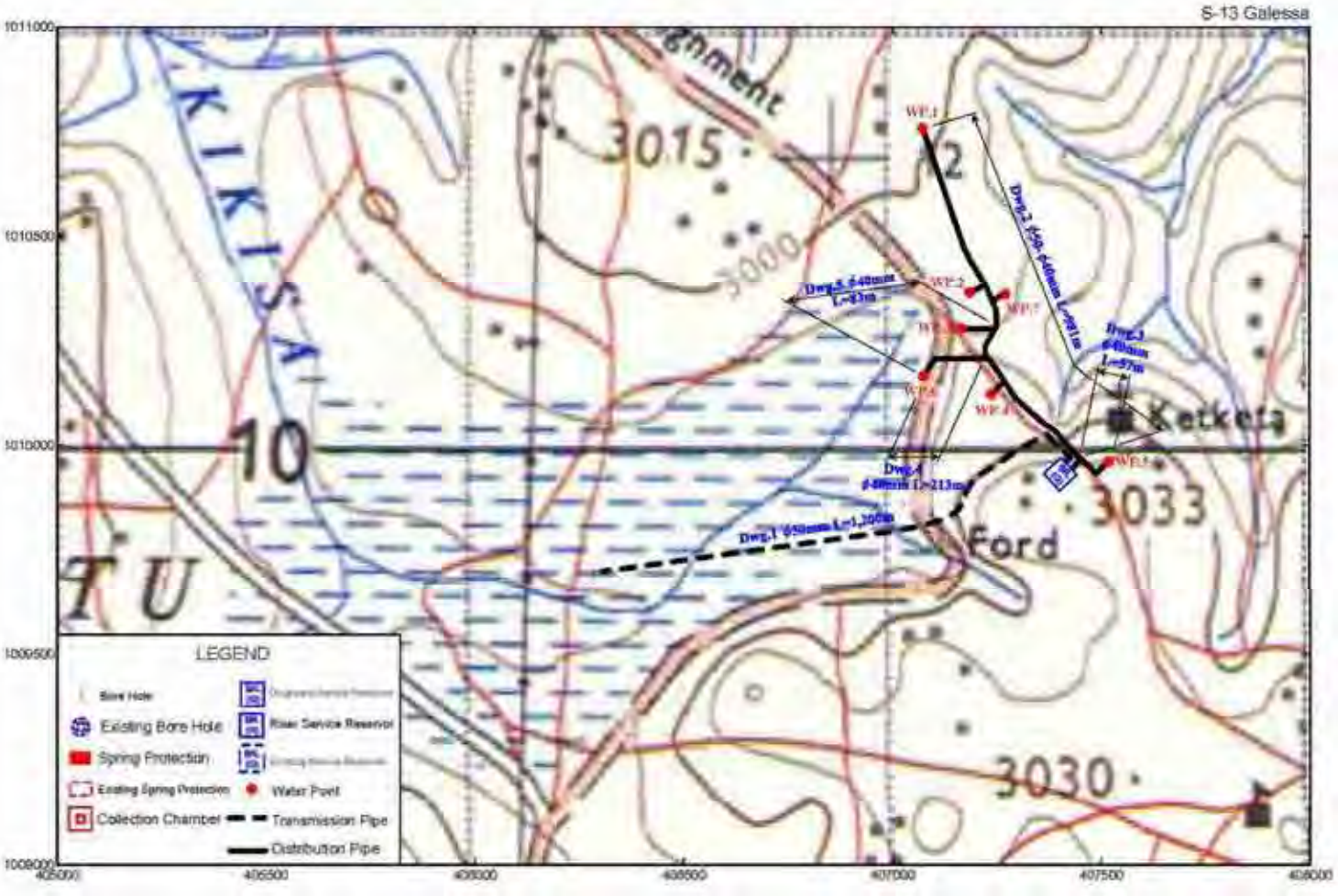


Figure 2-8 Layout for Water Supply Facilities（S-13 Galessa）

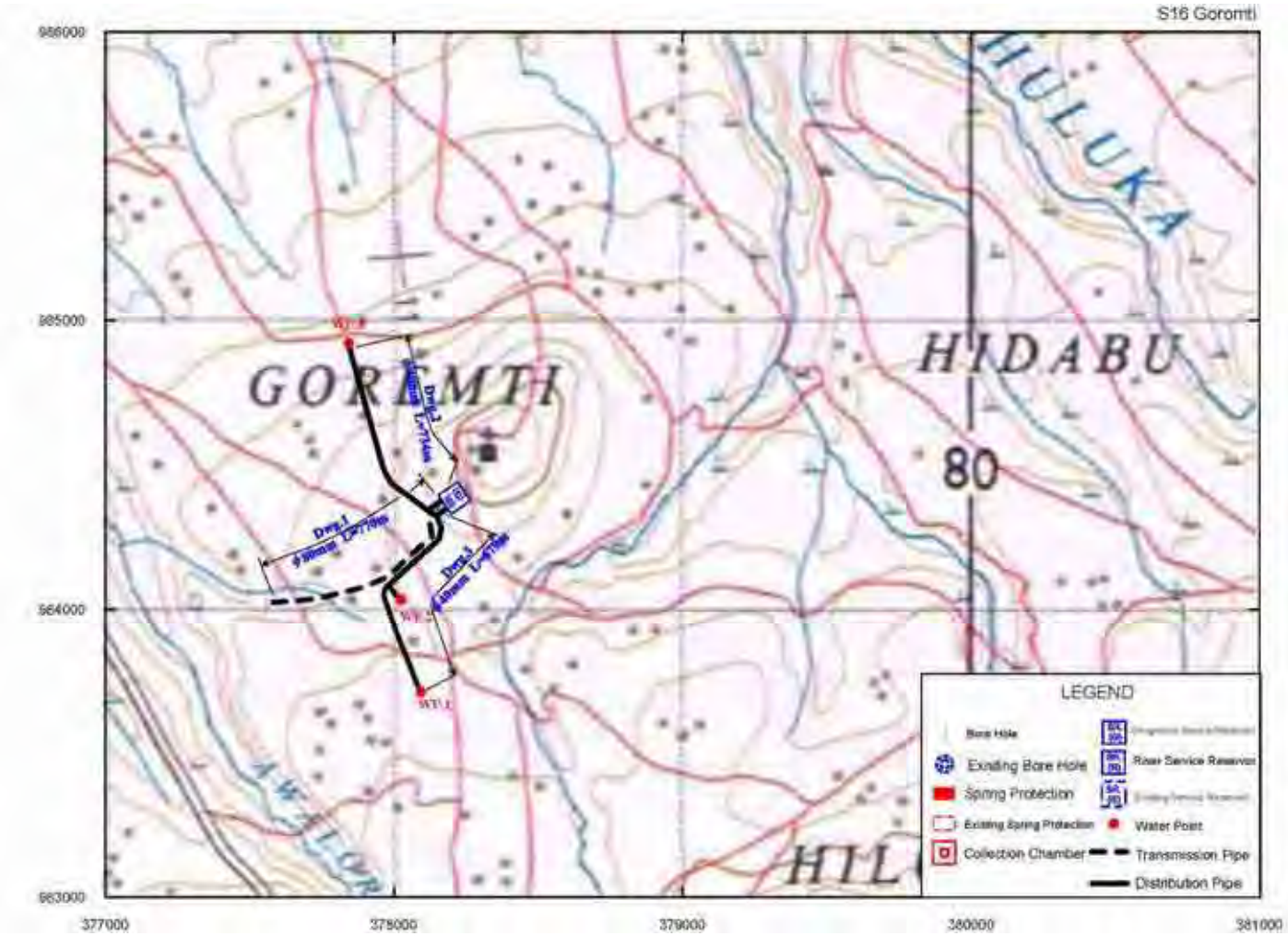


Figure 2-9 Layout for Water Supply Facilities（S-16 Gromti）

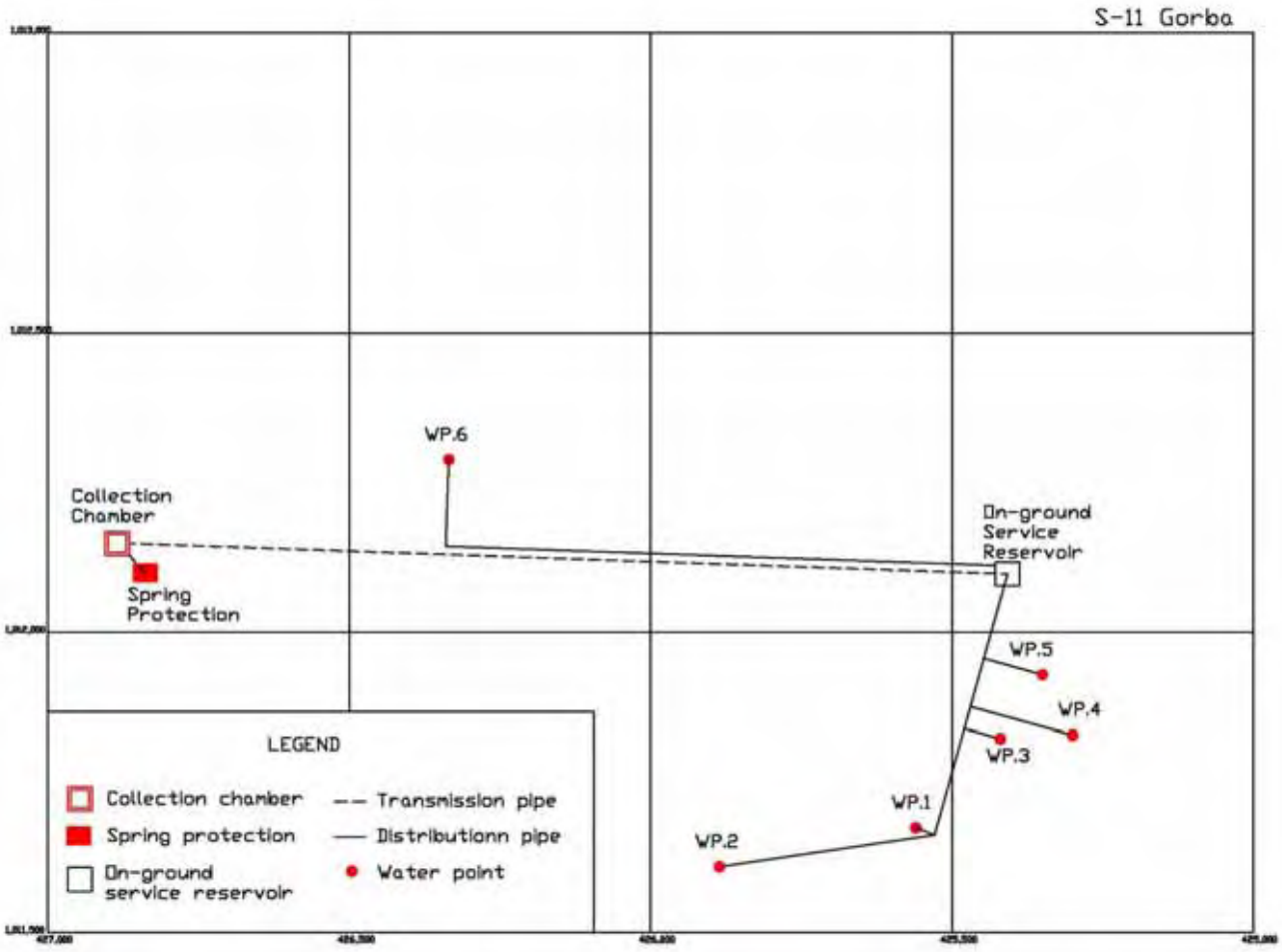


Figure 2-10 Layout for Water Supply Facilities（S-11 Gorba）

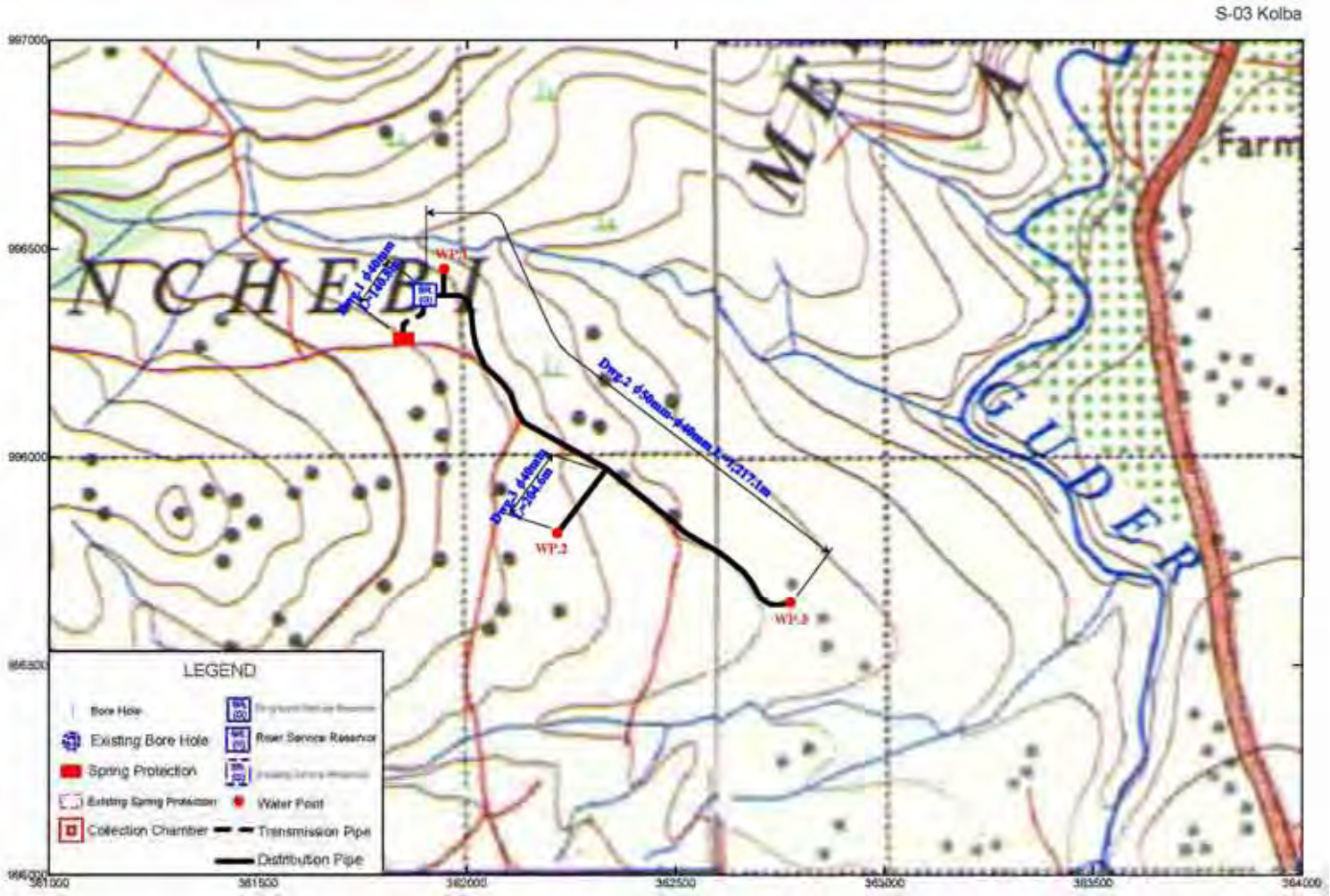


Figure 2-11 Layout for Water Supply Facilities（S-03 Kolba）

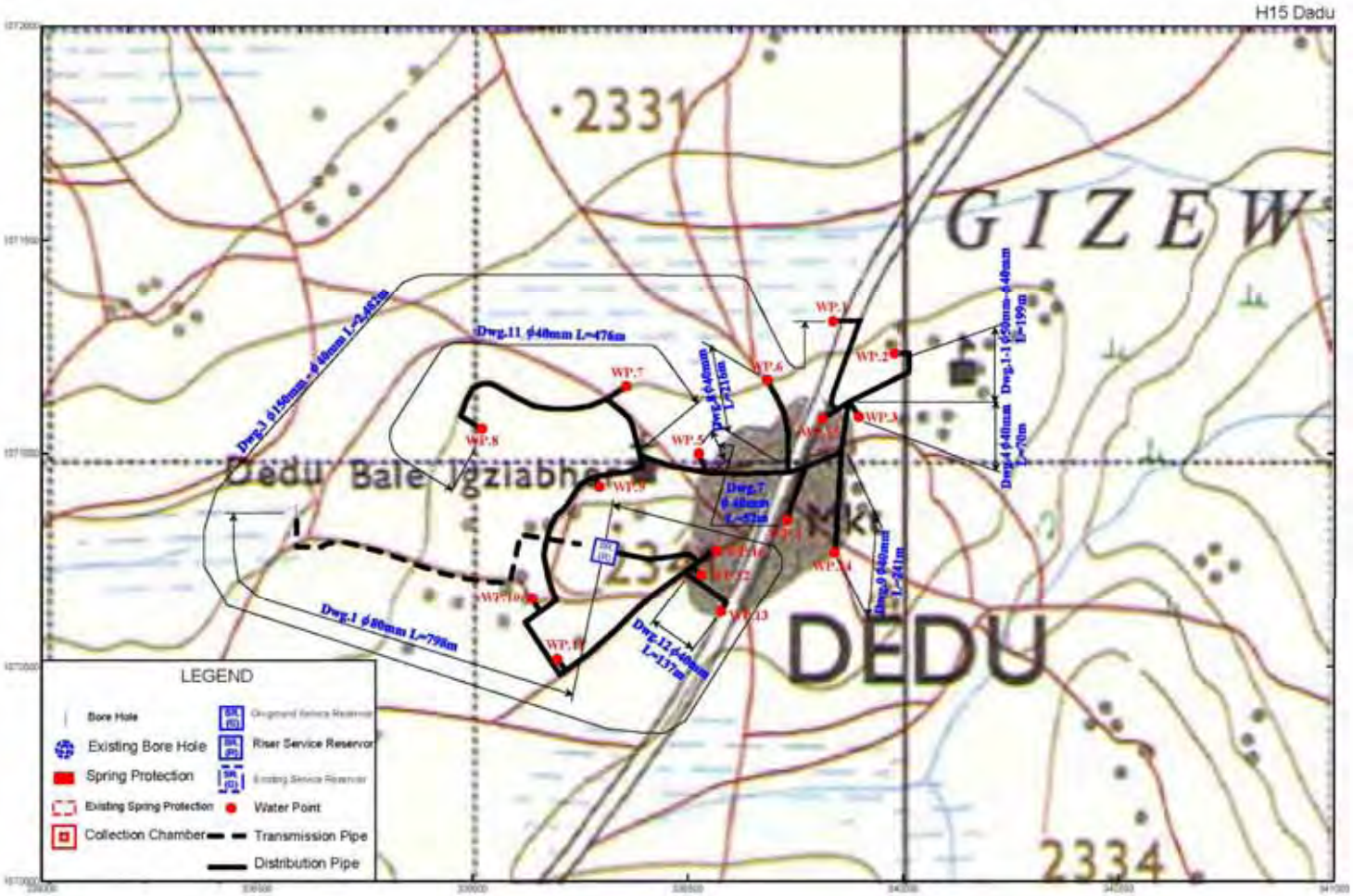


Figure 2-12 Layout for Water Supply Facilities（H-15 Dadu）

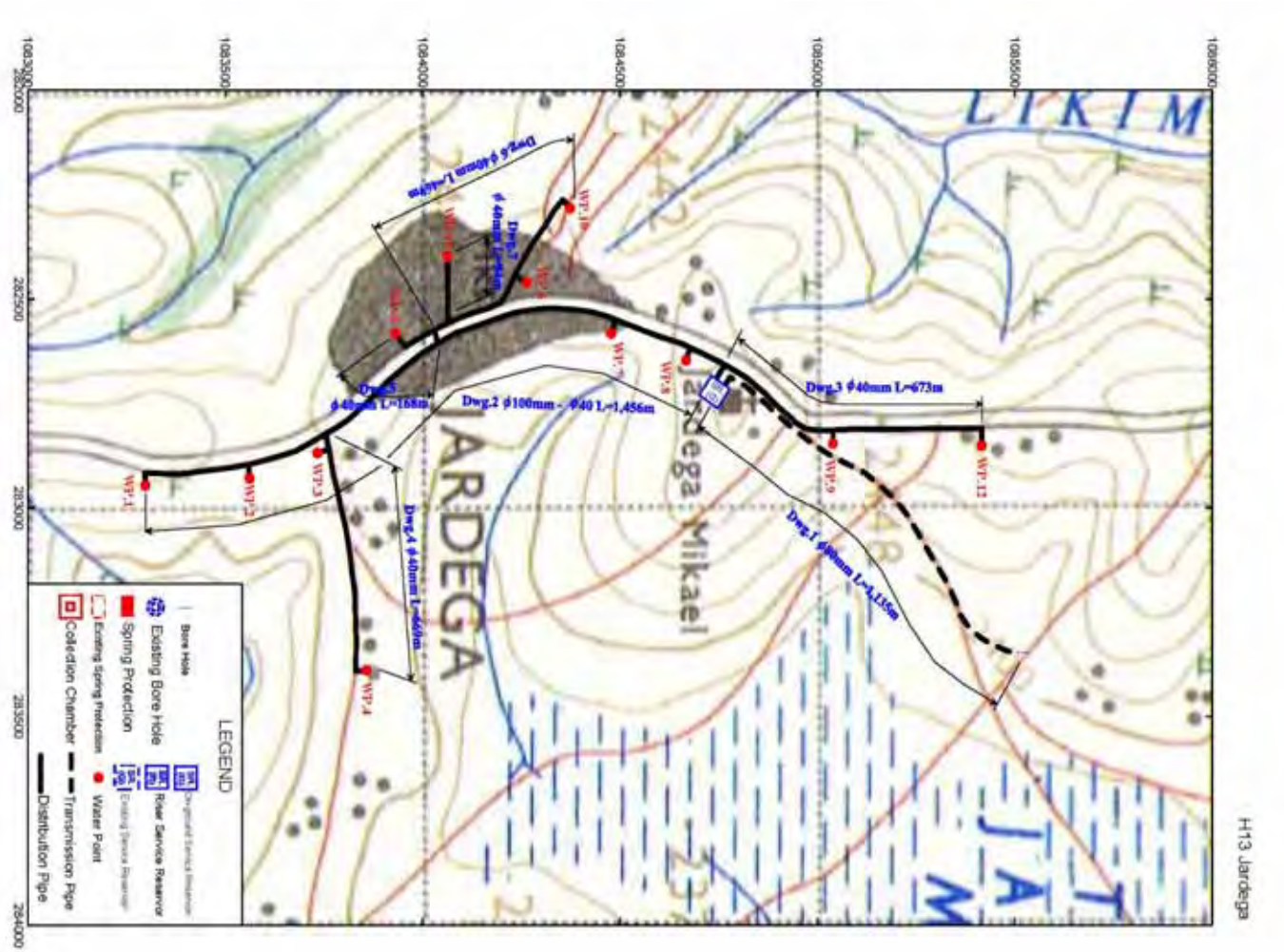


Figure 2-13 Layout for Water Supply Facilities（H-13 Jardega）

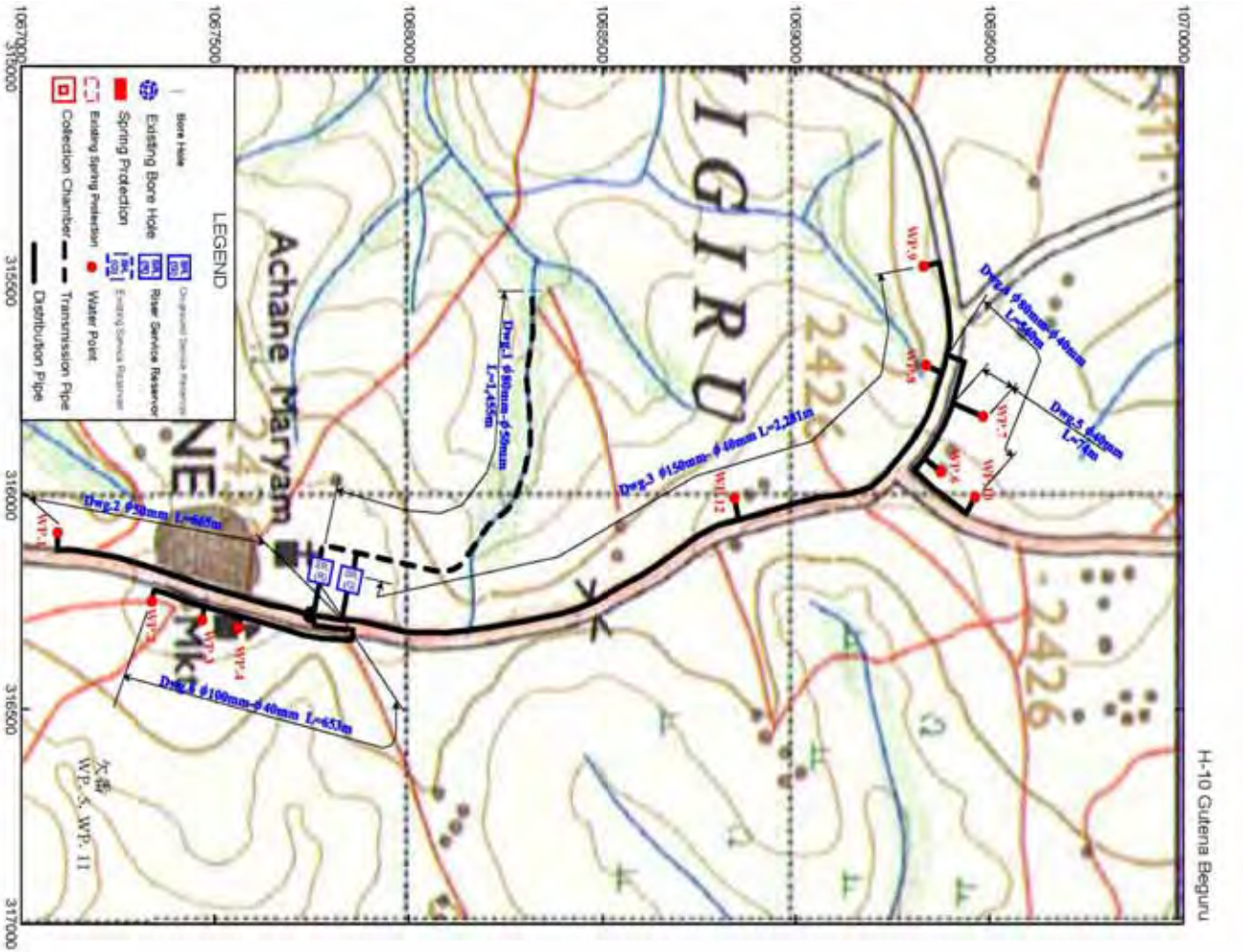


Figure 2-14 Layout for Water Supply Facilities（H-10 Gutena Beguru）

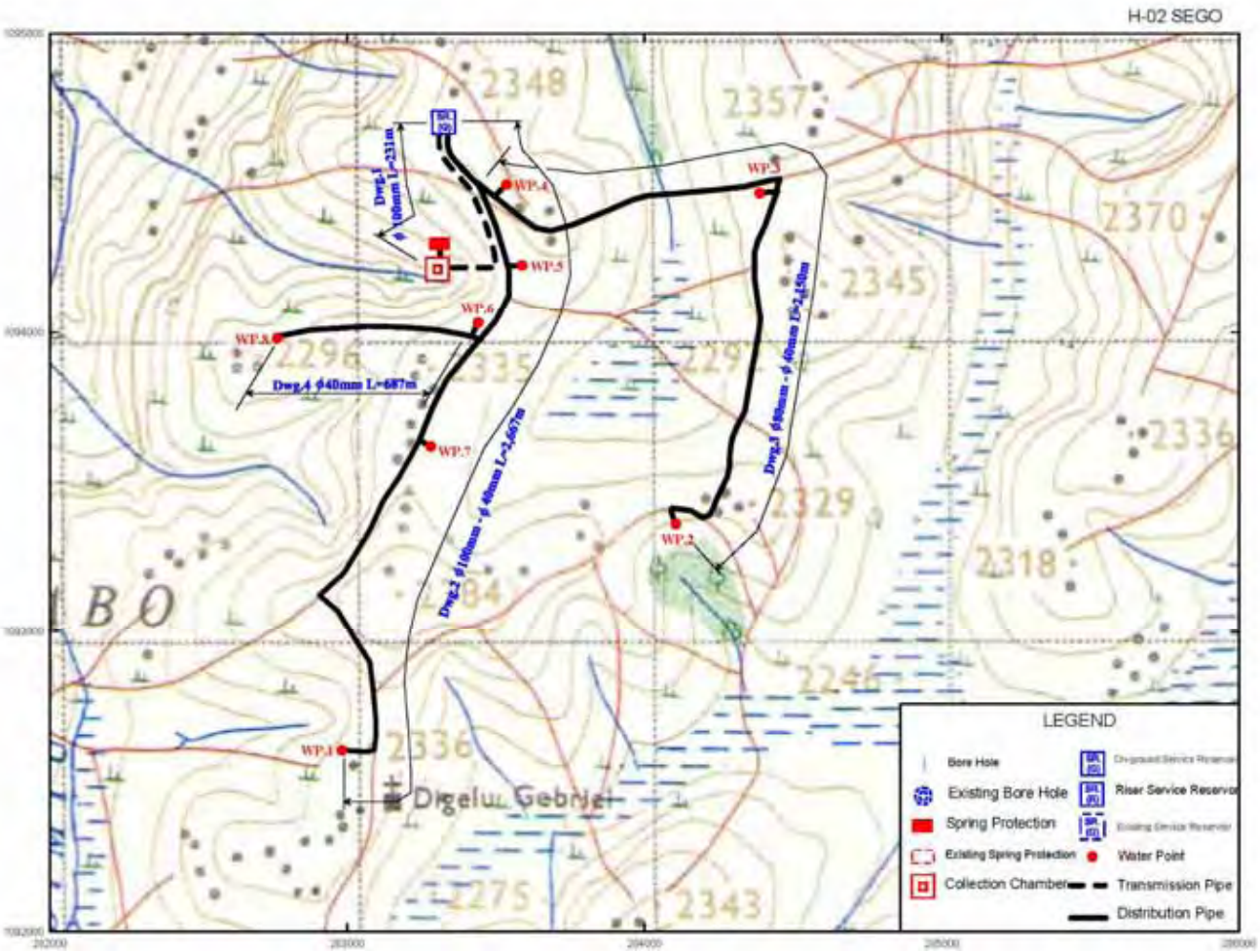


Figure 2-15 Layout for Water Supply Facilities（H-02 Sego）

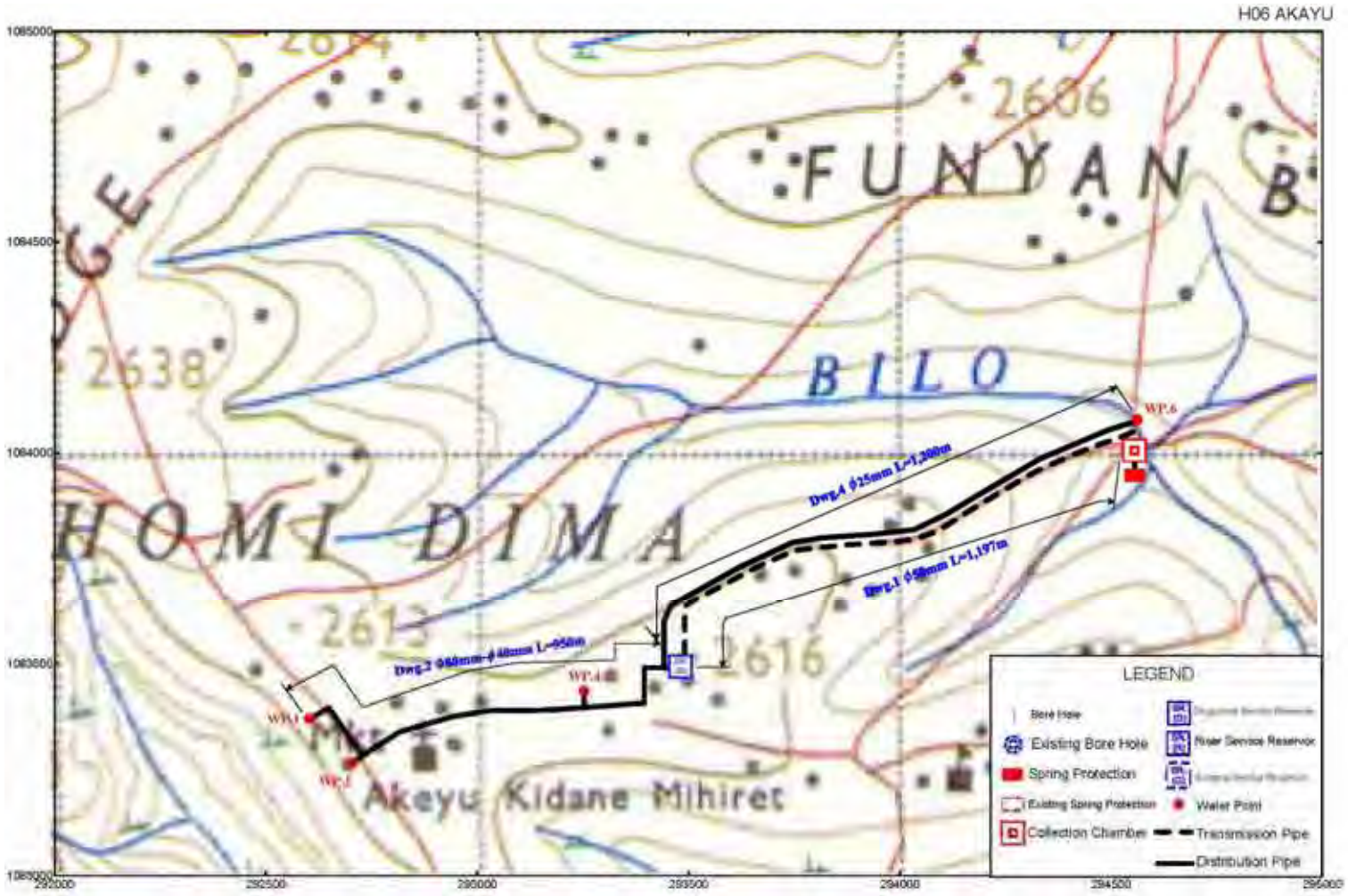


Figure 2-16 Layout for Water Supply Facilities（H-06 Akayu）

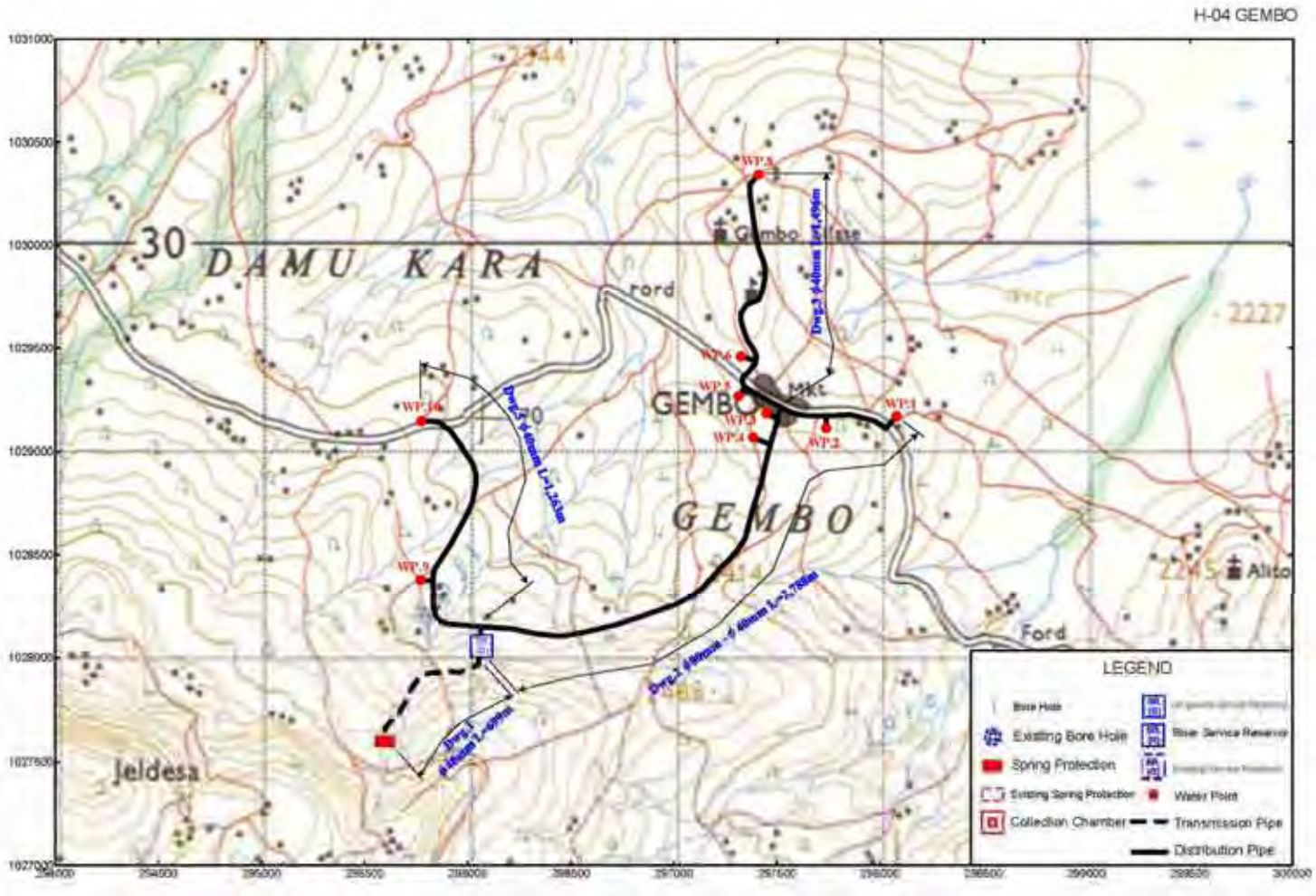


Figure 2-17 Layout for Water Supply Facilities（H-04 Gembo）

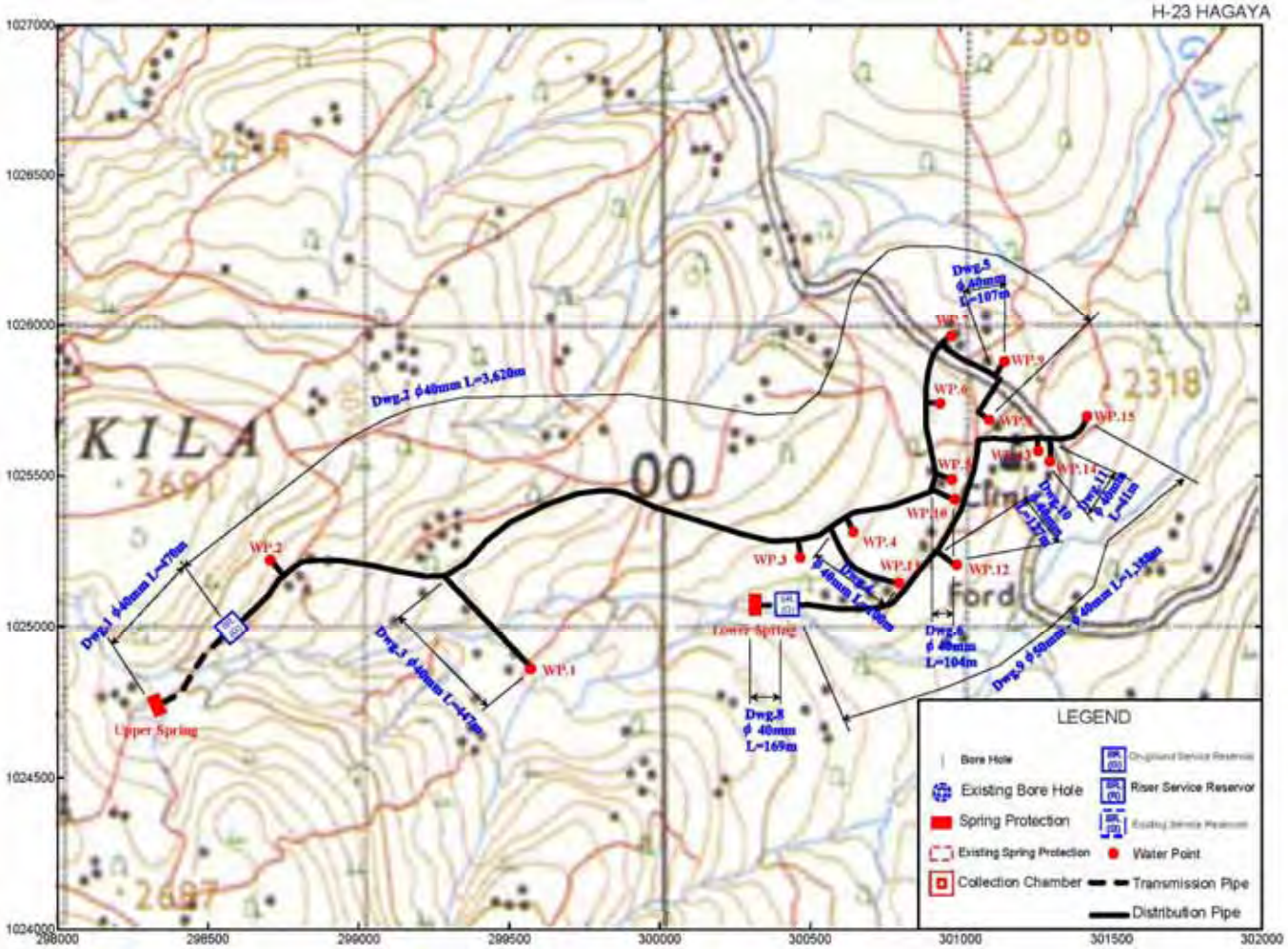


Figure 2-18 Layout for Water Supply Facilities（H-23 Hagaya）

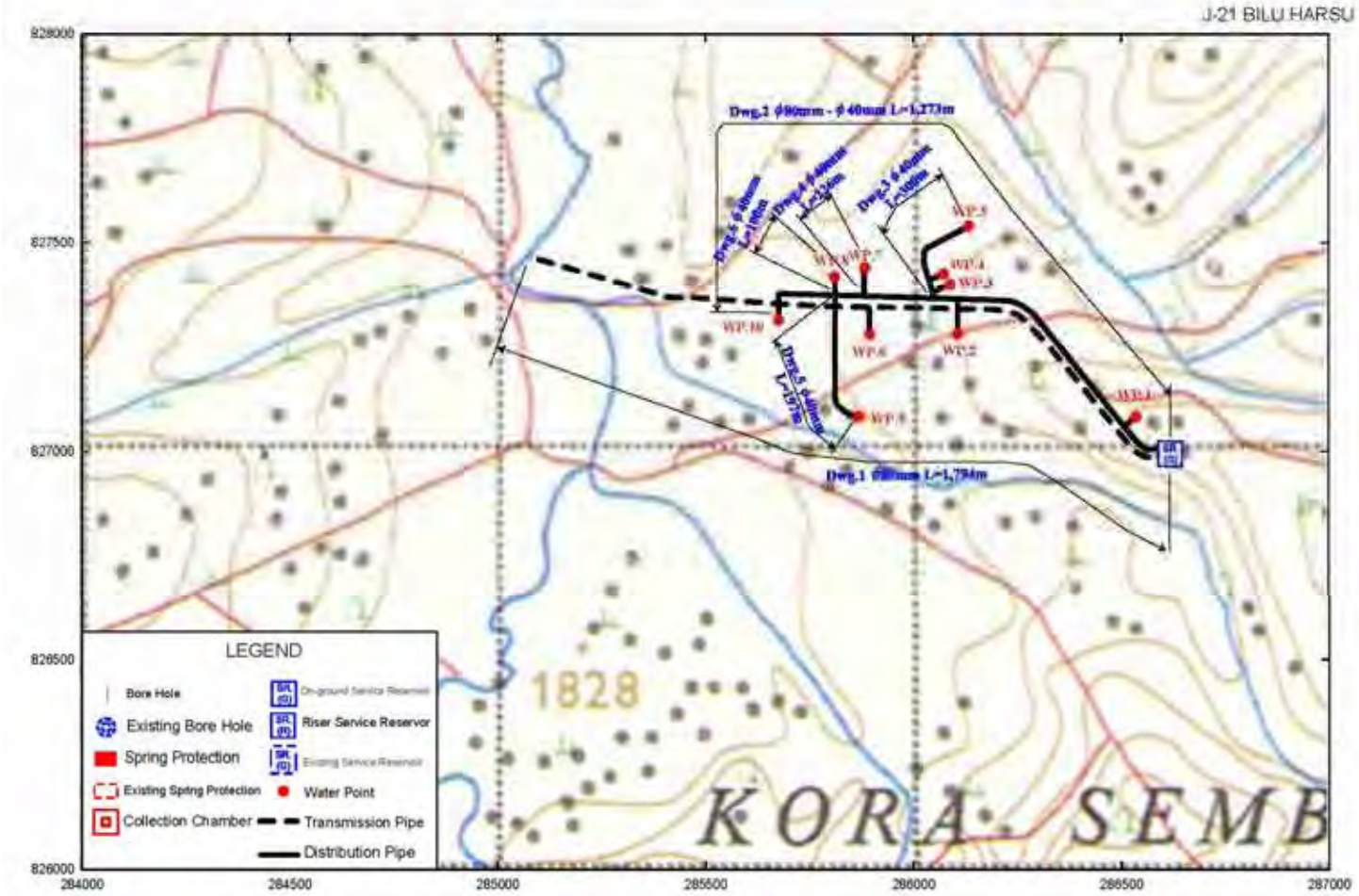


Figure 2-19 Layout for Water Supply Facilities（J-21 Bilu Harsu）

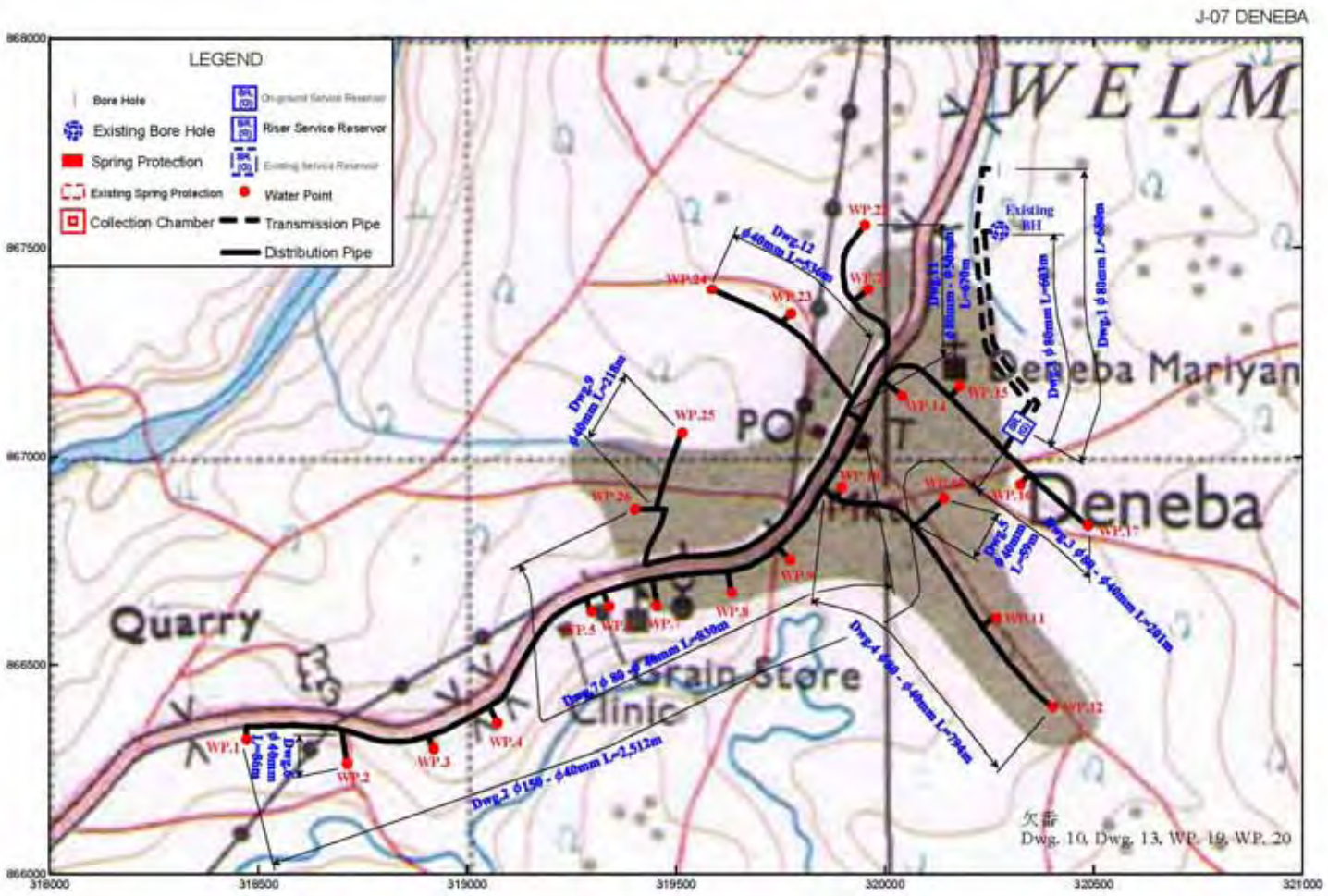


Figure 2-20 Layout for Water Supply Facilities（J-07 Deneba）

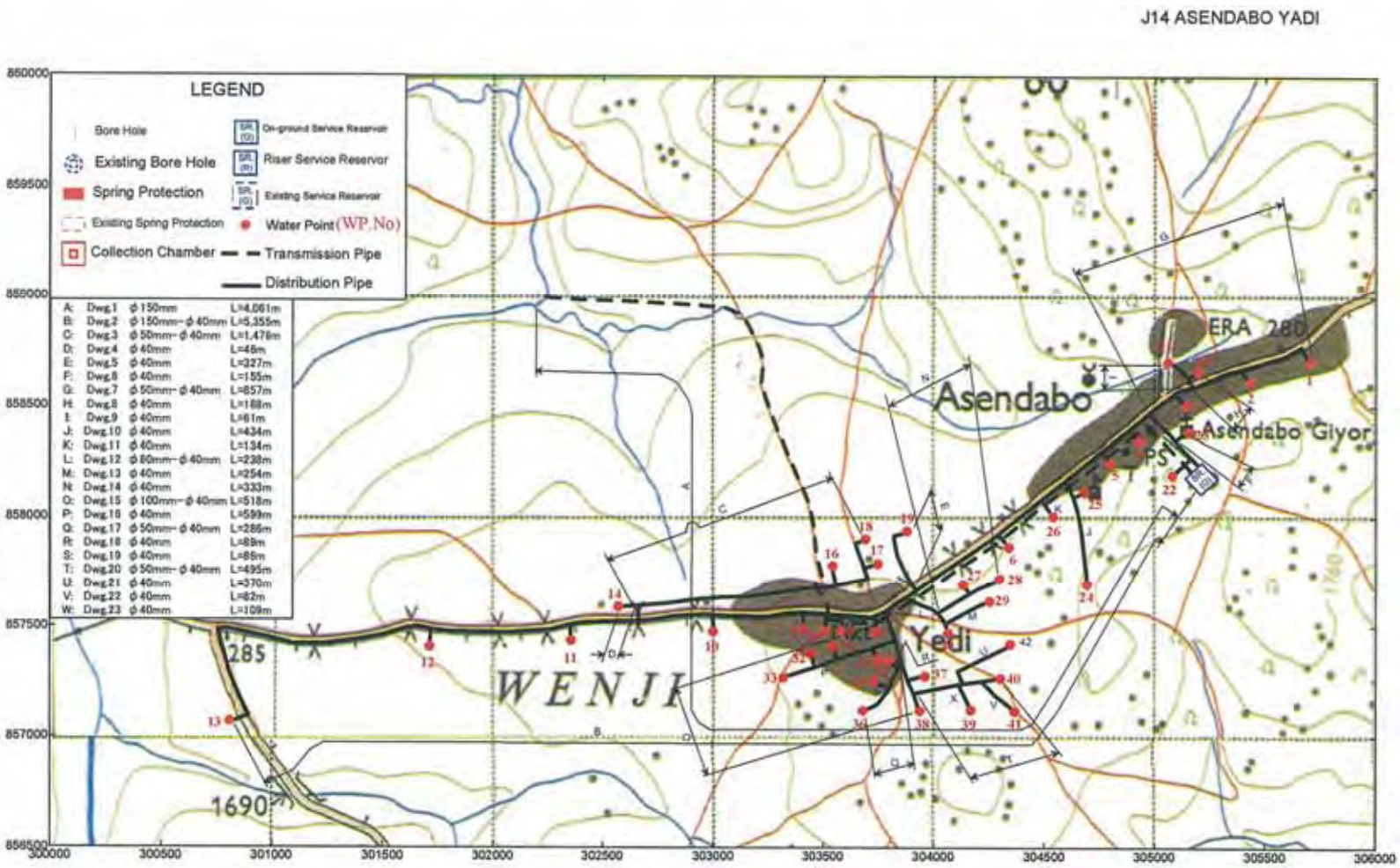


Figure 2-21 Layout for Water Supply Facilities（J-14 Asendabo Yadi）

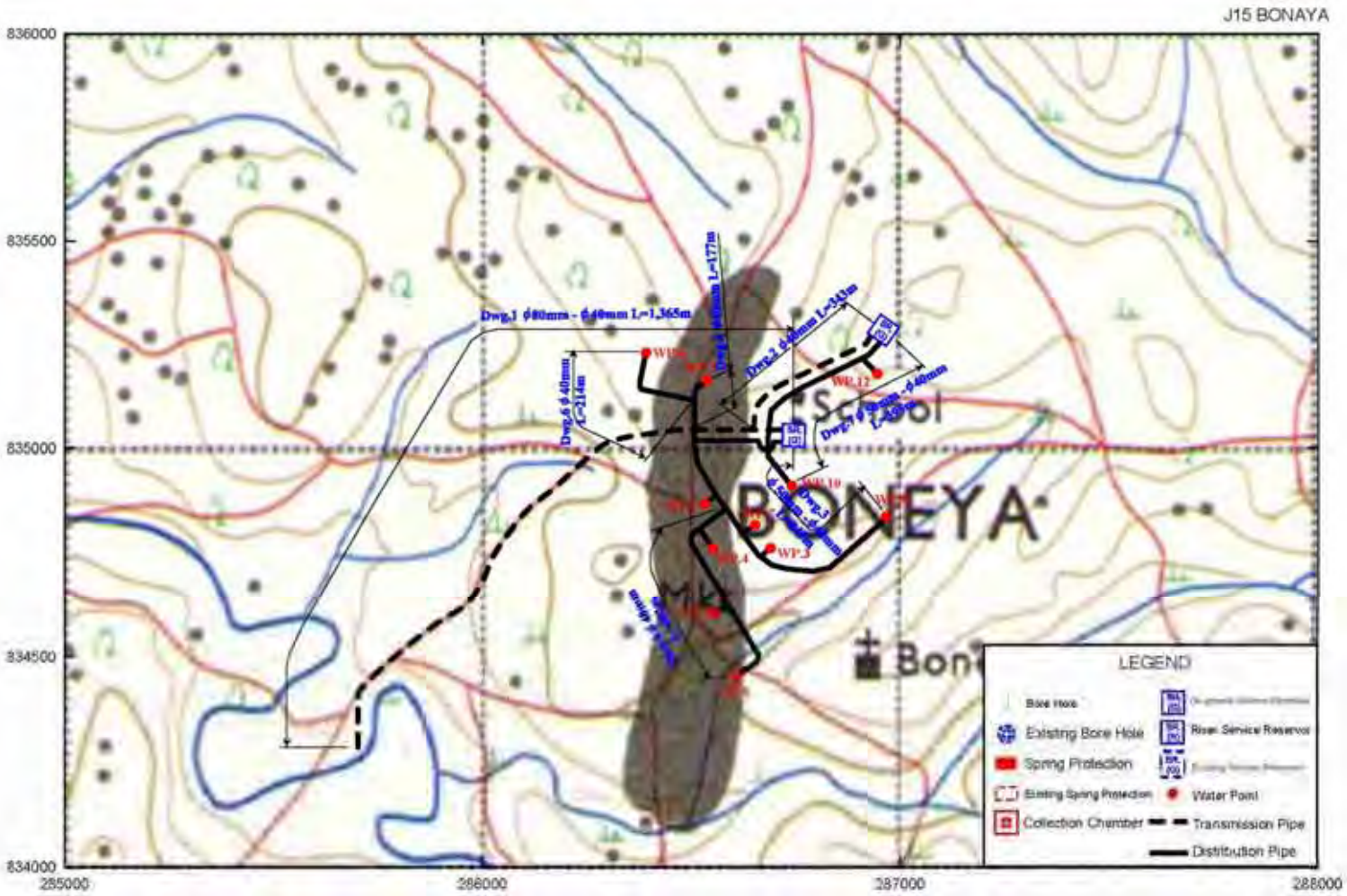


Figure 2-22 Layout for Water Supply Facilities（J-15 Bonaya）

2-2-5 Basic Design Drawing

Basic Design Drawings for this project are as shown below,

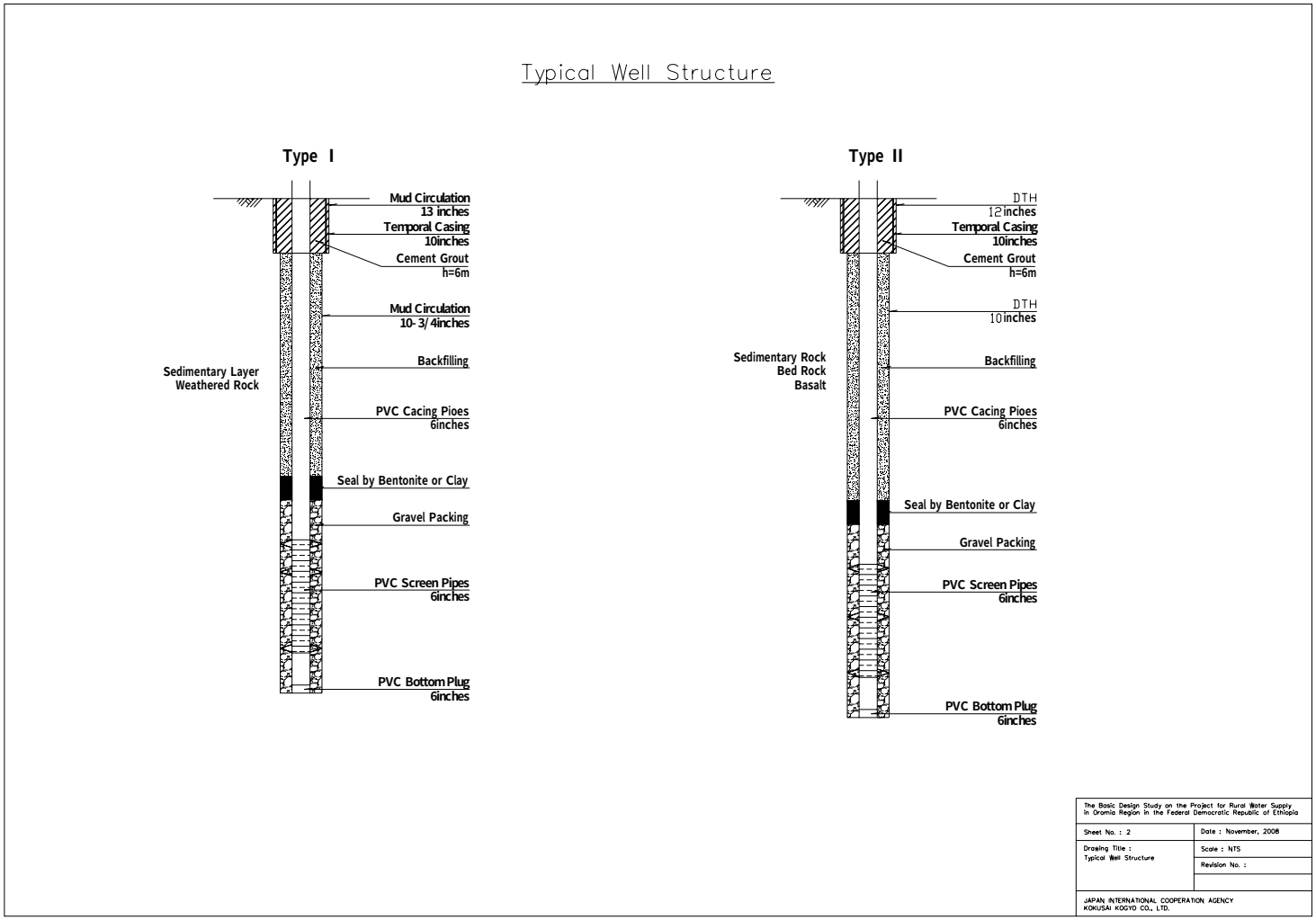
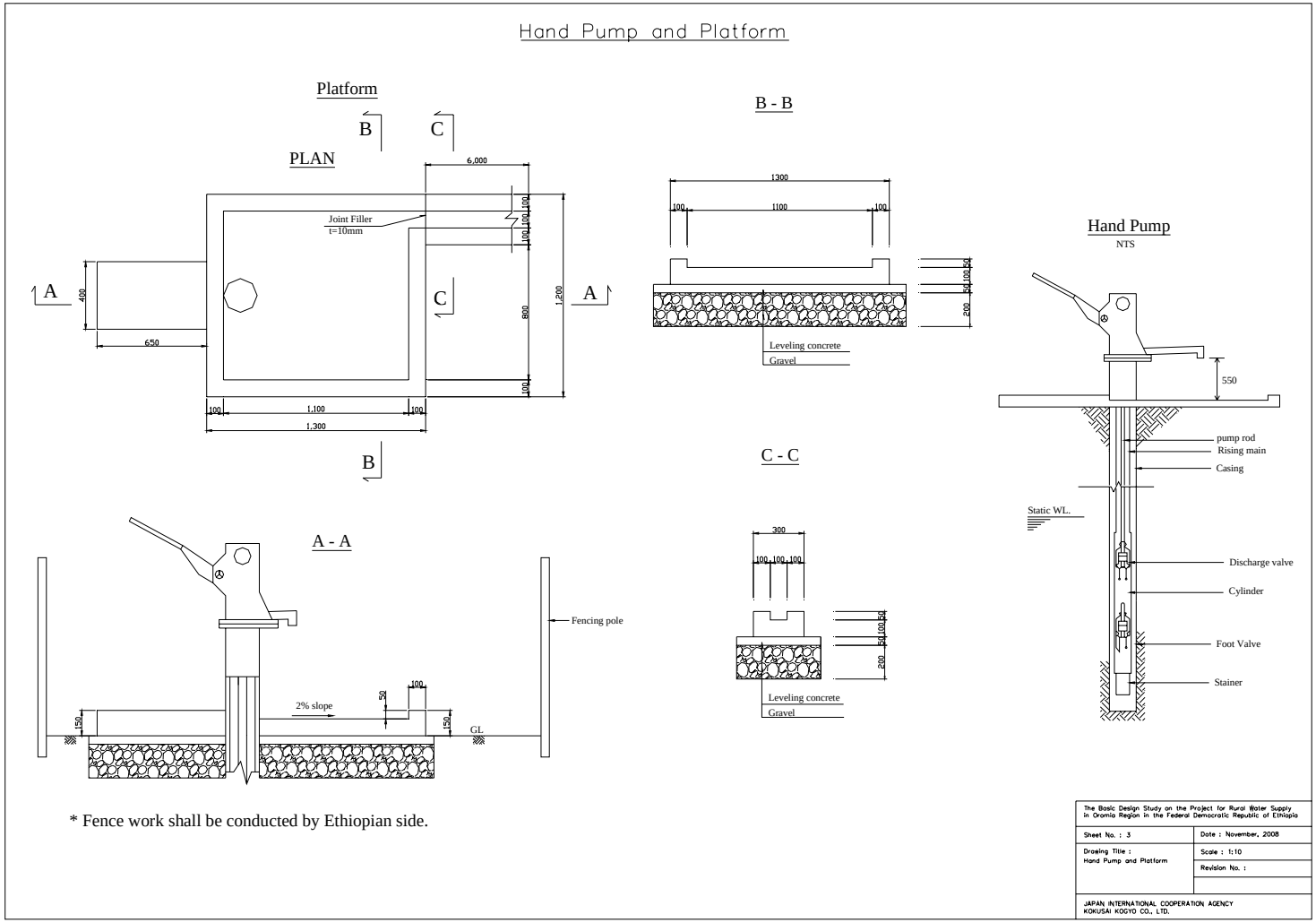


Figure 2-23 Typical Well Structure



* Fence work shall be conducted by Ethiopian side.

Figure 2-24 Hand Pump and Platform

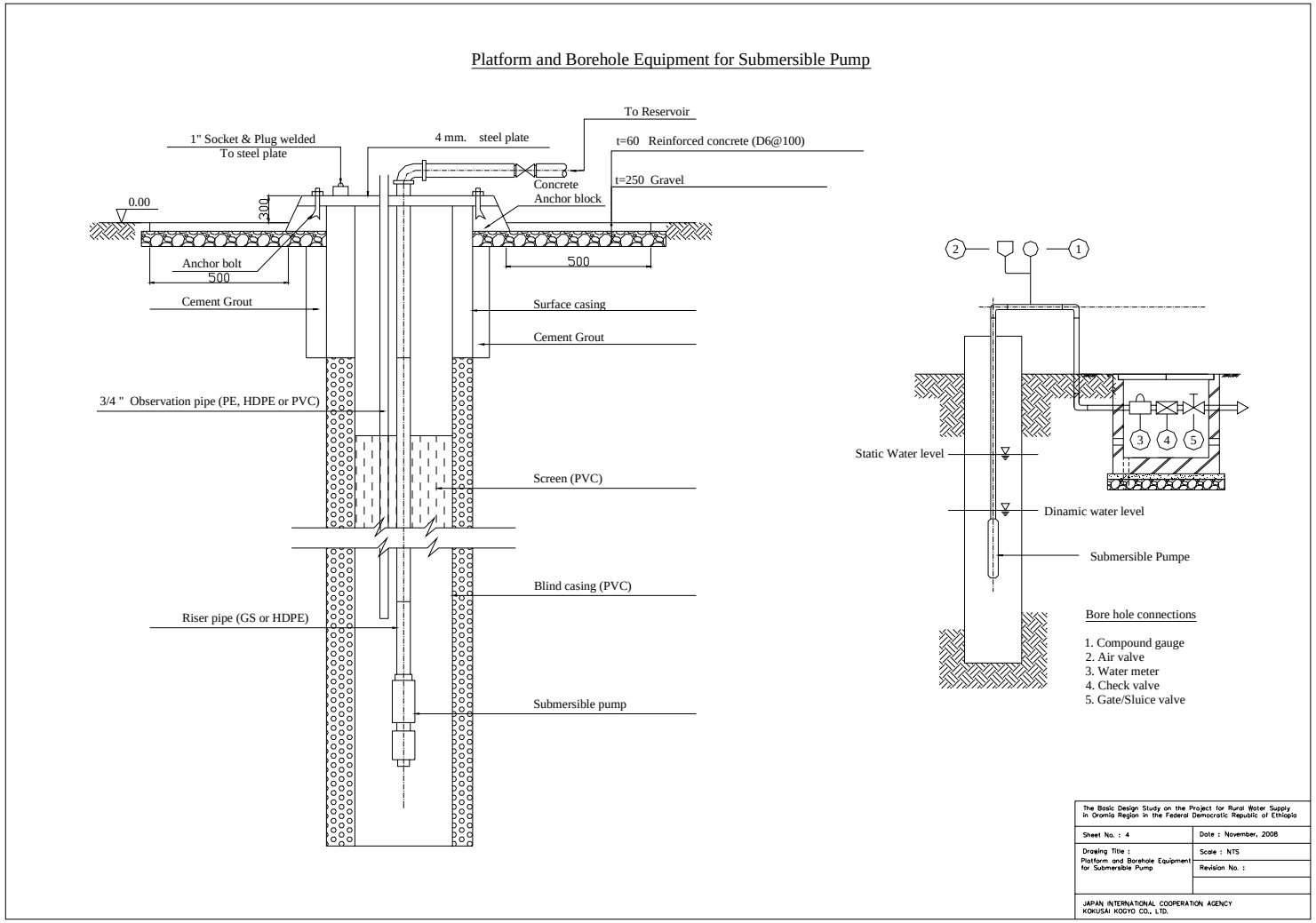


Figure 2-25 Platform and Borehole Equipment for Submersible Pump

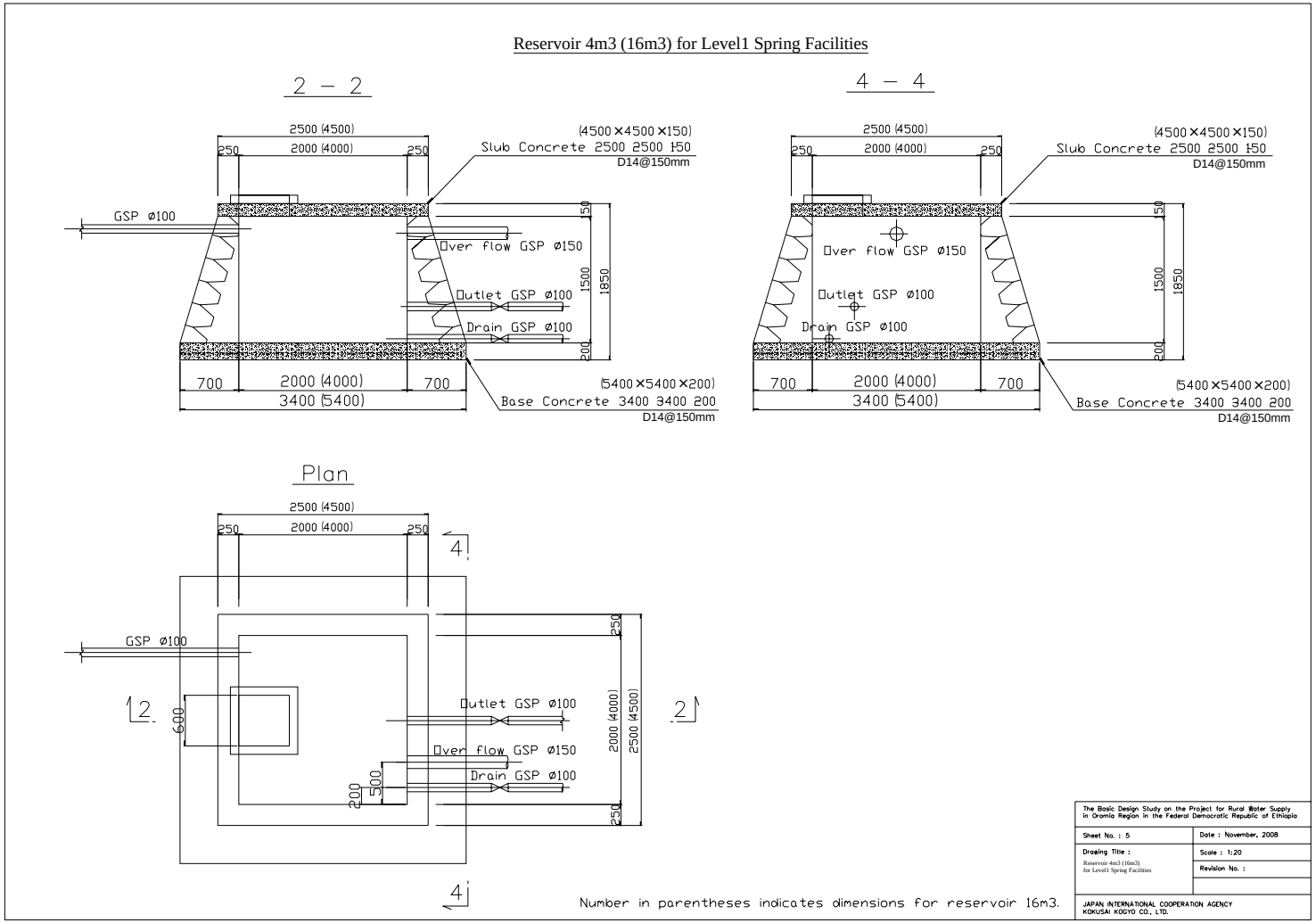


Figure 2-26 Reservoir 4 m^3 (16 m^3) for Level 1 Spring Facilities

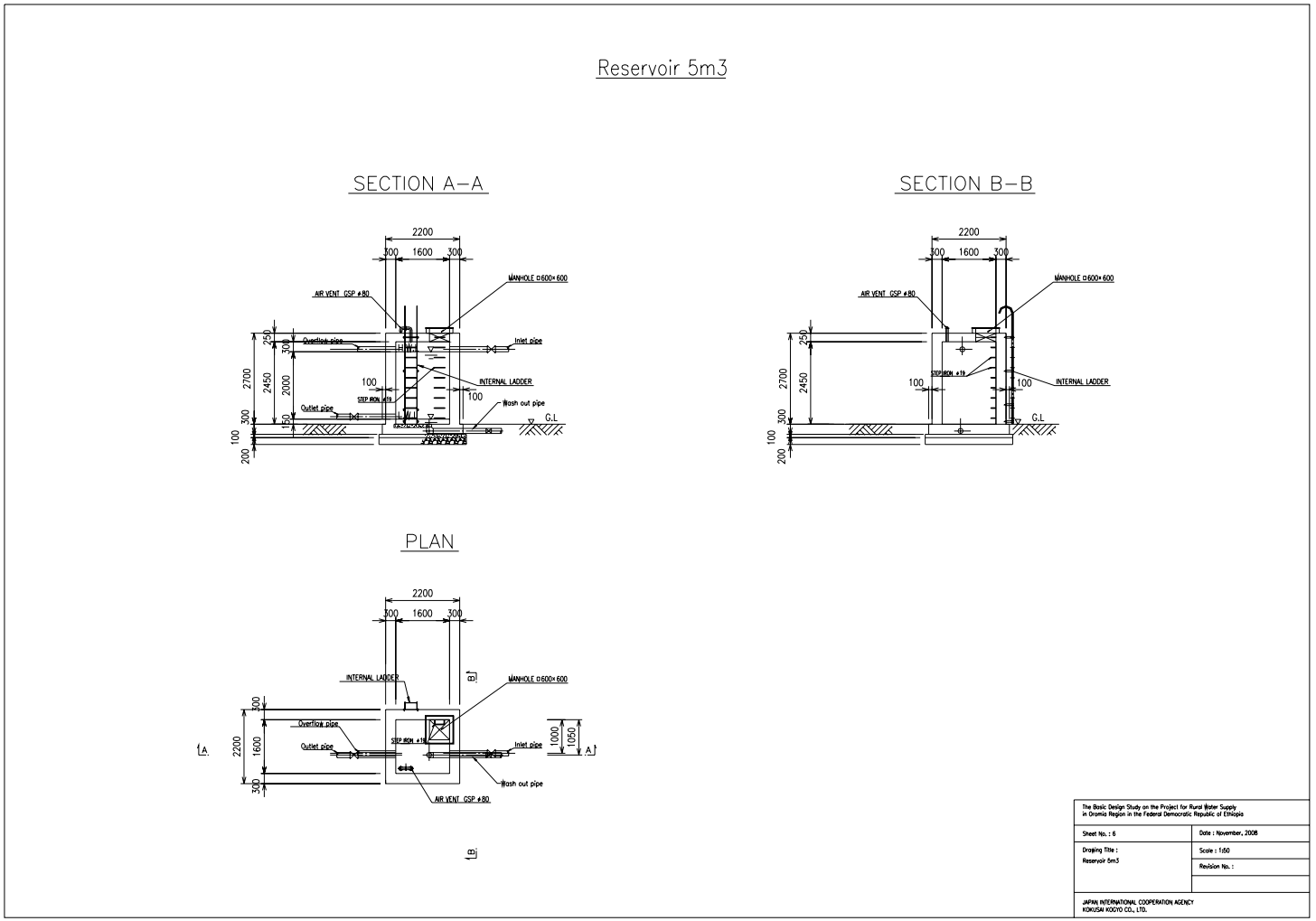


Figure 2-27 Reservoir 5 m^3

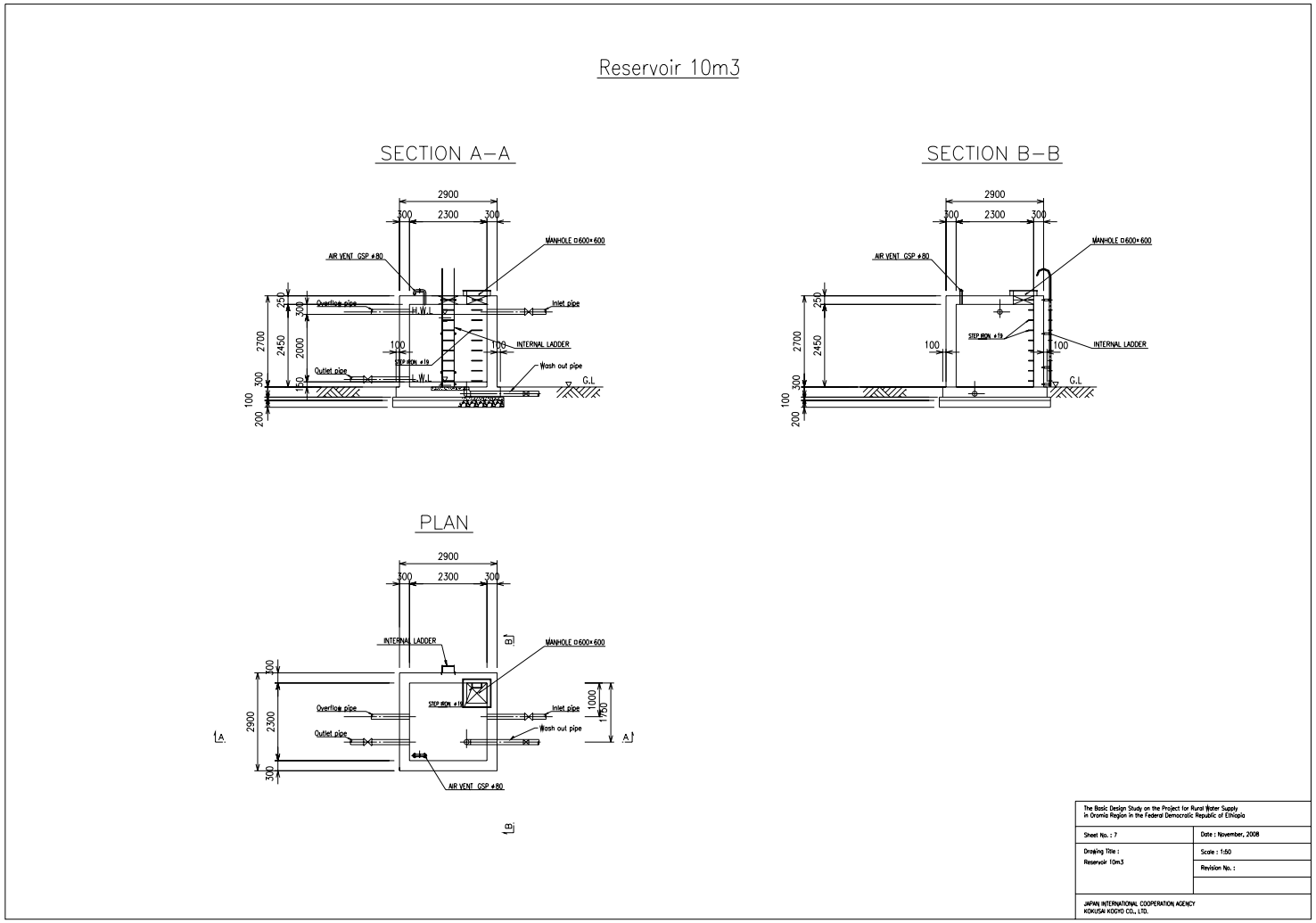


Figure 2-28 Reservoir 10 m^3

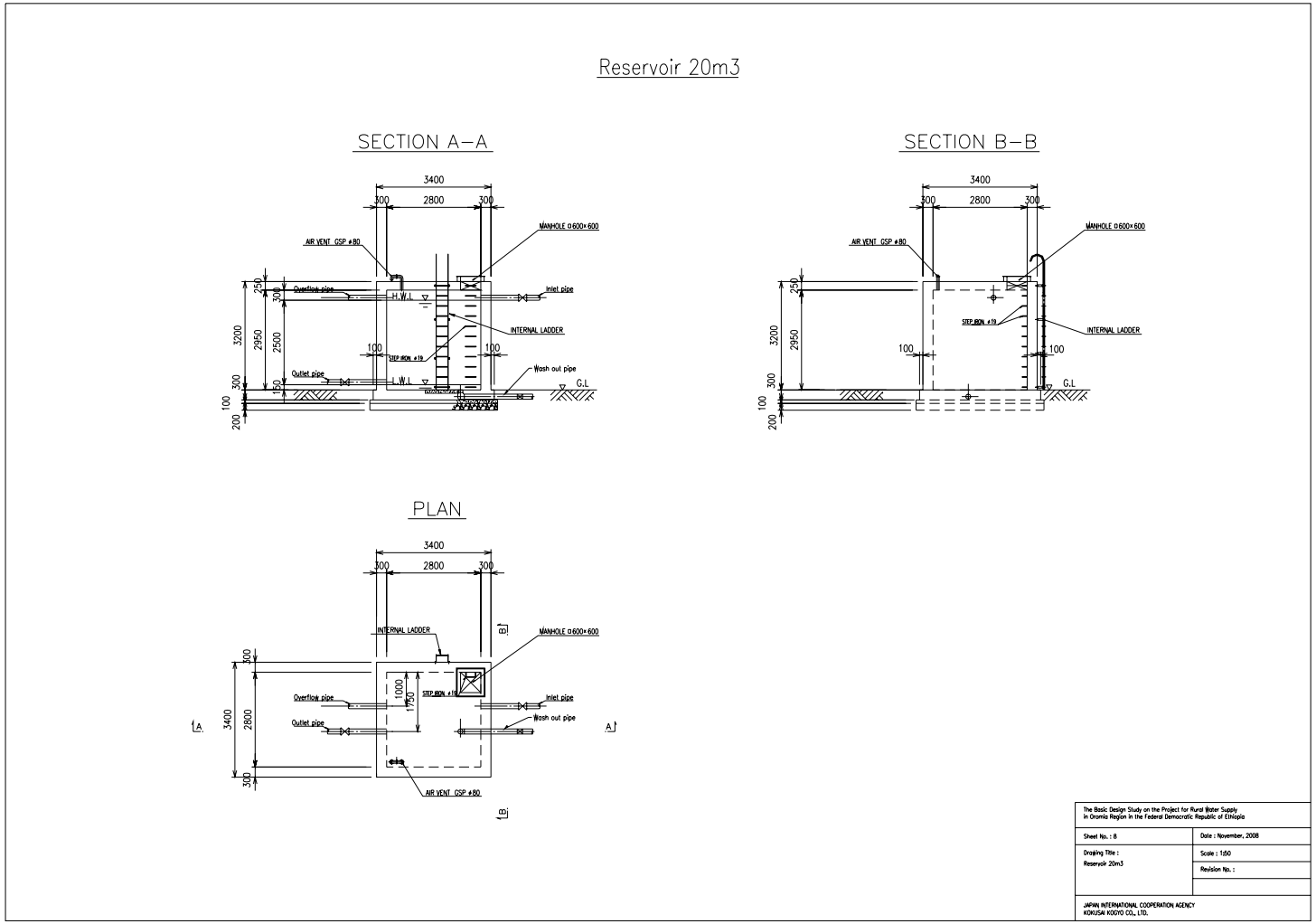


Figure 2-29 Reservoir 20 m^3

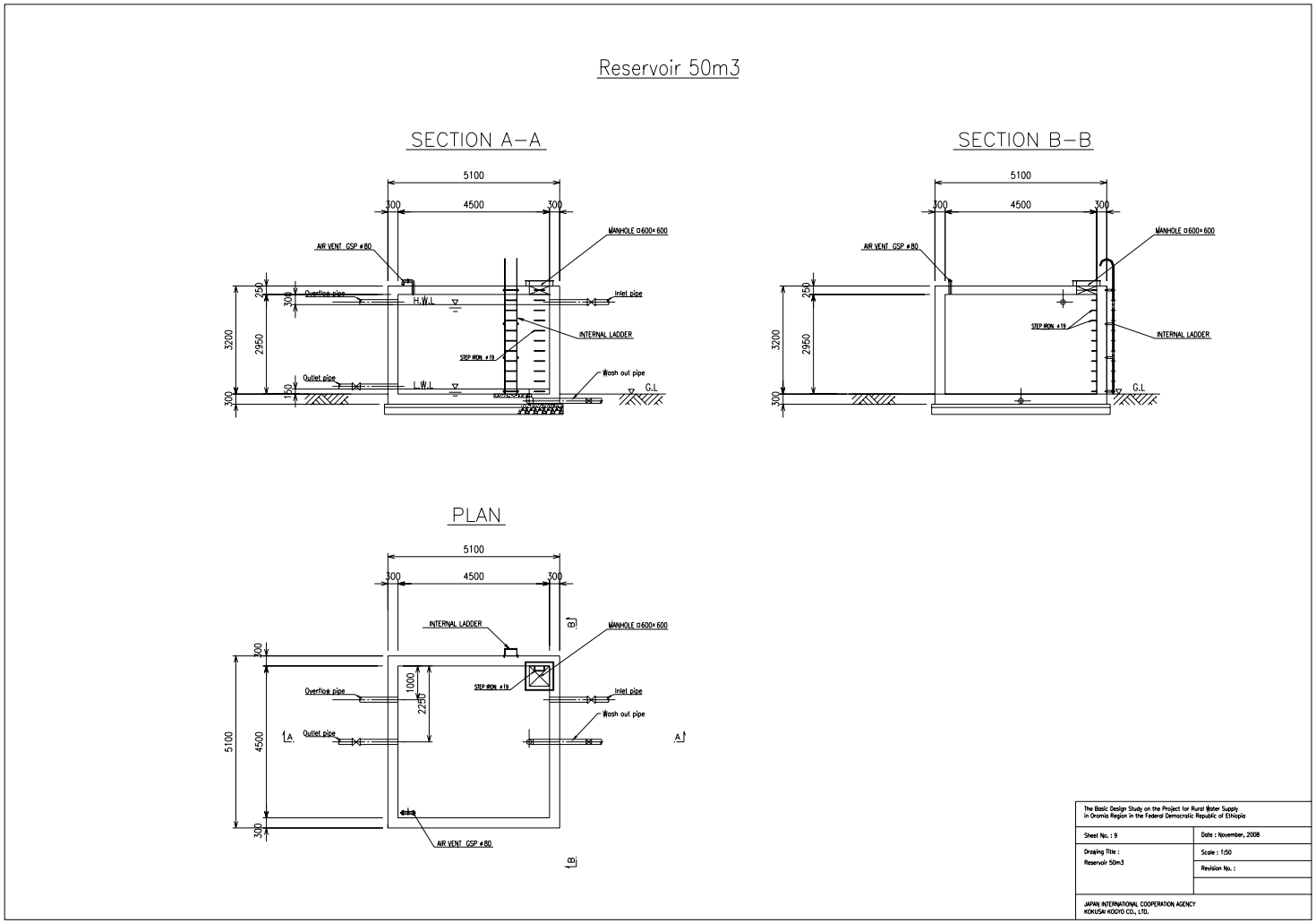


Figure 2-30 Reservoir 50 m^3

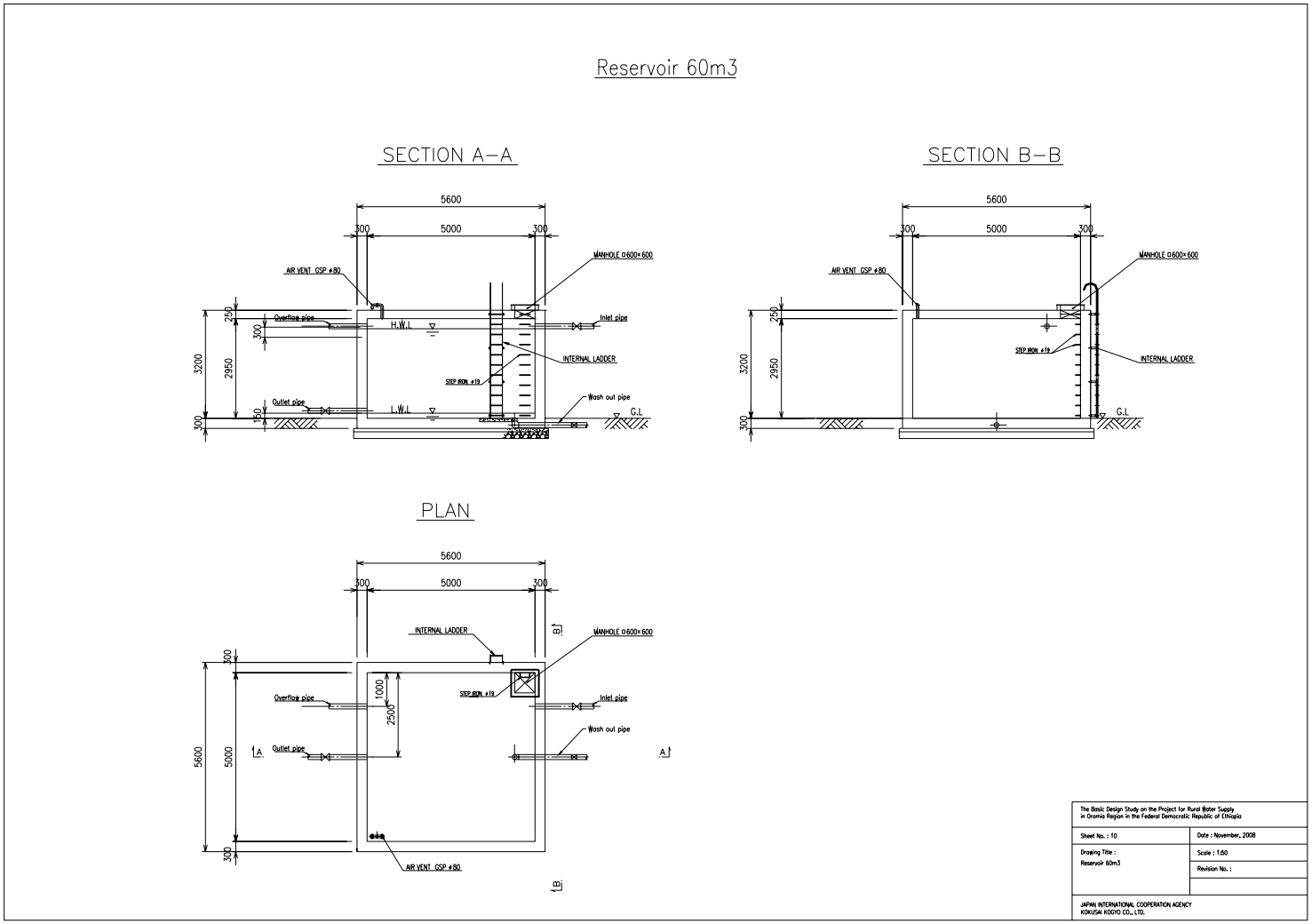


Figure 2-31 Reservoir 60 m^3

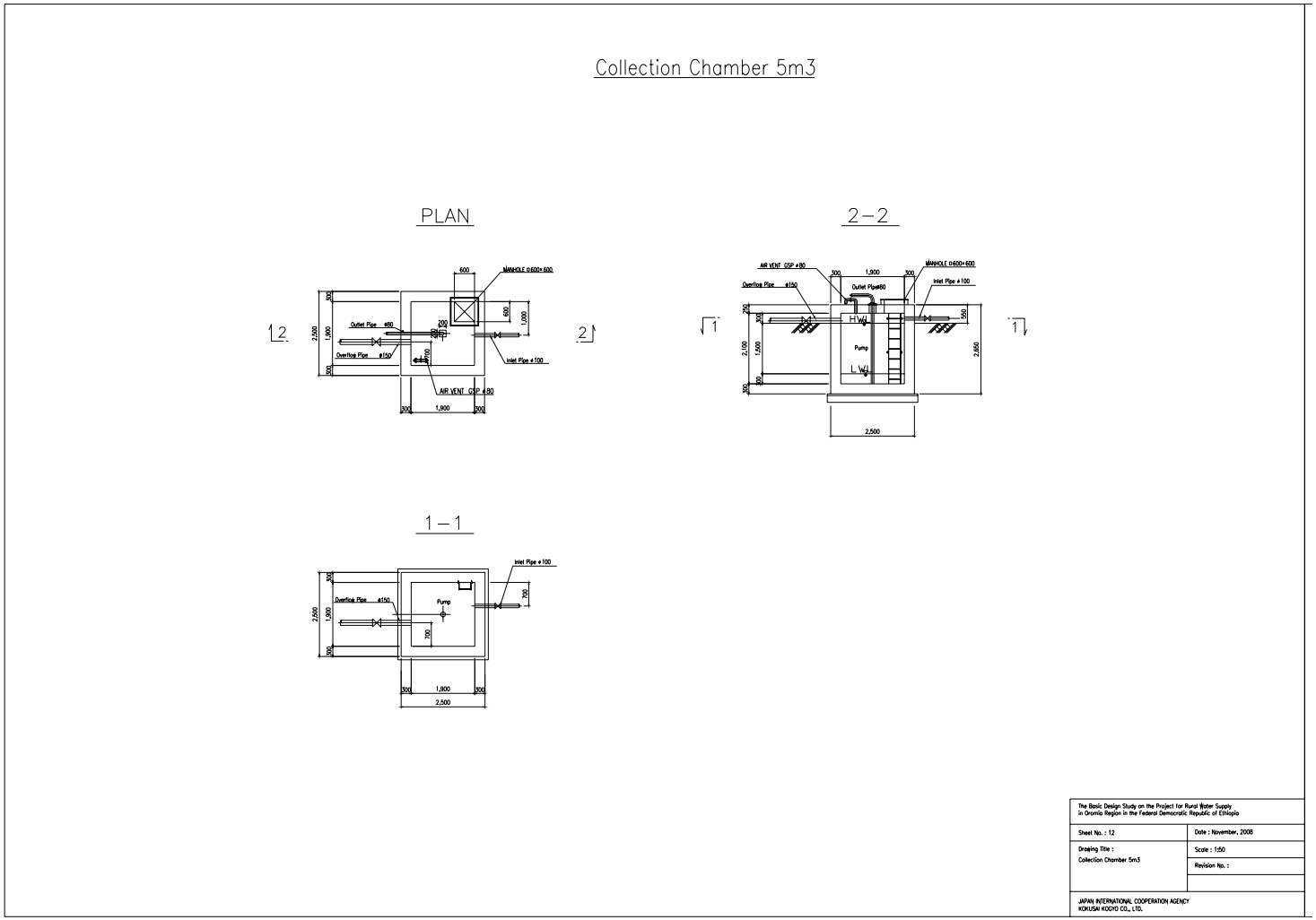


Figure 2-32 Collection Chamber 5 m^3

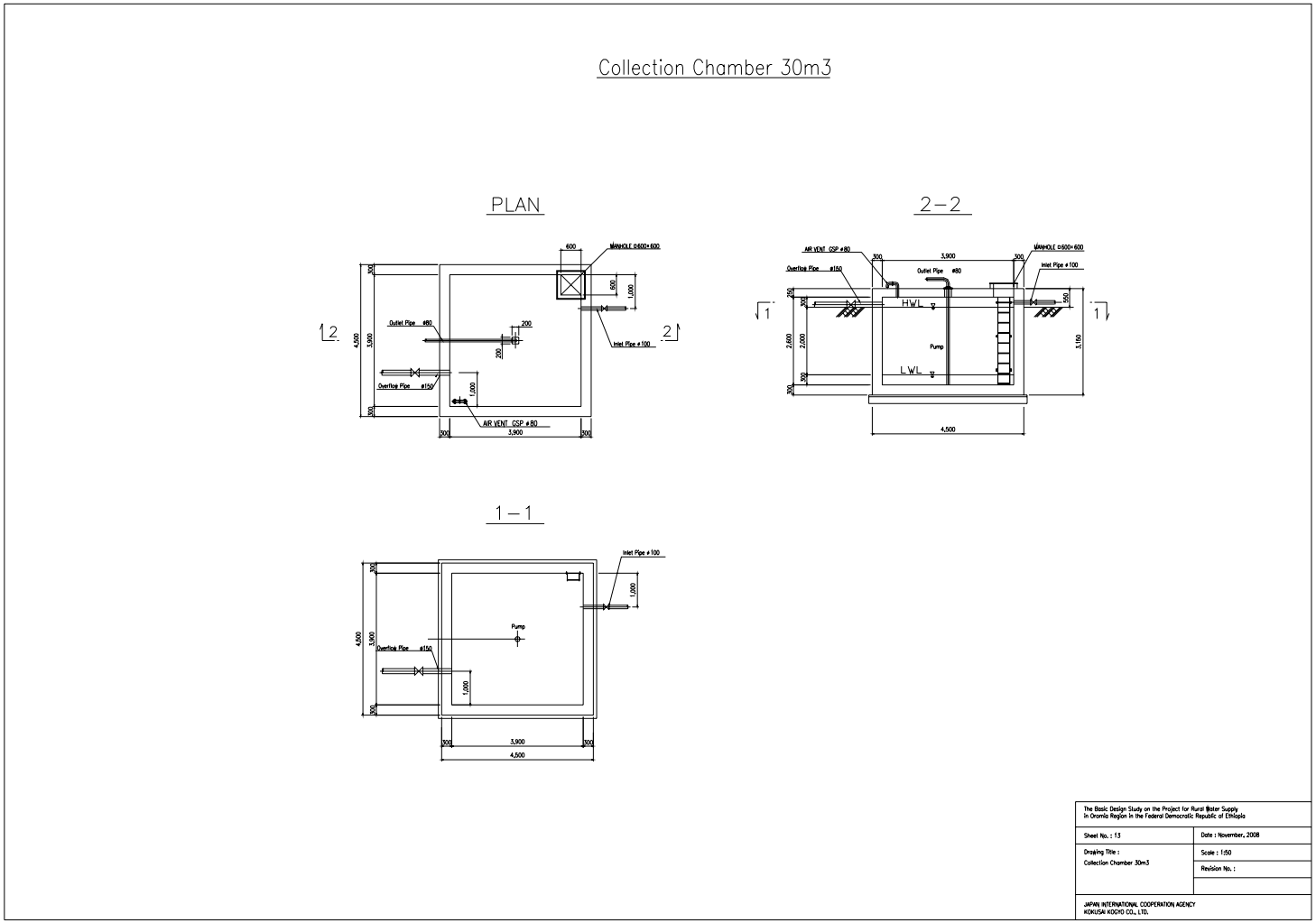


Figure 2-33 Collection Chamber 30 m^3

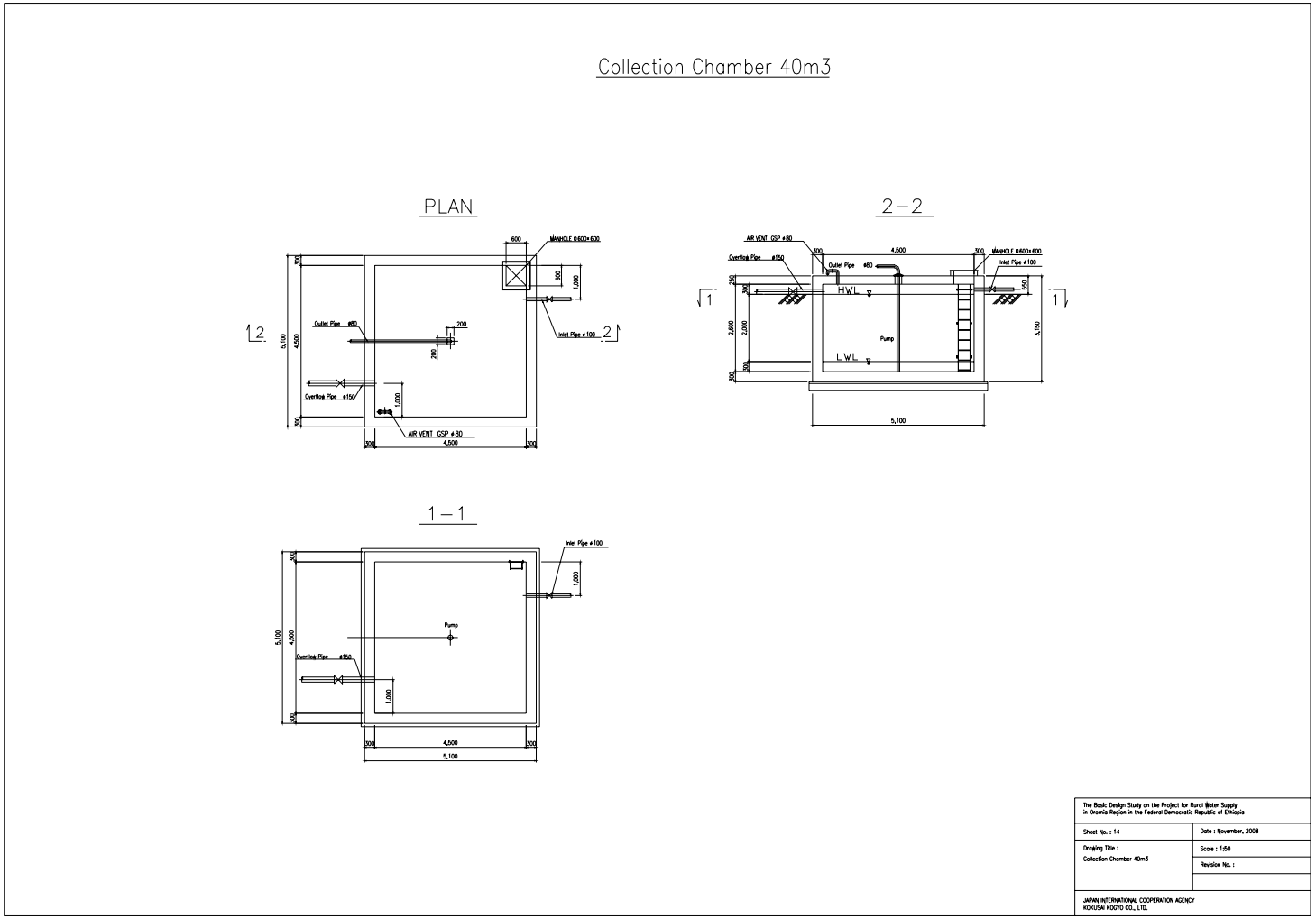


Figure 2-34 Collection Chamber 40 m^3

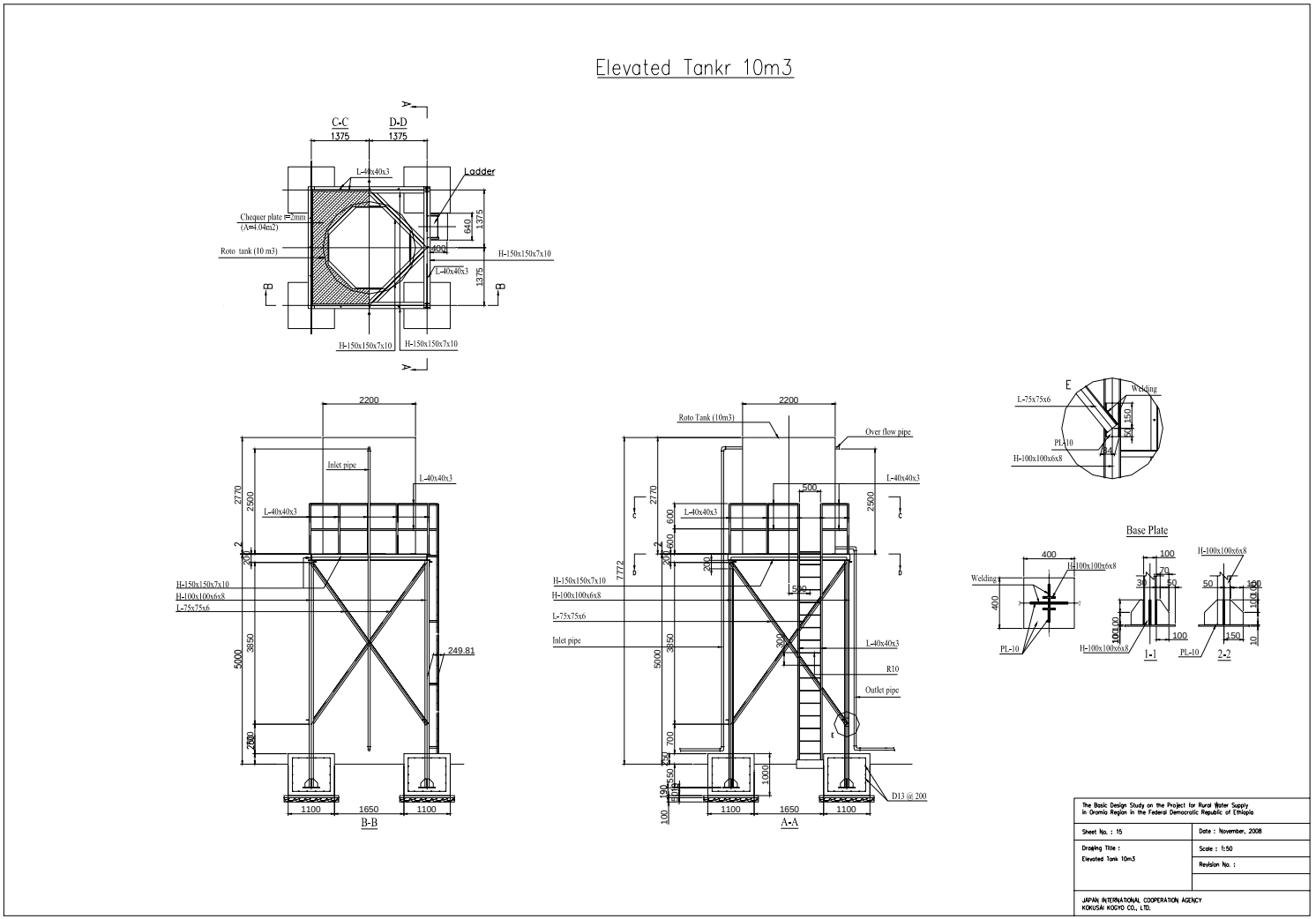


Figure 2-35 Elevated Tank 10 m^3

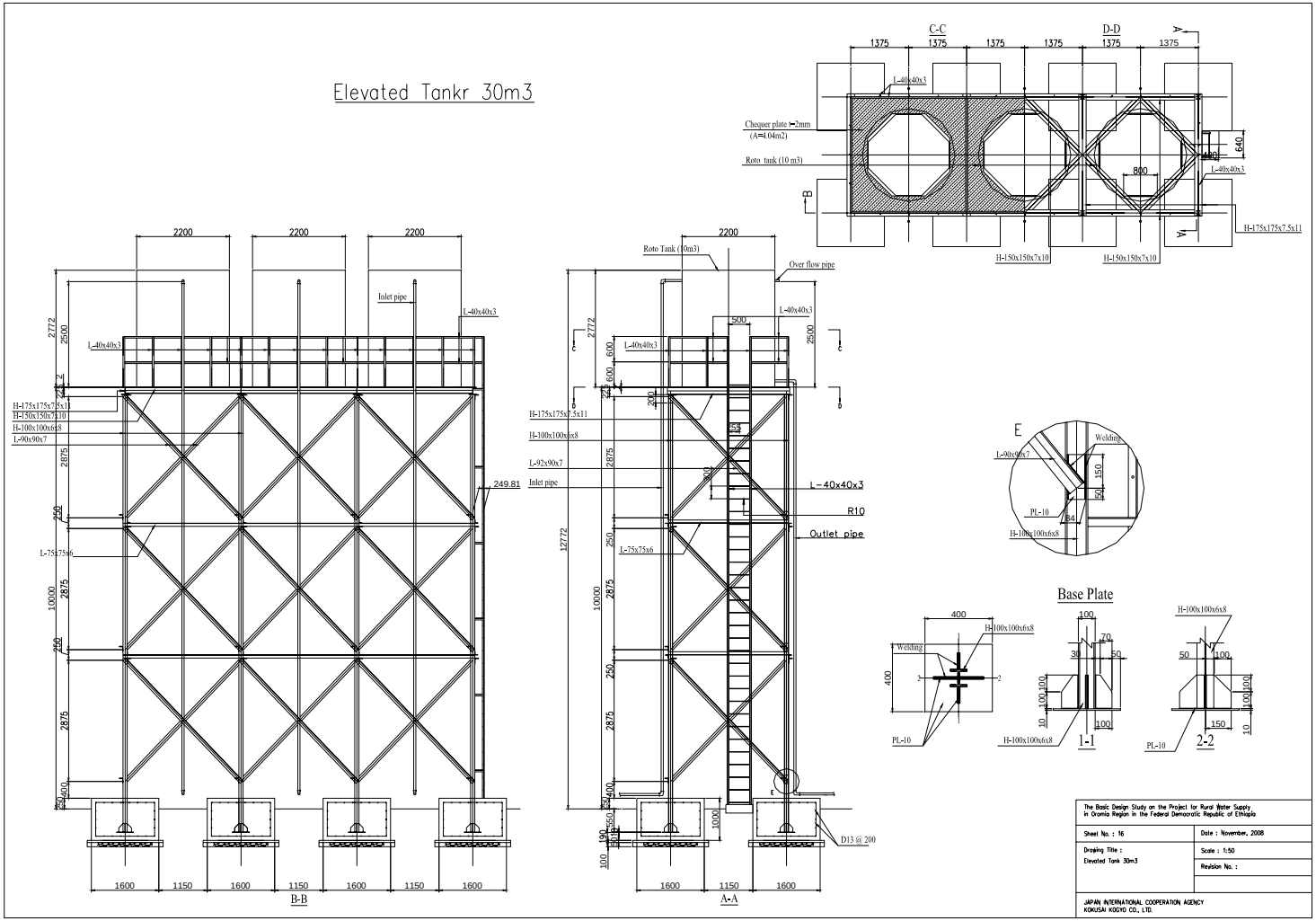


Figure 2-36 Elevated Tank 30 m^3

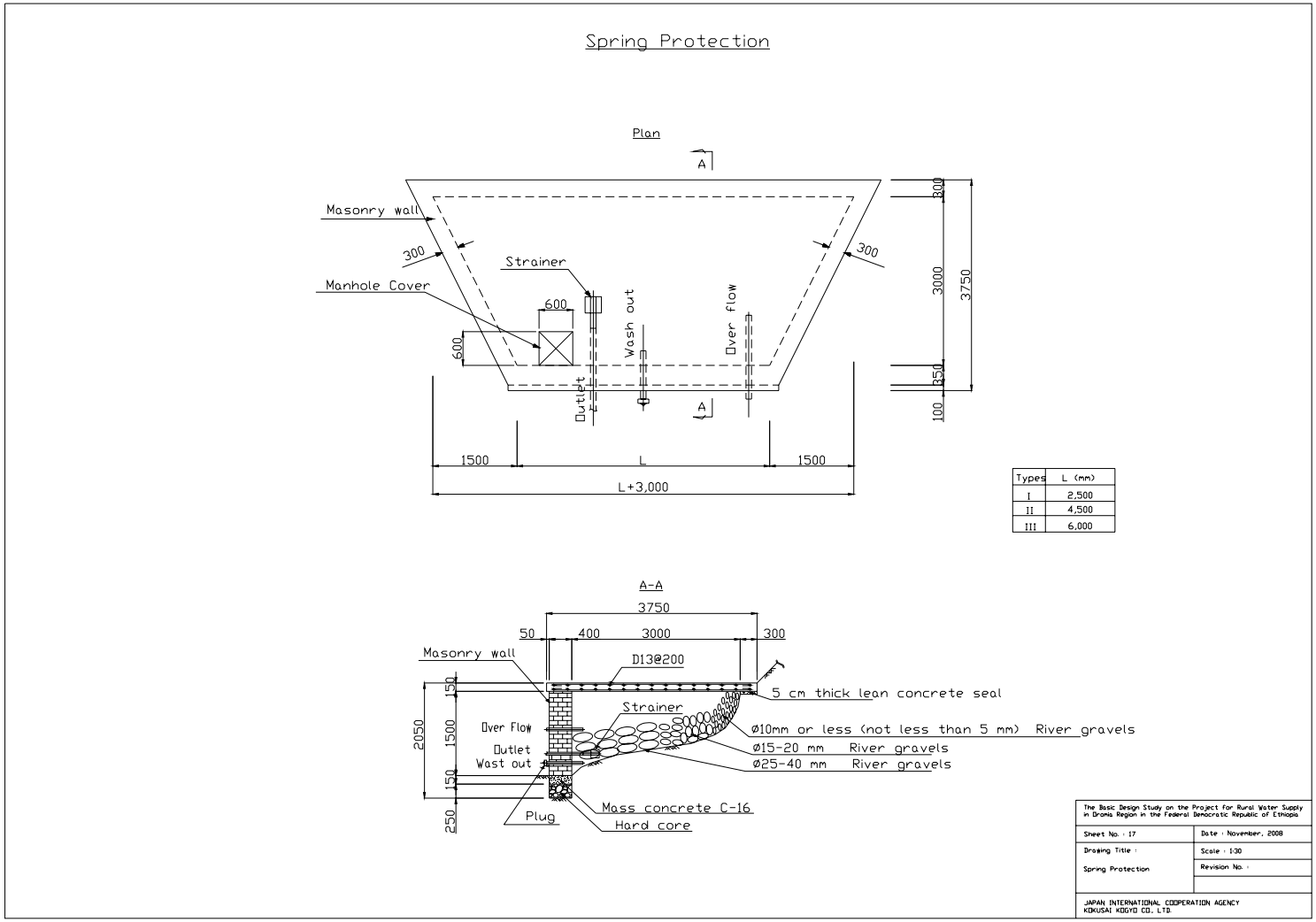


Figure 2-37 Spring Protection

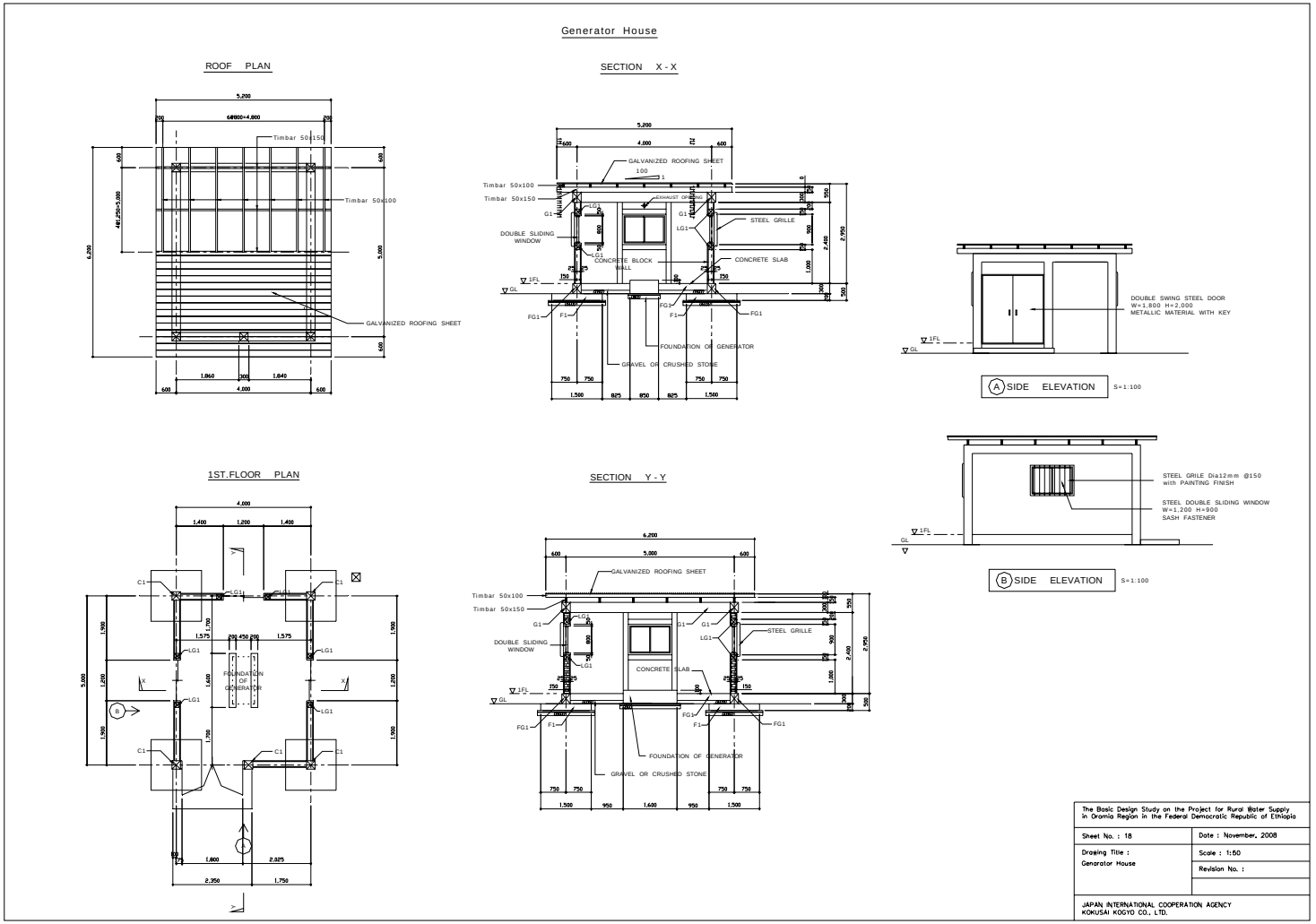


Figure 2-38 Generator House

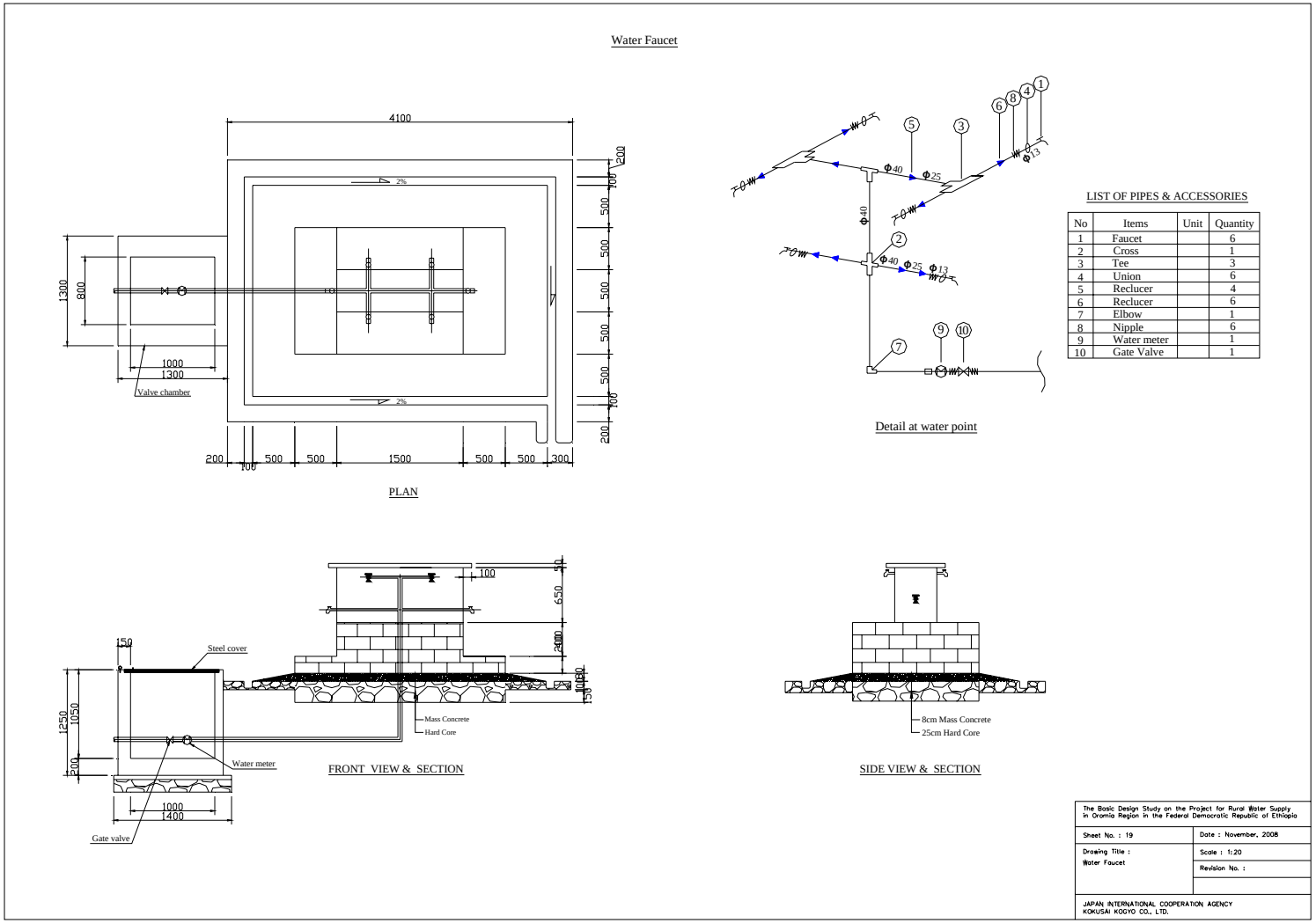


Figure 2-39 Water Faucet

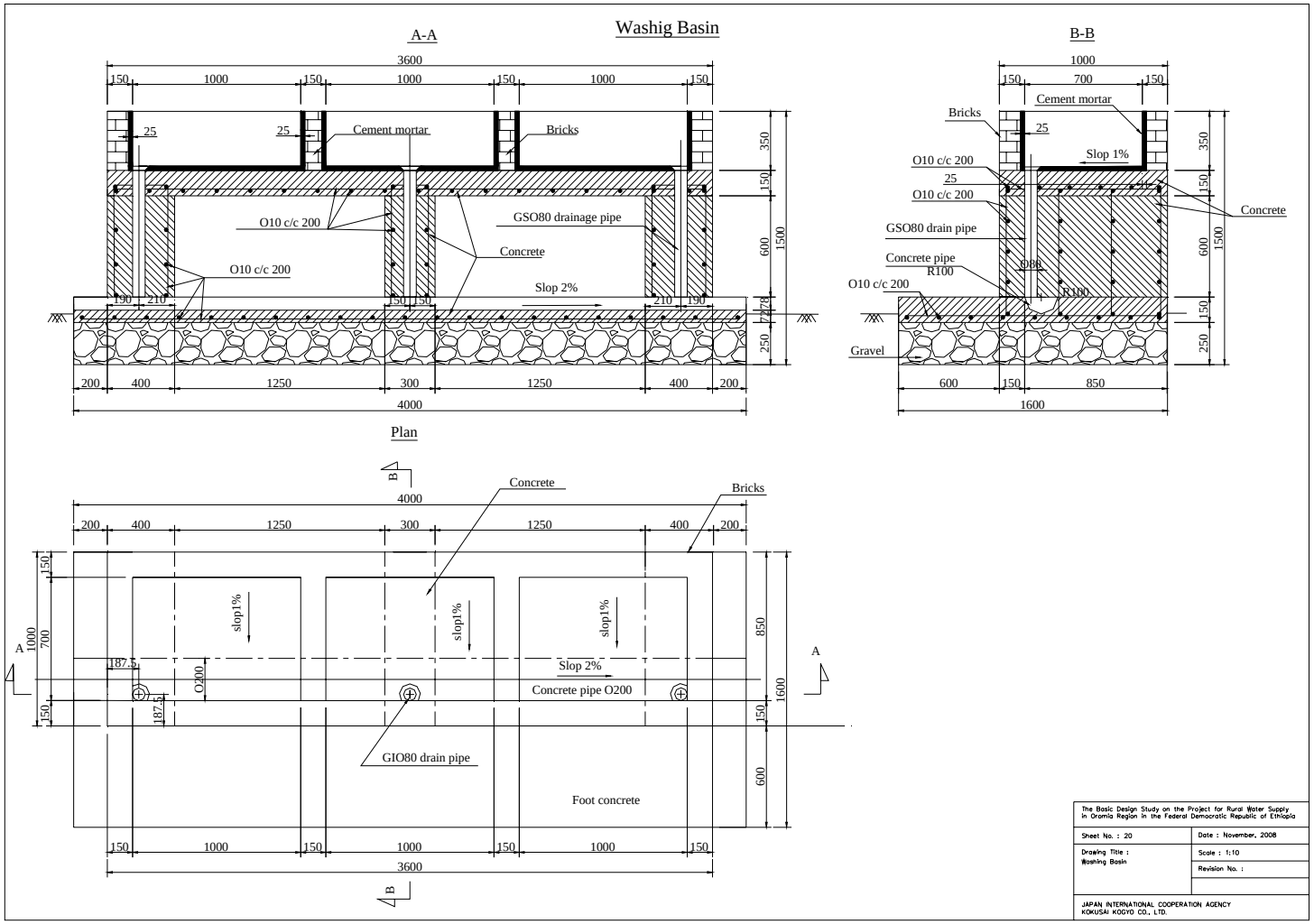
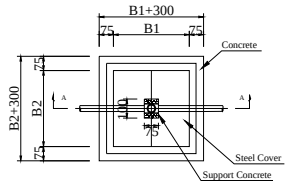


Figure 2-40 Washing Basin

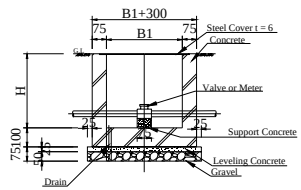
Valve Chamber

Water Meter, Gate, Wash Out and Air Valve chamber

Plan

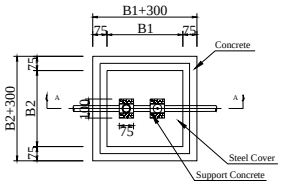


A-A



Water Meter & Gate Valve chamber

Plan



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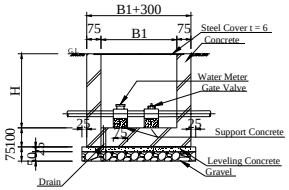
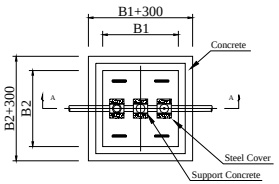
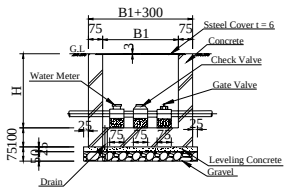


Water Meter, check and Gate Valve chamber

Plan



A-A



Items	Pipe Diameter	B1	B2	H
Water Meter	φ100	1000	800	1050
	φ150 ~ φ200	1500	800	1350
Gate Valve	φ100 ~ φ150	800	800	1350
	φ200 ~ φ250	1000	800	1350
Wash Out Valve	φ100 ~ φ150	800	800	1350
	φ200 ~ φ250	1000	800	1350
Air Valve	φ50	800	800	1350
Water Meter and Gate Valve	φ100 ~ φ150	1000	800	1350
	φ150	1500	800	1350
	φ200 ~ φ300	2000	1000	1350
Water Meter, Gate Valve and check Valve	φ100 ~ φ150	1000	800	1350
	φ150	1500	800	1350
	φ200 ~ φ250	2500	1000	1350

The Basic Design Study on the Project for Rural Water Supply in Oromia Region in the Federal Democratic Republic of Ethiopia	
Sheet No. : 21	Date : November, 2008
Drawing Title : Valve Chamber	Scale : 1:20
	Revision No. :
JAPAN INTERNATIONAL COOPERATION AGENCY KOKUSAI KOGYO CO., LTD.	

Figure 2-41 Valve Chamber

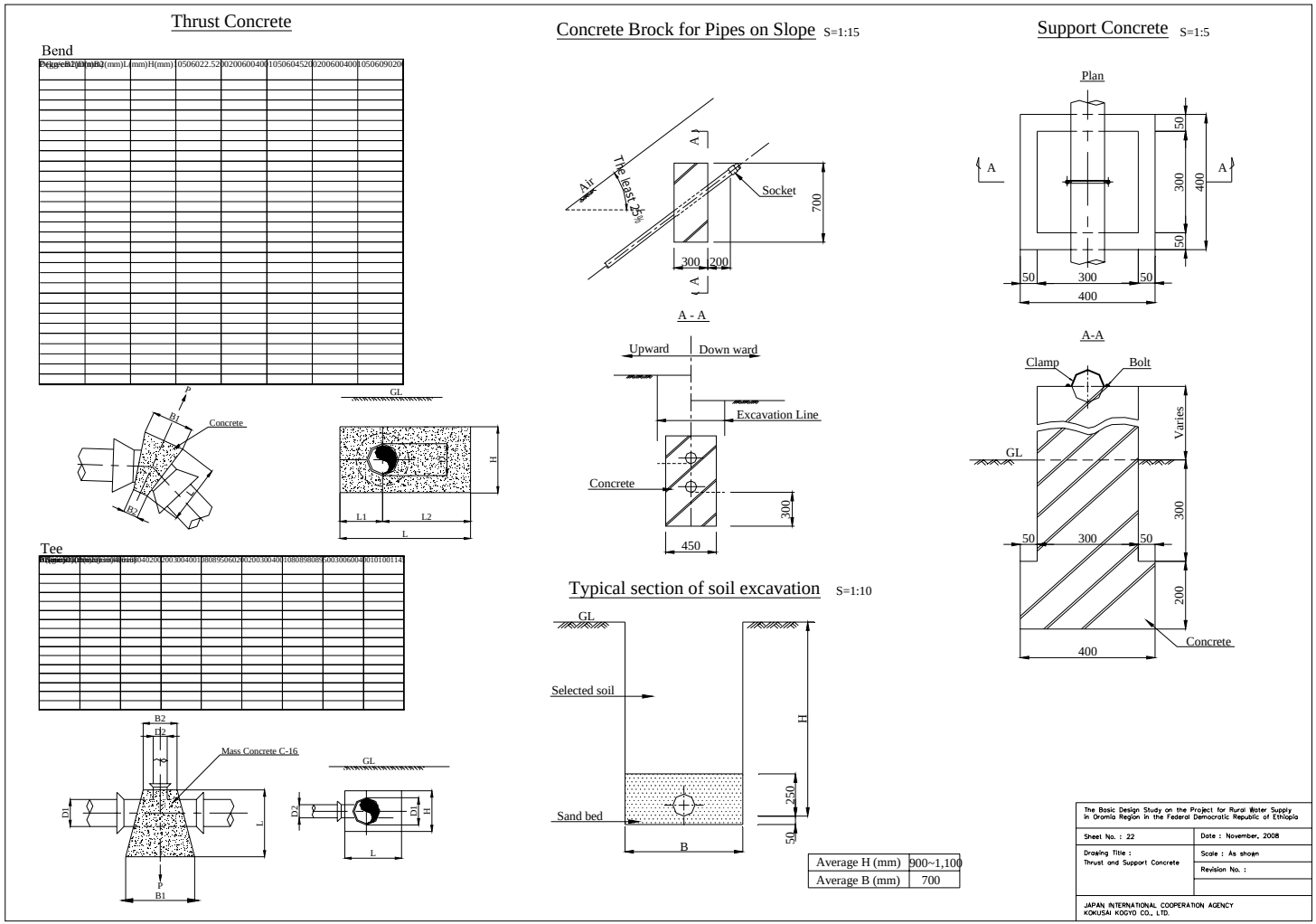


Figure 2-42 Thrust and Support Concrete

2-2-6 Implementation Plan

2-2-6-1 Concept of construction / Concept of procurement

This project shall be carried out based on the following implementation policy.

(1) Period of implementation

A period of 25.32 months (2.11 years) is required from contract signing to completion, so the project will be implemented with a "Government Bond Scheme" throughout the three financial years

(2) Type of water supply facility

The water supply facilities are categorized as follows:

1) Water sources.....from Deep well, Spring
2) Water collection.....by Hand Pump, Motorized Pump, Intake
3) Water Distribution.....by Hand Pump, On-Spot, Public faucet

(3) Principal works and composition construction works

Principal works, the critical path of the construction schedule, are pipeline works. Composition of construction works for drilling wells and civil works are to be made up of two or more teams.

(4) Method of well drilling

Drilling works are fundamentally performed using the DTH (down-the-hole hammer) method; the mud circulation method will also be adopted according to geological conditions.

(5) Target area

The target area is 3 (three) zones (West Showa, Horo Guduru and Jima) in accordance with the request from the Ethiopia side.

(6) Composition of construction management

To conduct construction works in this project requires precise decision making for the following reasons:

1) The number and wide distribution of drilling sites, and
2) Civil works, including pipe line works, are the most important works for quality and schedule control.

Therefore, a Japanese engineer will be allocated to manage technical matters and schedule control to avoid delays

2-2-6-2 Point to concern for implementation and procurement

(1) Access road conditions to work site

Existing road access and road conditions are not well maintained in this project area and some villages will not be reachable, especially in the rainy season. Therefore, it is necessary to improve road conditions and consider the execution schedule when planning the implementation schedule.

(2) Relation between OWRB, ZWRO, WWO and concerned authorities

Staff has been secured for operation and maintenance during this project. However they do not have sufficient ability and experience and, thus, will require training. During the implementation of this project, OWRB, ZWRO, WWO will require long term support by the authorities concerned, such as EWTEC staff and other concerned authorities.

(3) Soft component

The VWC must conduct sustainable operations to operate the water supply facilities, which will require strengthening the organization, marking minor repairs, conducting hygiene education and establishing a fee collection system before handing over the facilities. Meanwhile, long term support by the regional council and district council to establish a spare parts supply system and so forth is also a requirement. Therefore, the soft component activity will support VWC, WWO, ZWRO and OWRB and conduct a hygiene educational program for beneficiaries.

(4) Utilization of local contractor and local material

The local drilling contractors and civil contractors were evaluated as having the ability to implement this project as a sub contractor, and therefore the project will utilize local contractors.

The required construction material in this project such as cement, aggregate, reinforcement steel, timber and secondary products such as pipes, hand pumps, motorized pumps and generators. The countries from which construction material originates are summarized below.

Table 2-25 Country origin of construction material

Description	Country of origin			Reason
	Japan	Ethiopia	Third Country	
Cement		○		Low price and availability
Fine aggregate		○		ditto
Course aggregate		○		ditto
Steel product		○		ditto
Form material		○		ditto
Timber		○		ditto
Steel pipe		○		ditto
PVC		○		ditto
Valve		○	○	EU
Hand pump		○		Low price and availability
Motorized pump		○	○	EU
Generator		○	○	EU

However, if the material cannot be obtained locally within a certain period of time due to delivery and/or quality problems, imports from Japan or a third country may be considered. In the event it is necessary to import the material, a price comparison will be conducted between Japan and a third country and the lowest priced material shall be selected

2-2-6-3 Scope of works

The scope of works for facility construction to be implemented by Japanese Grant Aid of the Japanese and Ethiopian sides is shown below.

Table 2-26 Scope of work by Japanese and Ethiopian sides

Description	Japanese Side	Ethiopian Side	Note
Secure Water right		○	OWRB
Secure Land acquisition		○	OWRB
Secure storage yard for maintenance equipment		○	OWRB
Prepare access road to drilling point		○	Villagers, WWO, ZWRO, OWRB
Drilling well	○		
Construction Water supply facilities at Hand Pumps and Public faucets	○		
Construction drainage and/or dike to avoid flow in the water source at springs		○	Villagers
Construction drainage to discharge points		○	Villagers
Fencing around principal structure (Pump Houses, Reservoir Tanks)		○	OWRB, ZWRO
Fencing around Hand Pumps and Public faucets		○	Villagers
Install and supply the commercial electric lines to operate motorized pump （S-13 Galessa）		○	OWRB
Maintenance equipment	○		

2-2-6-4 Consultant and contractor supervision

This project will be implemented under Japanese Grant Aid for general projects by the government of Japan, and government of Ethiopia will enter into an agreement with a consultant recommended by the Japan International Cooperating Agency (JICA) for construction and procurement supervision. An agreement will be made between the contractor on the Japanese side and the Ethiopian side to construct the facilities. The consultant and the contractor on the Japanese side will dispatch supervision/management personnel as shown below

Table 2-27 Dispatch plan for personnel for consultant supervision and contractor supervision

Description	Member	Person	In charge	Duration
Construction supervisor for Consultant	Project Manager	1	Overall project management	On-spot
	Resident Engineer	1	Construct supervision	Full time
	Drilling Engineer	1	Drilling works supervision	On-spot
	Final Inspector	1	Final Inspection	On-spot
Construction supervisor for Contractor	Project Manager	1	Construction supervision	Full time
	Administrative officer	1	Administrative works and procurement control	Full time
	Drilling Engineer	1	Drilling works supervision	Full time
	Civil Engineer	1	Structure works	Full time
	Civil Engineer	1	Pipe line works	Full time

2-2-6-5 Quality control plan

(1) Concrete

1) Material

The concrete used for this project shall comply with the [Concrete Standard -2002 Japanese Civil Engineering] and/or Ethiopian standards, as shown below:

- Cement : Material Quality（JIS-R-5210 or equivalent）
- Water : Water Quality（JIS-A-5308-9 or equivalent）
- Aggregate : Sleeve analysis, Volume of hazardous substance （JIS-A-5005 or equivalent）

2) Trial Mix and Concrete Testing

Prior to commencement of the works, trial concrete mix will be conducted to decide the content of concrete mix using approved materials for each level of concrete strength. Successful trial mix proportions shall comply with the following conditions. Concrete strength shall be set for target compressive strength for each grade of concrete and fresh concrete slump test results shall be within allowable tolerance. Setting up concrete strength shall also accommodate standard deviation.

3) Concrete production

It is difficult to secure ready-mixed concrete in this project area and thus the concrete shall

be mixed at the site using a concrete mixing machine. Accuracy of the way materials are measured will affect concrete strength, so the measurement method for this project is defined as follows:

Table 2-28 Measurement method of concrete material

Item	Specification	Measurement
Cement	for Structure（21N）	by weight
	for lean concrete (18N)	
Aggregate	Fine aggregate	
	Coarse aggregate	
Water		by volume
Admixture		

4) Slump Testing

A fresh concrete slump test shall be conducted at the time of concrete casing. The allowable tolerance of slump figure shall be set at plus-minus 2.5cm.

5) Compressive concrete strength test

Concrete compressive testing will be conducted at a laboratory in Addis Ababa, taking a testing sample each time concrete is cast. Each sample will include 3 pieces. (JIS-A-1108 or equivalent)

(2) Steel products

The quality of the steel products which will be used in this project shall be checked based on the mil certificate. If the mil certificate is unable to be obtained, a tensile strength test shall be conducted with procured material. The qualities shall be confirmed based on the test results

(3) Wells

1) Material

Material specifications are shown in the chart. Material qualities shall be confirmed based on catalogues and test results.

2) Water quality analysis

Water quality analysis will be conducted by a third party. The standard shall refer to Table 2-7 Standard of water quality for this project.

(4) Pipe material

1) Material

This project shall adopt galvanized steel pipe (JIS-G-3442 or equivalent), poly vinyl chloride PVC (JIS-K-6742 or equivalent) and polyethylene pipes PE (ISO4427 or equivalent), all of which are easy to procure and maintain in Ethiopia.

2) Pipe testing

After installation of each section on the pipe lines written in the technical specifications, a hydraulic pressure test and leakage test are carried out to check the quality of the piping.

2-2-6-6 Plan of procurement for material and equipments

(1) Scope of the project

The division of the scope of works for the project between Japan and Ethiopia is as follows.

Table 2-29 Undertakings to be taken by each government

Item	Japan	Ethiopia
Procurement	・Equipment for maintenance ・Equipment for survey	・Equipment exception for equipment to be procured by Japanese side ・Spare parts which can be procured in Ethiopia
Maintenance	・N/A	・Training for operation of geophysical survey equipment with EWTE ・Securement of place to keep equipment
Tax exemption	・N/A	・Tax exemption
Warranty	・Warranty of equipment to be procured by Japanese side for 1 year	・Warranty of other equipment

(2) Plan of procurement for the supply equipment

The supply equipment of the project is based on supply at Ethiopia from viewpoints, such as ease of maintenance and service for this equipment after handover. However, the existence of a local agencies, quality of equipment, stock of spare parts and economical efficiency were judged synthetically, and the following results were reached.

Table 2-30 Procurement country

Item		Japan	Ethiopia	Third country	Remarks
A1	Motorbike		○		Available to procure from a local agency
A2	Pick-up truck		○		Available to procure from a local agency
B1	GPS	○			For economic reasons
B2	Geophysical survey equipment			○	For economic reasons
B3	Survey equipment	○			To ensure quality
B4	Water analysis kit	○			To ensure quality

(3) Schedule of procurement

1) Delivery term of the equipment

The equipment which has the longest delivery term are Pick up trucks (6 months), and shortest delivery term are Water analysis kits (1 month from Japan)

Other equipment which can be ordered at local agencies takes 6 months.

2) Transportation and arrival schedule

The equipment which to be procured in Japan will be transported by sea and inland to Addis Ababa via Djibouti port from Japan.

Delivery term to be 9 weeks from Japan to Addis Ababa (sea transport 5~7 weeks, inland transport 2 weeks)

3) Period of custom clearance

It is assumed that customs clearance will take 1 week.

4) Period of Inspection

It is assumed that the inspection will take 1 day at Addis Ababa.

2-2-6-7 Plan of soft component

(1) Background for plan of soft component

1) Background

In order for the built water supply facilities to be continuously used by villagers (the beneficiaries), the “Establishment of structure for operation and maintenance” and “acquisition of operation and maintenance” are indispensable.

The present condition of the operation and maintenance for the existing water facilities in the target area is being organized with the support of other donors and NGO at the moment.

2) Basic concept

The water supply facilities constructed in this project are to be used effectively and continuously. To do so, this plan is carried out based on the following three basic concepts.

Basic concept 1:

The continuous use of safe water from the water source (water supply facility) is urged through the implementation of hygiene education.

Basic concept 2:

Division of roles concerning operation and maintenance of water supply facilities is clarified as outlined below. Also, this deals with common issues in each organization, so mutual cooperation is strengthened by implementation of skill training which includes administration with awareness of these issues.

- Daily inspection and minor repair of the water supply facility are performed by beneficiaries under the Village Water Committee (VWC).
- ZWRO and WWO provide technical support to village, and
- ZWRO and WWO commission any major problems and repairs to OWRB.

Basic concept 3:

Reliable collection of water fees to secure operation and maintenance costs.

In addition, the above basic concepts were constructed with the following concerns in mind:

Matters of Concern:

- The lack of villagers' understanding of sanitation as they change from using an unsanitary water source to the water supply facilities which are to be built by this project. [Basic concept-1]
- The repair structure of water supply facilities does not function with a complete lack of understanding of roles and cooperation between villagers (VWC) and ZWRO, WWO. [Basic concept-2]
- The support capability of management control of operation and maintenance over a village does not improve from these organizations due to shortage in the skills, number of personnel, budget, and so forth of OWRB, ZWRO and WWO,.

- Insufficient overall management capability, from the collection of the water fee collection to payment for maintenance and repairs. [Basic concept-3]

(2) Target of soft component

1) Objective

The target of this project is "The villager's sanitation and health environment are improved in the Oromia region".

Also, the target of the soft component is framed to assure "Operation and maintenance is properly conducted by villagers" and "Long term utilization of facilities after completion of the project" in terms of the matters of concern and countermeasures of the background of the soft component and the operation and maintenance for the existing water supply facilities which are mentioned above.

2) Points to consider for support organizations

In order to assure work efficiency, the soft component activity will be conducted for each village, not for each at hand pump facility and public faucet.

The soft component activities will be conducted mainly by the Japanese consultant with the support of local consultants through On-the-Job training (OJT) with OWRB, ZWRO and WWO. The participation of OWRB in this project is proposed for next year, the exact dates and duration of which will be discussed. The project will mainly involve OWRB, ZWRO, and WWO personnel with a sufficient level of education so that they can play a central role.

(3) Output of soft component

The expected outputs of the soft component are summarized as follows.

<u>Output 1: Beneficiaries will conduct O&M activities with a sense of ownership</u>

In order for beneficiaries to sustainably implement operation and maintenance activities, it is necessary to enhance their sense of project ownership. In order to achieve this, it is important for the villagers to be involved in the decision making process, such as making user regulations and operation and maintenance rules at each stage of the project.

The following will be held to promote operation and maintenance carried out by villagers with a sense of ownership.

- Workshops included in the soft component will help to ensure that ZWRO, WWO, VWC and villagers have a common recognition of operation and maintenance.
- In order to explain the contents of this project to villagers, village meetings will be held where the villagers are able to express their opinions freely and come to an understanding, and come to have a sense of ownership of the project.

Output 2: Clarify the roles and support system of VWC and the implementing agencies

Just by establishing a new VWC in a village does not ensure that efficient and continuous control of operation and maintenance will be performed. Therefore, ZWRO and WWO should be involved in carrying out the workshops. This results in a support structure by clarifying the division of roles within a VWC, and cooperation of WWO, ZWRO and OWRB.

Output 3: Plan of operation and maintenance is centered on the villagers

The plan of operation and maintenance is centered on the villagers and will be formulated based upon the results of output 1 and 2 above. Activities will then commence based on this plan.

Once an operation and maintenance plan is decided, it is carried out as prescribed and the villagers and related personnel collaborate to conduct monitoring and evaluation of the conditions. A realistic and effective plan will be put in place based on the practice of reviewing these results and making any necessary revisions.

Output 4: Acquisition of necessary techniques by persons in charge

In order to perform continuous operation and maintenance, mastery of the following two skills are required:

- Acquisition of techniques required for operation & maintenance and repairs.

  When the implementation stage of the project reaches completion, skill training on operation and repairs will be provided to VWC, WWO and ZWRO.

  Also, cooperation with the following technical cooperation project is performed, and capacity building for the personnel of ZWRO and WWO should be carried out.
- Acquisition of techniques required for administration, such as collection of water fee.

  The VWC chairman and accountant receive training on everyday operational auditing.

Output 5: Improvement of villagers' understanding of sanitation

Hygiene education is offered to VWC, WWO and ZWRO in cooperation with other donors from the beginning of this project.

Moreover, these organizations will carry out hygiene education during this project.

(4) Indicators of output achievement

The indicator and measurement used to confirm the achievement of the 5 (five) output items are given in the table below.

Table 2-31 Indicators to achieve output

Output	Indicator	Measurement
Output 1 Villagers will conduct O&M activities with a sense of ownership.	1 Do the persons concerned have common recognition about residents' role in management control of maintenance?	1. Interview the people concerned
Output 2 Clarify the roles and support system of VWC and the implementing agencies.	1 Is the role of each organ concerned in management control of maintenance clear?	1. Organization chart for operation and maintenance
	2 Is each person concerned clearly conscious about their charge?	2. Interview the people concerned
Output 3 Formulation and execution of village O&M plan based on the role of villagers	1 Was the regulation of users defined?	1. Regulation of users
	2 Is correspondence of maintenance and repair clear?	2. Regulation of operation and maintenance
	3 Were monitoring and evaluation carried out according to the plan?	3. Record of monitoring activities
Output 4 Master the technical skills needed for operation and maintenance	1 Was the period of failure shortened?	1. Record of VWC activities
	2 Did the frequency of failure decrease?	2. Record of operation
	3 Was the record about rate collection, and institution operation and management created?	3. Records of water fee payment …etc.
Output 5 Improve villager's concept of health and hygiene.	1 Did the residents' hygiene consciousness increase?	1. Questionnaires to villagers
	2 Did the number of water diseases decrease by use of safe water?	2. Check number of water disease patients who have moved (Records of neighboring health institution, prefectural health and so on)

(5) Activities of the soft component (Input Plan)

A Japanese consultant (or local consultant under the Japanese consultant's instruction), in principle should be involved in implementing all soft component activities and should effectively utilize local resources.

Also, WWO and ZWRO should participate according to the contents of the soft component activity with cooperation of the technical cooperation project (EWTEC).

The soft component activities are categorized into three sections: Operation and

maintenance, Repair, and Improvement of Sanitation Awareness.

Furthermore, the activities categorized above will be carried out effectively in each phase, before construction, under construction, and at completion.

A description and outline of the activities which lead to each result of the soft component are given below

Table 2-32 Categorized activities and description of soft component

Term	Item	Description	Activity Type／Place	Lecturer ／【Target Audience】	Output ／Products
1 Activities Before Construction	1-1 Training of the technical development by villager's participation	Methods of increasing beneficiary participation and development will be taught to enforcement organization and the organs concerned. ● Consultants will assemble measures to improve any problems found upon analyzing OWRB, ZWRO and WWO's operation and maintenance of existing water supply facilities. ● Upon implementing the measures the consultant will confirm the above-mentioned results and policy with ZWRB, ZWRO and WWO, and then prepare the following activity Item 1-2.	Workshop ／ ZWRO	Consultant （Japanese, Local） ／ 【OWRB, ZWRO , WWO】	Output 2 ／ Workshop Report
	1-2 Villager's Meeting	Before construction (implementation) of this project, consultants, ZWRB, ZWRO and WWO explain to villagers the contents of this plan and go over again the responsibilities of the villagers. (Local consultant will continue to implement this with OWRB, ZWRO and WWO, after the initial guidance by Japanese consultant)	Workshop ／ Village	Consultant （Japanese, Local） OWRB , ZWRO , WWO ／ 【Villagers】	Output 2 ／ Workshop Report ／ Active Report ／ Hygiene Manual

2 Activities Under Construction	2-1 Decision of the Plan for Operation & Maintenance (O&M)	New village water committees (VWC) should be established or, existing VWCs should be restructured. A plan outlining the operation and maintenance of the facility including: division-of-roles (people in charge) within the VWC, rules of use covering use time, water fees, and fee collection process etc., needs to be formulated. ● OWRB, ZWRO and WWO establish (restructures) the water committee, selects people-in-charge, etc. in the target villages under instruction of a Japanese consultant and a local consultant. (Local consultants work in each area and a Japanese consultant guides local consultant)	Workshop ／ Selected Village	Consultant （Japanese, Local） OWRB , ZWRO , WWO ／ 【VWC】	Output 2 & 3 ／ Workshop Report ／ Regulations on facility use
	2-2 OJT for Inspection and Repair of Facilities - 1	Consultants and OWRB will train the staff of ZWRO and WWO in the technical skills necessary for the operation, maintenance, and repair of water supply facilities. Also, they will explain the procedure of procurement of spare parts. ● A village with a facility which is almost completed will be used by the consultant and OWRB as a model village to teach ZWRO and WWO staff how to repair serious breakdowns. (The Japanese consultant will only provide guidance in the initial stages. After that this work will be continued by the local consultant.)	Workshop ／ WWO ＋ Selected Villages	Consultant （Japanese, Local） OWRB ／ 【ZWRO , WWO】	Output 4 ／ Workshop Report

	2-3 OJT for Inspection and Repair of Facilities - 2	The local consultant, ZWRO, and WWO will train the chief of the water committee and the person in charge of operation and management in the technical skills necessary for the operation, maintenance, and repair of water supply facilities. They will also explain the procedure of procuring and managing spare parts. ● A village with a facility which is almost completed will be used by the local consultant, ZWRO and WWO as a model village to teach the residents of a target village how to repair minor breakdowns. (Local consultant will work for every area with ZWRO and WWO)	Workshop ／ WWO ＋ Selected Villages	Consultant （Local） ZWRO , WWO ／ 【VWC】	Output 4 ／ Workshop Report ／ Manual of O&M
	2-4 OJT for Administration	Consultant, ZWRO and WWO will give practical training to the chief and those in charge of administration and accounting at VWC, in the setting and collection of water fees, account management, and auditing. ● The local consultant, ZWRO and WWO will teach VWC the administrative management at the selected village (VWC) which is almost completed construction and has commenced VWC activity. (Local consultant will work for every area with ZWRO and WWO)	Workshop ／ WWO ＋ Selected Villages	Consultant （Local） ZWRO , WWO ／ 【VWC】	Output 4 ／ Workshop Report ／ Active Report

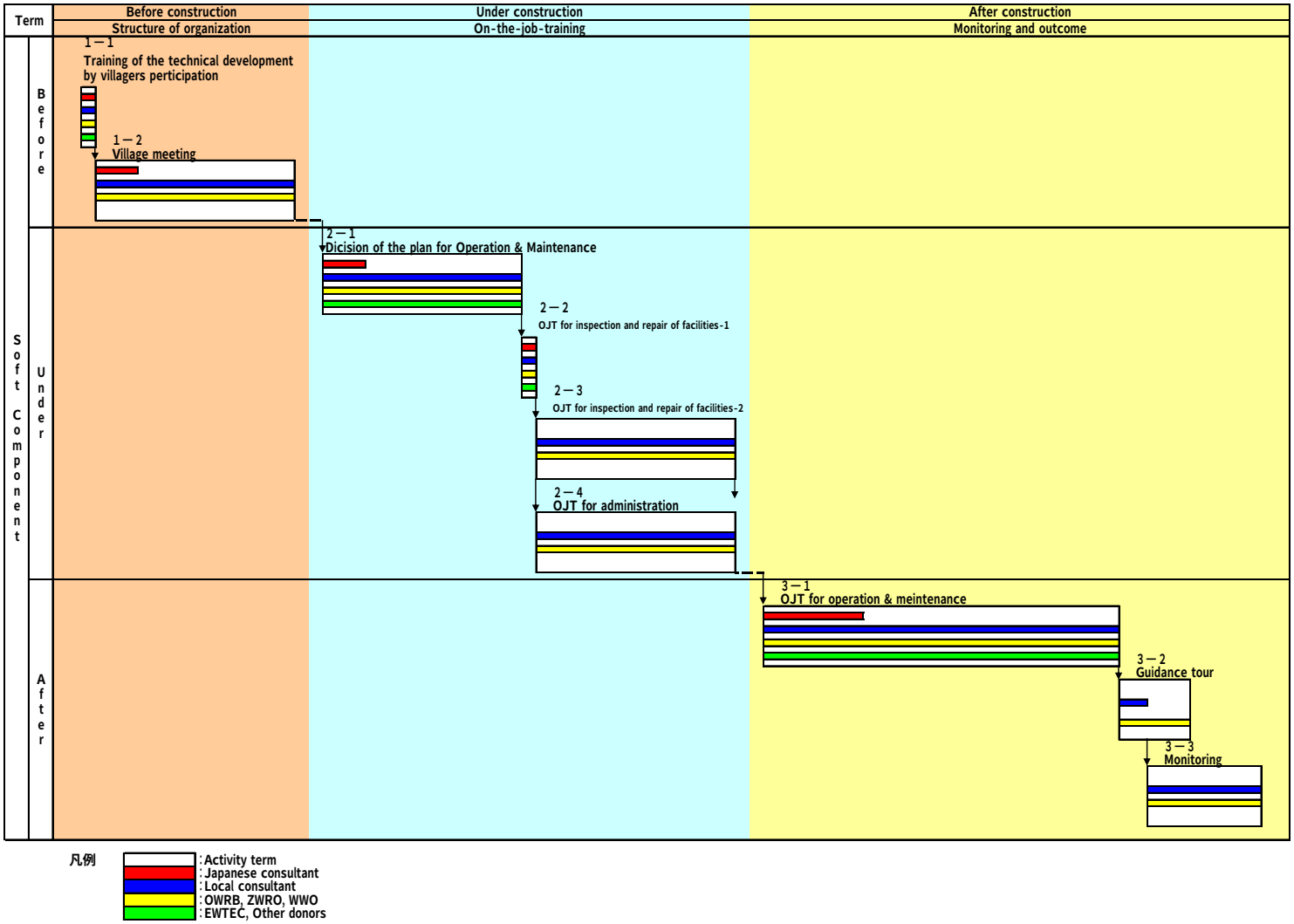
3 Activities After Construction	3-1 OJT for Operation & Maintenance (O&M)	Consultants (local and Japanese), OWRB and ZWRO will instruct WWO and VWC in operation and maintenance (O&M), and hygiene education, before the handover of the facilities. (Local consultant will continue this action for every area with OWRB after the guidance by Japanese consultant in beginning.)	at Facility ／ Villages	Consultant （Japanese, Local） ／ OWRB / ZWRO 【WWO, VWC】	Output 4 & 5 ／ Trouble shooting manual ／ Training records
	3-2 Guidance Tour	After hand over the facilities, the local consultant, OWRB and ZWRO will perform a guidance tour to monitor the activities of VWC and the condition of facilities to solve any problems etc. ● Consultant, OWRB and ZWRO investigate the outcome of above activities and perform guidance to solve any problems for WWO and VWC. ● Consultant will only give guidance to increase the capacity of OWRB and ZWRO staff on the first tour, after which they will carry it out independantly.	Guidance ／ Villages	Consultant （Local） OWRB , ZWRO ／ 【VWC, Villagers】	Output 4 ／ Guidance tour record
	3-3 Monitoring	At the end of this project (after hand over the facilities), instruction will be given about managing control-of-maintenance activities, ascertaining the hygiene situation, and techniques for problem solving. ● Monitoring activity should be commenced from about one month after the hand over of the facilities in each village.	Questionnaires ／ Villages	Consultant （Local） ／ OWRB / ZWRO 【WWO, VWC】	Output 4 & 5 ／ Monitoring Report ／ Active Report

※ Before construction …Immediately after issue commencement order.

※ Under construction …Immediately after decision the final village (Leve-1), final position of water point (Level2)

※ After construction …Immediately after operation of facility, around facility hand over

Table 2-33 Active flow of the Soft component



(6) Procurement of the main resources for the Soft Component implementation

Since soft component is to provide support concerning management skills, primary survey and design, and operation and maintenance, the implementation of this component spans the entire period of the project from inception to completion. The Japanese consultants, effectively utilizing local consultants, will efficiently and effectively attain targets using the implementation resources.

However, a Japanese consultant's intervention is to be kept to a minimum, but when necessary will be used arbitrarily as an overall resource for implementing this project, for the quality and process control of each activity, and for activities to strengthen ties with other donors and technical cooperation projects. This should take into account the purpose of the Soft Component (smooth startup of the project and to ensure sustainable results).

The necessary personnel for this activity are as follows.

♦ Japanese consultant (1 person)

As a chief of this Soft component activity, the consultant will be dispatched several times from Japan to Ethiopia during this activity. He works with a local consultant, strengthening ties with counterpart personnel of ZWRB, ZWRO, WWO, technical cooperation projects and other donors.

Japanese consultant is a talented person who has experience implementing soft component, serves both as the source of knowledge and experience for the water supply facility (electricity and machines) , and can perform capacity building of personnel concerned, all within the limited term of the project.

♦ Local consultant (1 person)

The local consultant works as the Japanese consultant's subordinate over the entire period of the project implementation. A local consultant has experience with water supply facilities and matters similar to the soft component. Also has knowledge of construction and can converse in the both the local language of the Oromia region and English.

(7) General schedule of the Soft Component

1) Content of the Soft Component

The soft component is divided into three activities (Before construction / Under construction / After construction). The Japanese consultant will be dispatched 4 times for total of 2.9months out of the total construction period 25.3 months and the local consultant will be active for 18.3months. It is difficult to comprehend activities and problems on site when the Japanese consultant is not in the country, so they will keep close communication with the local consultant and give instructions where needed.

Table 2-34 Duration of Soft Component Activity (months)

	1.Before construction	2.Under Construction	3. After Construction	Total
Japanese Consultant	0.9	0.9	1.1	2.9
Local Consultant	3.3	6.4	8.6	18.3

(8) Output of the Soft Component

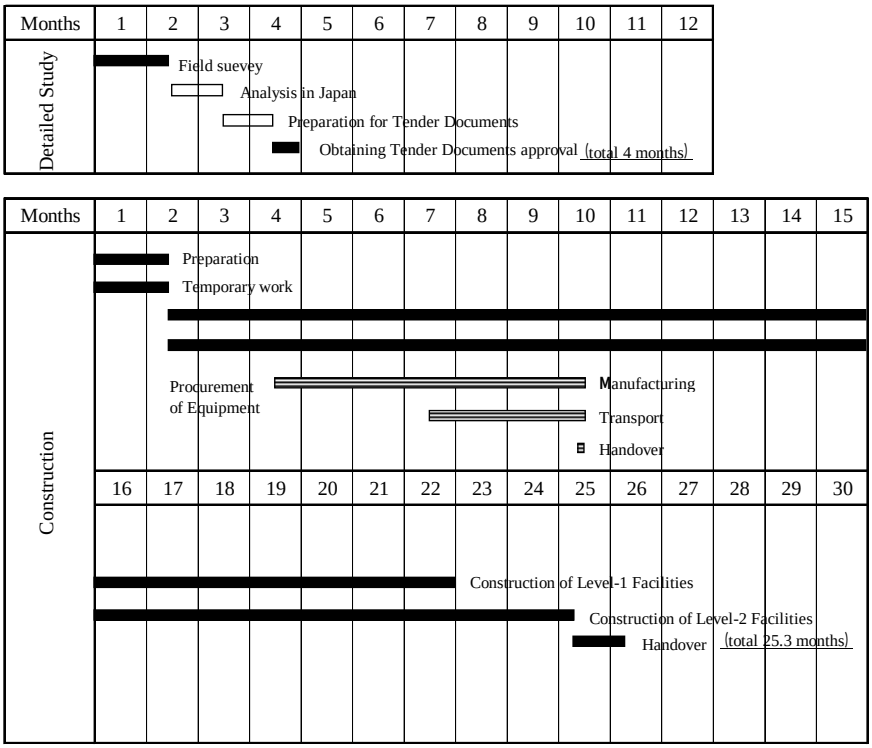
The output of the Soft Component activities is summarized below.

- Activity report
- Workshop report
- Manual of hygiene [Activity 1-2]
- User regulations [Activity 2-1]
- Technical training report [Activity 2-2, 2-3]
- Manual for operation and maintenance [Activity 2-3]
- Administration training report [Activity 2-4, 3-1]
- Manual of Trouble shooting [Activity 3-1]
- Round instruction record [Activity 3-2]
- Monitoring report [Activity 3-3]
- Completion report

2-2-6-8 General schedule

General schedule of the Detailed Design Study and Implementation is as shown below.

Table 2-35 General schedule



2-3 Obligation of Recipient Country

2-3-1 Specific Items for this Project

The following special items are required to be undertaken by the Ethiopian side when carrying out the Japanese Grant Aid scheme.

(1) The acquisition of the water rights of the source of springs and wells for the construction of water supply facilities.
(2) The land acquisition of the water supply facilities (ex. Pipe lines, Reservoir Tanks, Water Source, Pump House, etc,)
(3) Construction and maintenance o f access roads from main roads to villages and water sources
(4) To construct drainage and dike for discharging drain water and rain water around the Water Intake of Spring sources, etc.) [by villagers]
(5) To construct drainage for discharging drain water. (Out of the Platform of Hand pumps, Out of the Public Faucets) [by villagers]
(6) Construct fences around the water supply facilities.
(7) To provide consultant with free access to office space and Counterpart Personnel (C/P).
(8) To provide temporary land for Base Camp and Office of the contractor (at three Zones)
(9) To attend the technical inspection for procured equipment when arriving in Ethiopia (upon request of the consultant)
(10) To secure budget and construct the commercial electrical lines to S-13 Galessa pump house for motorized pump operation.
(11) To assign Counterpart Personnel (C/P) from OWRO, ZWRO, WWO at own expense to the Soft Component program of the project.

2-3-2 General Items

In the implementation of the Japanese Grant Aid scheme, recipient country is required to undertake certain measures, as follows,

(1) To explain, inform, communicate with the government agencies concerned and the related organizations for recognition of the project.
(2) To permit the acquisition and transfer to Japan all the data and information necessary to conduct the study.
(3) To bear the salary and other allowance for staff on the Ethiopian side.
(4) To ensure the prompt execution of unloading, customs, clearance at the port of disembarkation and internal transportation of the products purchased under the Grant Aid.
(5) To exempt Japanese nationals and the employees of third country peoples, who are employed

by Japanese consultant and/or contractor, from custom duties, internal taxes and other fiscal levies, this will be imposed in the recipient country with respect to the supply of the products and service under the verified contracts. Also, recipient country shall issue the entry visas and work permits to the above Japanese nationals and the employees of third country peoples to execute this project.

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

(7) The products purchased under the Grant Aid should not be re-exported from recipient country and/or sold off to third parties.

(8) 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 an authorized foreign exchange bank in Japan (herein after referred to as "the Bank"). The Government of Japan will execute the Grant by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under verified contracts. The payment will be made when payment request are presented by the Bank to the Government of Japan under an Authorization to Pay (A/P) issued the Government of the recipient country or its designated authority.

(9) The Government of the recipient country should bear the advising commission for the Authorization to Pay and payment commissions to the Bank.

2-4 Project Operation Plan

2-4-1 Basic Policy

There are some problems facing the target area that cause concern about the effective and sustained use of the water supply facilities constructed in the project.

- Slow progress transfering from unsanitary water source to clean water source with water supply facilities due to lack of hygiene knowledge.
- Clear division and implementation of roles relating to repairs as follows.
  - ✓ Minor repairs and maintenance are performed by VWC (villagers)
  - ✓ ZWRO and WWO provide technical support and assistance to VWC.
  - ✓ Major repairs are performed by OWRB though ZWRO and WWO.
- To make certain collection of water fees to cover the cost of operation and maintenance.
- To reinforce sustainable use of water supply facilities, implement the Soft component, such as the formation of beneficiaries' organizations, reinforcement of the operation and maintenance system, and hygiene education.

2-4-2 Establishment of Operation and Maintenance Management System

A water committee (WC) is established for each water source or public faucets, and a Village Water Committee (VWC) is established for each water supply system. The VWC chooses a leader, caretaker and accountant, and carries out daily inspection, cleaning, minor repairs and collection of repair costs.

The VWC is established in each village. The committee presides over the WC, and requests to ZWRO and WWO, who support Operation and Maintenance (O&M) as implementation agencies for repair of the facilities, for delivery of spare parts and so forth.

The roles and structure of O&M for water supply facilities are described below.

(1) Water Committee (WC)

1) Role

- ✓ Operation and maintenance for water sources or public taps
- ✓ Collection of water charge and payment to VWC

2) Structure

- ✓ Group leader: acts as coordinator for WC, contacts VWC when a well breaks down and communicates with other administrative agencies
- ✓ Caretaker: regularly inspects and the water supply facilities, cleans up around the facilities and makes minor repairs
- ✓ Water seller: collects water charge and transfers payment to VWC

(2) Village Water Committee (VWC)

1) Role

- ✓ Management of WC
- ✓ Contact to ZWRO and WWO
- ✓ Support for repair and maintenance of facilities
- ✓ Implementation of hygiene education
- ✓ Collection and holding water charge from WC
- ✓ Management and allocation of the cost for operation and maintenance

2) Structure

- ✓ Chairman: coordinates WC, manages budget and discuss ZWRO and WWO
- ✓ Accountant: collects and keeps water charge from WC
- ✓ Operator: operates water supply facilities and equipment
- ✓ Person in charge of maintenance: performs minor repairs and support WC

- ✓ Person in charge of hygiene education: promotes hygiene education

(3) Woreda Water Office (WWO)

1) Role

- ✓ Management of well log book
- ✓ Technical support, hygiene activities and advice for O&M
- ✓ Support for procurement of spare parts
- ✓ Survey and design for new and existing facilities
- ✓ Contact with ZWRO

2) Structure

- ✓ Head: coordinates operations in the Woreda and contacts organizations concerned
- ✓ Accountant, General affairs: Accounting for the whole organization and correspondence between divisions
- ✓ Water supply construction core process: construction work
- ✓ Water supply facilities management core process: maintains pipes, pumps, and generators
- ✓ Water resources management core process: maintains wells and springs

(4) Zonal Water Resources Office (ZWRO)

1) Role

- ✓ Management of WWO and coordination with donors and WASH program
- ✓ Maintenance of major repairs and support
- ✓ Support for procurement of spare parts
- ✓ Technical training of maintenance for WWO
- ✓ Support of hygiene activities for WWO
- ✓ Survey and design for new and existing facilities
- ✓ Contact with OWRB

2) Structure

- ✓ Head: coordinates operations in the Zone and contacts organs concerned
- ✓ Accountant, General affairs: Accounting whole affairs. Correspondences
- ✓ Water supply construction core process: implements the construction work
- ✓ Water supply facilities management core process: maintains facilities
- ✓ Water resources management core process: supervises operation and maintenance of wells and springs

(5) Oromia Water Resource Bureau (OWRB)

1) Role

- ✓ Implementation for water supply projects
- ✓ Investigation of rural water supply projects

2) Structure

- ✓ Water supply construction core process: implements the construction work
- ✓ Water supply facilities management core process: maintains facilities
- ✓ Water resources management core process: develops and maintains water resources

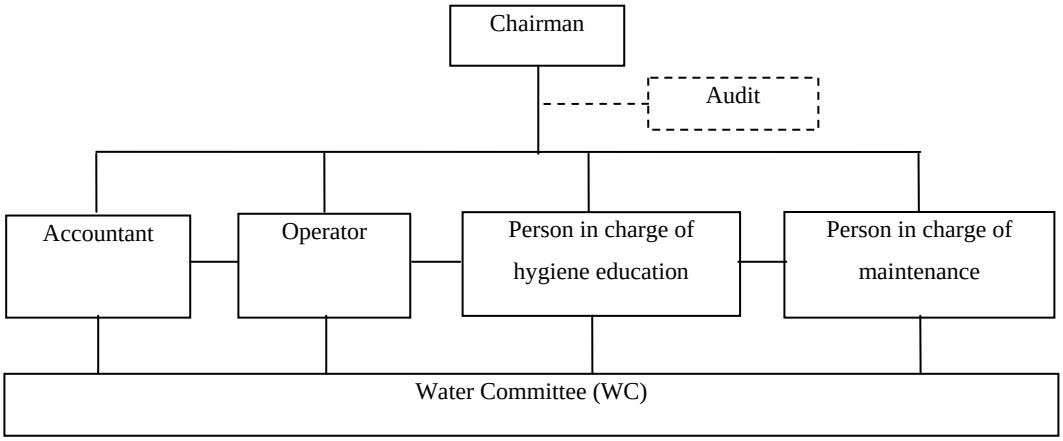


Figure 2-43 Organization chart of Village Water Committee (VWC)

2-4-3 Establishment of Repairing System for Water supply Facilities

(1) Minor breakdown

When the water supply facilities can be repaired easily, such as by changing parts, VWC purchases the necessary parts with its own funds and the caretaker changes the parts. WWO provides technical assistance to VWC if necessary.

(2) Major breakdown

VWC entrusts repair to the ZWRO through WWO concerning any breakdown which requires special equipment, material or technology.

2-4-4 Operation and Maintenance Cost

In principle, the operation and maintenance cost shall be borne by the beneficiaries. Further detail on operation and maintenance cost is shown in section 5-2: Operation and Maintenance Cost

2-4-5 Establishment of Supply System of Spare Parts

The firm that supplies spare parts for water supply facilities has an office in Addis Ababa, but

such offices or outlet stores are rarely located in target villages. If the number of water supply facilities increases through the implementation of the project, stores selling spare parts may be set up, but there is no guarantee for this to happen, so plans are based on the current stores in Addis Ababa.

It is unrealistic to expect the beneficiaries to purchase spare parts by themselves since they have little supplier information and it is difficult for them to travel to Addis Ababa.

Therefore, it is reasonable that the spare parts be sold by suppliers to the OWRB, ZWRO and WWO, or the ZWRO and WWO can purchase spare parts from the suppliers directly with reserve funds for repairs.

In the project, spare parts will be provided to operate and maintain the facilities for the time being. If spare parts are provided directly to VWC, it is possible that this would disrupt promotion of the repair reserve funds. Therefore, having ZWRO and WWO store the spare parts is under consideration.

2-4-6 Hygiene Education

There are many unsanitary water sources in the target area. Despite the development of good quality water resources, an effective reduction in waterborne disease will depend on a shift away from residents using unsanitary water that they have been drinking. To avoid this, it is necessary for the residents to be fully aware of the importance of good quality water by learning the facts of hygiene, leading to a positive change in their attitude to water use. For this reason, hygiene education is planned as follows.

- ✓ Person in charge of hygiene education of OWRB, ZWRO and WWO acts as a facilitator to implement hygiene education to residents.
- ✓ The hygiene education manual prepared by the study team will be used as teaching material, and the stock of teaching materials prepared in past projects by other donors will be used as support materials.
- ✓ The hygiene education deals with three themes, “water”, “sewage” and “waste”

2-4-7 Participation of Beneficiaries in the Construction Works

The purpose of beneficiary participation is to reinforce their sense of ownership, heighten sustained use of the water supply facilities and hygiene education. Beneficiary participation is limited to the following tasks, which do not affect the essential functions of the water supply facilities.

Table 2-36Work list for beneficiary participation

Object	Description	Works
Access road	Access road to delivery materials and machine for the construction	Earth work
Drainage	Drainage of platform, public tap and washing basin	Earth work
Fence	Fence around platform, public tap	Exterior work
Embankment, Drainage	Prevention for inflow waste water to springs	Earth work Stone masonry
Weeding, Cleaning	Keep clean around water supply facilities after handover	Earth work

2-5 Project Cost Estimation

2-5-1 Initial Cost Estimation

This cost estimate is provisional and to be further examined by the Government of Japan for approval of the Grant.

(1) Obligation of Ethiopia side

The following cost shall be the burden of the Ethiopia side.

2,671,000 Birr (Approximately 32 million JPY)

Table 2-37 Cost borne by the Government of Ethiopia

Description	Estimated Cost (Birr)
Construction of the power line at the Galessa site	60,000
Construction of fences for facilities	772,000
Allowance for Soft Component work	425,000
Tax on Equipment to be procured	1,344,000
Commissions of an Authorization to Pay (A/P)	70,000

(2) Condition of Quotation

1) Time of Estimation

The project cost was estimated in April 2008 when the field survey of the Basic Design Study was completed.

2) Exchange Rate

The project cost was estimated using the average rate over six months from October 1, 2007 to March 31, 2008.

1 US$ = 110.40 Yen

1 Euro = 162.34 Yen

1 Birr = 12.00 Yen

3) Schedule for the Construction and Equipment Procurement

Schedule for the construction and equipment procurement is shown in the implementing schedule.

4) Others

The project cost was estimated according to the Guideline of Japanese Grant Aid.

2-5-2 Operation and Maintenance Cost

The operation and maintenance costs for the level 1 facilities, hand pump wells and intakes of springs on-spot, and level 2 facilities are shown in the following tables.

Table 2-38 Operation and Maintenance cost per Hand pump well (Level-1)

（Birr/facility）

Item	Cost
Repair & Fixtures	23
Personnel expense for maintenance	100
Personnel expense for water fee collection	100
Sundry expenses	25
Total	248

Table 2-39 Operation and Maintenance cost per On-spot spring (Level-1)

（Birr/facility）

Item	Cost
Repair & Fixtures	90
Personnel expense for maintenance	100
Personnel expense for water fee collection	100
Sundry expenses	20
Total	310

Table 2-40 Operation and Maintenance cost per Level-2 facility

(Birr)

ID No.	Woreda	Village	Fuel fee	Electric power fee	Cost for Maintenance of Pump	Cost for Maintenance of Generator	Cost for Water Seller	Cost for Operator	Reserve Fund for Valves	Reserve Fund for Meters	Reserve Fund for Taps	Miscellaneous Expense	Disinfection Cost by Chlorine	Total
S-13	Dandi	Galessa	1,766	365	191	703	700	150	30	53	35	20		4,013
S-16	Ambo	Goromti	11,758		407	935	300	150	30	27	16	20		13,643
S-11	Ejere	Gorba	6,458		237	703	600	150	50	60	32	20	5	8,315
S-03	Toke Kutaye	Kolba					300		20	20	15	20	5	380
H-15	Hababo Guduru	Dadu	9,274		390	776	1,300	150	30	113	80	20		12,133
H-13	Jardega Jarte	Jardega	16,063		422	1054	900	150	30	87	57	20		18,783
H-10	Abay Chomen	Gutena Beguru	26,496		500	1318	900	150	30	87	59	20		29,560
H-02	Jardega Jarte	Sego	6,458		237	703	800	150	50	73	53	20	5	8,549
H-06	Jardega Jarte	Akayu	6,458		237	703	400	150	50	47	27	20	5	8,097
H-04	Jima Ganat	Gembo					800		20	60	40	20	5	945
H-23	Jima Ganat	Hagaya					1,200		40	100	60	20	5	1,425
J-21	Dedo	Bilu Harsu	9,274		390	776	800	150	30	73	44	20		11,557
J-07	Sokoru	Deneba	19,872		390	1318	1,900	150	30	160	108	20		23,948
J-14	Omo Nada	Asendabo Yadi	26,496		579	1318	3,200	150	30	300	187	20		32,280
J-15	Omo Nada	Bonaya	11,758		407	935	700	150	30	87	42	20		14,129

As of the year 2007

2-6 Other Relevant Issue

(1) Road conditions in the rainy season

Condition of most of the roads in the target area is unpaved and will become muddy during the rainy season. It isnecessary to make a detailed construction schedule considering the rainy season and road conditions for implementing the project.

(2) Acquisition of the water rights and land.

At the time of the Basic Design Study and Detailed Design Study, OWRB should acquire water source rights and land at the Project sites. However, there is a possibility that claims about these rights from some landowner may be lodged after the Project has started. Therefore, before the start of the project, OWRB should explain to the landowners and villagers the outline of this project and acquire these rights to avoid any of trouble over rights.

(3) Installation of commercial electric lines (S-13 Galessa)

It is a precondition of construction of the water supply facility that the Ethiopia side construct the commercial electric power lines at S-13 Galessa, for the motorized pump facility scheme.

In the Basic Design Study, Study team has confirmed that the Ethiopian side will carry out this electric power construction.

At the time of the Detail Design Study, the Study team confirmed the progress and situation of the budget measures and preparation of this electric power construction.

(4) Type of Hand Pump to be adopted

In the projects implemented out by the Ethiopian side and/or other donors, various models of Hand pumps are intermingled and adopted. There is no compatibility of the spare parts of these hand pumps and no established supply network of these spare parts.

For such reasons, OWRB recommend to adopt the Afridev Type and/or India Type for the ease of maintenance. Hence, these two types of Hand pump shall be adopted and shall be used properly by the ground water level for this project.

(5) Formulate spare parts procurement system

There is no unified system of spare parts procurement, such as VWC placing an order with a sales agency, or supplying via WWO or ZWRO.

Therefore, the method will be decided based on the discussion with VWC, WWO, ZWRO and supplier.

VWC is a basis of support of WWO or ZWRO and carries out minor repair, replace consumption parts, such as an oil filter, exchange of minor spare part, etc. with the operation and maintenance fund of VWC. Regarding major repair which needs the special equipment and

tools, VWC, WWO, ZWRO are a basis of support of OWRB, and entrusts repair to a private supplier, technical cooperation project (EWTEC), etc.

(6) Custom clearance, Tax exemption, Entry and residence permit

The construction material and equipment which are required to carry out the project with Japanese Grant Aid are tax-exempt. However, it is a concern that progress of the project is delayed and/or the project cost is pressed due to the delay of the custom clearance or tax exemption. Delays in issuing permission for entry and stay in Ethiopia also cause the above factors. Therefore, Study team requests the Ethiopian sides support and cooperation to solve above matters.

(7) Price escalation of construction material and manpower

Large fluctuations in oil, steel and cereal prices are causing high construction material and labor costs. It is thought that there is a risk of a large price increases during this project.

At the time of the Detail Design Study, the price escalation will be observed and the contents of the project will be re-examined.

Chapter 3. Project Evaluation and Recommendations

Chapter 3. Project Evaluation and Recommendation

3-1 Project Effect

The project aims to "increase population which is supplied safe and secure water in the target area". The effect of the project is summarized in the following tables.

Table 3-1 Improvement of the current situation through implementation of the Project

Current conditions and problem areas	Countermeasures through cooperation of project target	Direct Output/Improvements	Indirect Output/Improvements
The residents of the target region suffer from chronic water shortages. As a result, the problems of water-borne disease and the burden of labor on women and children have become severe.	Develop water sources and construct water supply facilities.	101,000 residents will be supplied safe and secure water by construction of water supply facilities in the Region.	1) Securing a safe water supply will reduce water-borne disease and assist in the health of residents. 2) Water sources will be closer, thus reducing the time spent by women and children to fetch water, and increasing their social participation and education opportunities.
With few water sources, the wells have not been repaired as planned, and thus the water supply conditions threaten to worsen.	Supply materials and equipment for well rehabilitation.	Village Water Committee (VWC) will be established in each village for operation and management of water supply facilities.	Safe and secure water will be supplied by effective and continuous operation and management.
Although staffs of OWRB, ZWRO and WWO have experience and knowledge about operation and maintenance of village water supply, the roles are unclear. Also, there is not enough manpower to provide management education to start village water committees of local residents.	The soft component is designed to clarify organization and improve operation and management capabilities. Also, instruct and educate residents.	Operation and management capabilities of the staff of OWRB, ZWRO and WWO will be improved, and they can implement hygiene education to residents as facilitators.	Mature cooperation between each organization will be built with improved capabilities.

3-2 Recommendations

The following considerations shall be made for the smooth and effective implementation of the project.

3-2-1 Recommendations for the Ethiopian side

(1) Improvement of access roads to the sites

The sites are mainly distributed along badly maintained mountainous roads. Some roads to the drilling sites cross ephemeral rivers, which may cause difficulties for transportation during the wet season. Furthermore, new roads shall be constructed from the sites to the main road as the drilling point is not always located nearby the main road. Construction of the transportation roads by the community and concerned government agency shall be necessary for the smooth implementation of the project.

(2) Primary distribution of commercial power supply

A water supply facility at the Galessa site will utilize commercial power supply. The primary extension / distribution from the closest power supply point to the site is the obligation of the Ethiopian side. This issue has been discussed and confirmed with the Ethiopian side, who will take responsibility to fulfill the requirement of primary distribution before the commencement of the project. It is anticipated that Ethiopian Electrical Power Corporation will implement this primary distribution to the selected site smoothly so that the project can start the secondary power connection in the limited time frame.

(3) Setup of Tax Exemption System and admission into and stay in Ethiopia

Some past projects experienced the problem that no attention was given to the subcontractor's tax exemption for project implementation. This is due to lack of flexibility on the tax exemption system for small purchases at local shops and/or lack of a sophisticated purchasing system for tax exemption. An efficient purchase system for tax exemption shall be studied by both the Ethiopian and Japanese sides before implementation. The Ethiopian side shall also be advised to monitor the system in case tax exemption is not applicable.

Additionally, the Ethiopian side shall accord Japanese nationals and employees of third country nationality who are employed by Japanese consultant and/or contractor, whose services may be required in connection with the supply of the products and services under the verified contracts, such facilities that may be necessary for their entry into the recipient country and stay therein for the performance of the work.

(4) Budget and personnel acquisition

A suitable arrangement shall be made on the budget and personnel acquisition from the local government to assist and support the construction works and activities for the soft component.

(5) Active participation of staff of OWRB, ZWRO and WWO in the Project

Although UNICEF, World Bank, AfDB and some donors have conducted projects in Oromia region, OWRB, ZWRO and WWO have not actively participated in those projects due to lack of equipment such as transfer vehicles. Therefore, active participation of OWRB, ZWRO and WWO in the project is expected by utilizating the procured equipment.

(6) Contribution to the project by local residents

It is important to develop the resident's sense of ownership of the water supply facilities through their participation in the construction of facilities to contribute to long term operation and maintenance. Accordingly, light duties such as fence construction, road rehabilitation to the site and ditch excavation work for water supply pipes shall be carried out by the residents. These duties shall be agreed upon with the residents.

3-2-2 Technical Cooperation and Partnership with other Donors

(1) Technical cooperation relationships

Soft component activity will be conducted as an initial guidance in this project for the improvement of operation and maintenance capacity. However activity for the improvement of O&M is limited due to the project period time constraints. In order to entrench O&M management in residents, and ZWRO and WWO staff, it is required to advise and monitor improvement activity in the medium-term. To achieve this, it is recommended to leverage a technical cooperation project, such as Ethiopia Water Technology Center (EWTEC), as a practice initiative.

(2) Partnership with other donors

The Water, Sanitation and Hygiene program (WASH), which puts emphasis on collaboration with the hygiene program and health, water and education sector and public private partnership (PPP) program, was started by UNICEF in 2004. At present, the project is being promoted as a partnership program by other donors including WB and AfDB with their budget.

Cooperation is required between the WASH program and this project in terms of hygiene education.

［Appendices］

1．Member List of the Study Team

2．Study Schedule

3．List of Parties Concerned in the Recipient Country

4．Minutes of Discussions

5．Soft component (Technical Assistance) Plan

6．References

1. Member List of the Study Team

（1） Basic Design Study（26th Feb, 2008 - 10th Jun, 2008）

No.	Member	Duty	Organization
1	Dr. Yuji MARUO	Team Leader	JICA
2	Mr. Hiromu INOUE	Planning Management	JICA
3	Mr. Hiroshi TAKASHIMA	Chief Consultant/ Groundwater Development Planning	KOKUSAI KOGYO
4	Mr. Kensuke ICHIKAWA	Geophysical Survey/ Test Boring Management	KOKUSAI KOGYO
5	Mr. Masahiko IKEMOTO	Geophysical Survey/ Test Boring Management	KOKUSAI KOGYO
6	Mr. Taketoshi FUJIYAMA	Water Supply Facility Planning	MITSUI MINERAL DEVELOPMENT ENGINEERING
7	Ms. Mitsuko NAKAMURA	Social Surey/ O&M Planning	KOKUSAI KOGYO
8	Mr. Takeshi ABE	Construction & Procurement Planning/ Cost Estimation	KOKUSAI KOGYO
9	Mr. Naoki YASUDA	Project Coordination	KOKUSAI KOGYO

（2） Discussion of Draft Report on the Basic Design Study
（4th Oct, 2008 – 11th Oct, 2008）

No.	Member	Duty	Organization
1	Dr. Yuji MARUO	Team Leader	JICA
2	Mr. Hiromu INOUE	Planning Management	JICA
3	Mr. Hiroshi TAKASHIMA	Chief Consultant/ Groundwater Development Planning	KOKUSAI KOGYO
4	Mr. Takeshi ABE	Construction & Procurement Planning/ Cost Estimation	KOKUSAI KOGYO

2. *Study Schedule*

(1) Basic Design Study

Day	Date			JICA		Consultant						
				Team Leader MARUO	Planning Management INOUE	Chief Consultant/ Groundwater Development Planning TAKASHIMA	Geophysical Survey/ Test Boring Management ICHIKAWA	Geophysical Survey/ Test Boring Management IKEMOTO	Water Supply Facility Planning FUJIYAMA	Social Surey/ O&M Planning NAKAMURA	Construction & Procurement Planning/ Cost Estimation ABE	Project Coodination YASUDA
1	Feb	26	T	Trip (HND-KIX-DXB)								Trip (HND-KIX-DXB)
2		27	W	Trip (DXB-ADD),Meeting at JICA, EOJ Visit								Same as consultant
3		28	T	Visit to MoFED and MoWR, Visit and discussion at OWRB								Same as consultant
4		29	F	Discussion at OWRB								Same as consultant
5	Mar	1	S	Field survey								Preparation for subcontract
6		2	S									
7		3	M	Discussion for M/D with OWRB								
8		4	T	Discussion and signing of M/D with OWRB								
9		5	W	Report to JICA, EOJ, MoFED, JICA, Trip (ADD-DXB)					Trip (HND-KIX-DXB-ADD)			
10		6	T	Trip (DXB-KIX-HND)		Internal meeting						Internal meeting
11		7	F			Signing subcontract			Signing subcontract			Signing subcontract
12		8	S			Internal meeting			Internal meeting			Internal meeting
13		9	S							Trip (HND-KIX-DXB-ADD)		
14		10	M			Signing subcontract			Signing subcontract			Signing subcontract
15		11	T			Field survey, topographic survey	Geophysical, Drilling, Water quality survey		Field survey, Topographic survey, Facilities designing	Discussion at OWRB		Supervision of subcontract work, Assistance in field survey
16		12	W							Survey on social condition		
17		13	T									
18		14	F									
19		15	S									
20		16	S			Internal meeting			Internal meeting			Internal meeting
21		17	M			Meeting with organs	Geophysical, Drilling, Water quality survey		Field survey, Topographic survey, Facilities designing	Survey on social condition		Supervision of subcontract work, Assistance in field survey
22		18	T			Field survey, topographic survey						
23		19	W									
24		20	T									
25		21	F									
26		22	S									
27		23	S			Internal meeting			Internal meeting			Internal meeting
28		24	M			Field survey, topographic survey	Geophysical, Drilling, Water quality survey		Field survey, Topographic survey, Facilities designing	Survey on social condition		Supervision of subcontract work, Assistance in field survey
29		25	T									
30		26	W									
31		27	T									
32		28	F									
33		29	S									
34		30	S			Internal meeting			Internal meeting			Internal meeting
35		31	M			Meeting with organs concerned	Geophysical, Drilling, Water quality survey		Field survey, Topographic survey, Facilities designing	Survey on social condition		Supervision of subcontract work, Assistance in field survey
36	Apr	1	T								Trip (HND-KIX-DXB-ADD)	
37		2	W			Internal meeting						
38		3	T			Cost estimate request					Cost estimate request	
39		4	F									
40		5	S									
41		6	S			Internal meeting			Internal meeting			

EOJ：Embassy of Japan、OWRB：Oromia Water Resources Bureau、MoFED：Ministry of Finance and Economic Development 、MoWR：Ministry of Water Resources
NGO：Nagoya、ADD：Addis Ababa、DXB：Dubai、KIX：Kansai

Day	Date			JICA		Consultant						
				Team Leader MARUO	Planning Management INOUE	Chief Consultant/ Groundwater Development Planning TAKASHIMA	Geophysical Survey/ Test Boring Management ICHIKAWA	Geophysical Survey/ Test Boring Management IKEMOTO	Water Supply Facility Planning FUJIYAMA	Social Surey/ O&M Planning NAKAMURA	Construction & Procurement Planning/ Cost Estimation ABE	Project Coodination YASUDA
42		7	M			Wrap up and hand over	Wrap up and hand over		Field survey, Topographic survey, Facilities designing	Survey on social condition	Field survey for construction planning	Supervision over take
43		8	T									
44		9	W			Internal meeting、Trip (ADD-DXB)						Internal meeting
45		10	T			Trip (DXB-KIX-HND)						Geophysical, Drilling, Water quality survey
46		11	F						Data collection, confirming design standard			
47		12	S									
48		13	S									
49		14	M									
50		15	T						Wrap up	Data collection, confirming, Internal meeting		
51		16	W									
52	Apr	17	T					Trip (HND-KIX-DXB-ADD)	Trip (ADD-DXB)		Internal meeting	
53		18	F						Trip (DXB-KIX-HND)			Internal meeting
54		19	S					Geophysical, Drilling, Water quality survey		Wrap up	Survey on market, collection cost estimate	Supervision of subcontract work, Assistance in field survey
55		20	S									
56		21	M							Trip (ADD-DXB)		
57		22	T							Trip (DXB-KIX-HND)		
58		23	W									
59		24	T									
60		25	F									
61		26	S									
62		27	S					Internal meeting			Internal meeting	
63		28	M					Geophysical, Drilling, Water quality survey			Internal meeting、Trip (ADD-DXB)	Supervision of subcontract work, Assistance in field survey
64		29	T									
65		30	W								Trip (DXB-KIX-HND)	
66		1	T									
67		2	F									
68		3	S									
69		4	S					Internal meeting				Internal meeting
70		5	M					Geophysical, Drilling, Water quality survey				Supervision of subcontract work, Assistance in field survey
71		6	T									
72		7	W			Trip (HND-KIX-DXB-ADD)						
73		8	T									
74		9	F			Data collection, discussion with agencies						
75		10	S									
76		11	S					Internal meeting				Internal meeting
77		12	M					Geophysical, Drilling, Water quality survey				Supervision of subcontract work, Assistance in field survey
78		13	T									
79		14	W									
80	May	15	T									
81		16	F									
82		17	S									
83		18	S			Internal meeting		Internal meeting				Internal meeting
84		19	M			Data collection, discussion with agencies		Data collection, discussion with agencies				Supervision of subcontract work, Assistance in field survey
85		20	T									
86		21	W									
87		22	T									
88		23	F									
89		24	S									
90		25	S			Internal meeting		Internal meeting				Internal meeting
91		26	M			Data collection, discussion with agencies		Data collection, discussion with agencies				Supervision of subcontract work, Assistance in field survey
92		27	T									
93		28	W									
94		29	T									
95		30	F			Trip (ADD-DXB)		Trip (ADD-DXB)				
96		31	S			Trip (DXB-KIX-HND)		Trip (DXB-KIX-HND)				
97		1	S									
98		2	M									
99		3	T									
100		4	W									
101	Jun	5	T									Wrap up,
102		6	F									
103		7	S									
104		8	S									
105		9	M									Trip (ADD-DXB)
106		10	T									Trip (DXB-KIX-HND)

(2) Discussion of Draft Report on the Basic Design Study

Day	Date			JICA		Consultant	
				Team Leader MARUO	Planning Management INOUE	Chief Consultant/ Groundwater Development Planning TAKASHIMA	Construction & Procurement Planning/ Cost Estimation ABE
1	Oct	4	S	Trip (NGO-DXB)	Trip (HND-KIX-DXB)	Trip (NGO-DXB)	
2		5	S	Trip (DXB-ADD),Internal meeting			
3		6	M	Meeting at JICA, Courtesy call on EOJ, MoFED, OWRB			
4		7	T	Courtesy call on MoWR, Discussion with OWRB			
5		8	W	Discussion with OWRB			
6		9	T	Discussion with OWRB/ Singning of Minutes of Meeting at OWRB			
7		10	F	Report to JICA and EOJ/ Trip(ADD-Paris)		Report to JICA and EOJ/ Trip(ADD-DXB)	
8		11	S	To another project		Trip (DXB-KIX-HND)	

３． *List of Parties Concerned in the Recipient Country*

＜Japanese Parties＞

Japanese Embassy

Mr. Kinichi Komano (Ambassador extraordinary and plenipotentiary)
Mr. Naoki Masuda (Second Secretary)

JICA Ethiopia office

Mr. Katsuhiro Sasaki (Resident Representative)
Mr. Naoki Ando (Deputy Resident Representative)
Mr. Hiroyuki Yakushi (Assistant Resident Representative)
Mr. Shinichiro Futami (Assistant Resident Representative)

＜Ethiopian Parties＞

Ministry of Water Resources

Mr. Asfaw Dingamo（Minister）

Ministry of Finance and Economic Development

Mr. Tilahun Tadesse (Department Head)
Mr. Hailemichael Kinfu (Head, Bilateral Cooperation Department)

Bureau of Finance and Economic Development

Mr. Berhanu Dirirsa (Deputy Bureau Head)
Mr. Elema Kampe (Deputy Bureau Head)

Oromia Water Resource Bureau

Mr. Motuma Mekasa（Bureau Head）
Mr. Kebede Garbe（Deputy Bureau Head）
Mr. Lemessa Mekonta（Rural WaSH* Program Coordinator）
Mr. Dinku Gutema（Socio-Economist）
Mr. Dame Abera（Socio-Economist）
Mr. Ashenafi Wolde（Procurement Analsyst）
Mr. Fekadu Lebecha (Rural WaSH* Focal Person)

Zonal Water Resource Office in West-Show

Mr. Chaluma （Office Head）
Mr. Zerihum Merga （Community Promotion）
Mr. Girma Batu （Electrical Engeneer Head）

Zonal Water Resource Office in Jimma

Mr. Fayissa Tolasaa（Office Head）
Mr. Teshome Abdisa

Zonal Water Resource Office in Horo-Guduru

Mr. Masfin Alemuu Waataree （Office Head）
Mr. Mohamed Abels
Mr. Timiru Bekele
Mr. Birhanu Waqo Dinqa （Community Promotion）
Mr. Torela Magarsa （Electrician）

Administration Jima Zone

Mr. Seyume Efona

Mr. Mohamed Nour

4. Minutes of Discussions

（1） Minutes of Discussions（4th March,2008）

MINUTES OF DISCUSSIONS
BASIC DESIGN STUDY ON "THE PROJECT FOR RURAL WATER SUPPLY IN OROMIA REGION"
IN THE FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA

Based on the results of the Preliminary Study on the project for rural water supply, which was carried out in August , 2007, the Government of Japan decided to conduct a Basic Design Study on the Project for Rural Water Supply in Oromia Region in the Federal Democratic Republic of Ethiopia (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA sent to the Federal Democratic Republic of Ethiopia the Basic Design Study Team (hereinafter referred to as "the Team"), which is headed by Dr. Yuji Maruo, Senior Advisor, Institute for International Cooperation, JICA and is scheduled to stay in the country from February 27 to May 30, 2008.

The Team has held series of discussions with concerned officials of the Governments of Ethiopia and conducted a field survey in the study area.

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

Addis Ababa, March 4, 2008

Dr. Yuji Maruo
Leader,
Basic Design Study Team,
Japan International Cooperation Agency (JICA)

Motuma Mekassa
Bureau Head

Ato Motuma Mekassa
Bureau Head,
Water Resources Bureau,
Oromia National Regional Sate

witnessed by:

Berhanu Dirirsa
Vice Bureau Head

Ato Berhanu Dirirsa
Deputy Bureau Head,
Bureau of Finance and Economic Development
Oromia National Regional State

ATTACHMENT

1. Objective of the Project

The objective of the Project is to improve the health and living condition of the people by providing the potable water through the construction of water supply facilities.

2. Project sites

The Oromia side and the Team (hereinafter referred to as "the both sides") confirmed the requested sites of the Project were located in 18 Woredas in three Zones (i.e. West Shoa, Horo Guduru and Jimma) in Oromia National Regional State. Those project sites are shown in Annex-1.

3. Responsible and Implementing Agencies

(1) The Responsible Agency is the Government of Oromia National Regional State.

(2) The Implementing Agency is Water Resources Bureau (hereinafter referred to as "OWRB", Oromia National Regional State. Organization charts of OWRB are shown in Annex-2.

4. Requested Components of the Project

Following the Preliminary Study, the Oromia side confirmed the requested project components as described in Annex-3, which were to be the subject for the present Basic Design Study.

5. Japan's Grant Aid Scheme

(1) The Oromia side understood that the Japan's Grant Aid Scheme which was explained by the Team, and which is described in Annex-4.

(2) The Oromia side also recognized the necessary measures to be undertaken by them for smooth implementation of the Project. The necessary measures are described in Annex-5.

6. Schedule of the Study

(1) The consultant members of the Team will proceed to further studies in Ethiopia until May 30, 2008.

(2) JICA will prepare the draft basic design report in English and dispatch a mission in order to explain its contents to OWRB around September 2008.

(3) In case that the contents of the report are accepted in principle by the Oromia side, JICA will finalize the report and send it to the Oromia side around October 2008.

(4) The Oromia side understands that execution of the Study does not necessarily imply the Japanese Government's commitment of the project implementation.

7. Other Relevant Issues

(1) Inception Report

The contents of Inception Report, which the Team explained to the Oromia side, was understood and accepted in principle by the Oromia side.

(2) Arrangements for the Study

As a response to the request by the Team, the Oromia side agreed to arrange necessary number of

counterpart personnel for the study and provide all the data and information relevant to the Project for the smooth implementation of the study. The Oromia side also agreed to provide an appropriate office space at both the Regional Water Resources Bureau and respective Zonal Water Resources Offices.

(3) Undertaking of the Oromia side

Although general undertakings of the Oromia side are shown in Annex-5, the Japanese side emphasized the responsibilities of the Oromia side to execute following matters and the Oromia side agreed that.

1) Tax Payment

The Team explained that Value Added Tax, customs duties and any other taxes and fiscal levy charges in Ethiopia arisen from the Project activities should be borne by beneficiary organizations as occasion arises.

The Oromia side understood that and would make a commitment to secure some budget for refund of these taxes, if any.

2) Necessary measures for Operation and Maintenance of facilities and equipments

The Oromia side would take any necessary measures and allocate the necessary budget, if any, to operate and maintain the facilities and equipment which would be provided by the Project.

3) Exception of Undertaking of the Oromia side

Regarding the items in "Annex-4 of (3)-5)-a)", the Oromia side pointed out that "clearing, leveling and reclamation of the project site" are regarded to be responsibilities and duties of the contractors according to the procedure of Oromia Region.

Likewise, requirement described in "Annex-4 of (3)-5)-b)" and "Annex-5 of No.7" are also regarded to be responsibilities of contractors.

(4) Design period of the project

The Team explained that as a general practice of Japan's Grant Assistance Projects the maximum design period would be 5 years after completion of the Project. Therefore in the present case, the target year of the Project would be 2016.

The Oromia side commented that the design period of 15 years for rural water supply facilities is defined in the design standard of Oromia region. The Oromia side further stated that as for electrical machineries such as generator and submergible pump design period of 10 years might be applied, since the life span of these machinery were expected to be about 10 years.

The Team will convey their comments to the government of Japan for further consideration.

(5)Study Policy of the Project

The Japanese side explained the Study policy as follows and the Oromia side agreed with it.

1) Investigation on Water Potential

a) Test Well Drillings for motorized schemes

- The Team will conduct test well drilling, pumping test and water quality analysis at 12 sites and also conduct pumping test and water quality analysis at 3 existing boreholes. Those test wells which are proved to have sufficient water potential, both yield and water quality, will be utilized as production wells upon the implementation.

If any of the test wells fail to have sufficient yield or due water quality, the motorized schemes would be replaced with appropriate number of hand pump schemes, and no substitutive site of motorized schemes would be considered.

b) Hand pump Schemes

- Electric resistivity survey will be conducted at every candidate sites for hand pump scheme, but no test well drilling will be carried out at these sites.

c) Gravity Spring Schemes with or without booster pump

- Discharges of the spring sources for the gravity spring schemes will be measured at the beginning of the Basic Design Study. If the amounts of spring discharge at the dry season would not be sufficient to cover the design population, those schemes would be replaced with other schemes such as on-spot spring protection or hand pump.

d) On-spot Spring Protection Schemes

-Discharges of 6 on-spot spring schemes would be also studied in the Basic Design Study.

2) Prioritization and Selection for the Implementation

The candidate sites would be prioritized and selected for the Japan's Grant Aid Scheme in accordance with following criteria;

a) Water Resource Potential
b) Capability of Beneficiaries on Operation and Maintenance of the facilities
c) Cost/Benefit Ratio
d) Urgency in needs of water supply facilities
e) Accessibility to the sites
f) Security condition
g) Others

The Team further explained that the final contents for the actual implementation would be determined based on the result of the Basic Design Study.

3) Component of Procurement

The Oromia side confirmed the number of the items to be requested as it is shown in the Annex-3. With regard to vehicles and motorbikes, however the Team would examine the appropriateness of procurement of them during the course of the study and report to the government of Japan. The Team explained again that it would be very unlikely for Japanese Government to approve the procurement of motorbikes and pick-up trucks, since no motorbikes neither pick-up trucks were approved in the previous 4 similar projects in Ethiopia.

The Oromia side emphasized the necessity of vehicles and motorbikes in terms of sustainability of operation and maintenance of water supply facilities. The Oromia side further commented that other donors like UNICEF, World Bank, AfDB etc. provided certain number of Motorbikes in their target Woredas (i.e. the WB provided 84, AfDB provided 41 and UNICEF provided 27 motorbikes in their targeted Woredas)

4) Capacity Building Plan

The Team recognizes the importance of capacity building of both village people and Zonal/Woreda Office staffs and the Team will formulate capacity building plans for them during the Study period. Besides various training courses for technicians and engineers are running at EWTEC (Ethiopia Water Technology Center), the Team suggested the Oromia side to make the best use of EWTEC training programs for the capacity building of their staffs.

The Oromia side recommended that nearby TVTC (Technical Vocational Training Center) facilities should be used for above mentioned training program.

(6) Request for Washing Basin and Shower House

The Oromia side requested the Team to construct washing basin and public shower facilities near the public taps.

3

The Team answered that construction of washing basins would be scrutinized during the course of the study, however construction of public shower facilities would not be considered since the public shower facilities have not been disseminated in Oromia Region neither in any parts of Africa and their appropriateness, effectiveness and sustainability etc have not been proven yet.
The Oromia side commented that there was one example of public shower in Arsi Zone and it has been maintained well by the village people.

(7) Decentralization policy and responsibilities of Woredas (Anas) / Zones
According to the National Decentralization Policy, the responsibility of entire development works of rural water supply schemes were supposed to be transferred to Woreda (Ana) water resources desks. However in case of Oromia Region, human resources capacities of Woreda (Ana) water resources desks are still to be developed. Therefore some parts of responsibilities such as development of motorized piped schemes or gravity piped schemes are still remaining in the hands of Zonal Offices.
The Team requested the Oromia side to involve Woreda (Ana) water resources desks at every steps of the Project so that Woreda (Ana) water resources desks would be able to manage water schemes properly when the entire responsibilities are transferred to Woreda (Ana) water resources desks. The Oromia side agreed with it and committed to deploy certain staffs of Woreda (Ana) water resource Desk to the Study.

(8) Alternative Village List
The Oromia side agreed to prepare a list of 15 alternative villages with priorities from respective zone for the candidates of hand pump scheme construction, if in case any of the test wells fail to produce necessary amount of yield for the motorized schemes, and if in case these infeasible motorized schemes might not be replaced with hand pump schemes.

(9) Avoidance of duplication with other projects.
The Team requested the Oromia side that any of the candidate sites would not be overlapped with any other project supported by other donor agencies, NGOs and Ethiopian official organization(s).

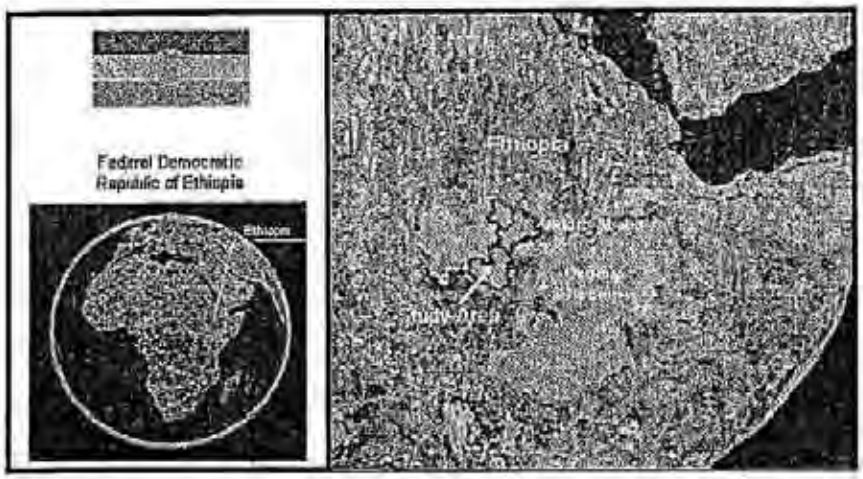
(10) Careful Handling of the Study Reports
The Team explained that certain information in both the draft and the final reports of the Study should be dealt with confidentially until the tender is closed when the project proceeds to actual implementation stage, since disclosure of the information will affect fairness of tender procedure.
The Oromia side understood the sensitivity in dealing with the study reports and agreed on careful handling of the reports for achieving fair tendering.

Annex-1: Target Sites of the Project
Annex-2: Organization Chart of OWRB
Annex-3: Requested Components of the Project
Annex-4: Japan's Grant Aid Scheme
Annex-5: Major Undertakings to be taken by Each Government

END

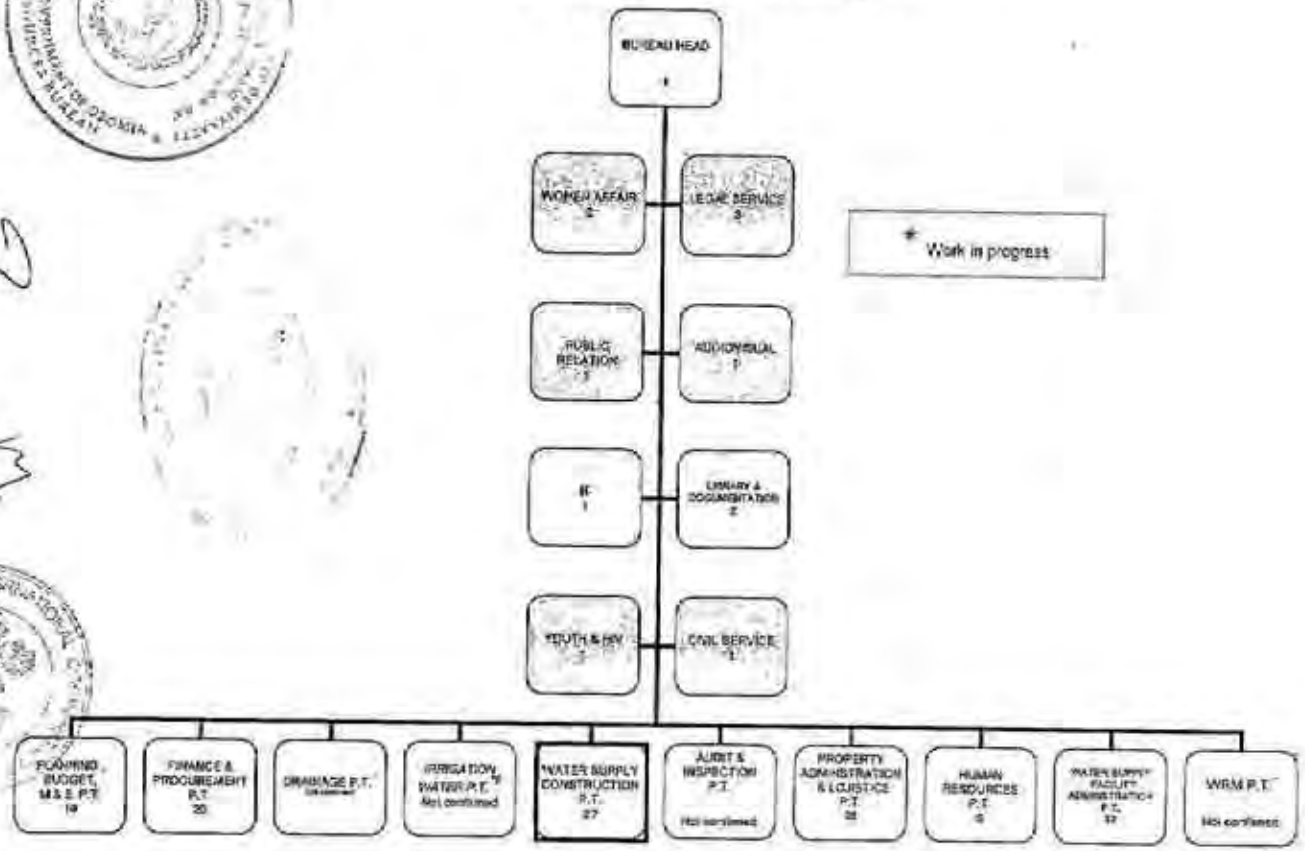
Annex-I

Target Sites of the Project



Annex-2

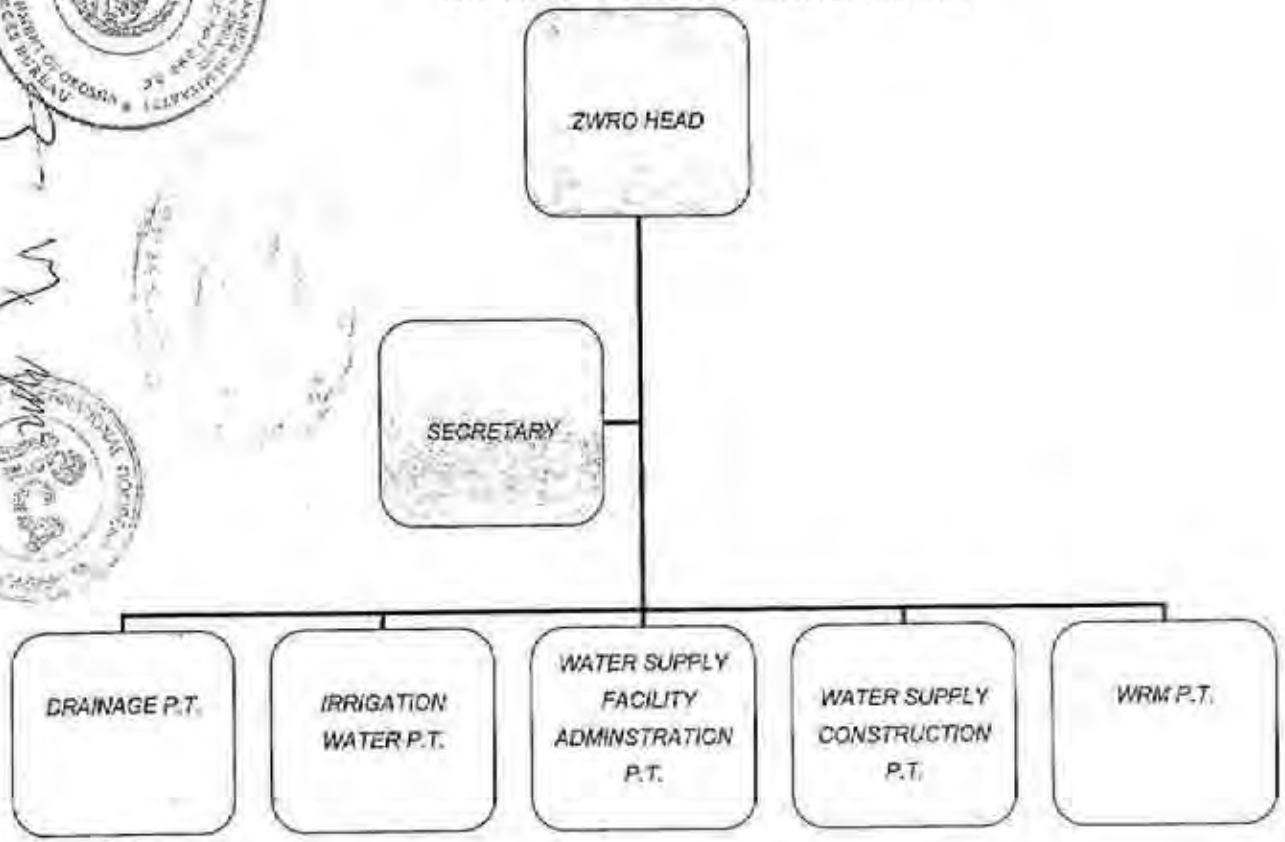
ORGANIZATION STRUCTURE OF OROMIA WATER RESOURCES BUREAU



Work in progress

Annex-2

ORGANISATION STRUCTURE OF EACH ZONAL WATER RESOURCES OFFICES



7

Annex-3

Requested Components of the Project

1. Construction

Number of Woredas at each Zone		Borehole				Spring		
		Hand pump schemes	Motorized Piped scheme			Spring on spot	Piped schems	
			New	Existing	New & Existing		Gravity	Lifting by pump
West Showa	7	4	4	0	0	6	1	3
Horo Guduru	7	18	3	0	1	0	3	2
Jima	4	28	3	1	1	0	0	0
3 zones combined	18	50	10	1	2	6	4	5

2. Equipment

Item	Qt'y		Remarks (allocation)
Motorbike	21	unit	target 18 Woredas + 3 Zones
Pick-up truck	3	unit	1 per Zone
Tools for hand pump maintenance	50	set	same as the number of hand pumps
GPS	21	unit	target 18 Woredas + 3 Zones
Geophysical survey equipment (resistance)	3	unit	1 per Zone
Survey equipment (total station)	3	unit	1 per Zone
Water analysis kit (pH, TDS, Temp, EC)	21	unit	target 18 Woredas + 3 Zones

Note: Details of each component will be examined through further studies in Japan.

8

Annex-4

The Japan's Grant Aid Scheme

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

(1) Grant Aid Procedure

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

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

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

Secondly, JICA conducts the study (Basic Design Study), using Japanese consulting firms.

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

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

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

(2) Basic Design Study

1) Contents of the Study

The aim of the Basic Design Study (hereinafter referred to as "the Study"), conducted by JICA on a requested project (hereinafter referred to as "the Project"), is to provide a basic document necessary for the appraisal of the Project by the Government of Japan. The contents of the Study are as follows:

a) confirmation of the background, objectives and benefits of the Project and also institutional capacity of agencies concerned of the recipient country necessary for the Project's implementation;

b) evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from the technical, social and economic points of view;

c) confirmation of items agreed on by both parties concerning the basic concept of the Project;

d) preparation of a basic design of the Project; and
e) estimation of costs of the Project.

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

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

2) Selection of Consultants
For smooth implementation of the Study, JICA uses a registered consulting firm selected through its own procedure (competitive proposal). The selected firm participates in the Study and prepares for a report based upon the terms of reference set by JICA.

At the beginning of implementation after the Exchange of Notes, for the services of the Detailed Design and Construction Supervision of the Project, JICA recommends the same consulting firm which participated in the Study to the recipient country in order to maintain the technical consistency.

(3) Japan's Grant Aid Scheme

1) Exchange of Notes (E/N)
Japan's Grant Aid is extended in accordance with the Notes exchanged by the two Governments concerned, in which the objectives of the project, period of execution, conditions and amount of the Grant Aid, etc., are confirmed.

2) "The period of the Grant" means the one fiscal year which the Cabinet approves the project for. Within the fiscal year, all procedure such as exchanging of the Notes, concluding contracts with consulting firms and contractors and final payment to them must be completed.

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

3) Under the Grant, in principle, Japanese products and services including transport or those of the recipient country are to be purchased.
When the two Governments deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country.

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

4) Necessity of Verification
The Government of the recipient country or its designated authority will conclude contracts

denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. This "Verification" is deemed necessary to secure accountability to Japanese taxpayers.

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

a) to secure land necessary for the sites of the Project and to clear, level and reclaim the land prior to commencement of the construction;
b) to provide facilities for distribution of electricity, water supply and drainage and other incidental facilities in and around the sites;
c) to ensure all expenses and prompt execution for unloading and customs clearance at ports of disembarkation in the recipient country and internal transportation therein of the products purchased under the Grant Aid;
d) to exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the verified contracts;
e) to accord Japanese nationals whose services may be required in connection with the supply of the products and services under the verified contracts such as facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work;

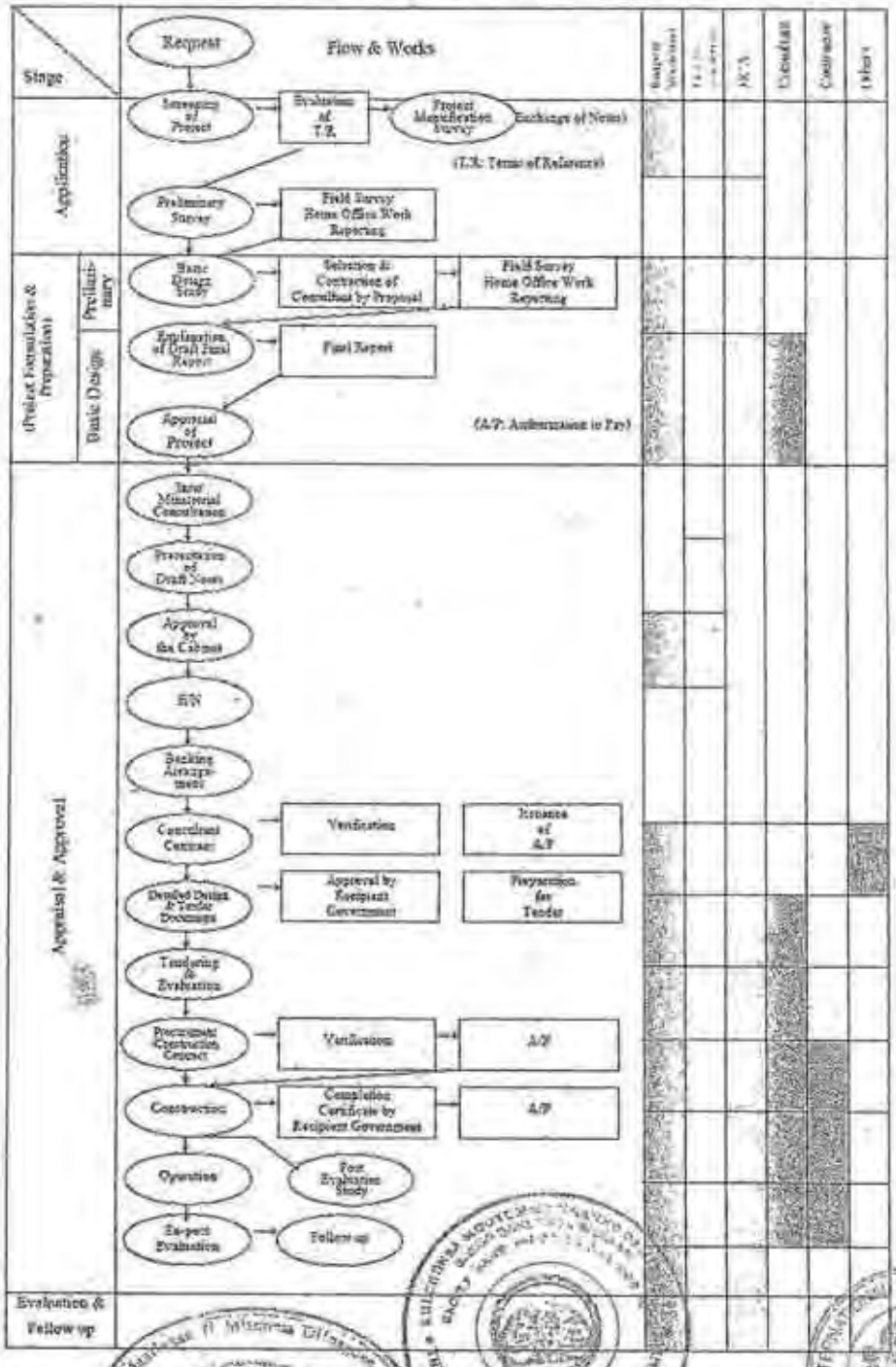
6) "Proper Use"
The recipient country is required to operate and maintain the facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign the necessary staff for operation and maintenance as well as to bear all the expenses other than those covered by the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

7) "Re-export"
The products purchased under the Grant Aid shall not be re-exported from the recipient country.

8) Banking Arrangement (B/A)
a) The Government of the recipient country or its designated authority should open an account in the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"). The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the verified contracts.
b) The payments will be made when payment requests are presented by the Bank to the Government of Japan under an Authorization to Pay (A/P) issued by the Government of 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.

FLOW CHART OF JAPAN's GRANT AID PROCEDURES



Annex-5

Major Undertakings to be taken by Each Government

No.	Items	To be covered by Grant Aid	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 buildings	•	
7	To provide facilities for the distribution of electricity, water supply, drainage and other incidental facilities		
	1) Electricity		
	a. The distributing line to the site		•
	b. The drop wiring and internal wiring within the site	•	
	c. The main circuit breaker and transformer	•	
	2) Water supply		
	a. The city water distribution main to the site		—
	b. The supply system within the site (receiving and elevated tanks)	•	
	3) Drainage		
	a. The city drainage main (for storm, sewer and others) to the site		•
	b. The drainage system (for toilet sewer, ordinary waste, storm drainage and others) 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 in Japan for the banking services based upon the B/A		
	1) Advising commission of A/P		•
	2) Payment commission		•
9	To ensure unloading and customs clearance at port of disembarkation in recipient country		
	1) Marine (Air) transportation of the products from Japan to the recipient country	•	
	2) Tax exemption and custom clearance of the products at the port of disembarkation		•

	3) Internal transportation from 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		•
13	To bear all the expenses , other than those to be borne by the Grant, necessary for construction of the facilities as well as for the transportation and installation of the equipment		•

(B/A: Banking Arrangement) (A/P: Authorization to Pay)

Note: Gas Supply (No. 7-4) is not applicable

（2） Minutes of Discussions（9th October,2008）

MINUTES OF DISCUSSIONS
ON
THE BASIC DESIGN STUDY ON
THE PROJECT FOR RURAL WATER SUPPLY IN OROMIA REGION
IN THE FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA

(Explanation of Draft Final Report)

In February 2008, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched the Basic Design Study Team on the Project for Rural Water Supply in Oromia Region (hereinafter referred to as "the Project") to the Federal Democratic Republic of Ethiopia (hereinafter referred to as "Ethiopia"), and through discussion, field survey, and technical examination of the results of the survey in Japan, JICA prepared a Draft Final Report of the Basic Design study.

In order to explain and to consult with the concerned officials of the Government of Ethiopia on the components of the Draft Final Report, JICA sent to Ethiopia the Draft Final Report Explanation Team (hereinafter referred to as "the Team"), which is headed by Dr. MARUO Yuji, Senior Advisor, Institute for International Cooperation, JICA, from October 5 to 10, 2008.

As a result of discussions, both sides confirmed the main items described on the attached sheets.

Addis Ababa, October 9, 2008

Dr. Yuji MARUO
Leader,
Basic Design Study Team,
Japan International Cooperation Agency (JICA)

Ato Kebede Gerba
Deputy Bureau Head,
Water Resources Bureau,
Oromia National Regional Sate

witnessed by:

Ato Elema Kempe
Deputy Bureau Head,
Bureau of Finance and Economic Development
Oromia National Regional State

ATTACHMENT

1. Components of the Draft Final Report

The Oromia Water Resources Bureau (ORWB; and hereinafter referred to as "the Oromia Side") agreed and accepted in principle the components of the Draft Final Report explained by the Team.

2. Japan's Grant Aid scheme

The Oromia side understood the Japan's Grant Aid Scheme and would take the necessary measures and allocate necessary budget properly for smooth implementation of the Project, as a condition for the Japan's Grant Aid to be implemented. The Grant Aid Scheme and necessary measures were described in the Annex 4 and 5 of the Minutes of Discussions signed by both sides on March 4, 2008 (hereinafter refereed to as "the Previous M/D") , which is attached to the Draft Final Report of the Basic Design Study of the Project.

3. Schedule of the Study

JICA will complete the final report in accordance with the confirmed items and send it to the Oromia side by the end of December 2008.

4. Other Relevant Issues

(1) Project Cost Estimate

The Team explained to the Oromia side the estimated project cost to be born by the Japanese side as attached in Annex 1(A). Both sides confirmed that this estimated cost was provisional and would be examined further by the Government of Japan for its final approval.

Furthermore, both sides confirmed that this estimated project cost should never be duplicated in any form nor disclosed to any other party(s) until the relevant contracts are awarded by OWRB. This confinement of the estimated project cost is necessary for securing fairness of tender procedure.

The Team explained the estimated project cost to be born by the Oromia side as attached in Annex 1(B), and requested the Oromia side to secure necessary budget for the project and report the result of budget arrangement to JICA Ethiopia Office in writing by the middle of April 2009. The Oromia side accepted it.

(2) Final Components of the Project

The Team explained that the Government of Japan would examine the contents of the Final Report of the Basic Design Study of the Project and the final components would be decided by the Government of Japan.

The Oromia side understood and agreed to the above explanation made by the Team.

(3)Undertakings of the Oromia side

Both sides confirmed again the undertakings of the Oromia side which were described in 7 (3) of the Attachment of the Previous M/D.

In addition to that, the Team requested to the Oromia side following additional undertakings:

- extension of power line to the water point in Galessa site
- guarantee of any rights and privileges to the third country personnel employed by the Japanese consultants/contractors of the Project same as its Japanese nationals

- construction of fences around every water supply facility (spring, well, pump house, water reservoir, public faucet and hand pump).

The Oromia side agreed and accepted above mentioned matters.

(4)Mobilization of Beneficiaries

Both sides agreed that the necessity of a technical assistance program so-called "Soft Component Program" for the beneficiaries and officials of Woreda Water Office (hereinafter referred to as "WWO") and Zonal Water Resources Office (hereinafter referred to as "ZWRO") in the target areas, and confirmed the contents of Soft Component Program as follows:

- Capacity enhancement of operation and maintenance skills of water supply facilities for members of water committees.
- Capacity enhancement of management and administration skills in supporting water committees' activities for WWO/ZWRO's staffs.

The Oromia side committed to deploy counterpart personnel to implement the Soft Component Program and bear their local costs.

End

Annex-2: Operation and Maintenance Cost

The operation and maintenance (O&M) costs for the level 1 facilities, hand pump wells and intakes of spring on spot, and level 2 facilities are shown in the following tables. Those costs shall be reserved by Water Committee (WC) and Village Water Committee (VWC).

O&M cost per hand pump well (level 1)

Birr/Month

Description	Cost
Supplies expenses	23
Labor cost for O&M	100
Cost for water seller	100
Miscellaneous expense	25
Total	248

O&M cost per intake of spring on spot (level 1)

Birr/Month

Description	Cost
Reserve fund for equipment	90
Labor cost for O&M	100
Cost for water seller	100
Miscellaneous expense	20
Total	310

O&M cost for level 2 facilities

Birr/Month

VillageNo.	Woreda	Village	Cost
S-13	Dandi	Galessa	7,286
S-10	Ambo	Goromti	13,843
S-11	Ejere	Gorba	8,315
S-03	Toke Kutaye	Kolba	380
H-15	Hababo Guduru	Dadu	12,133
H-13	Jardega Jarte	Jardega	18,763
H-10	Abay Chomen	Gutena Beguru	29,580
H-02	Jardega Jarte	Sego	8,549
H-08	Jardega Jarte	Akayu	8,097
H-04	Jima Ganat	Gemba	945
H-23	Jima Ganat	Hagaya	1,425
J-21	Dedo	Bilu Harcu	11,557
J-07	Sokoru	Deneba	23,948
J-15	Omo Nada	Bonaya	14,129
J-14	Omo Nada	Asendabo Yadi	32,280

5. *Soft component (Technical Assistance) Plan*

Soft component (Technical Assistance) Plan

(1) Background for plan of soft component

1) Background

In order for the built water supply facilities to be continuously used by villagers (the beneficiaries), the "Establishment of structure for operation and maintenance" and "acquisition of operation and maintenance" are indispensable.

The present condition of the operation and maintenance for the existing water facilities in the target area is being organized with the support of other donors and NGO at the moment.

2) Basic concept

The water supply facilities constructed in this project are to be used effectively and continuously. To do so, this plan is carried out based on the following three basic concepts.

<u>Basic concept 1:</u>

The continuous use of safe water from the water source (water supply facility) is urged through the implementation of hygiene education.

<u>Basic concept 2:</u>

Division of roles concerning operation and maintenance of water supply facilities is clarified as outlined below. Also, this deals with common issues in each organization, so mutual cooperation is strengthened by implementation of skill training which includes administration with awareness of these issues.

- Daily inspection and minor repair of the water supply facility are performed by beneficiaries under the Village Water Committee (VWC).
- ZWRO and WWO provide technical support to village, and
- ZWRO and WWO commission any major problems and repairs to OWRB.

<u>Basic concept 3:</u>

Reliable collection of water fees to secure operation and maintenance costs.

In addition, the above basic concepts were constructed with the following concerns in mind:

<u>Matters of Concern:</u>

- The lack of villagers' understanding of sanitation as they change from using an unsanitary water source to the water supply facilities which are to be built by this project. [Basic concept-1]

- The repair structure of water supply facilities does not function with a complete lack of understanding of roles and cooperation between villagers (VWC) and ZWRO, WWO. [Basic concept-2]
- The support capability of management control of operation and maintenance over a village does not improve from these organizations due to shortage in the skills, number of personnel, budget, and so forth of OWRB, ZWRO and WWO,.
- Insufficient overall management capability, from the collection of the water fee collection to payment for maintenance and repairs. [Basic concept-3]

(1) Target of soft component

1) Objective

The target of this project is "The villager's sanitation and health environment are improved in the Oromia region".

Also, the target of the soft component is framed to assure "Operation and maintenance is properly conducted by villagers" and "Long term utilization of facilities after completion of the project" in terms of the matters of concern and countermeasures of the background of the soft component and the operation and maintenance for the existing water supply facilities which are mentioned above.

2) Points to consider for support organizations

In order to assure work efficiency, the soft component activity will be conducted for each village, not for each at hand pump facility and public faucet.

The soft component activities will be conducted mainly by the Japanese consultant with the support of local consultants through On-the-Job training (OJT) with OWRB, ZWRO and WWO. The participation of OWRB in this project is proposed for next year, the exact dates and duration of which will be discussed. The project will mainly involve OWRB, ZWRO, and WWO personnel with a sufficient level of education so that they can play a central role.

(2) Output of soft component

The expected outputs of the soft component are summarized as follows.

<u>Output 1: Beneficiaries will conduct O&M activities with a sense of ownership</u>

In order for beneficiaries to sustainably implement operation and maintenance activities, it is necessary to enhance their sense of project ownership. In order to achieve this, it is important for the villagers to be involved in the decision making process, such as making user regulations and operation and maintenance rules at each stage of the project.

The following will be held to promote operation and maintenance carried out by villagers

with a sense of ownership.

- Workshops included in the soft component will help to ensure that ZWRO, WWO, VWC and villagers have a common recognition of operation and maintenance.
- In order to explain the contents of this project to villagers, village meetings will be held where the villagers are able to express their opinions freely and come to an understanding, and come to have a sense of ownership of the project.

Output 2: Clarify the roles and support system of VWC and the implementing agencies

Just by establishing a new VWC in a village does not ensure that efficient and continuous control of operation and maintenance will be performed. Therefore, ZWRO and WWO should be involved in carrying out the workshops. This results in a support structure by clarifying the division of roles within a VWC, and cooperation of WWO, ZWRO and OWRB.

Output 3: Plan of operation and maintenance is centered on the villagers

The plan of operation and maintenance is centered on the villagers and will be formulated based upon the results of output 1 and 2 above. Activities will then commence based on this plan.

Once an operation and maintenance plan is decided, it is carried out as prescribed and the villagers and related personnel collaborate to conduct monitoring and evaluation of the conditions. A realistic and effective plan will be put in place based on the practice of reviewing these results and making any necessary revisions.

Output 4: Acquisition of necessary techniques by persons in charge

In order to perform continuous operation and maintenance, mastery of the following two skills are required:

- Acquisition of techniques required for operation & maintenance and repairs.

  When the implementation stage of the project reaches completion, skill training on operation and repairs will be provided to VWC, WWO and ZWRO.

  Also, cooperation with the following technical cooperation project is performed, and capacity building for the personnel of ZWRO and WWO should be carried out.
- Acquisition of techniques required for administration, such as collection of water fee.

  The VWC chairman and accountant receive training on everyday operational auditing.

Output 5: Improvement of villagers' understanding of sanitation

Hygiene education is offered to VWC, WWO and ZWRO in cooperation with other donors from the beginning of this project.

Moreover, these organizations will carry out hygiene education during this project.

(3) Indicators of output achievement

The indicator and measurement used to confirm the achievement of the 5 (five) output items are given in the table below.

Indicators to achieve output

Output	Indicator		Measurement
Output 1 Villagers will conduct O&M activities with a sense of ownership.	1	Do the persons concerned have common recognition about residents' role in management control of maintenance?	1. Interview the people concerned
Output 2 Clarify the roles and support system of VWC and the implementing agencies.	1	Is the role of each organ concerned in management control of maintenance clear?	1. Organization chart for operation and maintenance
	2	Is each person concerned clearly conscious about their charge?	2. Interview the people concerned
Output 3 Formulation and execution of village O&M plan based on the role of villagers	1	Was the regulation of users defined?	1. Regulation of users
	2	Is correspondence of maintenance and repair clear?	2. Regulation of operation and maintenance
	3	Were monitoring and evaluation carried out according to the plan?	3. Record of monitoring activities
Output 4 Master the technical skills needed for operation and maintenance	1	Was the period of failure shortened?	1 . Record of VWC activities
	2	Did the frequency of failure decrease?	2. Record of operation
	3	Was the record about rate collection, and institution operation and management created?	3. Records of water fee payment …etc.
Output 5 Improve villager's concept of health and hygiene.	1	Did the residents' hygiene consciousness increase?	1 . Questionnaires to villagers
	2	Did the number of water diseases decrease by use of safe water?	2. Check number of water disease patients who have moved (Records of neighboring health institution, prefectural health and so on)

(4) Activities of the soft component (Input Plan)

A Japanese consultant (or local consultant under the Japanese consultant's instruction), in principle should be involved in implementing all soft component activities and should effectively utilize local resources.

Also, WWO and ZWRO should participate according to the contents of the soft component activity with cooperation of the technical cooperation project (EWTEC).

The soft component activities are categorized into three sections: Operation and

maintenance, Repair, and Improvement of Sanitation Awareness.

Furthermore, the activities categorized above will be carried out effectively in each phase, before construction, under construction, and at completion.

A description and outline of the activities which lead to each result of the soft component are given below

Categorized activities and description of soft component

Term	Item	Description	Activity Type／Place	Lecturer／【Target Audience】	Output／Products
1 Activities Before Construction	1-1 Training of the technical development by villager's participation	Methods of increasing beneficiary participation and development will be taught to enforcement organization and the organs concerned. ● Consultants will assemble measures to improve any problems found upon analyzing OWRB, ZWRO and WWO's operation and maintenance of existing water supply facilities. ● Upon implementing the measures the consultant will confirm the above-mentioned results and policy with ZWRB, ZWRO and WWO, and then prepare the following activity Item 1-2.	Workshop／ZWRO	Consultant (Japanese, Local)／【OWRB, ZWRO , WWO】	Output 2／Workshop Report
	1-2 Villager's Meeting	Before construction (implementation) of this project, consultants, ZWRB, ZWRO and WWO explain to villagers the contents of this plan and go over again the responsibilities of the villagers. (Local consultant will continue to implement this with OWRB, ZWRO and WWO, after the initial guidance by Japanese consultant)	Workshop／Village	Consultant (Japanese, Local) OWRB , ZWRO , WWO／【Villagers】	Output 2／Workshop Report／Active Report／Hygiene Manual

2 Activities Under Construction	2-1 Decision of the Plan for Operation & Maintenance (O&M)	New village water committees (VWC) should be established or, existing VWCs should be restructured. A plan outlining the operation and maintenance of the facility including: division-of-roles (people in charge) within the VWC, rules of use covering use time, water fees, and fee collection process etc., needs to be formulated. ● OWRB, ZWRO and WWO establish (restructures) the water committee, selects people-in-charge, etc. in the target villages under instruction of a Japanese consultant and a local consultant. (Local consultants work in each area and a Japanese consultant guides local consultant)	Workshop ／ Selected Village	Consultant （Japanese, Local） OWRB , ZWRO , WWO ／ 【VWC】	Output 2 & 3 ／ Workshop Report ／ Regulations on facility use
	2-2 OJT for Inspection and Repair of Facilities - 1	Consultants and OWRB will train the staff of ZWRO and WWO in the technical skills necessary for the operation, maintenance, and repair of water supply facilities. Also, they will explain the procedure of procurement of spare parts. ● A village with a facility which is almost completed will be used by the consultant and OWRB as a model village to teach ZWRO and WWO staff how to repair serious breakdowns. (The Japanese consultant will only provide guidance in the initial stages. After that this work will be continued by the local consultant.)	Workshop ／ WWO ＋ Selected Villages	Consultant （Japanese, Local） OWRB ／ 【ZWRO , WWO】	Output 4 ／ Workshop Report

	2-3 OJT for Inspection and Repair of Facilities - 2	The local consultant, ZWRO, and WWO will train the chief of the water committee and the person in charge of operation and management in the technical skills necessary for the operation, maintenance, and repair of water supply facilities. They will also explain the procedure of procuring and managing spare parts. ● A village with a facility which is almost completed will be used by the local consultant, ZWRO and WWO as a model village to teach the residents of a target village how to repair minor breakdowns. (Local consultant will work for every area with ZWRO and WWO)	Workshop ／ WWO ＋ Selected Villages	Consultant （Local） ZWRO , WWO ／ 【VWC】	Output 4 ／ Workshop Report ／ Manual of O&M
	2-4 OJT for Administration	Consultant, ZWRO and WWO will give practical training to the chief and those in charge of administration and accounting at VWC, in the setting and collection of water fees, account management, and auditing. ● The local consultant, ZWRO and WWO will teach VWC the administrative management at the selected village (VWC) which is almost completed construction and has commenced VWC activity. (Local consultant will work for every area with ZWRO and WWO)	Workshop ／ WWO ＋ Selected Villages	Consultant （Local） ZWRO , WWO ／ 【VWC】	Output 4 ／ Workshop Report ／ Active Report

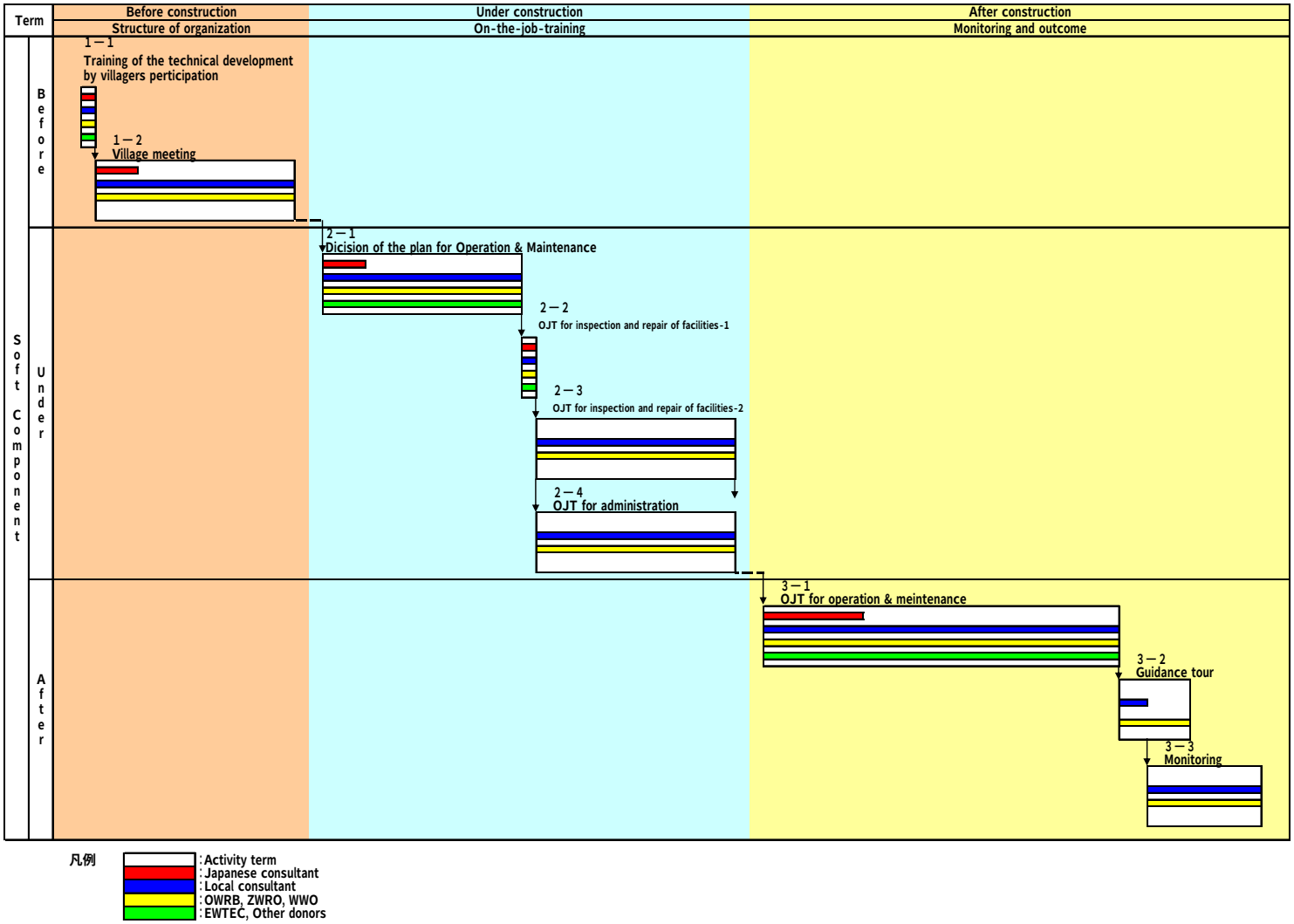
3 Activities After Construction	3-1 OJT for Operation & Maintenance (O&M)	Consultants (local and Japanese), OWRB and ZWRO will instruct WWO and VWC in operation and maintenance (O&M), and hygiene education, before the handover of the facilities. (Local consultant will continue this action for every area with OWRB after the guidance by Japanese consultant in beginning.)	at Facility ／ Villages	Consultant （Japanese, Local） ／ OWRB / ZWRO 【WWO, VWC】	Output 4 & 5 ／ Trouble shooting manual ／ Training records
	3-2 Guidance Tour	After hand over the facilities, the local consultant, OWRB and ZWRO will perform a guidance tour to monitor the activities of VWC and the condition of facilities to solve any problems etc. ● Consultant, OWRB and ZWRO investigate the outcome of above activities and perform guidance to solve any problems for WWO and VWC. ● Consultant will only give guidance to increase the capacity of OWRB and ZWRO staff on the first tour, after which they will carry it out independantly.	Guidance ／ Villages	Consultant （Local） OWRB , ZWRO ／ 【VWC, Villagers】	Output 4 ／ Guidance tour record
	3-3 Monitoring	At the end of this project (after hand over the facilities), instruction will be given about managing control-of-maintenance activities, ascertaining the hygiene situation, and techniques for problem solving. ● Monitoring activity should be commenced from about one month after the hand over of the facilities in each village.	Questionnaires ／ Villages	Consultant （Local） ／ OWRB / ZWRO 【WWO, VWC】	Output 4 & 5 ／ Monitoring Report ／ Active Report

※ Before construction …Immediately after issue commencement order.

※ Under construction …Immediately after decision the final village (Leve-1), final position of water point (Level2)

※ After construction …Immediately after operation of facility, around facility hand over

Active flow of the Soft component



(5) Procurement of the main resources for the Soft Component implementation

Since soft component is to provide support concerning management skills, primary survey and design, and operation and maintenance, the implementation of this component spans the entire period of the project from inception to completion. The Japanese consultants, effectively utilizing local consultants, will efficiently and effectively attain targets using the implementation resources.

However, a Japanese consultant's intervention is to be kept to a minimum, but when necessary will be used arbitrarily as an overall resource for implementing this project, for the quality and process control of each activity, and for activities to strengthen ties with other donors and technical cooperation projects. This should take into account the purpose of the Soft Component (smooth startup of the project and to ensure sustainable results).

The necessary personnel for this activity are as follows.

♦ Japanese consultant (1 person)

As a chief of this Soft component activity, the consultant will be dispatched several times from Japan to Ethiopia during this activity. He works with a local consultant, strengthening ties with counterpart personnel of ZWRB, ZWRO, WWO, technical cooperation projects and other donors.

Japanese consultant is a talented person who has experience implementing soft component, serves both as the source of knowledge and experience for the water supply facility (electricity and machines) , and can perform capacity building of personnel concerned, all within the limited term of the project.

♦ Local consultant (1 person)

The local consultant works as the Japanese consultant's subordinate over the entire period of the project implementation. A local consultant has experience with water supply facilities and matters similar to the soft component. Also has knowledge of construction and can converse in the both the local language of the Oromia region and English.

(6) General schedule of the Soft Component

1) Content of the Soft Component

The soft component is divided into three activities (Before construction / Under construction / After construction). The Japanese consultant will be dispatched 4 times for total of 2.9months out of the total construction period 25.3 months and the local consultant will be active for 18.3months. It is difficult to comprehend activities and problems on site when the Japanese consultant is not in the country, so they will keep close communication with the local consultant and give instructions where needed.

Duration of Soft Component Activity (months)

	1.Before construction	2.Under Construction	3. After Construction	Total
Japanese Consultant	0.9	0.9	1.1	2.9
Local Consultant	3.3	6.4	8.6	18.3

(7) Output of the Soft Component

The output of the Soft Component activities is summarized below.

- Activity report
- Workshop report
- Manual of hygiene [Activity 1-2]
- User regulations [Activity 2-1]
- Technical training report [Activity 2-2, 2-3]
- Manual for operation and maintenance [Activity 2-3]
- Administration training report [Activity 2-4, 3-1]
- Manual of Trouble shooting [Activity 3-1]
- Round instruction record [Activity 3-2]
- Monitoring report [Activity 3-3]
- Completion report

6. References

（1） List of References

No.	Item	Print, Video, Map, Photo etc	Original/ Copy	Publishing Organization	Year
1	Manual for Technical Design Standard for the Tigray Region	Print	Copy	TWRMEB	-
2	Water supply “Design Working standard Guidlines”	Print	Copy	TWRMEB Water resources Management, Regulatory and Database department	2005
3	Labor Proclamation No.377/2003	Print	Copy	Ministry of Labor and social Affairs	2004
4	Ethiopia: sustainable Development and Poverty Reduction Program (SDPRP) Interim annual Progress Report(2003/04)	Print	Copy	Ministry of Finance and Economic Development	2004
5	Explanation of the Geological Map of Ethiopia Scale 1:2,000,000, 2nd edition	Print	Copy	Ethiopia Geological survey	1996
6	A Proposal Paper for Hydro geological Mapping of Ethiopia	Print	Copy	Provisional Military Government of socialist Ethiopia Hydrogeology and Engineering Geology Division	1984
7	Evaluation of Aynalem Well Field and Selection of Prospective Well Fields around Mekele Town for Water supply source Draft final Report Volume : Evaluation of groundwater potential	Print	Copy	Water Works Design and supervision Enterprise	2006
8	Customs Tariff (Based on the 2002 version of the HS), Volume Ⅰ	Soft file	Original	ECA	2003
9	Customs Tariff (Based on the 2002 version of the HS), Volume Ⅱ	Soft file	Original	ECA	2003
10	Rural Water Supply and Sanitation Program Regional Implementation Guidelines Tigray Region	Soft file	Original	Federal Democratic Republic of Ethiopia Ministry of Water Resource	2004
11	Urban Water Supply and Sanitation Program Regional Implementation Guidelines Tigris Region	Soft file	Original	Federal Democratic Republic of Ethiopia Ministry of Water Resource	2004
12	Water Supply and Sanitation Program Implementation Manual	Soft file	Original	Federal Democratic Republic of Ethiopia Ministry of Water Resource	2004
13	Budget for Regional Rural WSS Program	Soft file	Original	-	-
14	Budget for Regional Urban WSS Program	Soft file	Original	-	-

No.	Item	Print, Video, Map, Photo etc	Original/ Copy	Publishing Organization	Year
15	Rainfall data in adigrat, alamata, hagerselam, korem, maichew, makele, senkata, waja, wedisemero	Soft file	Original	NMS	-
16	Maximum Temperature data in adigrat, alamata, hagerselam, korem, maichew, makele, senkata, waja, wedisemero	Soft file	Original	NMS	-
17	Minimaum Temperature in adigrat, alamata, hagerselam, korem, maichew, makele, senkata, waja, wedisemero	Soft file	Original	NMS	-
18	Ethiopia Map 1:50,000 （3913A～D、3912A～D）	Map	Original	Ethiopian Mapping Authority	-
19	Ethiopia Map 1:250,000 （37MC2～4、37MD10～16）	Map	Original	Ethiopian Mapping Authority	-
20	Contract Agreement Made Between Tigray Water Works construction Enterprise and Tigray Water Resources Development Commission For Tirkan, Shimeri, Shiglli, and Ruwassa Water Supply Projects	Print	Copy	Tigray Water Resources Development	2005
21	Memorandum of Understanding among the Tigray Region Government represented by the Bureau of Water and Mines Resources Development & Tigray Water works construction Enterpriser & UNICEFF on the cooperation for the development of the Rural Water Supply Sector in Tigray	Print	Copy	-	-
22	Contract Agreement Between Tigray Water Resources Development Commission And Tigray Water Works Construction Enterprise for Construction of Adi-Gebru Water Supply System	Print	Copy	National Regional State of Tigray Water Resources Development Commission	2005
23	EGRAP, Groundwater for Development	Print	Copy	Ministry of Water Resources, Geological Survey of Ethiopia	2007
24	Construction Ahead	Print	Original	www.constructionahead.com	2007
25	Ethiopia Statistical Abstract 2007	Print	Original	CSA	2007
26	1994 Population and Housing Census of Ethiopia, Result for Oromiya Region, VolumeI- Part I	Print	Original	CSA	1996

No.	Item	Print, Video, Map, Photo etc	Original/ Copy	Publishing Organization	Year
27	1994 Population and Housing Census of Ethiopia, Result for Oromiya Region, VolumeI- Part VI	Print	Copy	CSA	1996
28	Welfare Monitoring Survey 2004, Analytical Report	CD-ROM	Original	CSA	2004
29	Welfare Monitoring Survey 2004, Statistical Report on Basic Population Characteristics, Education, Health, Nutritional status and Child care	CD-ROM	Original	CSA	2004
30	Welfare Monitoring Survey 2004, Statistical Report on Basic Population Characteristics, Education, Health, Nutritional status and Child care	CD-ROM	Original	CSA	2004
31	Household Income, Consumtion and Expenditure Survey 2004/5 VolumeI Analytical Report on Indicators on Living Standard, Accessibility, Household Assets, Food security and HIV/AIDS	Print	Original	CSA	2007
32	Household Income, Consumtion and Expenditure Survey 2004/5 VolumeII Statistical Report	Print	Copy	CSA	2007
33	Guidelines for Management of Rural Water Supply Scheme (Oromian)	Print	Copy	OWRB	2002
34	Operation Manual of Guideline (Oromian)	Print	Copy	OWRB	2002
35	WaSH Manual 01 (Scheme Administration and Management Model)	Soft file	Copy	Plan International	2007
36	WaSH Manual 02 (Scheme Administration and Management Manual)	Soft file	Copy	Plan International	2007
37	WaSH Manual 03 (Operation and Maintenance Manual for Spring Development Works)	Soft file	Copy	Plan International	2007
38	WaSH Manual 04 (Operation and Maintenance Manual for hand Dug and Shallow Drilled Development Works)	Soft file	Copy	Plan International	2007
39	WaSH Manual 05 (Operation and Maintenance Manual for Motorized System)	Soft file	Copy	Plan International	2007

No.	Item	Print, Video, Map, Photo etc	Original/ Copy	Publishing Organization	Year
40	WaSH Manual 06 (Financial Management Manual)	Soft file	Copy	Plan International	2007
41	WaSH Manual 07 (Goods Management Manual)	Soft file	Copy	Plan International	2007
42	WaSH Manual 08 (Reporting Manual)	Soft file	Copy	Plan International	2007
43	Rural Water Supply and Sanitation Project Request for Proposals	Print	Copy	OWRB	2007
44	Rural Water Supply & Sanitation and Hygiene Program (RWSSHP) The WATSANCO Handbook	Print	Copy	OWRB	2007
45	Rural Water Supply & Sanitation and Hygiene Program (RWSSHP) The Woreda Guide to RWSSHP Planning & Management	Print	Copy	OWRB	2007
46	Rural Water Supply & Sanitation and Hygiene Program (RWSSHP) The Woreda RWSSHP Operational Manual	Print	Copy	OWRB	2007
47	Rural Water Supply & Sanitation and Hygiene Program (RWSSHP) Community Facilitator's Guide	Print	Copy	OWRB	2007
48	RWSSHP Resource Booklet # 1 (Community Organization)	Print	Copy	OWRB	2007
49	RWSSHP Resource Booklet # 2 (Money Management)	Print	Copy	OWRB	2007
50	RWSSHP Resource Booklet # 3 (Technical Issues)	Print	Copy	OWRB	2007
51	RWSSHP Resource Booklet # 4 (Hygiene & Sanitation)	Print	Copy	OWRB	2007
52	RWSSHP Resource Booklet # 5 (Facilitation Skills)	Print	Copy	OWRB	2007

(2) List of Target Sites for Drilling

No.	Zone	Woreda	Village	Facility level	No, of Drilling	UTM E	UTM N	Elevation(m)	Depth (m)	Drilling Method	Expected Water Level (m)
S-12	West Showa	Jaldu	Kolu Gelan	1	3	398563	1032139	2,799.4	80	Rotary	10-20
"	"	"	"	1		397628	1030397	2,787.7	80	Rotary	10-20
"	"	"	"	1		397557	1031287	2,799.6	90	Rotary	10-20
H-14	Horo Guduru	Hababo Guduru	Loya Dilelo	1	2	334360	1062088	2,308.0	60	Rotary	10-20
"	"	"	"	1		333496	1061498	2,299.9	60	Rotary	10-20
H-07	Horo Guduru	Abay Chomen	Genji Ketala	1	2	312355	1062694	2,251.6	70	Rotary	10-20
"	"	"	"	1		311586	1063473	2,247.2	75	Rotary	10-20
J-01	Jima	Omo Nada	Ale	1	3	294231	843413	1,793.3	90	Rotary	20-30
"	"	"	"	1		294926	843329	1,794.1	100	Rotary	20-30
"	"	"	"	1		294675	842734	1,826.2	100	Rotary	20-30
J-19	Jima	Omo Nada	Waktola	1	2	305936	848091	1,719.9	100	Rotary	10
"	"	"	"	1		305883	848790	1,728.3	100	Rotary	10
J-20	Jima	Omo Nada	Toli Sebeta	1	1	295978	847120	1,784.7	100	Rotary	10
S-08	West Showa	Dano	Babo Geseso	1	2	314020	981550	1,622.0	100	DTH	10-20
	"	"	"	1					100	DTH	10-20
S-17	West Showa	Jibat	Al Gubo Besal	1	2	343054	959318	2,414.9	100	DTH	10-20
	"	"	"	1					100	DTH	10-20
S-24	West Showa	Ambo	Gosu Qora	1	1	373268	990191	2,203.7	90	DTH	10-20
H-05	Horo Guduru	Jima Rare	Gammada	1	3	340555	1079075	2,322.0	100	DTH	10-20
	"	"	"	1					100	DTH	10-20
	"	"	"	1					100	DTH	10-20
H-08	Horo Guduru	Jima Ganat	Bedo Gidami	1	3	292734	1042464	2,277.6	100	DTH	10-20
"	"	"	"	1		293056	1042578	2,268.3	90	DTH	10-20
"	"	"	"	1		292817	1043209	2,276.0	80	DTH	10-20
H-09	Horo Guduru	Jima Ganat	Kelala Didmtu	1	3	294197	1046173	2,246.6	80	DTH	10-20
"	"	"	"	1		294687	1046252	2,239.4	80	DTH	10-20
"	"	"	"	1		294853	1046848	2,235.6	90	DTH	10-20
H-21	Horo Guduru	Jima Rare	Burka Hobo	1	3	318668	1028563	2,220.3	90	DTH	10-20
"	"	"	"	1		317826	1028165	2,224.5	90	DTH	10-20
"	"	"	"	1		317583	1029455	2,228.8	100	DTH	10-20
H-22	Horo Guduru	Jardega Jarte	Haro Habo	1	2	281442	1090044	2,290.3	90	DTH	10-20
"	"	"	"	1		281055	1089594	2,267.9	70	DTH	10-20
H-18	Horo Guduru	Abe Dongoro	Tulu Gana	1	3	246864	1059115	1,363.0	60	DTH	10-20
"	"	"	"	1					60	DTH	10-20
"	"	"	"	1					60	DTH	10-20
J-08	Jima	Kersa	Bulbul No.2	1	9	287773	855260	1,731.8	90	DTH	10
"	"	"	"	1		287892	854841	1,713.2	90	DTH	10
"	"	"	"	1		287257	854206	1,725.8	90	DTH	10
"	"	"	"	1		291188	854315	1,746.8	90	DTH	10
"	"	"	"	1		291955	853094	1,711.0	90	DTH	10
"	"	"	"	1		291539	854783	1,755.6	90	DTH	10
"	"	"	"	1		289334	854841	1,792.8	90	DTH	10
"	"	"	"	1		291985	853268	1,713.8	90	DTH	10
"	"	"	"	1		287327	854085	1,720.4	90	DTH	10
J-04	Jima	Sekoru	Bore	1	1	328471	888317	1,939.6	100	DTH	10
J-09	Jima	Sekoru	Bore	1	4	314993	858084	1,725.8	80	DTH	50-60
"	"	"	"	1		315097	858861	1,728.9	75	DTH	50-60
"	"	"	"	1		312650	857804	1,762.3	100	DTH	50-60
"	"	"	"	1		314015	857812	1,728.2	85	DTH	50-60
J-12	Jima	Sekoru	Dobi	1	4	331425	894070	1,947.5	130	DTH	10-15
"	"	"	"	1		332716	893905	2,003.3	130	DTH	10-15
"	"	"	"	1		332245	893604	1,977.7	130	DTH	10-15
"	"	"	"	1		331464	893691	1,946.5	130	DTH	10-15
J-10	Jima	Sekoru	Cheka Walaka	1	1	324836	863369	1,905.7	90	DTH	10
J-18	Jima	Omo Nada	Gudeta Bula	1	2	312634	857614	1,765.1	90	DTH	50-60
"	"	"	"	1		312276	856107	1,763.0	115	DTH	50-60
J-03	Jima	Kersa	Marewa	1	2	269231	849392	1,825.8	110	DTH	10
"	"	"	"	1		269293	849981	1,786.9	110	DTH	10
J-14	Jima	Omo Nada	Asendabo Yedi	2	1	302303	858962	1,679.4	100	Rotary	-
H-15	Horo Guduru	Hababo Guduru	Dedu	2	1	338577	1070865	2,318.6	70	DTH	-
J-07	Jima	Sekoru	Deneba	2	2	320274	867688	1,729.6	50	DTH	-

（3） Monthly Cost for Operation and Maintenance

Level 2 Facilities

(Birr)

ID No.	Woreda	Village	Fuel fee	Electric power fee	Cost for Maintenance of Pump	Cost for Maintenance of Generator	Cost for Water Seller	Cost for Operator	Reserve Fund for Valves	Reserve Fund for Meters	Reserve Fund for Taps	Miscellaneous Expense	Disinfection Cost by Chlorine	Total
S-13	Dandi	Galessa	4517	934	489	1798	1791	384	77	136	90	51		10,267
S-16	Ambo	Goromti	30077		1041	2392	767	384	77	69	41	51		34,899
S-11	Ejere	Gorba	16520		606	1798	1535	384	128	153	82	51	13	21,270
S-03	Toke Kutaye	Kolba					767		51	51	38	51	13	971
H-15	Hababo Guduru	Dadu	23723		998	1985	3325	384	77	289	205	51		31,037
H-13	Jardega Jarte	Jardega	41090		1079	2696	2302	384	77	223	146	51		48,048
H-10	Abay Chomen	Gutena Beguru	67778		1279	3371	2302	384	77	223	151	51		75,616
H-02	Jardega Jarte	Sego	16520		606	1798	2046	384	128	187	136	51	13	21,869
H-06	Jardega Jarte	Akayu	16520		606	1798	1023	384	128	120	69	51	13	20,712
H-04	Jima Ganat	Gembo					2046		51	153	102	51	13	2,416
H-23	Jima Ganat	Hagaya					3070		102	256	153	51	13	3,645
J-21	Dedo	Bilu Harsu	23723		998	1985	2046	384	77	187	113	51		29,564
J-07	Sokoru	Deneba	50833		998	3371	4860	384	77	409	276	51		61,259
J-14	Omo Nada	Asendabo Yadi	67778		1481	3371	8186	384	77	767	478	51		82,573
J-15	Omo Nada	Bonaya	30077		1041	2392	1791	384	77	223	107	51		36,143

As of the year 2016

Level 1 Facility (Hand Pump)

(Birr)

Item	Cost
Supplies expenses	59
Labor cost for O&M	256
Cost for water seller	256
Miscellaneous Expense	64
Total	635

As of the year 2016

Level 1 Facility (Spring Source)

(Birr)

Item	Cost
Reserve fund for equipmen	230
Labor cost for O&M	256
Cost for water seller	256
Miscellaneous Expense	51
Total	793

As of the year 2016

(4) Target Sites for the Project

West Showa

No.	Woreda	Village	No. of villages	Type of facility (Level-1/2)	Type of intake	No. of sites	No. of water resources	No. of drilling during construction	Water supply coverage (by population)	
									2007	2016
S-08	Dano	Babo Geseso	1	1	Hand pump	2	Well× 2	2	640	785
S-17	Jibat	Aal Gubo Besa	1	1	Hand pump	2	Well× 2	2	620	761
S-13	Dandi	Galessa	1	2	Motorized pump	1	Well× 1	0	1,111	1,363
S-16	Ambo	Goromti	1	2	Motorized pump	1	Well× 1	0	2,500	3,068
S-11	Ejere	Gorba	1	2	Motorized pump	1	Spring× 1	-	1,684	2,066
S-01	Dano	Kalacha Jibat	1	1	**Spring on spot**	1	Spring× 1	-	2,019	2,478
S-03	Toke Kutaye	Kolba	1	2	Gravity	1	Spring× 1	-	1,144	1,404
S-19	Jaldu	Boni Jawi	1	1	**Spring on spot**	1	Spring× 1	-	1,813	2,225
S-12	Jaldu	Kolu Galan	1	1	Hand pump	3	Well× 3	3	1,429	1,754
S-07	Jaldu	Kilbe	1	1	**Spring on spot**	1	Spring× 2	-	841	1,032
S-24	Ambo	Goso Qura	1	1	Hand pump	1	Well× 1	1	450	552
S-21	Ambo	Dobi	1	1	**Spring on spot**	1	Spring× 1	-	700	859
S-23	Ambo	Degale Garita 1	1	1	**Spring on spot**	1	Spring× 1	-	650	798
S-25	Toke Kutaye	Boke	1	1	**Spring on spot**	1	Spring× 1	-	200	245
S-26	Toke Kutaye	Toke Kombolcha	1	1	**Spring on spot**	1	Spring× 2	-	400	491
S-22	Ambo	Degale Garita 2	1	1	**Spring on spot**	1	Spring× 1	-	500	614
Total					**Level-1**	16	**No. of wells** 9	8	11,373	13,957
					Level-2	4	**No. of wells** 1	0	5,328	6,538
					Total	20	**Total** 10	8	16,701	20,495

Horo Guduru

No.	Woreda	Village	No. of villages	Type of facility (Level-1/2)	Type of intake	No. of sites	No. of water resources	No. of drilling during construction	Water supply coverage (by population)	
									2007	2016
H-15	Hababo Guduru	Dadu	1	2	Motorized pump	1	Well× 1	1	3,306	4,057
H-13	Jardega Jarte	Jardega	1	2	Motorized pump	1	Well× 1	0	1,653	2,028
H-10	Abay Chomen	Gutena Beguru	2	2	Motorized pump	1	Well× 1	0	2,975	3,651
H-05	Jima Rare	Chala Foka (Gamada)	1	1	Hand pump	3	Well× 3	3	1,100	1,350
H-02	Jima Rare	Sego	1	2	Motorized pump	1	Spring× 1	-	2,384	2,925
H-06	Jardega Jarte	Akayu	1	2	Motorized pump	1	Spring× 1	-	1,983	2,433
H-04	Jima Ganat	Gembo	5	2	Gravity	1	Spring× 1	-	1,983	2,433
H-17	Abe Dongoro	Dalachoo	1	1	**Spring on spot**	**1**	Spring× 1	-	1,653	2,028
H-23	Jima Ganat	Hagaya	1	2	Gravity	1	Spring× 1	-	1,565	1,920
H-08	Jima Ganat	Badho Gidami	1	1	Hand pump	**3**	Well× 3	3	2,644	3,244
H-09	Jima Ganat	Kalala Didmtu	1	1	Hand pump	**3**	Well× 3	3	1,983	2,433
H-14	Hababo Guduru	Loya Dilalo	1	1	Hand pump	**2**	Well× 2	2	992	1,217
H-07	Abay Chomen	Ganji Ketala	1	1	Hand pump	**2**	Well× 2	2	1,322	1,622
H-21	Jima Rare	Burka Hobo	1	1	Hand pump	**3**	Well× 3	3	1,860	2,282
H-22	Jardega Jarte	Haro Abo	1	1	Hand pump	**2**	Well× 2	2	1,437	1,763
H-18	Abe Dongoro	Tulu Gana	1	1	Hand pump	**3**	Well× 3	3	3,306	4,057
Total					**Level-1**	22	**No. of wells** 21	21	16,297	19,996
					Level-2	7	**No. of wells** 3	1	15,849	19,447
					Total	29	**Total** 24	22	32,146	39,443

Jima

No.	Woreda	Village	No. of villages	Type of facility (Level-1/2)	Type of intake	No. of sites	No. of water resources	No. of drilling during construction	Water supply coverage (by population)	
									2007	2016
J-21	Dedo	Bilu Harsu	1	2	Motorized pump	1	Well× 1	0	2,310	2,835
J-07	Sokoru	Deneba	1	2	Motorized pump	1	Well× 2	2	8,767	10,758
J-14	Omo Nada	Asendabo Yadi	2	2	Motorized pump	1	Well× 1	1	4,200	5,154
J-15	Omo Nada	Bonaya	1	2	Motorized pump	1	Well× 1	0	2,000	2,454
J-08	Karsa	Bulbul No.2	9	1	Hand pump	9	Well× 9	9	6,500	7,976
J-01	Omo Nada	Ale	1	1	Hand pump	3	Well× 3	3	1,750	2,147
J-04	Omo Nada	Jaso Abe	1	1	Hand pump	1	Well× 1	1	250	307
J-09	Sokoru	Bore	1	1	Hand pump	4	Well× 4	4	2,060	2,528
J-12	Sokoru	Dobi	2	1	Hand pump	4	Well× 4	4	2,500	3,068
J-10	Sokoru	Chaka Walaka	1	1	Hand pump	1	Well× 1	1	450	552
J-18	Omo Nada	Gudeta Bula	1	1	Hand pump	2	Well× 2	2	850	1,043
J-19	Omo Nada	Waktola	2	1	Hand pump	2	Well× 2	2	750	920
J-20	Omo Nada	Tolisebeta	1	1	Hand pump	1	Well× 1	1	511	627
J-03	Karsa	Marewa	2	1	Hand pump	2	Well× 2	2	840	1,031
Total					**Level-1**	29	**No. of wells** 29	29	16,461	20,199
					Level-2	4	**No. of wells** 5	3	17,277	21,201
					Total	33	**Total** 34	32	33,738	41,400
Total of Three Zones					**Level-1**	**67**	**No. of wells** 59	58	44,131	54,152
					Level-2	**15**	**No. of wells** 9	4	38,454	47,186
					Total	**82**	**Total** 68	62	82,585	101,338