MINUTES OF DISCUSSIONS

ON THE PREPARATORY SURVEY

ON

THE PROJECT FOR IMPROVEMENT OF WATER SUPPLY SYSTEM

AT KASSALA CITY,

IN THE REPUBLIC OF THE SUDAN

(EXPLANATION ON DRAFT REPORT)

In March 2010, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched a Preparatory Survey Team on the Project for Improvement of Water Supply Facilities in Kassala City (now the relevant components mentioned here is referred to as "the Project for Improvement of Water Supply System at Kassala City" and hereinafter referred to as "the Project") to the Government of the Republic of the Sudan (hereinafter referred to as "Sudan") and through discussion, field survey and technical examination of the results in Japan, JICA prepared a draft report of the study.

In order to explain and consult with the Government of Sudan on the components of the draft report, JICA sent to Sudan the Draft Report Explanation Team (hereinafter referred to as "the Team"), which was headed by Eng. Yosuke Sasaki, Senior Advisor, JICA, from 14th to 23rd May 2011.

As a result of discussions, both parties confirmed the main items described in the attached sheets.

Kassala, 18th May, 2011

佐々木 洋介

Eng. Yosuke SASAKI
Leader
Preparatory Survey Team
Japan International Cooperation Agency

Eng. Mohamed H.M. AMMAR
Director General
Public Water Corporation
Government of National Unity
Sudan

Witnessed by

Eng. Hashim Mohamed Abdulatief
Director General
Kassala State Water Corporation
Kassala State
Government of National Unity
Sudan

for/ Elgaili Mohamed ElBashir
Undersecretary
Ministry of International Cooperation
Government of National Unity
Sudan

ATTACHMENT

1 Components of the Draft Report

The Sudan side agreed and accepted in principle the components of the draft outline design explained by the Team. The components of the Project are shown in Annex-1.

2 Japan's Grant Aid Scheme

The Sudan side understood the Japan's Grant Aid Scheme and would take the necessary measures and allocate budget properly for smooth implementation of the Project, as a condition for the Japanese Grant Aid to be implemented. The Grant Aid Scheme and necessary measures mentioned above are described in the Annex-4 and Annex-6 of the Minutes of Discussions signed by both parties on 10th March 2010 (hereinafter referred to as "the previous minute").

3 Responsible and Implementing Agency

3.1 The Responsible Agency is the Public Water Corporation (hereinafter referred to as "PWC").

3.2 The Implementing Agency is Kassala State Water Corporation (hereinafter referred to as "SWC").

4 Schedule of the Study

JICA will complete the final report in accordance with the confirmed item and send it to the Government of Sudan by the end of June 2011.

5 Other Relevant Issues

The following issues were discussed and confirmed by the both sides.

5.1Component of the Project

The Team explained the components of the Project and noted that the additional distribution pipes, equipment, machines and tools and rehabilitation of workshop will not be a component of this project. Based on the above explanation, both sides agreed on the components and confirmed that the draft technical specifications listed in Annex-1 is strictly confidential and should never be duplicated or released to other parties.

5.2 Project Cost Estimate and Budgetary Arrangement

The Team explained to the Sudan side the estimated project cost as attached in Annex-1. Both side confirmed that this estimated cost (including contingency) was provisional and would be examined further by the Government of Japan for its final approval. The contingency would cover the additional costs against natural disaster, unexpected natural conditions, etc.

The Sudan side reconfirmed to secure necessary counterpart budget for the project timely and adequately

to cover the required amount of the cost, as promised in the previous minutes.

Furthermore, both sides confirmed that this estimated project cost is strictly confidential, and should never be duplicated or released to other parties.

5.3 Other undertaking of the Sudan side

The Team explained to the Sudan side its obligations and timelines and costs to be covered by the Sudan side as listed in Annex-2 and Annex-3, and the Sudan side understood and promised to make available the necessary funding in a timely manner and execute them by the period mentioned in the Annex-3.

The Sudan side promised that PWC and SWC shall take necessary measures to facilitate project implementation, such as exemption of Value Added Tax, custom duties, and any other taxes and fiscal levy charges in Sudan arising from the Project activities.

Both sides confirmed that the procured equipment and materials for construction should be kept in adequate storage and that SWC shall be responsible for providing adequate space as the stockyard.

5.4 Soft Component Issues

The Team explained to the Sudan side the contents of the Soft Component and the obligations during its implementation. The Team also stressed that ownership, careful planning and continuous cooperation are necessary for sustainability of transferred knowledge and experience. The Sudan side understood and promised to execute and facilitate necessary measures to implement them.

5.5 Safety and Security

The Sudan side will ensure that necessary measures are taken for the safety and security of the Japanese nationals as well as other staffs involved in the Project.

5.6 Environmental and Social Considerations

The Team explained the importance of environmental and social considerations during construction and operation. Also, the Team explained the environmental and social impacts and the mitigation measures to be taken in the Project based on Environmental Checklist (Annex 4) and stated that the Monitoring Form should be used to monitor the impacts of the Project. Further, although EIA report is not necessary, "Environmental Feasibility Study" specified in Environment Protection Act needs to be submitted. The Sudan side understood and agreed to submit the study in a timely manner.

5.7 Tentative Schedule

The team explained that cabinet approval by the Government of Japan on the Project for Detailed Design is still under consideration and explained that overall tentative schedule will be notified as soon as it is approved by the Government of Japan.

Annex-1 Components of the Project
Annex-2 Obligations of the Sudan Side
Annex-3 Project Cost Estimation of the Sudan Side
Annex-4 Environmental Check List, Monitoring Form

This page is closed to the confidentiality.

# Annex-2 Obligations of the Sudan Side

① Provision of necessary data and materials for the project

② Ensuring safety at the project sites

③ Payment of commissions for Banking Arrangements (B/A) and Authorization to Pay (A/P)

④ Quick loading and unloading, and customs clearance procedures for the materials and equipment for construction procured for the project

⑤ Adoption of measures for exemption from taxation for the materials and equipment to be brought into Sudan by Japanese personnel, taxes on subcontracts for the procurement of the materials and equipment, and the execution of services based on the approved contract

⑥ Appropriate use and operation and maintenance of facilities constructed in the project

⑦ Other obligations listed below..

| Item | Timing of execution | Remarks |
|---|---|---|
| 1. Existing wells | | |
| (1) Ensuring site | Boundary verification:<br>Within one month after contract with the Japanese Consultant firm.<br>Land use permission:<br>Before construction start at latest | Since there are existing wells for which the site boundaries are not clear, site should be ensured by establishing the site boundaries. |
| (2) Soil preparation in site and removal of trees, etc. | Before construction start at latest | Prepare the soil within the site area, and remove trees, shrubs, etc. |
| (3) Replacement of power supply equipment on the primary side | Before electric construction start at latest | Renew power supply equipment on the primary side that has deteriorated. |
| (4) Emergency generator equipment | Before electric construction start at latest | Replace existing well pumps, and renew generators that have deteriorated or have inadequate power generating capacity. |
| (5) Installation of fences and gates | Before handing over | Install fences and gates to ensure and maintain safety of well facilities. |
| 2. New wells | | |
| (1) Ensuring site | Boundary verification:<br>Within one month after contract with the Japanese Consultant firm.<br>Land use permission:<br>Before construction start at latest | Although the scheduled site for well is public land, the boundaries should be established and the necessary site should be ensured. |
| (2) Soil preparation in site and removal of trees, etc. | Before construction start at latest | Prepare the soil within the site area, and remove trees, shrubs, etc. |
| (3) Drawing power and installing power supply equipment on the primary side | Before electric construction start at latest | Since power is not being supplied to the area containing new wells, install power supply equipment on the primary side for drawing power. |
| (4) Install fences and gates | Before handing over | Install fences and gates to ensure and maintain safety of well facilities. |
| 3. New WTP | | |
| (1) Ensuring site | Boundary verification:<br>Within one month after contract with the Japanese Consultant firm. | Site for new WTP has already been ensured, but erect strong side stakes to demarcate the site boundaries. |
| (2) Soil preparation in site and removal of trees, etc. | Before construction start at latest | Soil preparation at the site is already completed; remove trees, shrubs, etc. |

| Item | Timing of execution | Remarks |
|---|---|---|
| (3) Provision of temporary sites for work | Before construction start at latest | Provide temporary site for work within the new WTP. |
| (4) Access roads | Before construction start at latest | Although access roads have been ensured along the dike, there are locations where trees project on to the public roads. The projecting branches must be pruned or the trees removed. |
| (5) Drawing power and installing power supply equipment on the primary side | Before construction start at latest | Since power is not being supplied to the area containing WTP, install power supply equipment on the primary side for drawing power. |
| (6) Provision of water for water filling tests | Before water filling test | Water is ensured and provided by conveying it to the WTP from the water source wells. |
| (7) Installation of fences and gates | Before handing over | Install fences and gates to ensure and maintain safety of the WTP. |
| 4. Conveyance pipes and distribution mains | | |
| (1) Cooperation related to request for exclusive use of roads and rivers | Before construction start | Before the work of laying raw water and distribution mains, cooperate to complete formalities of the organization that manages roads and rivers for their exclusive use. |
| (2) Pruning and removing trees, shrubs, etc., in roads | Before construction start at latest | Trees, shrubs, exist in roads on the raw water and distribution pipeline routes. If these obstruct pipe laying work, prune or remove them. |
| (3) Clearing objects on the road | Before construction start at latest | Clear concrete blocks or other objects such as signboards remaining on roads. |
| (4) Suspension of water supply because new pipe or existing pipe connections | Before and during connection works | Cooperate with the residents during suspension of water supply when new pipes or existing pipes are to be connected by notifying the residents and witnessing the connection work. |
| 5. Others | | |
| (1) Disposal area for surplus soil from the work | Before all construction start | SWC to specify the disposal location after discussion with Kassala City. |
| (2) Project implementation | During all construction works | SWC to station engineers and to cooperation in the project implementation. |

# Annex-3 Project Cost Estimation of the Sudan Side

(Unit: thousand SDG)

| Item | Cost | Remarks |
|---|---|---|
| 1. Existing wells | | |
| (1) Ensuring site | - | This is site owned by SWC. |
| (2) Soil preparation in site and removal of trees, etc. | 5.6 | |
| (3) Replacement of power equipment on the primary side | 12.5 | Renew deteriorated and old equipment. |
| (4) Emergency generator equipment | 125.0 | Renew deteriorated and inadequate capacity generators. |
| (5) Installation of fences and gates | 122.2 | |
| Sub-total | 265.3 | |
| 2. New wells | | |
| (1) Ensuring site | - | Free because this is public land. |
| (2) Soil preparation in site and removal of trees, etc. | 5.9 | |
| (3) Drawing power and installing power supply equipment on the primary side | - | Included in the water treatment plant. |
| (4) Installation of fences and gates | 134.4 | |
| Sub-total | 140.3 | |
| 3. New water treatment plant | | |
| (1) Ensuring site | - | This is site owned by SWC. |
| (2) Soil preparation in site and removal of trees, etc. | 1.6 | |
| (3) Provision of temporary sites for work | - | This is site owned by SWC. |
| (4) Access roads | 0.6 | Prune and remove trees on roads. |
| (5) Drawing power and installing power supply equipment on the primary side | 241.9 | Including new wells |
| (6) Provision of water for water filling tests | 23.0 | |
| (7) Installation of fences and gates | 64.7 | |
| Sub-total | 331.8 | |
| 4. Conveyance pipes and distribution main | | |
| (1) Pruning and removing trees, shrubs, etc., in roads | 0.6 | |
| (2) Clearing objects on the road | - | To be borne by owner |
| Sub-total | 0.6 | |
| 5. Others | | |
| (1) Project implementation cost | 24.3 | |
| (2) Bank commission | 15.0 | |
| Sub-total | 39.3 | |
| Total | 777.3 | |

# Annex-4 Environmental Check List, Monitoring Form

## (1) Environmental Check List

| Category | Environmental Item | Main Check Items | Yes: Y No: N | Confirmation of Environmental Considerations |
|---|---|---|---|---|
| 1 Permits and Explanation | (1) EIA and Environmental Permits | (a) Have EIA reports been already prepared in official process?<br>(b) Have EIA reports been approved by authorities of the host country's government?<br>(c) Have EIA reports been unconditionally approved? If conditions are imposed on the approval of EIA reports, are the conditions satisfied?<br>(d) In addition to the above approvals, have other required environmental permits been obtained from the appropriate regulatory authorities of the host country's government? | (a) N<br>(b) N<br>(c) N<br>(d) Y | (a) , (b), (c),<br>Although EIA report is unnecessary, "Environmental Feasibility Study" specified from Environment Protection Act needs to be submitted. The contents of "Environmental Feasibility Study" are included in the contents of the initial environmental examination survey.<br><br>(d)<br>The approvals about construction of source wells and raw water mains were acquired. |
| | (2) Explanation to the Public | (a) Have contents of the project and the potential impacts been adequately explained to the Local stakeholders based on appropriate procedures, including information disclosure? Is understanding obtained from the Local stakeholders?<br>(b) Have the comment from the stakeholders (such as local residents) been reflected to the project design | (a) Y<br>(b) Y | (a) , (b)<br>Two stakeholder meetings were held. Suitable explanations for the local resident and stakeholders who participated in the meeting were given, and participant's understandings have been obtained. Moreover, participant's opinions are made to reflect in the project. |
| | (3) Examination of Alternatives | (a) Have alternative plans of the project been examined with social and environmental considerations? | (a) Y | Examination of alternatives is only two cases of "With project" and "Without project." |

| Category | Environmental Item | Main Check Items | Yes: Y No: N | Confirmation of Environmental Considerations |
|---|---|---|---|---|
| 2 Pollution Control | (1) Air Quality | (a) Is there a possibility that chlorine from chlorine storage facilities and chlorine injection facilities will cause air pollution? Are any mitigating measures taken?<br>(b) Do chlorine concentrations within the working environments comply with the country's occupational health and safety standards? | (a) N<br>(b) N | (a)<br>Although gaseous chlorine is used for disinfection in the existing institution, the considered storage facility is planned.<br><br>(b)<br>Chlorine is not specified although there is law which specifies labor environment in the Sudan. |
| | (2) Water Quality | a) Do pollutants, such as SS, BOD, COD contained in effluents discharged by the facility operations comply with the country's effluent standards? | (a) N | (a)<br>There is no drainage from WTP. |
| | (3) Wastes | (a) Are wastes, such as sludge generated by the facility operations properly treated and disposed in accordance with the country's regulations? | (a) N | (a)<br>There is no generating of the water purifying sludge. |
| | (4) Noise and Vibration | (a) Do noise and vibrations generated from the facilities, such as pumping stations comply with the country's standards? | (a) Y | (a)<br>The machines which generate noise and vibration are installed in a building, and it takes noise control measures. Therefore, it is presumed that adverse impacts by noise and vibration are not generated in the operation stage. |
| | (5) Subsidence | (a) In the case of extraction of a large volume of groundwater, is there a possibility that the extraction of groundwater will cause subsidence? | (a) N | (a)<br>It was decided upon the pumping plan based on the detailed existing well investigation. Therefore, it is judged that land subsidence does not occur. |

| Category | Environmental Item | Main Check Items | Yes: Y<br>No: N | Confirmation of Environmental Considerations |
|---|---|---|---|---|
| 3 Natural Environment | (1) Protected Areas | (a) Is the project site or discharge area located in protected areas designated by the country's laws or international treaties and conventions?<br>Is there a possibility that the project will affect the protected areas? | (a) N | (a)<br>There is no protected area appointed by the Sudan government, an international treaty, etc. in the survey area. |
| | (2) Ecosystem | (a) Does the project site encompass primeval forests, tropical rain forests, ecologically valuable habitats (e.g., coral reefs, mangroves, or tidal flats)?<br>(b) Does the project site or discharge area encompass the protected habitats of endangered species designated by the country's laws or international treaties and conventions?<br>(c) If significant ecological impacts are anticipated, are adequate protection measures taken to reduce the impacts on the ecosystem?<br>(d) Is there a possibility that the amount of water used (e.g., surface water, groundwater) by project will adversely affect aquatic environments, such as rivers? Are adequate measures taken to reduce the impacts on aquatic environments, such as aquatic organisms? | (a) N<br>(b) N<br>(c) N<br>(d) N | (a) , (b), (c), (d)<br>There are no primeval forests, tropical rain forests, ecologically valuable habitats in the survey area. No adverse impact on the ecosystem is envisaged. |
| | (3) Hydrology | (a) Is there a possibility that the amount of water used (e.g., surface water, groundwater) by the project will adversely affect surface water and groundwater flows? | | (a)<br>The detailed existing well investigation was conducted and it has decided upon the pumping plan which does not have adverse impact on the existing well. |

| Category | Environmental Item | Main Check Items | Yes: Y No: N | Confirmation of Environmental Considerations |
|---|---|---|---|---|
| 4 Social Environment | (1) Resettlement | (a) Is involuntary resettlement caused by project implementation? If involuntary resettlement is caused, are efforts made to minimize the impacts caused by the resettlement?<br>(b) Is adequate explanation on compensation and resettlement assistance given to affected people prior to resettlement?<br>(c) Is the resettlement plan, including compensation with full replacement costs, restoration of livelihoods and living standards developed based on socioeconomic studies on resettlement?<br>(d) Is the compensations going to be paid prior to the resettlement?<br>(e) Is the compensation policies prepared in document?<br>(f) Does the resettlement plan pay particular attention to vulnerable groups or people, including women, children, the elderly, people below the poverty line, ethnic minorities, and indigenous peoples?<br>(g) Are agreements with the affected people obtained prior to resettlement?<br>(h) Is the organizational framework established to properly implement resettlement? Are the capacity and budget secured to implement the plan?<br>(i) Are any plans developed to monitor the impacts of resettlement?<br>(j) Is the grievance redress mechanism established? | (a) N<br>(b) N<br>(c) N<br>(d) N<br>(e) N<br>(f) N<br>(g) N<br>(h) N<br>(i) N<br>(j) N | (a) , (b), (c), (d), (e), (f), (g), (h), (i), (j)<br>The construction site of WTP is already acquired, acquisition of new land is unnecessary. Involuntary resettlement of residents does not occur. |

| Category | Environmental Item | Main Check Items | Yes: Y No: N | Confirmation of Environmental Considerations |
|---|---|---|---|---|
| | (2) Living and Livelihood | (a) Is there a possibility that the project will adversely affect the living conditions of inhabitants? Are adequate measures considered to reduce the impacts, if necessary?<br>(b) Is there a possibility that the amount of water used (e.g., surface water, groundwater) by the project will adversely affect the existing water uses and water area uses? | (a) N<br>(b) N | (a)<br>The influence on the water vender by the improvement of water supply service is expected. Employment by SWC and adequate measures by the state government, the locality government and SWC are expected.<br><br>(b),<br>The detailed existing well investigation was conducted and it has decided upon the pumping plan which does not have adverse impact on the existing well. |
| | (3) Heritage | (a) Is there a possibility that the project will damage the local archeological, historical, cultural, and religious heritage? Are adequate measures considered to protect these sites in accordance with the country's laws? | (a) N | (a)<br>There is no possibility that the project will damage the archeological, historical, cultural and religious heritage. |
| | (4) Landscape | (a) Is there a possibility that the project will adversely affect the local landscape? Are necessary measures taken? | (a) N | (a)<br>The surrounding area of the planned site (South WTP) is mainly agricultural land and empty land, and there is no scene which should be considered. |
| | (5) Ethnic Minorities and Indigenous Peoples | (a) Are considerations given to reduce impacts on the culture and lifestyle of ethnic minorities and indigenous peoples?<br>(b) Are all of the rights of ethnic minorities and indigenous peoples in relation to land and resources respected? | (a) N<br>(b) N | (a), (b)<br>Ethnic minorities and indigenous people are not settled in the project area and no serious impact of project activities are expected on culture and lifestyle of ethnic minorities and indigenous people. |

| Category | Environmental Item | Main Check Items | Yes: Y<br>No: N | Confirmation of Environmental Considerations |
|---|---|---|---|---|
| | (6) Working Conditions | (a) Is the project proponent not violating any laws and ordinances associated with the working conditions of the country which the project proponent should observe in the project?<br>(b) Are tangible safety considerations in place for individuals involved in the project, such as the installation of safety equipment which prevents industrial accidents, and management of hazardous materials?<br>(c) Are intangible measures being planned and implemented for individuals involved in the project, such as the establishment of a safety and health program, and safety training (including traffic safety and public health) for workers etc.?<br>(d) Are appropriate measures taken to ensure that security guards involved in the project not to violate safety of other individuals involved, or local residents? | (a) N<br>(b) N<br>(c) N<br>(d) N | (a) , (b), (c), (d)<br>It is required to make safe consideration through the technical cooperation project concerning operation and management of WTP. |
| 5 Others | (1) Impacts during Construction | (a) Are adequate measures considered to reduce impacts during construction (e.g., noise, vibrations, turbid water, dust, exhaust gases, and wastes)?<br>(b) If construction activities adversely affect the natural environment (ecosystem), are adequate measures considered to reduce impacts?<br>(c) If construction activities adversely affect the social environment, are adequate measures considered to reduce impacts?<br>(d) If the construction activities might cause traffic congestion, are adequate measures considered to reduce such impacts? | (a) N<br>(b) N<br>(c) N<br>(d) N | (a) , (b), (c), (d)<br>In the construction stage, in order to mitigate noise, vibration, and particulates, it is necessary to take suitable measures.<br>Serious impacts on the natural environment are not anticipated. |

| Category | Environmental Item | Main Check Items | Yes: Y No: N | Confirmation of Environmental Considerations |
|---|---|---|---|---|
| | (2) Monitoring | (a) Does the proponent develop and implement monitoring program for the environmental items that are considered to have potential impacts?<br>(b) What are the items, methods and frequencies of the monitoring program?<br>(c) Does the proponent establish an adequate monitoring framework (organization, personnel, equipment, and adequate budget to sustain the monitoring framework)?<br>(d) Are any regulatory requirements pertaining to the monitoring report system identified, such as the format and frequency of reports from the proponent to the regulatory authorities? | (a) N<br>(b) N<br>(c) N<br>(d) N | (a) , (b), (c), (d)<br>Monitoring plans on both construction stage and operation stage have been prepared. Monitoring is to be conducted based on these plans. Detailed environmental monitoring plan is also prepared and monitoring framework is to be established by SWC.<br>These monitoring results are periodically reported to Ministry of Physical Panning and Public Utilities of the state government which is the higher organization of SWC.<br>In particular, about the monitoring result of the groundwater level, the consultation with the Water Resources Department is required. |
| 6 Note | Reference to Checklist of Other Sectors | (a) Where necessary, pertinent items described in the Dam and River Projects checklist should also be checked. | | (a) ,<br>None |
| | Note on Using Environmental Checklist | (a) If necessary, the impacts to transboundary or global issues should be confirmed (e.g., the project includes factors that may cause problems, such as transboundary waste treatment, acid rain, destruction of the ozone layer, or global warming). | (a) Y | (a) ,<br>The impacts to transboundary or global issues are not assumed. |

## (2) Monitoring Form (Draft)

1) Monitoring Form for Surrounding Environment (Construction Stage)

| Monitoring Item | Monitoring Results during Report Period |
|---|---|
| Number of requests and complaints | |
| Content of requests/complaints | |

2) Monitoring Form for Noise (Construction Stage)

| Item | Unit | Measured Value (Max.) | Country's Standards | Standards for Contract | Referred International Standards | Remarks (Measurement Point, Frequency, Method, etc.) |
|---|---|---|---|---|---|---|
| Noise level | dB | | | | 85 dB* | |

* The regulation value in Japan (during construction work period)

3) Monitoring Form for Supplied Treated Water (Operation Stage)

| Item | Unit | Measured Value (Mean) | Measured Value (Max.) | Country's Standards | Standards for Contract | Referred International Standards | Remarks (Measurement Point, Frequency, Method, etc.) |
|---|---|---|---|---|---|---|---|
| pH | - | | | 6.5 – 8.5 | | | |
| Turbidity | NTU | | | 5 NTU | | | |
| Residual Chlorine | mg/l | | | 0.1* | | 5** | |
| E. Coli | n/100 ml | | | ND | | | |
| Fluoride | mg/l | | | 1.5 mg/l | | | |
| $NO_2$-N | mg/l | | | 2 mg/l as $NO_2$ | | | |
| $NO_3$-N | mg/l | | | 50 mg/l as $NO_3$ | | | |

* Usually, 0.1 mg/l is secured in order to maintain disinfection property.
** In the WHO guideline, 5 mg/l is shown as upper limit.

4) Monitoring Form for Noise (Operation Stage)

| Item | Unit | Measured Value (Max.) | Country's Standards | Standards for Contract | Referred International Standards | Remarks (Measurement Point, Frequency, Method, etc.) |
|---|---|---|---|---|---|---|
| Noise level | dB | | | | 40 dB* | |

* The regulation value in Japan (during night time)

5) Monitoring Form for Noise (Operation Stage)

| Item | Unit | Measured Value | Country's Standards | Standards for Contract | Referred International Standards | Remarks (Measurement Point, Frequency, Method, etc.) |
|---|---|---|---|---|---|---|
| Groundwater Level | m | | | | | |

## 添付資料－5　討議議事録（テクニカルノート）

(1) 第 1 次現地調査（2010 年 7 月 3 日）
(2) 第 1 次現地調査（2010 年 9 月 19 日）
(3) 第 2 次現地調査（2010 年 12 月 19 日）

TECHNICAL NOTE (1)

ON

THE PREPRATORY SURVEY

OF

THE PROJECT FOR IMPROVEMENT OF WATER SUPPLY FACILITIES

AT

KASSALA CITY,

IN

SUDAN

In the course of discussions and the preparatory survey (hereinafter referred to as "the Survey") on the Project for Improvement of Water Supply Facilities at Kassala City in Sudan (hereinafter referred to as "the Project"), Kassala State Corporation (hereinafter referred to as the "SWC") and the JICA Preparatory Survey Team (hereinafter referred to as the "the Team") have confirmed on the technical issues as described in the attached.

Kassala, July 3, 2010

| | |
|---|---|
| Eng. Mustafa Mohamaddin Lduis | Mr. Makoto HOMMA |
| Director General | Chief Consultant, |
| Kassala State Water Corporation | JICA Preparatory Survey Team |
| Kassala State | Japan |
| Government of National Unity | |
| Sudan | |

## ATTACHMENT

1. Project Site

The Project site is located at the east bank of Gash River in Kassala city. The area of the eastern side of Mt. Mukram is out of Scope. Site map is shown in Annex-1.

2. Population

The population of the Project Site is 167,650(2008) and estimated 204,739(2016) according to the Census.

3. Housing Plan in Northern distinct

Housing Plan in Northern distinct aims at dealing with the growth of population in Kassala city. There is no limitation for housing.

4. Land information

SWC provide the Land information below.

- Land of the Existing Facility: boundary of the Land, Patent roll
- Land for the Source Well Construction Site: boundary of the Land, Patent roll

5. Permission to use Existing Irrigation Well around the Test Well Construction Site

SWC requests the owner of the existing irrigation wells around the test well construction site to measure groundwater level in it for investigation of the radius of influence of the test well during pumping test.

6. Stakeholder Meeting regarding EIA

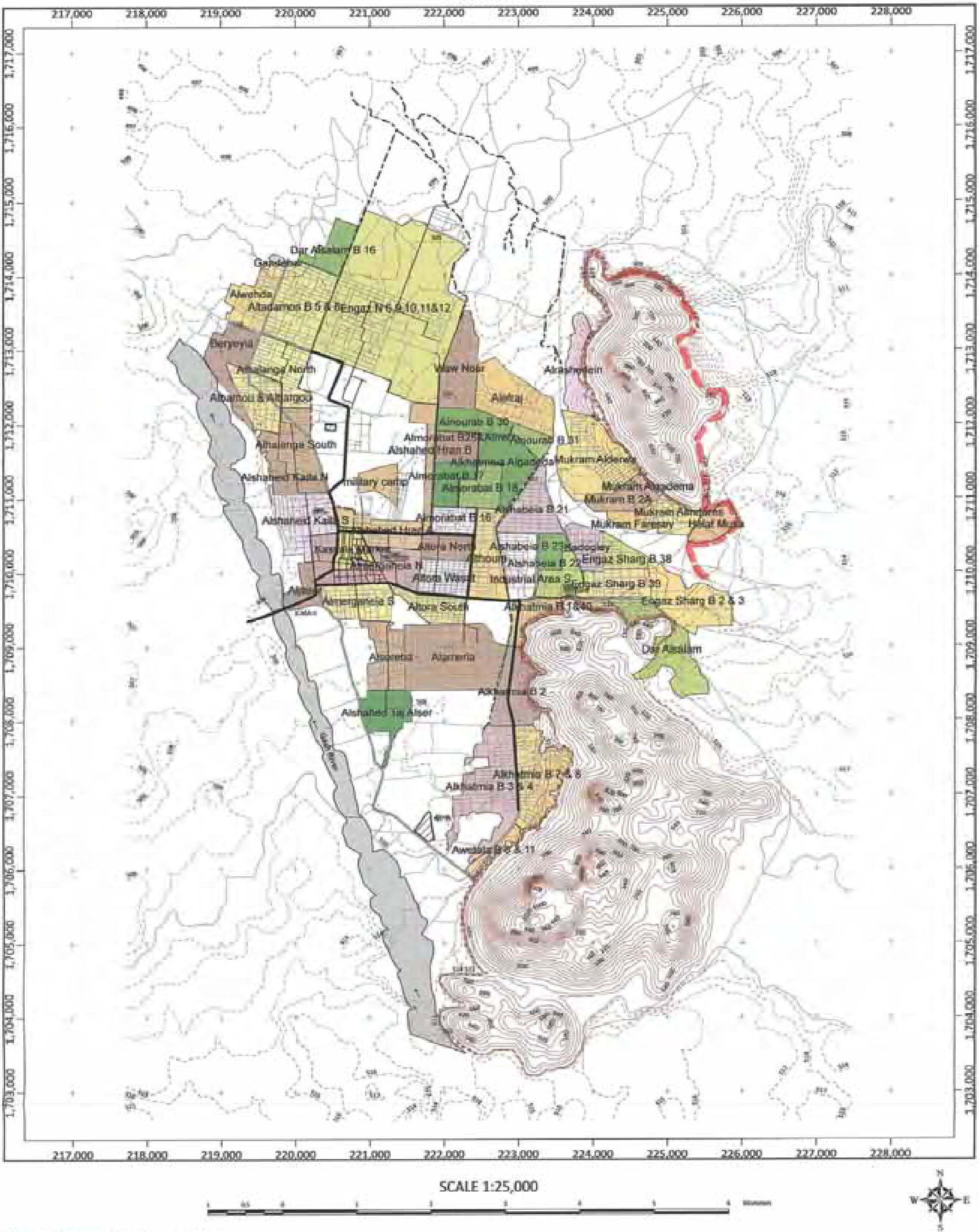
SWC coordinate to hold the Stakeholder Meeting regarding EIA on September and December and the Team will assist.

7. Water consumption survey

SWC continue to measure the water meters once per week for Water consumption survey.

Annex - 1

# KASSALA



Index Map

LEGEND

| | | | | | |
|---|---|---|---|---|---|
| ■ | Facilities (Office, Workshop) | ━ | Paved Main Road | ─ | Footpath |
| • | Facilities (Well) | ─ | Paved Road | ─·─ | River, Canal |
| ▭ | Facilities (Conveyance, Stockyard) | ─ | Unpaved Main Road | | |
| ▨ | Planned Well Site | ─ | Unpaved Road | | |

| | |
|---|---|
| Grid : | UTM Zone 37 |
| Projection : | Transverse Mercator |
| Spheroid : | WGS 1984 |
| Unit of Measurement : | Meter |
| Meridian of Origin : | 39 deg. East of Greenwich |
| Latitude of Origin : | Equator |
| Scale Factor at Origin : | 0.9996 |
| False Co-ords of Origin : | 500,000m Easting<br>Nil m Northing |
| Datum : | WGS 1984 |

TECHNICAL NOTE (2)

ON

THE PREPRATORY SURVEY

OF

THE PROJECT FOR IMPROVEMENT OF WATER SUPPLY FACILITIES

AT

KASSALA CITY,

IN

SUDAN

In the course of discussions and the preparatory survey (hereinafter referred to as "the Survey") on the Project for Improvement of Water Supply Facilities at Kassala City in Sudan (hereinafter referred to as "the Project"), Kassala State Corporation (hereinafter referred to as the "SWC") and the JICA Preparatory Survey Team (hereinafter referred to as the "the Team") have confirmed on the technical issues as described in the attached.

Kassala, September 19, 2010

| | |
|---|---|
| Eng. Mustafa Mohamaddin Dien<br>Director General<br>Kassala State Water Corporation<br>Kassala State<br>Government of National Unity<br>Sudan | Mr. Makoto HOMMA<br>Chief Consultant,<br>JICA Preparatory Survey Team<br>Japan |

## ATTACHMENT

Both parties agreed on the followings.

### I. General

#### 1. Cooperation project

The Team prepared the basic plan of the improvement of the water supply facilities at east bank of the Gash River in Kassala City (hereinafter referred to as "the Basic Plan"). Cooperation component(s) will be selected from the Basic Plan and defined as a cooperation project depending on the budget through the meeting between JICA and SWC, scheduled to be held on November 2010. The Basic Plan is shown in the **Appendix-1**.

#### 2. The Basic Plan

1) There is a possibility of the modification of the components and/or facilities specification shown in the **Appendix-1** with the progress of the discussions and designing.

2) The Basic Plan aims at improving current water supply situation, especially for eliminating the water stoppage area through year, and does not cover north housing planning area.

3) The Basic Plan has been drawn up based on the preparatory survey results by the Team. The conditions of the Basic Plan are defined as below.

| | | |
|---|---|---|
| - Target year | : | 2016 |
| - Target area | : | east bank of Gash River in the Kassala town locality and Musa of Kassala rural locality (refer to **Fig.1-1** of **Appendix-1**) |
| - Population | : | 204,739 |
| - Piped water service population | : | 204,739 (100%) |
| - Water consumption per capita | : | 90 l/c/d (domestic : 75 l/c/d, others 15 l/c/d) |
| - Leakage loss | : | improved up to 15% from 35% of 2009 |

4) The Basic Plan shows the water balance between consumption and supply in 2016. The lack in water supply to consumption is to be compensated by developing new groundwater source and/or decreasing leakage loss from the existing old piping. As rehabilitation of old piping takes long period and high cost, the Basic Plan presents an alternative that develops new groundwater sources up to the maximum groundwater development potential.

5) SWC considers the priority of the components of the Basic Plan is as below.

| Priority | Components |
|---|---|
| 1. | Rehabilitation of the existing reservoirs of the Mahta WTP |
| 1. | - Construction of new water treatment plant in South<br>- Construction of new boreholes up to groundwater development potential<br>- Construction of distribution main from new water treatment plant to the east service area |
| 3 | Rehabilitation of the whole asbestos pipes |
| 4 | Construction of new water treatment plant in North |

## 2. Rehabilitation project

Rehabilitation project of the existing reservoirs will be carried out in advance apart from other components for improvement of the water supply facilities, because the existing reservoirs at east bank of Gash River have always the risk of burst due to deterioration of the panel materials and so on. The rehabilitation project includes the existing reservoirs at west bank of Gash River with same condition as at east bank. However, the rehabilitation of the reservoirs at west bank is not always carried out, depending on the limited budget allocated for the project.

## 3. Applicable standards and/or guidelines

As Sudanese guidelines and/or standards for designing of the water supply facilities are under preparing, Japanese guideline of "Design criteria for waterworks facilities by JWWA (Japan Water Works Association)" can be applied to the projects. As for other Japanese guidelines and/or standards, they are essentially able to be applied to the projects in case SWC approve of their application.

## 4. Technical Assistance

Sudanese side requests the two technical assistances as below.

- Development of piping database using GIS
- Capacity building of O&M of SWC, if necessary

For the former technical assistance, the piping database has already developed by the Team and SWC, and will be transferred to SWC after completion of the survey.

For the later technical assistance, the following programs are utilized. In addition to the followings, SWC strongly requests the soft component for training operation at the starting of the facilities, conducted by the Consultant.

- OJT (on the job training) by Japanese contractor for initial operation training of the facility
- Capacity development project for provision of the services for basic human needs in Kassala by JICA
- Capacity development project for water sector by JICA

## II. Project for the rehabilitation of the reservoirs at east and west banks of the Gash River

### 1. Scope of the project

The project aims at rehabilitation of the following existing water treatment plant (WTP), composing of reservoirs and incidental facilities such as distribution pumps.

- Mahta WTP at east bank of Gash River
- Garb WTP at west bank of Gash River

Mahta WTP has higher priority than Garb WTP. When both WTPs are impossible to be rehabilitated due to lack in budget, the rehabilitation of Mahta WTP only will be implemented.

### 2. Existing source wells

The existing source wells for both WTPs are out of scope of the project. The water flow into from existing reservoirs to newly constructed reservoirs will be changed over by reconnecting conveyance pipes. The operating duration of 15 source wells for Mahta WTP will be changed from 20 hours to 24 hours.

### 3. Flood countermeasure

In consideration of the 2003 flood damage at Mahta WTP, Mahta WTP takes flood countermeasure in rehabilitation planning.

### 4. Outline of rehabilitation facilities

The rehabilitation of the WTPs is to construct new facilities in the same site.

### 4-1 Mahta WTP

1) Design capacity
   - Daily maximum water consumption : 11,050m3/day
   - Hourly maximum water consumption : 16,600m3/day
2) Scope of facilities to be newly constructed
   a. Receiving Well
   b. Reservoir
      - Design capacity : 11,050m3/day÷24hours×8hours*1＝3,683m3
      - Material : Reinforced Concrete
      (*1According to Japanese Design Criteria for Waterworks Facility)
   c. Distribution Pump Building
   d. Distribution Pump
   e. Chlorination Dosing Facility
   f. Electric Facility (not including transformer for the WTP)
   g. Generator for Emergency (within 50% of Distribution Pump Load)

### 4-2. Garb WTP

1) Design capacity
   - Daily maximum water consumption : 5,200m3/day



14

- Hourly maximum water consumption : 7,800m3/day

2) Scope of facilities to be newly constructed

a. Receiving Well

b. Reservoir

- Design capacity : 5,200m3/day÷24hours×8hours*1＝1,733m3
- Material : Reinforced Concrete

(*1According to Japanese Design Criteria for Waterworks Facility)

SWC strongly requests the rehabilitation of the existing distribution pumps in addition to above facilities.

### 5. Stoppage of WTP

Although the both WTPs are required to work continuously without stoppage, they need to stop during changeover of facilities including electrical equipment from existing to newly constructed ones by reconnecting piping and/or cabling.

### 6. Major undertakings to be taken by SWC

In the implementation of the project, SWC is required to undertake the following measures.

1) Provision of cleared, embanked and leveled land
2) Removal of the trees at construction site of new facilities inside the existing WTP premise
3) Provision of land for a temporary site office, warehouse and stock yard nearby project site
4) Preparation of a graded access road to the construction site
5) Preparation of a disposal site for the surplus soil generated at construction works
6) Provision of electric power
7) Construction of a gate and fence
8) Dismantlement of the existing facilities after construction of new facilities

## III. Project for the improvement of water supply facilities at east bank of Gash River in Kassala City

### 1. Cooperation project

Cooperation project will be finally defined at the meeting between JICA and SWC held on November 2010 from the Basic Plan by numbering priority of the components. SWC puts highest priority on the rehabilitation project of the existing reservoirs. As for other components, SWC gives high priority to the construction of the new WTP in South. On grounds of the above, the Team and SWC preliminary discussed and mutually confirmed on the project on the assumed scenario that new WTP in South would be constructed. However, the both parties agreed that further technical discussions should be done after the cooperation project is defined.

## 2. Development of sources wells

1) As a result of the survey of the test drilling, maximum groundwater development potential has been estimated at 345m3/hr (8,280m3/day). This volume is set at the upper limitation of the development amount of water sources wells for the project. (refer to **Fig.1-4** of **Appendix-1**)

2) If new wells construction is required for the project, the Consultant will drill them during detailed design stage. SWC should secure the land and access road for drilling and make a negotiation with nearby inhabitants if necessary. When carrying out pumping test of the new well, the impact survey on the existing well surrounding new well should be conducted by SWC. The specification of new wells should be indicated by SWC.

3) Of the seven test wells, available wells will be converted to product wells for the project.

4) Product wells for the project, drilled at the survey and the detail design, should be under control of SWC by the starting of the construction works. SWC should also measure the groundwater level of the product wells twice a month.

5) For the designing of conveyance pipes from existing wells to new reservoirs, the Consultant should check the existing well pumps for specifications and installation levels as well as static groundwater levels in cooperation with SWC.

6) Groundwater quality of new product wells should comply with the standard of SSMO for drinking water.

## 4. Well pump facilities

1) Well pump facilities are 24 hours working.

2) SWC should secure access way and make land leveling for newly constructed well pump facilities.

3) Although the project does not include rehabilitation of the existing wells, but includes replacement of the existing well pumps if necessary.

4) New well pump facilities install sheds, but do not equip with emergency generators because electricity situation will be certainly improved at the target year. An operator and/or guardsman will not be staffed as well.

5) New well pump facilities install a flow meter and a pressure gauge at the outlet pipe of the well pump.

## 5. Construction of conveyance pipes (source wells to reservoirs)

1) The Consultant will conduct a profile leveling from source wells to new reservoirs after the cooperation project is defined. The profile leveling will be conducted during the second preparatory survey, scheduled November– December 2010, or detailed design stage.

2) Conveyance pipe routes should be determined through the site survey conducted by both SWC and the Team in consideration of construction and maintenance, because the routes are expected to run through agricultural area and/or along the bank of Gash River. The Consultant should conduct the computation of the conveyance pipes.

## 6. Construction of new WTP in South

Both parties preliminary discussed the construction of the new WTP in South from a technical point of view and reached to the following conclusion. Both parties have same understandings on the project that the purpose of the project is to solve current water supply problems of water stoppage in east service areas, and that new WTP will be surely able to solve it.

1) New WTP will be designed according to Japanese guideline of water works "Design criteria for water works facilities by JWWA". The framework of new WTP is shown as below.

   a. Receiving Well
   b. Reservoir (reinforced concrete)
   c. Distribution Pump Building
   d. Distribution Pump
   e. Chlorination Dosing Facility
   f. Electric Facility (not including transformer for the WTP)
   g. Generator for Emergency (within 50% of Distribution Pump Load)

2) New WTP in South will be constructed at the land which SWC already acquired from a land owner. SWC had been negotiating with the land owner for many months and finally got it by preparing substitute land. Since it is very difficult and almost impossible to acquire new land elsewhere from now on, new WTP will be constructed at the land that SWC already acquired.

3) Design capacity of the new WTP shall be finally determined based on the Basic Plan and further survey results according to the Japanese guideline of "Design criteria for waterworks facilities by JWWA.

4) For flow rate control of the new WTP with hourly fluctuated demand, appropriate numbers of distribution pumps, including stand-by pump(s), will be installed The head of pumps will be determined by the results of distribution networks computation.

5) Chlorine gas will be utilized for chlorine injection system in the same manner of the exiting WTP.

6) Flood countermeasures will be considered in designing on ground of the fact that the land was under water at 2003 flood.

7) An administration building requested by SWC will be excluded from the new WTP, because the control room for operators and/or staffs will be prepared in the

distribution pump building.

8) A work shop and a laboratory will not be installed in the new WTP, because the exiting ones are possibly used.

9) SWC is required to ask the State Electricity Corporation to supply electricity up to the new WTP using dual lines in consideration of the continuous and stable WTP operation.

## 7. Construction of distribution pipes

1) The Consultant should conduct a distribution networks computation in the whole project area using GIS database of piping networks which the Team and SWC have developed through the survey. The computation results will be utilized not only for the project but also for piping rehabilitation plan of SWC in near future.

2) The Team will prepare the rehabilitation plan of existing pipes based on the computation results. Demarcations of the rehabilitation of the pipes will be discussed after completion of the computation, expected to be held on the second survey. However, the distribution main pipe from the new WTP in South will be constructed by Japanese side. The demarcation has three options, i.e. (1) construction and materials procurement by Japanese side, (2) construction by SWC and materials procurement by Japanese side, (3) construction and materials procurement by SWC. In case of (2), SWC should allocate and secure budget for construction.

3) As uPVC is a standard pipe material of SWC, the project will use uPVC for distribution pipes considering maintenance and procurement. However, the project will use FRP pipes, steel pipes or ductile cast iron pipes for the distribution pipes with 400mm diameter more, because no uPVC pipes are available to such diameter. When selecting pipe material, not only cost but also procurement and maintenance should be taken into consideration.

4) Distribution main is required to be laid for conveying water from the WTP in South to existing piping networks. The distribution main will be constructed by Japanese side. The route of the distribution main is planned to run along the drainage canal as shown in **Appendix-2**, because of no obstacles under ground.

5) If the water pressure of the new WTP in South is enough to send water to existing service area, the project will employ the way to send water directly to service area without using existing booster pumps, Mukram PS, Shareba PS, Gawage PS and Dooma PS.

6) If the project includes replacement of existing asbestos pipes and branched service pipes of PE, the demarcation of the replacement has three options, i.e. (1) replacement works and materials procurement by Japanese side, (2) replacement works by SWC and materials procurement by Japanese side, (3) replacement works and materials procurement by SWC. In case of (2), SWC should allocate and secure budget for replacement works.

7) Distribution piping networks should equip with stop valves, air valves and drain valves, etc, where necessary, but not equip with fire hydrants as current situation.

## 8. Equipment for operation and maintenance

1) Most of equipment and machines at Kassala east office do not work. SWC submitted the equipment and machine list to be requested. After discussions, SWC re-presents the equipment and machine list to be requested. The list is shown in **Appendix-3**.

2) Machines and equipment for workshop will be installed and placed at the workshop inside Kassala east office of SWC. SWC also requested to rehabilitate the existing workshop building for protecting machines and equipment from dust and sand storm. The rehabilitation of workshop building is put on hold as "pending".

3) As for construction machines for piping maintenance works as wells as machines and equipment for workshop, further discussions and examination are necessary considering collaboration with the survey team of the capacity development project for provision of the services for basic human needs in Kassala which will start October 2010..

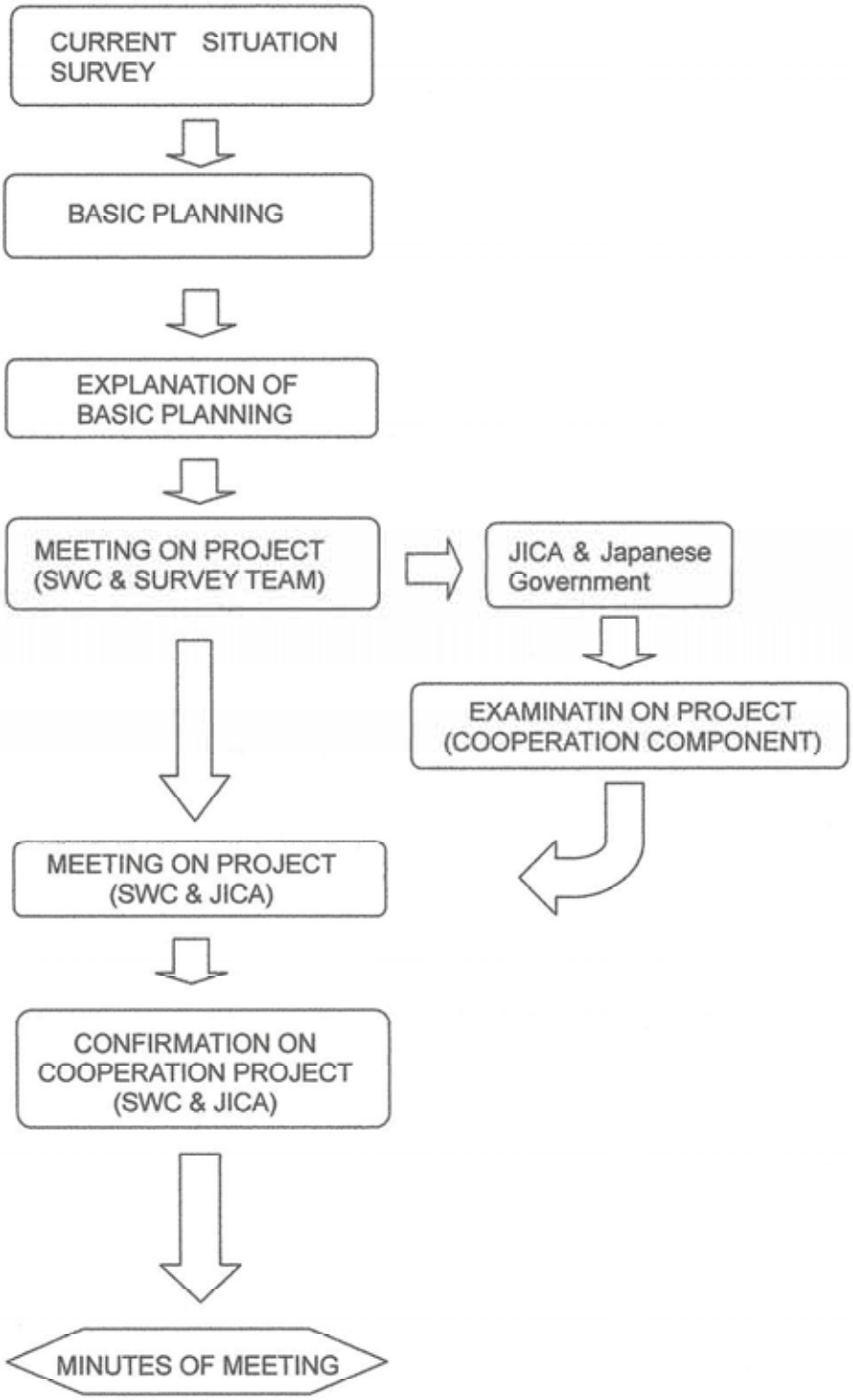
## 10. Major undertakings to be taken by SWC

In the implementation of the project, SWC is required to undertake the following measures.

1) Provision of cleared, embanked and leveled land
2) Provision of land for a temporary site office, warehouse and stock yard nearby project site
3) Preparation of a graded access road to the construction site
4) Preparation of a disposal site for the surplus soil generated at construction works
5) Construction of access road to the new WTP
6) Provision of electric power
7) Construction of a gate and fence
8) Provision of land for new production well site

## Appendix-1 The Basic Plan

### PROCEDURE OF THE PROJECT FOR IMPROVEMENT OF WATER SUPPLY FACILITIES AT KASSALA CITY



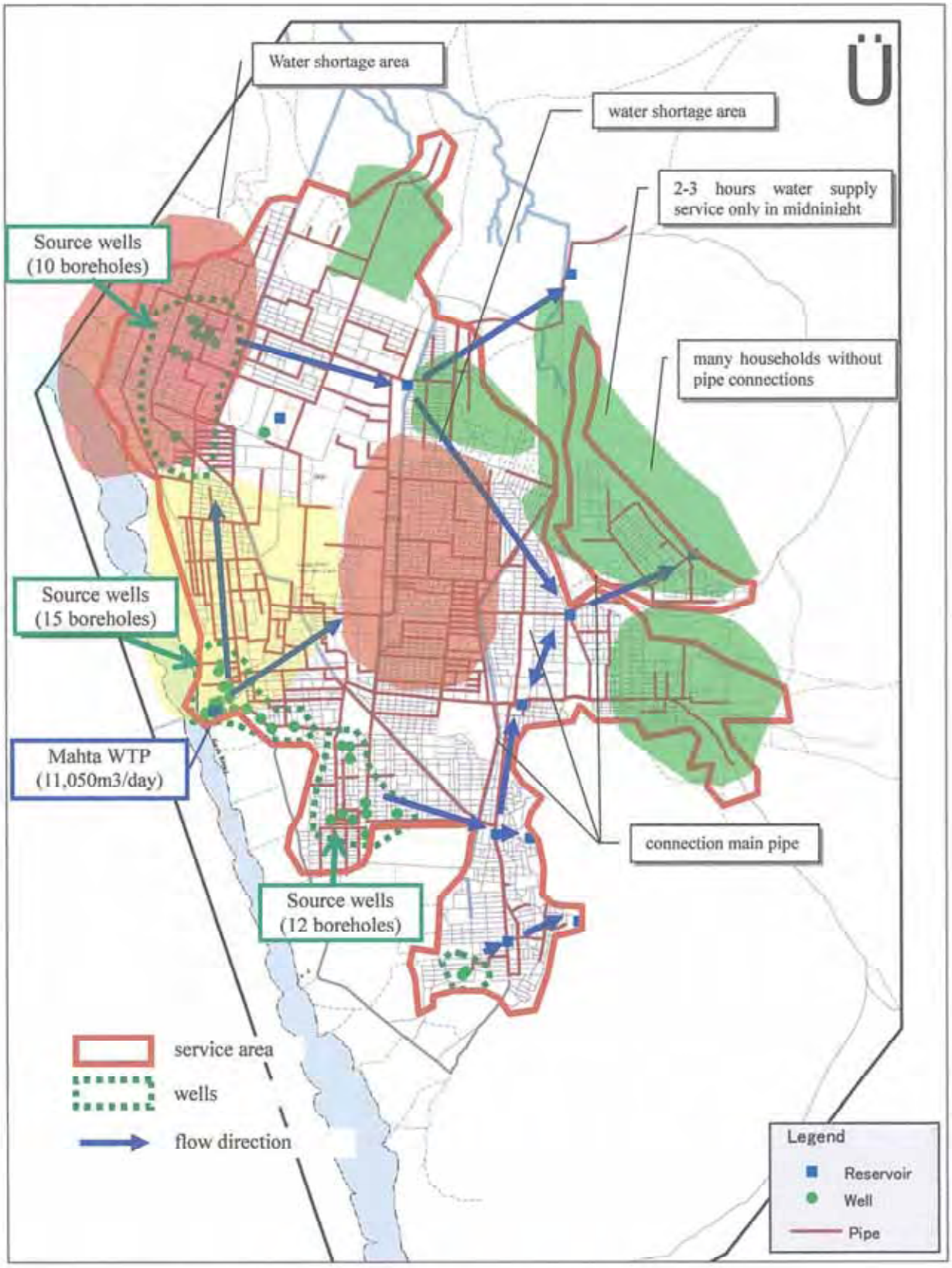



FIG.1-1 CURRENT WATER SERVICE SITUATION

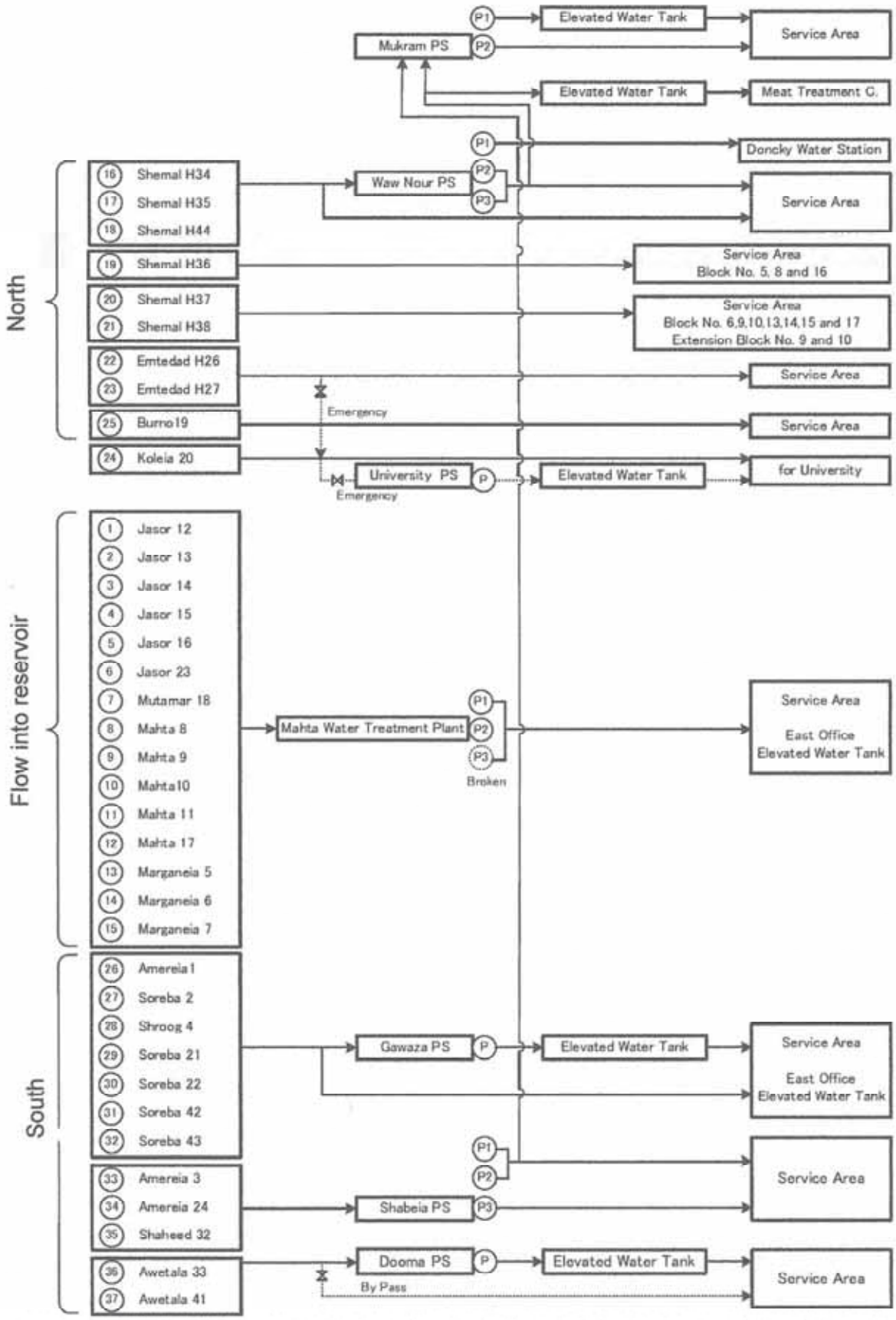



FIG.1-2 EXISTING PIPE CONNECTION

# BASIC PLANNING

- Target year : 2016

- Target area : Current water service area as shown in FIG.1
  (East distinct of Kassala Town Locality)
  + (Musa of Kassala Rural Locality)

- Population : 204,739 (in 2016)

| | In 2008<br>Acc. to Sensus | In 2009<br>Basis of planning | In 2016<br>Target year |
|---|---|---|---|
| East distict of Kassala Town Locality | 165,915 | 170,113 | 202,620 |
| Musa of Kssala Rural Locality | 1,735 | 1,776 | 2,119 |
| TOTAL | 167,650 | 171,889 | 204,739 |

- Served population :

(in 2009) 125,479 (piped connection service)
46,410 (others)
171,889 (TOTAL)

(in 2016) 204,739 (piped connection service)
0 (others)
204,739 (TOTAL)

- Water consumption per captia :

(in 2009) 49 l/c/d (domestic use) □average incl. piped connection and other services
13 l/c/d (commercial + public use)
62 l/c/d (TOTAL)

(in 2016) 75 l/c/d (domestic use)
15 l/c/d (commercial + public use)
90 l/c/d (TOTAL)□Target of Kassala State WASH strategy (2010-2016)

- Leakage loss :

(in 2009) 35% estimated by the survey

(in 2016) 15% rehabilitation of AC pipes of 98km, and service pipes for 21,000 households

■ Maximum groundwater development potential:

35m$^3$/hr (840m3/d) x 9 boreholes = 315m3/hr (7,560m3/d)

10m3/hr (240m3/d) x 3 boreholes = 30m3/hr (720m3/d)

Total 345m3/hr (8,280 m3/d) (12 boreholes)

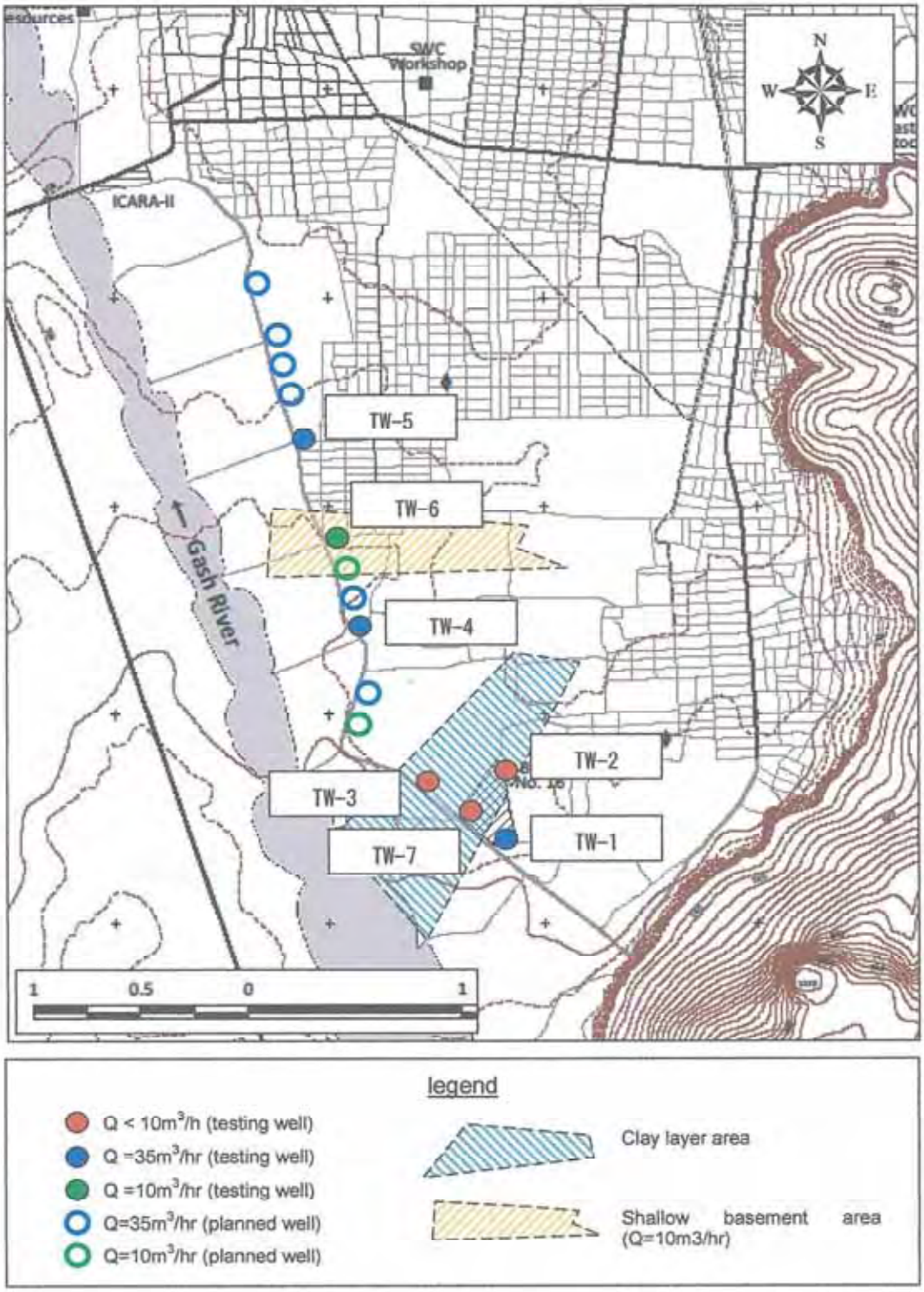



FIG.1-3 MAXIMUM GROUNDWATER DEVELOPMENT POTNTIAL

■ Water balance (in 2016) :

Table 1-1 Water Balance (in 2016)

| ITEM | 2016 年<br>Basic plan | 2016 年<br>Alternative |
|---|---|---|
| Served population | 204,739 | 204,739 |
| Water consumption per captia (l/c/d) | 90 | 90 |
| Water demand (m3/day) | 18,426 | 18,426 |
| Leakage (%) | 15 | 28 |
| Daily average water consumption (m3/day) | 21,678 | 25,592 |
| Seasonal fluctuation ratio | 1.3 | 1.3 |
| A. Daily maximum water consumption (m3/day) | 28,181 | 33,270 |
| 1) Water supply from existing source wells (m3/day) | | |
| Southern wells (11 boreholes) (m3/day) | 7,704 | 7,704 |
| Mahta WTP (15 boreholes) (m3/day) | 11,050 | 11,050 |
| Northern wells (10 boreholes) (m3/day) | 6,468 | 6,468 |
| TOTAL | 25,222 | 25,222 |
| 2) Water supply from new wells (m3/day)<br>(Maximum groundwater development potential) | 2,959<br>(8,280) | 8,048<br>(8,280) |
| B. Water supply amount (1+2) (m3/day) | 28,181 | 33,270 |
| Water balance (A-B) | 0 | 0 |

Alternative: New wells are to be constructed up to maximum groundwater development potentantial. In this case, leakage ratio increases up to 28% instead of 15% of the basic plan.