Minutes of Discussions
on the Preparatory Survey for the Project for
Expansion of Water Supply System in Ta Khmau

In response to the request from the Government of the Kingdom of Cambodia (hereinafter referred to as "Cambodia"), Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched the Preparatory Survey Team for the Outline Design (hereinafter referred to as "the Team") of the Project for Expansion of Water Supply System in Ta Khmau (hereinafter referred to as "the Project") to the Government of Cambodia. The Team held a series of discussions with the officials of the Government of Cambodia and conducted a field survey. In the course of the discussions, both sides have confirmed the main items described in the attached sheets.

Phnom Penh, 28th June, 2019

Dr. Shigeyuki Matsumoto
Leader
Preparatory Survey Team
Japan International Cooperation Agency
Japan

H.E. Dr. Sim Sitha
Director General
Phnom Penh Water Supply Authority
Kingdom of Cambodia

ATTACHMENT

Project Outline

1. Outline of comparator facility

   The Team explained the outline of comparator facilities as Annex 1. Both sides confirmed that comparator facilities were used only for estimating project cost, and the actual design of the facilities would be proposed by SPC in the later stage.

2. Risk allocation during the O&M period

   The Team explained the risk allocations described in Annex 2, and both sides agreed with it.

3. Project schedule

   The Team explained the tentative project schedule based on the comparator facilities described in Annex 2, which was shortened from the previous plan based on the requests from the Cambodian side. Both sides confirmed that the proposal for shortening the construction schedule by SPC should be included as one of the bidding evaluation items to encourage earlier completion.

   The Team also explained that the tentative schedule might be reconsidered with reflection of opinions in a project briefing session for Japanese companies to be held by JICA in Tokyo in July, 2019.

4. Basic framework of evaluation of Quality and Cost Based Selection (QCBS)

   The Team explained the basic framework of evaluation of QCBS described in Annex 2, and both sides agreed with it.

Requirements

5. Installation of solar power facilities

   The Team explained that the solar power facilities could not be covered by the Grant as the amount of Grant is limited, and the solar panel installation shall not be included in the tender. The Team also explained the result of scenario analysis which calculated the viability of the solar power investment described in Annex 3. WTP specification shall allow optional solar power installation with minimum 146kW, and PPWSA shall decide whether to install or request SPC to install solar power facilities after the tender.

6. Laboratory for water quality test in WTP

PPWSA requested that the layout and equipment of the laboratory attached to WTP should be in accordance with ISO9001 and ISO17025. The Team took note of it.

Both sides agreed that the laboratory in WTP should be equipped with enough equipment to analyze daily test items in the National Drinking Water Quality Standards.

7. Water quality standards

Both sides confirmed the water quality standards which SPC should meet as Annex 4. The daily test items shall be analyzed by SPC in the laboratory attached to WTP, and quarterly and yearly test items shall be analyzed by PPWSA. PPWSA specifically requested that turbidity of treated water should be 1NTU or less. PPWSA also explained that it would not require SPC to treat trihalomethane precursors and odor substances.

8. Required pumping head of the distribution pumps and the water pressure requirement

PPWSA requested the Team to design the pumping head of the distribution pumps at least 4.5 bars (0.45Mpa) based on the recommendation of the Master Plan, and to set up the water pressure requirement as 4 bars (0.4Mpa) at the off-take point (flow meter) subject to the hydrauric analysis by the Team. PPWSA accepts reasonable decline in water pressure if the demand exceeds 33,000 m^3/day.

9. Production amount

SPC shall make best efforts to produce water 30,000-33,000m^3/day and the suspension of intake should be avoided as far as possible in any case of raw water deterioration. SPC shall also request a meeting to PPWSA in case the actual production amount is varied from the production plan which shall be submitted to PPWSA in advance.

Contract Terms

10. Contract terms

The Team explained the contract terms including the conditions for hand-back after the termination of O&M contract and the conditions for hand-back after the termination of O&M contract described in Annex 2, and both sides agreed with

them.

11. Method for off-take price calculation

The Team explained the method for off-take price calculation described in Annex 2. PPWSA understood the composition of the price formula. The Team explained that through the bidding process, the proposals from SPC to reduce off-take price would be encouraged. Both sides also understood off-take price is subject to a proposal by SPC.

PPWSA strongly requested to refer to the benchmark of existing WTPs in terms of efficiency, namely 275 Wh/m^3 for unit electricity consumption and 346 $Riel/m^3$ for the unit production cost. PPWSA understood that the off-take price could be more than the benchmark because of the specific cost items required for the Grant Aid with O&M, but strongly requested that the off-take price should be less than 500 $Riel/m^3$.

Final approval of the off-take price will be made by the Board of Directors, but off-take price based on the comparator facility are basically discussed at the moment as attached Annex 5. PPWSA requested to further improve the efficiency of electricity consumption.

The Team explained the following three steps to decide the off-take price:

(1) Assumption based on the comparator facility to be agreed in the Preparatory Survey, which will be written in the Minutes of Discussions at the explanation of the draft report which is scheduled around October to November in 2019, and the schedule of Grant Agreement (G/A),

(2) Requirement to be written in the bidding document, which should be the same as the assumption above in principle, and

(3) Final decision to be fixed based on the proposal from SPC and the contract negotiation between SPC and PPWSA, which will be written in the contract.

The Team requested PPWSA to report to the Board of Directors about the progress of examination of the off-take price based on the comparator facility before the end of August 2019 and inform the Team of the result.

Both sides reconfirmed that the off-take price should be approved by the Board of Directors of PPWSA and no other approval from related authorities would be necessary.

Others

12. Stockyard and office for the consultant and SPC during the construction stage
    The Team requested PPWSA to find possible space for the stockyard and office necessary for the construction stage in the previous meeting. PPWSA explained that the space of Niroth WTP would be available for free of charge.

13. Technical transfer
    The Team proposed that the proposal of asset management and preventive maintenance by SPC, which are the advantage of Japanese companies, would be included as an item to be evaluated in the bidding. PPWSA agreed the proposal by the Team.

14. Trading currency
    The Team explained that some Japanese companies requested the payment of O&M contract from PPWSA to SPC in US dollar. PPWSA explained that only Cambodian Riel is acceptable, because the water tariff is collected in Riel.

15. Dispatch of staff from PPWSA to SPC
    PPWSA explained their intention to dispatch about 5 staff to SPC and bear their salary mainly for smooth hand-back at the termination of O&M period. PPWSA staff shall report to SPC in daily operation. Relative salaries shall be subtracted from the off-take price.

16. Salaries of local employees
    SPC's salaries to local employees shall be equivalent to those of PPWSA in principle.

17. Third party monitoring
    PPWSA explained that third party monitoring would not be necessary during O&M period.

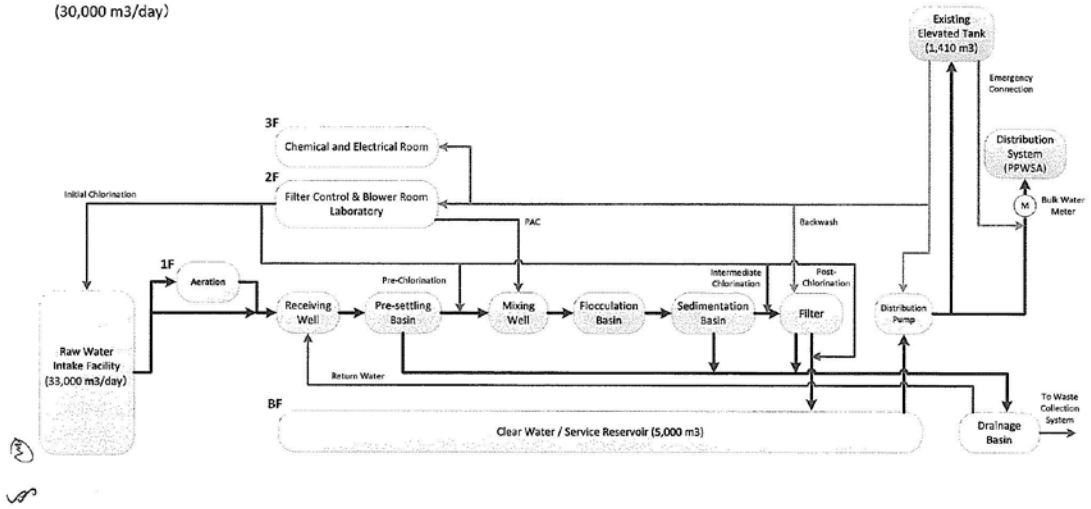
Annex 1 Outline design of the comparator facilities
Annex 2 Term Sheet
Annex 3 Analysis of private investment for solar panel
Annex 4 Water quality standards
Annex 5 O&M cost analysis for off-take price

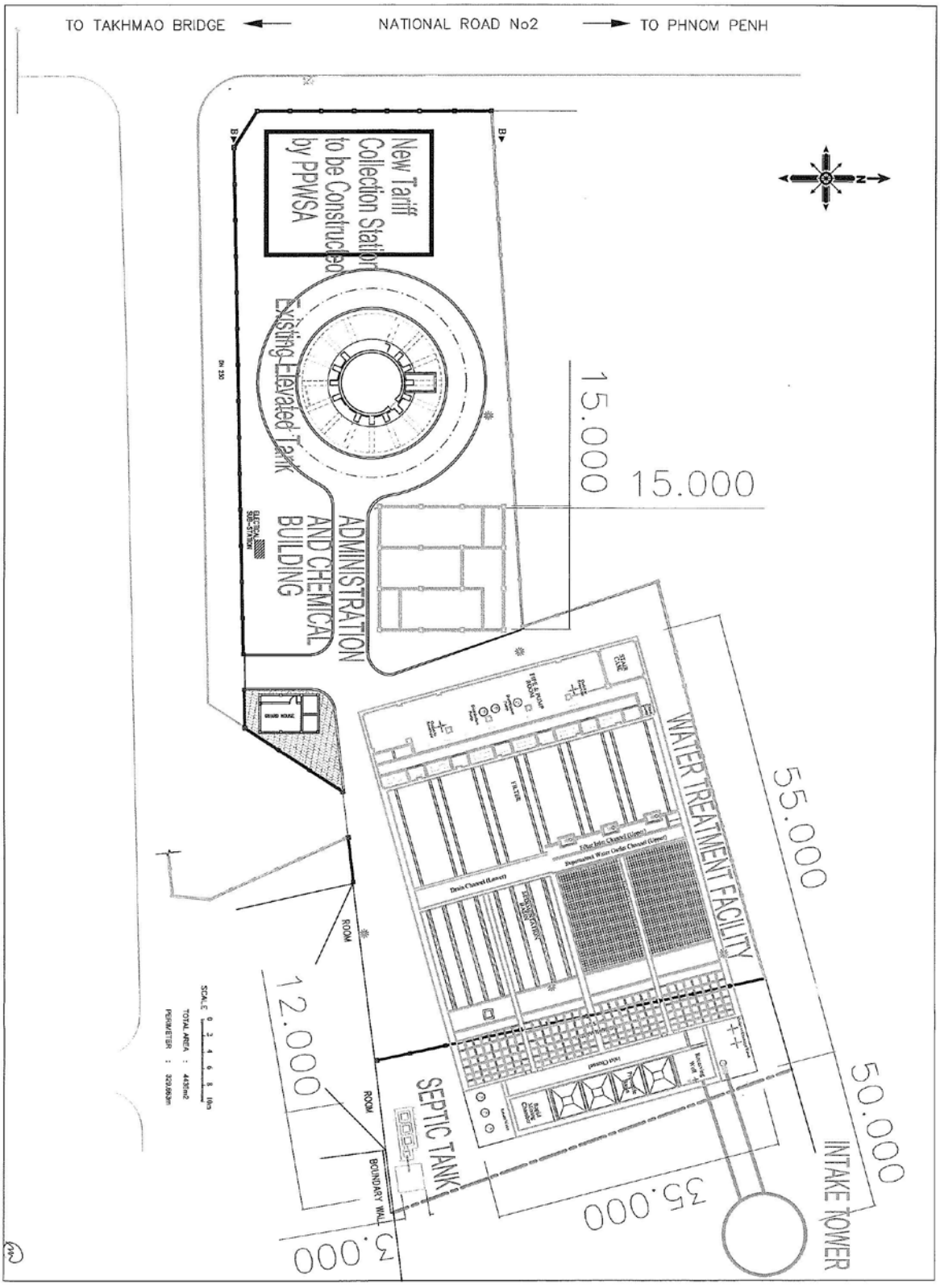
Ta Khmau WTP

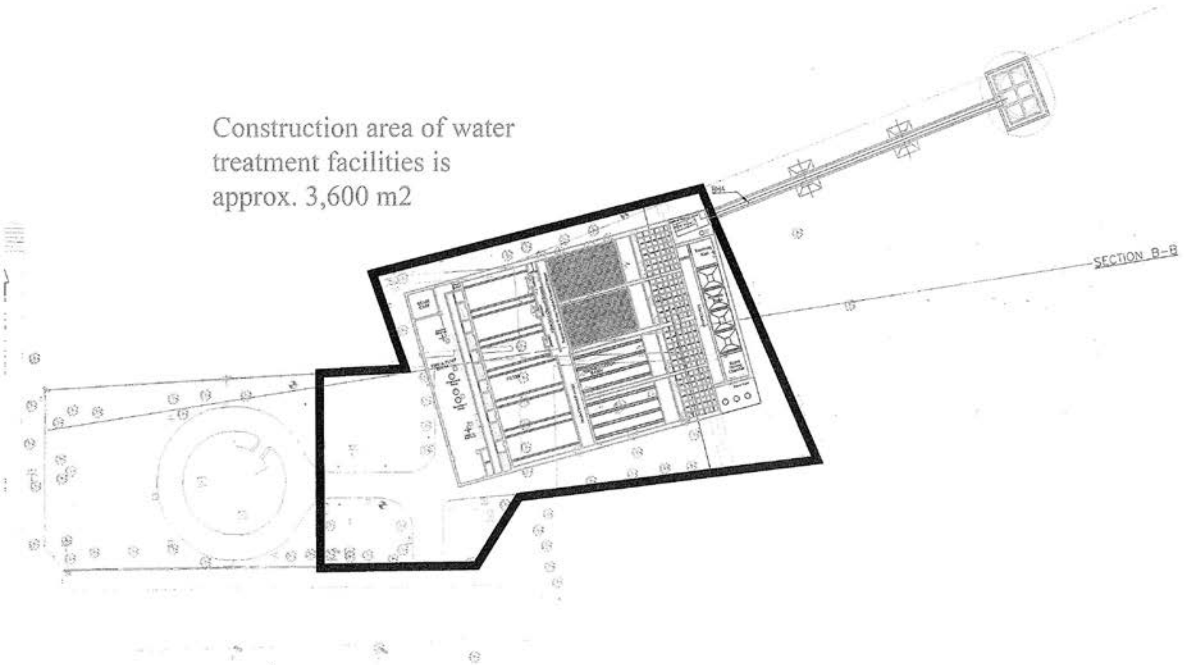
Treatment Process

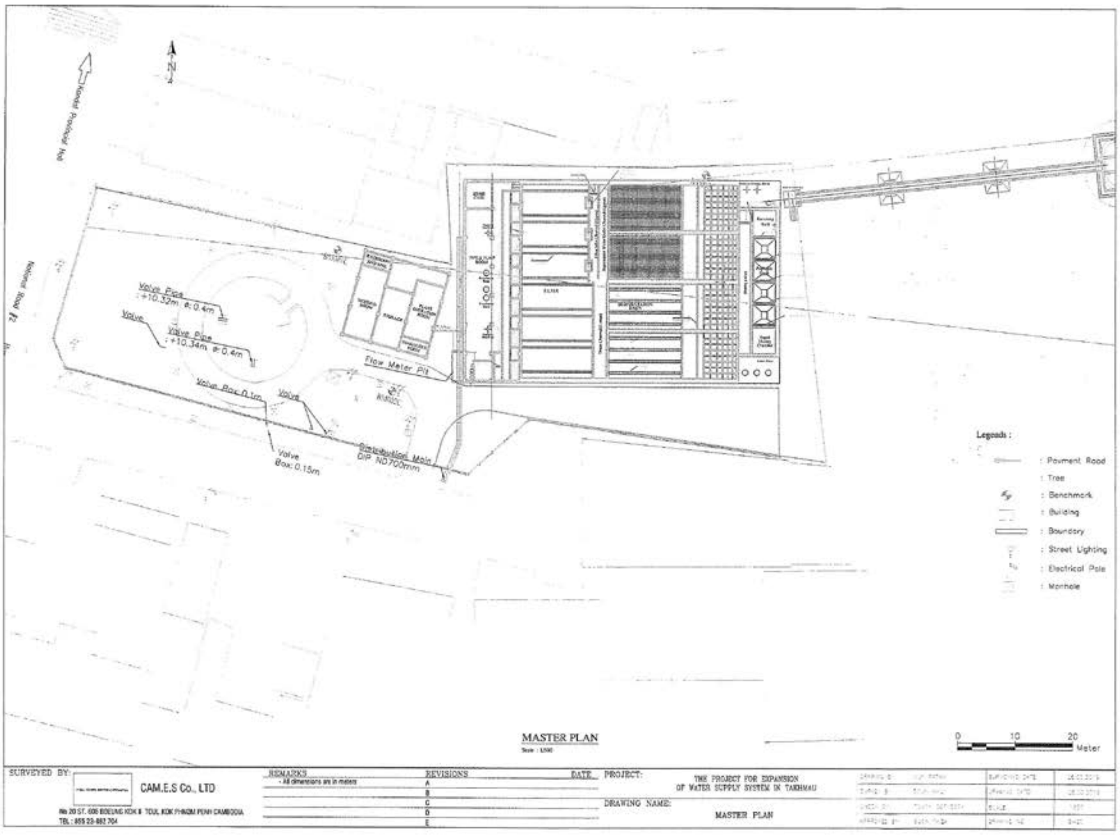
Water Treatment Facility

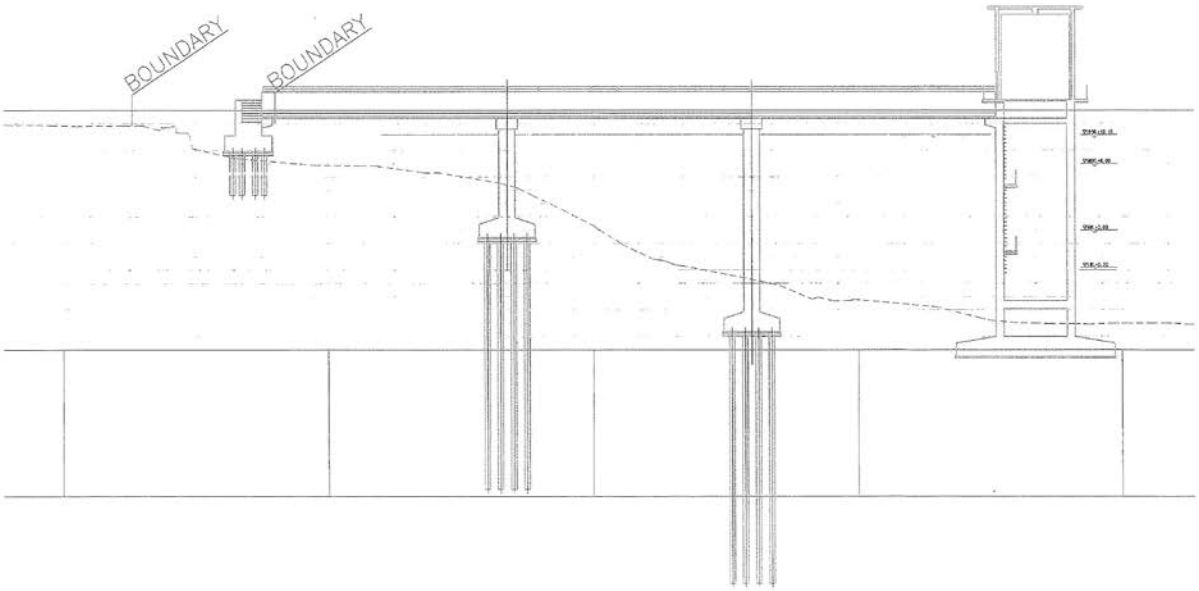
(30,000 m3/day)

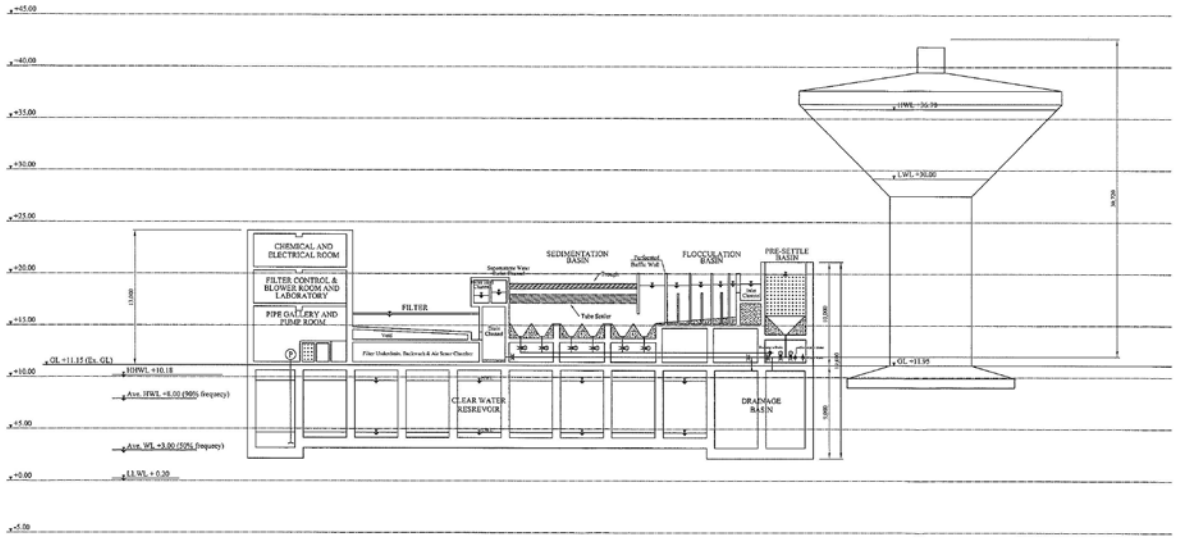



TO TAKHMAO BRIDGE
NATIONAL ROAD No2
TO PHNOM PENH
New Tariff Collection Station to be Constructed by PPWSA
Existing Elevated Tank
ADMINISTRATION AND CHEMICAL BUILDING
ELECTRICAL SUB-STATION
15.000
15.000
WATER TREATMENT FACILITY
55.000
50.000
INTAKE TOWER
35.000
SEPTIC TANK
ROOM
12.000
ROOM
BOUNDARY WALL
N
SCALE
TOTAL AREA : 4435m2
PERIMETER : 329.85m


Construction area of water
treatment facilities is
approx. 3,600 m2
SECTION B-B

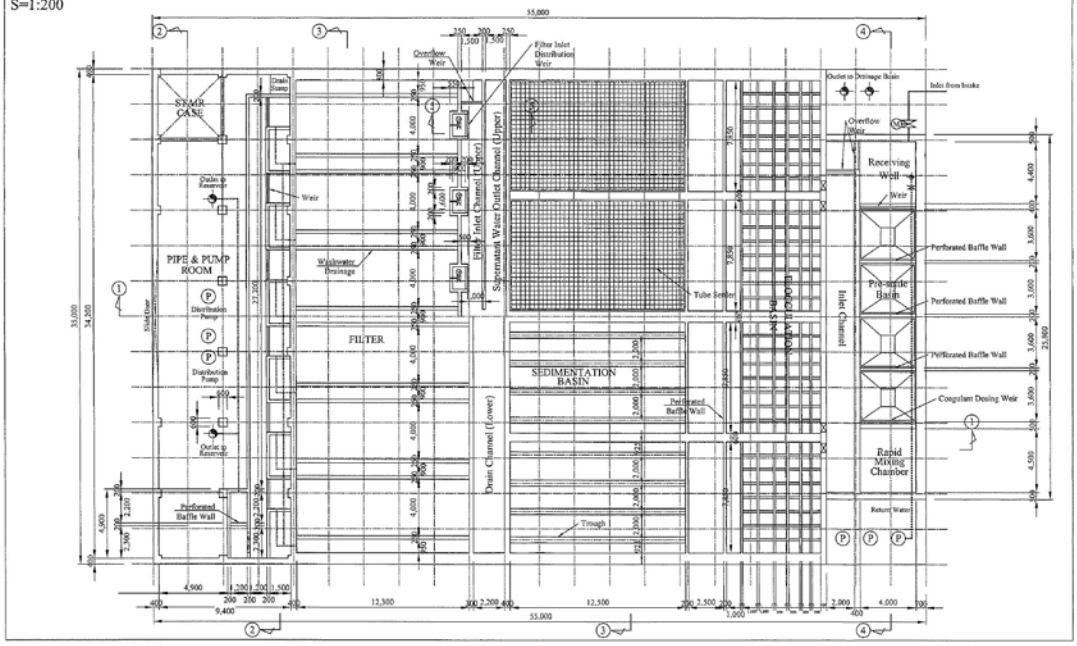

Flow Meter Pit
Legends :
: Pavment Road
: Tree
: Benchmark
: Building
: Boundary
: Street Lighting
: Electrical Pole
: Manhole
MASTER PLAN
SURVEYED BY:
CAM.E.S Co., LTD
REMARKS
REVISIONS
DATE
PROJECT:
THE PROJECT FOR EXPANSION
OF WATER SUPPLY SYSTEM IN TAKHMAU
DRAWING NAME:
MASTER PLAN


BOUNDARY
BOUNDARY


CHEMICAL AND ELECTRICAL ROOM
FILTER CONTROL & BLOWER ROOM AND LABORATORY
PIPE GALLERY AND PUMP ROOM
FILTER
SEDIMENTATION BASIN
FLOCCULATION BASIN
PRE-SETTLE BASIN
CLEAR WATER RESEVOIR
DRAINAGE BASIN

WATER TREATMENT FACILITY
Receiving Well, Pre-settle Basing, Rapid Mixing Chamber,
Flocculation Basin, Sedimentation Basin, Filter and Pipe & Pump Room
GF
S=1:200

PLAN



WATER TREATMENT FACILITY
Clear Water Reservoir & Drainage Basin
BF
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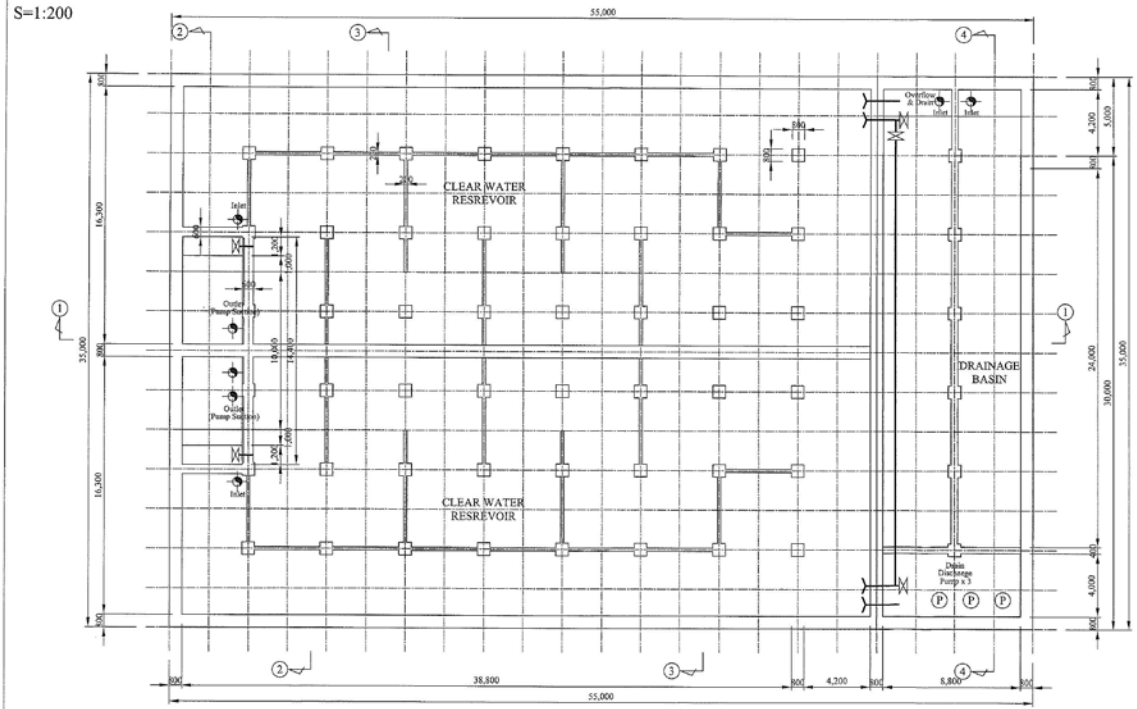
PLAN



WATER TREATMENT FACILITY
General Section
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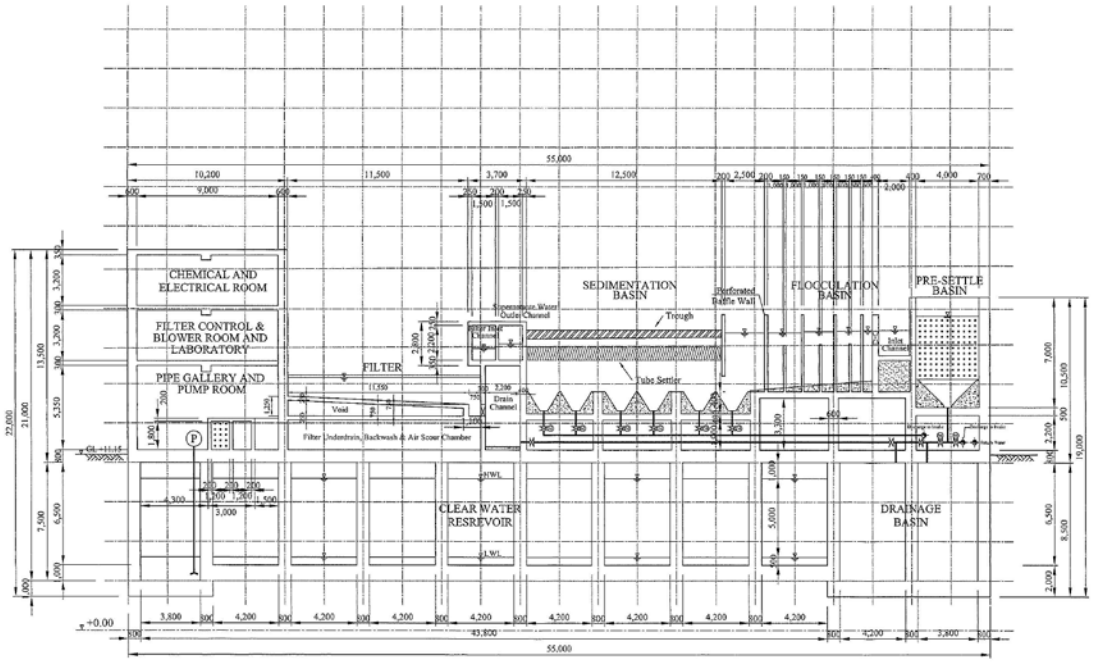
GENERAL SECTION 1-1



WATER TREATMENT FACILITY
Section
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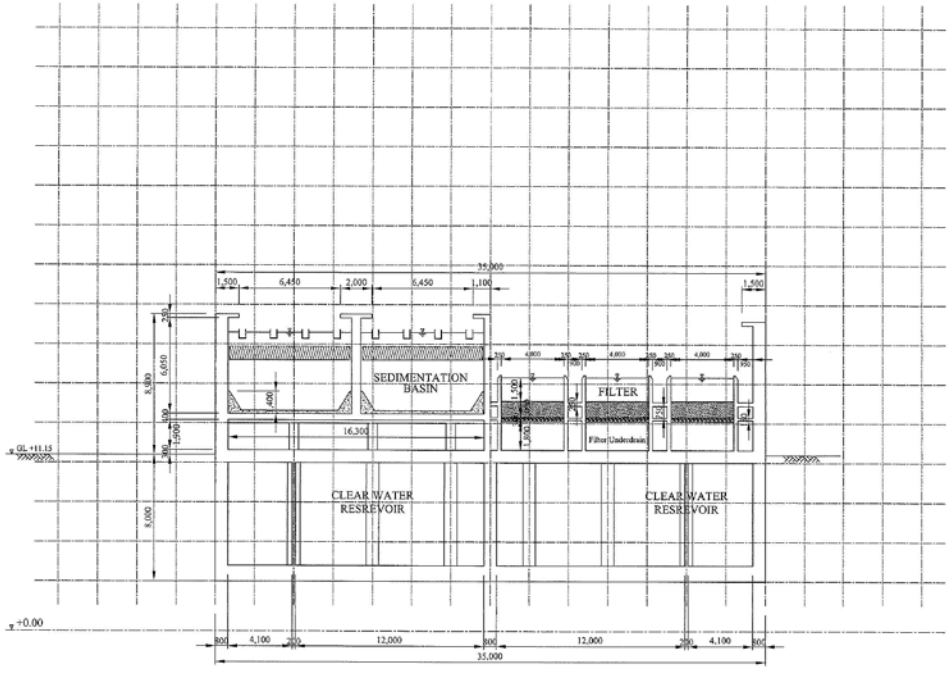
SECTION 3-3



Document No.1 Term Sheet

THE PROJECT FOR EXPANSION OF WATER SUPPLY SYSTEM IN TA KHMAU

CONFIDENTIAL / DRAFT / DISCUSSION PURPOSE ONLY

1. Project Outline

1.1 Project Background

- The water demand in the area supplied by PPWSA is projected to be double in 2030 and capacity of existing water treatment plants (hereinafter referred to as "WTP/WTPs") in Phnom Penh will be insufficient to meet the demand in 2020.
- The New WTP shall be developed to supply the water mainly in Ta Khmau area in which many low-income households need access to clean water at affordable water tariff and neighbor Phnom Penh areas where PPWSA develops water distribution system.
- The Government of Cambodia requested to the Government of Japan for the funds to implement the project for expansion of water supply system in Ta Khmau.

1.2 Project Objectives

The objective of the Project is to improve the access to safe water in Ta Khmau District through the expansion of water supply system including construction, operation and maintenance (hereinafter referred to as "O&M") of the new WTP.

1.3 Project Structure

The Project would be implemented by applying the Japanese Grant Aid with O&M, whose outline is explained in Annex 3 of Minutes of Discussions on the Preparatory Survey for the Project for Expansion of Water Supply System in Ta Khmau dated 29th March 2019 in particular;

- PPWSA will be the executing agency and the implementing agency for the Project.
- The Japanese Grant Aid shall be used for construction of the facilities and procurement of equipment necessary for the Project, and the consulting service to be assigned to consultants.
- A Japanese company or a joint venture of Japanese companies will be selected through a competitive tender and establish a Special Purpose Company (SPC) in Cambodia that shall be responsible for the design, construction, and O&M of the new WTP consistently,
- Contracts consist (a) comprehensive contract which consolidates both contracts for the purchase of the products and/or services and for the operation and maintenance, (b) contract(s) for the purchase of products and/or services and (c) contract(s) for the operation and maintenance, and
- The Government of Cambodia shall ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the Government of Cambodia with respect to the

purchase of the products and/or the services be exempted or be borne by its designated authority without using the Grant and its accrued interest.

1.4 Project Site

The construction site of the new WTP is located in Ta Khmau District, which is shown in Annex 1 of Minutes of Discussions on the Preparatory Survey for the Project for Expansion of Water Supply System in Ta Khmau dated 29th March 2019.

1.5 Risk Allocations

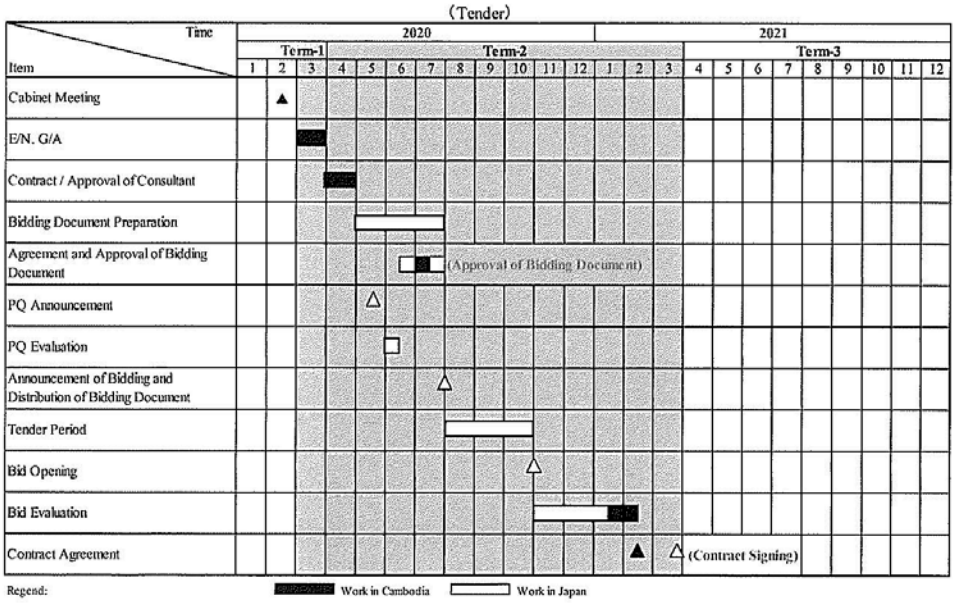
Risks	PPWSA	SPC	Remarks/Examples
EPC risk	O	O	- Any additional costs caused by PPWSA shall be borne by PPWSA (e.g. variation orders from PPWSA to SPC, UXO related costs) - Any additional costs caused by change in external conditions shall be borne by PPWSA (e.g. unforeseen ground conditions, major inflation during construction period). These costs may be covered by the amount of the grant for contingency mentioned in the Grant Agreement which is applicable according to the JICA guideline. - Any additional costs caused by SPC shall be borne by SPC (e.g. design deficiency, inflation during construction period).
Demand risk	O		PPWSA shall pay for 30,000m3/day of treated water if SPC provides or is ready to provide 30,000m3/day of treated water that satisfies the required water quality on a monthly average, regardless of any reason on PPWSA side (e.g. demand stays low or distribution pipes get damaged).
Operation risk		O	No payment shall be made if the delivered water does not satisfy the water quality requirement due to poor operation by SPC (e.g. facility malfunction, inappropriate usage of water treatment chemicals etc.). In case the water delivered by SPC does not comply with national drinking water standards required by PPWSA, SPC shall compensate for any damage (e.g. compensation to end-customers) suffered by PPWSA as a result of such poor operation by SPC.
Electricity price	O		Any fluctuations in electricity price shall be covered by

Risks	PPWSA	SPC	Remarks/Examples
risk			PPWSA according to the Price Formula for Bulk Water Supply.
Electricity availability risk		O	In case the electricity is not supplied to the facility due to blackout, neither SPC has obligation to supply water to PPWSA, nor PPWSA must pay SPC for the period. SPC does not have a right to claim operating loss caused by such blackout to PPWSA.
Inflation risk (during O&M period)	O		Increase in production costs caused by inflation (e.g. wages or raw materials) shall be covered by PPWSA according to the Price Formula for Bulk Water Supply.
Raw water quality risk	O		Additional cost of production due to change in quality of raw water shall be covered by PPWSA and compensated to the SPC.
Licensing risk	O		IEIA/EIA or any other permit/authorization necessary for the SPC to operate the facility shall be obtained by PPWSA.
Legal risk (change of project specific law)	O		Additional cost caused by a change in law that specifically affects the project (e.g. upgrade of national quality standard for drinking water) shall be covered by PPWSA and compensated to the SPC.
Legal risk (change of general law)		O	Additional cost caused by a change in general law that would affect the whole economy (e.g. VAT) shall be covered by the SPC.
Force Majeure risk	O	O	A Force Majeure is an event that is external, unpredictable, and irresistible and has a significant impact on the project. Both parties may terminate the contract if the impact of a Force Majeure lasts for a certain period (based on practice of water utilities). Neither party has any obligation to each other for the cost of mitigation measures to prevent increasing loss caused by Force Majeure. PPWSA shall have the option to require SPC to transfer to PPWSA all of its right, title and interest in and to the assets. The value of the assets shall be net book value of the assets.

1.6 Project Schedule

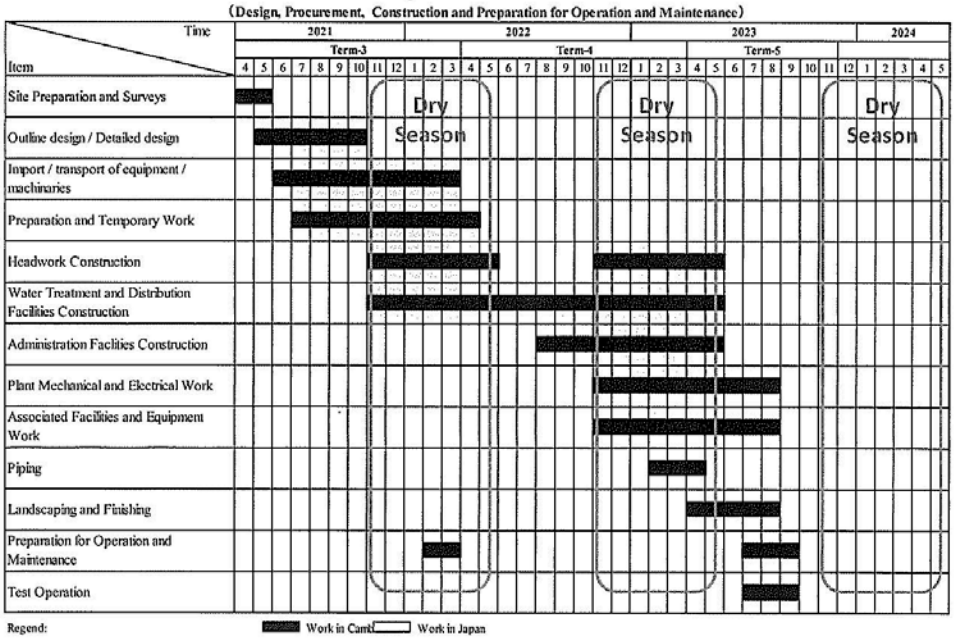
Implementation Schedule

(Tender)



Implementation Schedule

(Design, Procurement, Construction and Preparation for Operation and Maintenance)



The schedule above is based on the Comparator facilities (the Consultants plan) and SPC may propose shorter construction duration in the tender.

4

1.7 Tender Evaluation

- The prime contractor(s), namely, SPC and the prime consulting firm, which enter into contracts with PPWSA, are limited to "Japanese nationals", in principle.
- Quality and Cost Based Selection (QCBS) that includes technical, commercial, financial and legal evaluation will be applied for the bidding of SPC.

Evaluation methodology

Note: This shall be reviewed and concurred by JICA.

Comprehensive Evaluation Score = Technical Score * X + Price Score * (1-X)

where X is a weight factor 1>X>0 (In this stage the Consultants propose 0.5 as X. Please refer the separate sheet for the analysis of the weight factor X of Price score)

Tentative Technical Score

	Category	Score
1	Tenderers experience with respect to comparable projects;	TBA
2	Proposed Organization	TBA
3	Experience of key staff in relation to the scope of work;	TBA
4	Proposed design by SPC for bidding	TBA
5	Construction Work Plan	TBA
6	Operation and Maintenance and Monitoring Plan	TBA
	Maximum possible score	100

Tentative Price Score

The tenderer bids on 10-year Life Cycle Cost (LCC) where

10-year LCC = EPC price + Net present value of O&M costs discounted at 4.5%

(SPC submit EPC price, 10-year average O&M Cost(α), 10-year average fixed volume of electricity usage(β), and the margin rate at bidding to calculate 10-year LCC)

Price score = Lowest Price / Price of the Tenderer * 100

Note that

(1) EPC price shall be below the Grant budget applicable to the EPC contract, and

(2) O&M cost will be reflected in the contract price of bulk water

2. Requirements

2.1. Preconditions

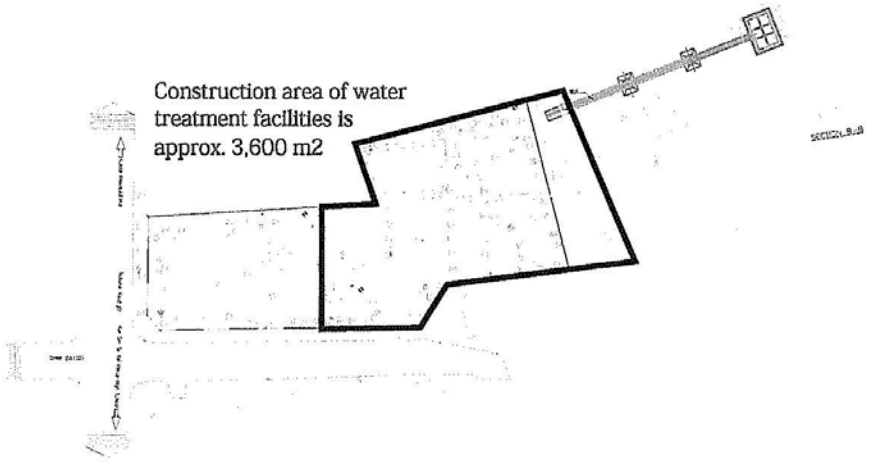
2.1.1. Construction Area

There are an existing elevated tank and a tariff collection station as major facilities within the PPWSA's property where the new WTP shall be constructed. The available construction area of water treatment facilities (WTFs) excluding headworks (intake and raw water transmission facilities) is approximately 3,600 m2.

Headworks shall be constructed in the river outside of PPWSA's property.

There is unleveled land along the river that are PPWSA's property but outside of existing fence. This area could be leveled as part of SPC's EPC work.

Existing tariff collection station shall be shifted to outside of construction area by PPWSA before commencement of the design-build work.



The site area is limited therefore, stockyard, workshop, temporary office etc. required for the constriction shall be provided by PPWSA.

Topographic and geotechnical features will be provided to SPC by PPWSA in later stage.

2.1.2. Raw Water Quality

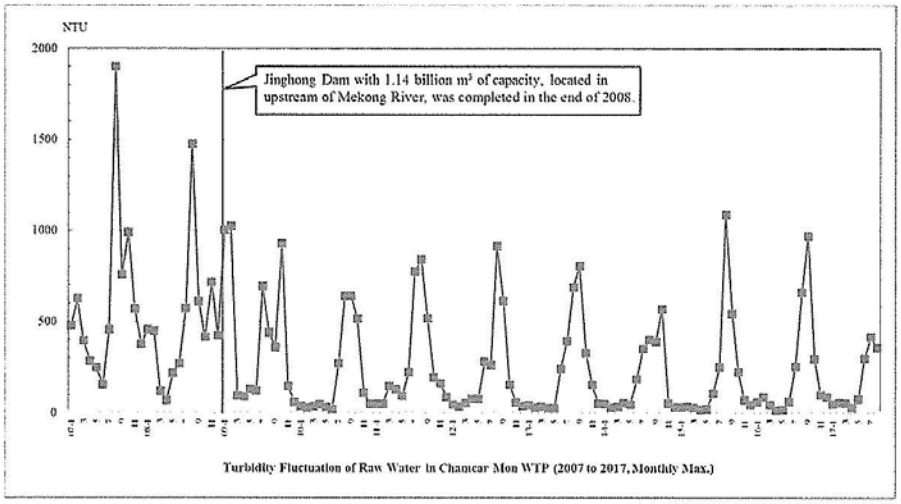
Raw water source shall be Bassac River.

The raw water quality recorded at intake of Chamcar Mon WTP located at upstream of Ta Khmau site along Bassasc River during 2009-2017 after Jinghong dam was commenced operation in 2008 shows following characteristics.

- Turbidities are quite different in dry season and wet season. Minimum turbidity in dry season was 7NTU, average turbidity in wet season is 250 NTU and maximum turbidity was 1088NTU.
- pH is generally high in wet season and low in dry season, average pH is 7.4, Minimum pH was 6.7.
- Color is a bit high, average color is approximately 30TCU.
- Average Ammonium (NH4) is approximately 0.5mg/l in wet season and approximately 0.2mg/l in dry season. However Ammonium (NH4) has been on the rise from 2016 and maximum was 1.81.

Followings are summary of raw water turbidity at intake of Chamcar Mon WTP during 2009-2016.

- Average Turbidity in Dry Season: 40NTU
- Average Turbidity in Wet Season: 245NTU
- Average Turbidity over 8 years: 115NTU
- Maximum Turbidity over 8 years: 1088NTU
- Minimum Turbidity over 8 years: 7NTU

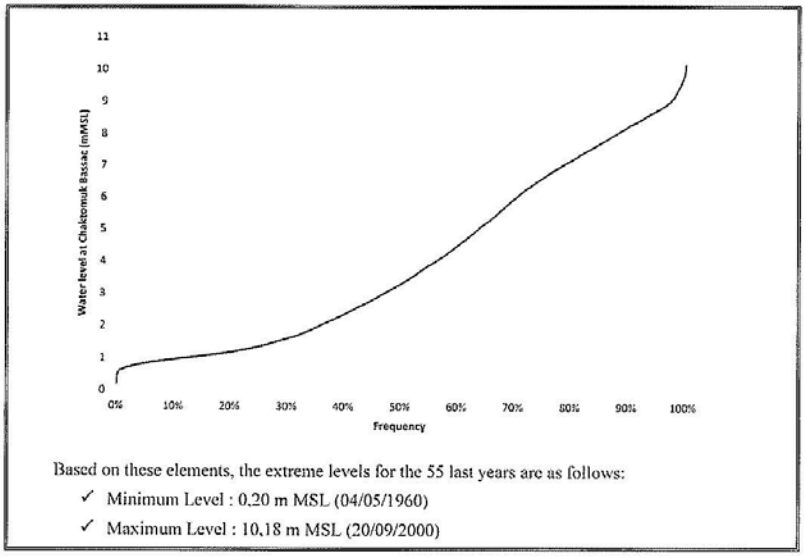


Turbidity Fluctuation of Raw Water in Chamcar Mon WTP (2007 to 2017, Monthly Max.)

The result of monthly raw water quality analysis of March-May 2017 at intake location of Ta Khumau Site carried out under our Survey will be provided separately.

2.1.3. Water Level of Bassac River

The feasibility study for expansion of Chamca Mon WTP gives minimum river water level and maximum river water level, as MSL+0.20m and MSL+10.28m respectively as shown below.



Based on these elements, the extreme levels for the 55 last years are as follows:

- ✓ Minimum Level : 0.20 m MSL (04/05/1960)
- ✓ Maximum Level : 10.18 m MSL (20/09/2000)

2.2. Output requirements

2.2.1. Requirement for the Facilities

2.2.1.1. Requirement of Treated Water Quantity

Water Treatment Capacity of 30,000 m3/day.

2.2.1.2. Required pumping head

The pumping head of the distribution pumps shall be at least 4.5 bars (0.45Mpa) based on the recommendation of the Master Plan.

2.2.1.3. Laboratory for water quality test in WTP

The layout and equipment of the laboratory attached to WTP should be in accordance with ISO9001 and ISO17025. The laboratory in WTP should be equipped with enough equipment to analyze daily test items in the National Drinking Water Quality Standards.

2.2.1.4. Intake Type

Intake facility shall be intake tower type.

2.2.1.5. Disinfection

Disinfection shall be by On-Site Electro-Chlorination System (OSEC System).

2.2.2. Requirement for the Operation

2.2.2.1. Requirement of Treated Water Quantity

SPC shall make best efforts to produce water 30,000-33,000m3/day and the suspension of intake should be avoided as far as possible in any case of raw water deterioration. SPC shall also request a meeting to PPWSA in case the actual production amount is varied from the production plan which shall be submitted to PPWSA in advance.

2.2.2.2. Requirement of Treated Water Quality

The water quality standards which SPC should meet as Annex 4 of Minutes of Discussions signed on June 28th, 2019 between PPWSA and JICA. The daily test items shall be analyzed by SPC in the laboratory attached to WTP, and quarterly and yearly test items shall be analyzed by PPWSA. Turbidity of treated water should be 1NTU or less. SPC would not be required to treat trihalomethane precursors and odor substances.

2.2.2.3. Requirement of Distribution Pressure

The water pressure shall be at least 4 bars (0.4Mpa) at off-take point (flow meter). Reasonable decline in distribution pressure is accepted if the demand exceeds 33,000 m3/day.

2.3. Work to be done by SPC

SPC shall work for followings.

1. Design of New WTP
   (a) Basic Design
   (b) Detailed Design
   (c) Application Work for Design
   (d) Laws and Regulations to be complied.
2. Construction of New WTP
   (a) Civil and Equipment Works
   (b) Plant Mechanical Work
   (c) Plan Electrical Work
   (d) Application Work for Construction
3. Operation and Maintenance of New WTP
   (a) Water Quality Control
   (b) Treated Water Volume Control in case required by PPWSA
   (c) Monitoring and Control of Water Treatment
   (d) Maintenance and Repair
   (e) Procurement of Fuel, Chemical and Other Consumables
   (f) Management of Power Receiving, Water Use and Fuel / Chemical Storage and Safety
   (g) Cleaning

(h) Security and Safety

(i) Emergency Action

4. Hand-Over Work at the End of the O&M period

(a) Performance Test of WTP

(b) Asset Check and Evaluation

2.4. Cost to be borne by SPC

Following cost shall be borne by SPC.

Design and Build Stage:

(a) Head office over-head cost related to construction work

Operation Stage

(b) Head Office over-head cost related to the operation and maintenance work

(c) Any other cost which is not directly related with operation of the new WTP

2.5. Reporting Obligations

Following submittals shall be provided by SPC. Detail shall be provided in later stage

(a) At the time of work commencement

(i) Work commencement application

(ii) Design, Construction and Operation Plan

(iii) Organization structure for the operation

(b) Design and Build period

(i) Report related to construction works including progress record

(ii) Draft of Operation and Maintenance Manual

(iii) Draft of Self-monitoring Report

(iv) Modification and additional work confirmation report

(v) Commissioning reports

(c) At the time of hand-over

(i) Completion report or substantial completion certificate and list of outstanding works

(ii) Final operation and maintenance manual

(iii) Final self-monitoring reports template

(d) During operation period

(i) Monthly report including self-monitoring report

(e) At the time of hand-back

(i) Performance check list of the facilities.

(ii) Remaining book value calculation and confirmation sheet.

(iii) Purchase agreement of SPC's facilities, if any.

(iv) Letter of Waiver of claims and liens and release of rights relating this project from PPWSA to SPC.

(f) At the time of Expiration of warranty against defect period

(i) Report on Expiration of Warranty against Defect Period

3. Contract Terms

Draft O&M contract shall be prepared based on the following items. Draft EPC contract shall be prepared separately in accordance with JICA's standard form of contract.

	Contract Terms	Conditions
1	**O&M period**	After the completion of the new WTP, the ownership of the WTP will be transferred from SPC to PPWSA, then PPWSA and SPC will agree the O&M contract for 10 years after commencement (definition is to be agreed) of O&M on the facilities owned by PPWSA.
2	**Production of bulk water**	Production of bulk water is fundamentally a responsibility of the SPC.
3	**Payment mechanism and price of bulk water**	On a separate sheet
4	**Repairment**	During O&M period, SPC may use leased facilities free of charge, however, the SPC shall be responsible for any repairment of the facilities at its own cost. SPC shall keep good conditions of the facility and equipment in accordance with PPWSA's Standard Operation Procedure (SOP).
5	**Conditions for the hand-back**	- After the end of O&M period, PPWSA has the right to be handed back the leased WTP facilities from the SPC under certain requirements (e.g. the result of the motor vibration test is within 5% of initial specification). - The SPC shall remove any additional facilities or equipment installed for its operation and restore the WTP to its initial condition at its own cost, if required by PPWSA. - PPWSA has the right to purchase any remaining inventories (e.g. raw materials) at their book value.
6	**Private investment**	The SPC may invest in some additional facilities, software, or any other equipment necessary for the operations. PPWSA has the right to purchase the private investments from the SPC at their residual value (net book value) at the end of O&M period.
7	**Self-monitoring**	SPC shall monitor and report to PPWSA its operation. Monitoring requirements shall be studied.
8	**Operation data and financial information**	The SPC shall record and report all the operation data and financial information in a required format. PPWSA may utilize the data to continue operation of the WTP after hand-back.
9	**Early termination / compensation events**	- Termination for convenience (Unilateral termination) PPWSA has the right to terminate the contract early for public

		interest. In this case the SPC shall be compensated in full, for all the private investments, inventories and additional costs incurred by the termination of the contract, and opportunity costs for the equity. Opportunity costs for the equity shall be a sum of net profit for the remaining contract period based on the SPC's initial financial plan initially agreed in the contract. - Termination for default by PPWSA The termination condition shall be in line with the case of the termination for convenience. - Termination for default by SPC PPWSA shall have the option to require SPC to transfer to PPWSA all of its right, title and interest in and to the assets and inventories. The value of the assets and inventories shall be net book value of the assets minus cost of damages and losses suffered by PPWSA due to the termination of the contract. - Termination for Force Majeure A Force Majeure is an event that is external, unpredictable, and irresistible and has a significant impact on the project. Both parties may terminate the contract if the impact of a Force Majeure lasts for 180 days. Neither party has any obligation to each other for the cost of mitigation measures to prevent increasing loss caused by Force Majeure. PPWSA shall have the option to require SPC to transfer to PPWSA all of its right, title and interest in and to the assets and inventories. The value of the assets and inventories shall be net book value of the assets.
10	**Invoice settlement**	SPC shall report and charge to PPWSA by the 10th day of each month for the bulk water produced in the previous month. PPWSA shall in return review the invoice and make payment within two months after the invoice receiving date. Currency to be used for the invoice settlement shall be Cambodian Riel.
11	**Staff Employment**	1) PPWSA shall take over the employment contracts from the SPC at the end of O&M period. 2) PPWSA intends to dispatch about 5 staff to SPC and bear their salary. PPWSA staff shall report to SPC in daily operation. Relative salaries shall be subtracted from the off-take price.

Payment mechanism – Price Formula for Bulk Water Supply

In the bidding documents, SPC shall submit EPC price, 10-year average O&M Cost(α), 10-year average fixed volume of electricity usage(β), and the margin rate at bidding to calculate 10-year LCC

SPC Invoice (PPWSA payment to SPC) = (1) sales of bulk water + (2) additional services – (3) penalties

(1) Sales of bulk water = (4) volume of water delivered * (5) unit price of bulk water

(4) volume of water delivered shall be confirmed by a volume meter just after distribution pump

(5) Unit price of bulk water = α * (6) inflation index + β * (7) electricity price
+ (8) additional production costs + (9) agreed margin for SPC

α is a fixed (agreed) basis for O&M costs excluding electricity defined in the contract

(6) Inflation index for the first year of O&M shall be All Item Index of Consumer Price Index published by National Institute of Statistics for the latest available month at O&M commencement divided by that for the contract month. Inflation index shall be revised based on the same methodology annually.

β is a fixed (agreed) volume of electricity usage per m3 defined in the contract

(7) Electricity price shall be the price determined in the contract between PPWSA and the electricity supplier.

(8) applies if and only if quality deterioration of raw water or change in water quality standard cause additional production costs.

(9) = agreed margin rate * (α * (6) + β * (7) + (8))

Agreed margin rate is a fixed (agreed) rate defined in the contract

(2) Additional services include deeper analysis of water quality or site visit tour or any other services that are not included in the ordinary O&M activities defined in the contract.

(3) In case the water delivered by SPC does not comply with the drinking water standards of the WHO and national drinking water standards, PPWSA will not pay for the delivered water by SPC. In addition, SPC shall compensate for any damage (e.g. compensation to end-customers) suffered by PPWSA as a result of the such poor operation of SPC.

Based on the Comparator facilities, α is estimated KHR182/m3 and β 302Wh/m3.

Example for the month of June 2025 (all figures are assumptions)

(1)		Sales of bulk water	= (4) * (5)	KHR395,125,200
	(4)	Volume of water delivered	as delivered by SPC	900,000m3 per month
	(5)	Unit price of bulk water	= α * (6) + β * (7) + (8) + (9)	KHR438/m3
	α	Basis for O&M costs excluding electricity	as defined in the contract	KHR182/m3
	(6)	Inflation index	= 200.05 for Jan 2025 / 176.02 for Jan 2021 at the time of contract (All item CPI from monthly report by the National Institute of Statistics)	1.13
	β	Volume of electricity usage per m3	as defined in the contract	302Wh/m3
	(7)	Electricity price	Electricity price for June 2025	KHR584/kWh
	(8)	Additional production costs	Not applicable	0
	(9)	Required margin	= (α * (6) + β * (7) +(8)) * 15% 15% as defined in the contract	KHR57/m3
(2)		Additional services	Work shop program requested by PPWSA	KHR4,000,000
(3)		Compensation	Not applicable	0
		SPC Invoice	= (1) + (2) + (9)	KHR399,125,200

Production conditions		Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	
Annual production	m3		10,950,000	10,950,000	10,950,000	10,950,000	10,950,000	10,950,000	10,950,000	10,950,000	10,950,000	10,950,000	—(1)
FX rate	KHR/JPY	35.2	35.7	36.2	36.2	36.2	36.2	36.2	36.2	36.2	36.2	36.2	
Inflation rate	% growth		9%	3%	3%	3%	3%	3%	3%	3%	3%	3%	
Inflation index	index	1.00	1.09	1.13	1.16	1.19	1.23	1.27	1.30	1.34	1.38	1.43	
Electricity price	KHR/kWh	584	584	584	584	584	584	584	584	584	584	584	
Discount rate	%	4.5%											

EPC price			Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
EPC price	000JPY	3,600,000											

Electricity cost (given at 20,000 m3/day)			Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	
Capacity														
Intake	kW			161.2	161.2	161.2	161.2	161.2	161.2	161.2	161.2	161.2	161.2	
Treatment	kW			88.3	88.3	88.3	88.3	88.3	88.3	88.3	88.3	88.3	88.3	
Chemical	kW			40.8	40.8	40.8	40.8	40.8	40.8	40.8	40.8	40.8	40.8	
Distribution	kW			199.0	199.0	199.0	199.0	199.0	199.0	199.0	199.0	199.0	199.0	
Others	kW			10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	
Total				499.3	499.3	499.3	499.3	499.3	499.3	499.3	499.3	499.3	499.3	
Consumption														
Intake	kWh			1,412,112	1,412,112	1,412,112	1,412,112	1,412,112	1,412,112	1,412,112	1,412,112	1,412,112	1,412,112	
Treatment	kWh			64,459	64,459	64,459	64,459	64,459	64,459	64,459	64,459	64,459	64,459	
Chemical	kWh			59,568	59,568	59,568	59,568	59,568	59,568	59,568	59,568	59,568	59,568	
Distribution	kWh			1,743,240	1,743,240	1,743,240	1,743,240	1,743,240	1,743,240	1,743,240	1,743,240	1,743,240	1,743,240	
Others	kWh			29,200	29,200	29,200	29,200	29,200	29,200	29,200	29,200	29,200	29,200	
Total	kWh			3,308,579	3,308,579	3,308,579	3,308,579	3,308,579	3,308,579	3,308,579	3,308,579	3,308,579	3,308,579	
per m3	Wh/m3			302	302	302	302	302	302	302	302	302	302	—(2)
Total cost	000KHR			1,932,210	1,932,210	1,932,210	1,932,210	1,932,210	1,932,210	1,932,210	1,932,210	1,932,210	1,932,210	
per m3	KHR/m3			176	176	176	176	176	176	176	176	176	176	
% of total cost	%			52%	49%	49%	46%	46%	46%	46%	46%	46%	46%	

Labor			Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	
# of employees														
CEO	persons			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
O&M & technical training advisor	persons			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
Chief manager	persons			1	1	1	1	1	1	1	1	1	1	
Facility manager	persons			1	1	1	1	1	1	1	1	1	1	
Quality manager	persons			1	1	1	1	1	1	1	1	1	1	
Admin/business staff	persons			3	3	3	3	3	3	3	3	3	3	
M&E Engineer	persons			1	1	1	1	1	1	1	1	1	1	
Operating staff	persons			6	6	6	6	6	6	6	6	6	6	
Total	persons			14	14	14	14	14	14	14	14	14	14	
Salaries (excl. inflation effect)														
CEO	000KHR			724,092	724,092	724,092	724,092	724,092	724,092	724,092	724,092	724,092	724,092	
O&M & technical training advisor	000KHR			724,092	724,092	724,092	724,092	724,092	724,092	724,092	724,092	724,092	724,092	
Chief manager	000KHR			60,221	60,221	60,221	60,221	60,221	60,221	60,221	60,221	60,221	60,221	
Facility manager	000KHR			47,634	47,634	47,634	47,634	47,634	47,634	47,634	47,634	47,634	47,634	
Quality manager	000KHR			47,634	47,634	47,634	47,634	47,634	47,634	47,634	47,634	47,634	47,634	
Admin/business staff	000KHR			35,047	35,047	35,047	35,047	35,047	35,047	35,047	35,047	35,047	35,047	
M&E Engineer	000KHR			35,047	35,047	35,047	35,047	35,047	35,047	35,047	35,047	35,047	35,047	
Operating staff	000KHR			35,047	35,047	35,047	35,047	35,047	35,047	35,047	35,047	35,047	35,047	
Total wages														
CEO	000KHR			362,046	362,046	362,046	362,046	362,046	362,046	362,046	362,046	362,046	362,046	
O&M & technical training advisor	000KHR			362,046	362,046	362,046	362,046	362,046	362,046	362,046	362,046	362,046	362,046	
Chief manager	000KHR			60,221	60,221	60,221	60,221	60,221	60,221	60,221	60,221	60,221	60,221	
Facility manager	000KHR			47,634	47,634	47,634	47,634	47,634	47,634	47,634	47,634	47,634	47,634	
Quality manager	000KHR			47,634	47,634	47,634	47,634	47,634	47,634	47,634	47,634	47,634	47,634	
Admin/business staff	000KHR			105,141	105,141	105,141	105,141	105,141	105,141	105,141	105,141	105,141	105,141	
M&E Engineer	000KHR			35,047	35,047	35,047	35,047	35,047	35,047	35,047	35,047	35,047	35,047	
Operating staff	000KHR			210,281	210,281	210,281	210,281	210,281	210,281	210,281	210,281	210,281	210,281	
Total	000KHR			1,230,649	1,230,649	1,230,649	1,230,649	1,230,649	1,230,649	1,230,649	1,230,649	1,230,649	1,230,649	—(3)
per m3	KHR/m3			112	112	112	112	112	112	112	112	112	112	
% of total cost	%			33%	31%	31%	31%	31%	31%	31%	31%	31%	30%	

Chemicals			Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	
Unit consumption														
PAC	g/m3			10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	
Chlorine	g/m3			5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Unit price (excl. inflation effect)														
PAC	KHR/kg			2,137	2,137	2,137	2,137	2,137	2,137	2,137	2,137	2,137	2,137	
Chlorine	KHR/kg			2,288	2,288	2,288	2,288	2,288	2,288	2,288	2,288	2,288	2,288	
Total cost														
PAC	000KHR			234,012	234,012	234,012	234,012	234,012	234,012	234,012	234,012	234,012	234,012	
Chlorine	000KHR			125,268	125,268	125,268	125,268	125,268	125,268	125,268	125,268	125,268	125,268	
Total	000KHR			359,280	359,280	359,280	359,280	359,280	359,280	359,280	359,280	359,280	359,280	—(4)
per m3	KHR/m3			33	33	33	33	33	33	33	33	33	33	
% of total cost	%			10%	9%	9%	9%	9%	9%	9%	9%	9%	9%	

Repair, maintenance and insurance (excl. inflation effect)			Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	
Machinery	000KHR			108,614	108,614	108,614	108,614	108,614	108,614	108,614	108,614	108,614	217,227	
Electrical equipment	000KHR			72,409	72,409	72,409	72,409	72,409	72,409	72,409	72,409	72,409	144,818	
	000KHR	0		181,023	181,023	181,023	181,023	181,023	181,023	181,023	181,023	181,023	362,045	—(5)
per m3	KHR/m3	0		17	17	17	17	17	17	17	17	17	33	
% of total cost	%	0%		5%	5%	5%	5%	5%	5%	5%	5%	5%	9%	

Other operating expenses (excl. inflation effect)			Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	
Employee social security	000KHR			6,720	6,720	6,720	6,720	6,720	6,720	6,720	6,720	6,720	6,720	
Transportation	000KHR			21,723	21,723	21,723	21,723	21,723	21,723	21,723	21,723	21,723	21,723	
Office keeping	000KHR			43,445	43,445	43,445	43,445	43,445	43,445	43,445	43,445	43,445	43,445	
Accounting audit / legal services	000KHR			21,723	21,723	21,723	21,723	21,723	21,723	21,723	21,723	21,723	21,723	
Other operating costs	000KHR			9,361	9,361	9,361	9,361	9,361	9,361	9,361	9,361	9,361	9,361	
VAT/import tax	000KHR			96,524	114,627	114,627	114,627	114,627	114,627	114,627	114,627	114,627	132,729	
	000KHR			199,497	217,599	217,599	217,599	217,599	217,599	217,599	217,599	217,599	235,701	—(6)
per m3	KHR/m3			18	20	20	20	20	20	20	20	20	22	
% of total cost	%			5%	6%	6%	6%	6%	6%	6%	6%	6%	6%	
[illegible]	%			100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
O&M cost excl. electricity per m3 production	KHR/m3			179	204	210	217	223	230	237	244	251	285	
O&M cost excl. electricity per m3 production excl. inflation effect	KHR/m3			163	182	182	182	183	182	182	182	182	200	
Electricity cost per m3 production	KHR/m3			176	176	176	176	176	176	176	176	176	176	
Total unit cost of m3 production	KHR/m3			355	381	387	393	400	406	413	420	428	461	
Total unit cost of m3 production excl. inflation effect	KHR/m3			340	358	358	358	358	358	358	358	358	376	

10 year total O&M cost excl. electricity	000KHR	19,879,911	—(7) =sum((3)+(4)+(5)+(6))
10 year total production	m3	109,500,000	—(8) =sum((1))
α 10 year average O&M cost excl. electricity excl. inflation effect	KHR/m3	182	—(9) =(7)/(8)
β 10 year average consumption of electricity per m3 production	Wh/m3	302	—(10) =average((2))

Lifecycle cost to PPWSA			Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
EPC	000KHR	108,613,728											
Operating margin	%		15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
Others payment	000KHR		4,795,264	4,800,595	4,807,779	4,957,485	5,039,582	5,124,142	5,211,239	5,300,949	5,393,350	5,488,523	
TOTAL	000KHR	108,613,728	4,795,264	4,800,595	4,807,779	4,957,485	5,039,582	5,124,142	5,211,239	5,300,949	5,393,350	5,488,523	

10 year lifecycle cost to PPWSA (NPV)	KHR000	142,260,337

Unit Price of bulk water	KHR/m3		432	428	445	453	460	468	476	484	493	501
[illegible]												
[illegible]			4,795,264	4,800,595	4,807,779	4,957,485	5,039,582	5,124,142	5,211,239	5,300,949	5,393,350	5,488,523
[illegible]			3,308,579	3,308,579	3,308,579	3,308,579	3,308,579	3,308,579	3,308,579	3,308,579	3,308,579	3,308,579
[illegible]			1,932,210	1,932,210	1,932,210	1,932,210	1,932,210	1,932,210	1,932,210	1,932,210	1,932,210	1,932,210
[illegible]			359,280	359,280	359,280	359,280	359,280	359,280	359,280	359,280	359,280	359,280
[illegible]			1,230,649	1,230,649	1,230,649	1,230,649	1,230,649	1,230,649	1,230,649	1,230,649	1,230,649	1,230,649
[illegible]			181,023	181,023	181,023	181,023	181,023	181,023	181,023	181,023	181,023	362,045
[illegible]			199,497	217,599	217,599	217,599	217,599	217,599	217,599	217,599	217,599	235,701

Annex 3

CROWN AGENTS

ACCELERATING SELF-SUFFICIENCY & PROSPERITY

DOCUMENT NO.3 SOLAR POWER TA KHMAU WATER PURIFICATION PLANT

Analysis of Private Investment for Solar Panel

Decision making is required for Solar Power Investment

- The solar power facilities cannot be covered by the Grant as the Grant budget is limited.
- PPWSA needs to decide whether to install the solar power facilities at its own investment or SPC' private investment.
- If the solar power facilities should be installed,
  - PPWSA shall discuss, negotiate, and agree with SPC at its own risk apart from this Grant scheme because private investment must be separated from the Grant component.
  - The Consultants shall prepare the requirements for the WTP to be consistent with the solar power installation.

- Given that the electricity price in Cambodia is relatively high @720KHR/kWh and Electricity price cut is expected in the near future, scenario analysis is provided on the next page for PPWSA's investment decision.

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Scenario Analysis for Solar Power Investment

Assumptions		
Capacity	kW	146
Efficiency coefficient	--	6
Electricity generation	kWh/year	319,740
Initial capital expenditure	JPY	40,000,000
FX rate	KHR/JPY	36.2
Initial capital expenditure	000KHR	1,448,183
Depreciation method	--	Straight-line
Lifetime	years	17

Economic analysis tells us that solar panel investment is worth to do, even the electricity price goes down to KHR400/kWh.
If it goes down below KHR300/kWh from the first year of this project period, it is not worth to invest.

Case 1		Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14	Y15	Y16	Y17
Electricity price	KHR/kWh		720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720
Electricity value	000KHR		230,213	230,213	230,213	230,213	230,213	230,213	230,213	230,213	230,213	230,213	230,213	230,213	230,213	230,213	230,213	230,213	230,213
Depreciation	000KHR		85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187
Net profit	000KHR	0	145,026	145,026	145,026	145,026	145,026	145,026	145,026	145,026	145,026	145,026	145,026	145,026	145,026	145,026	145,026	145,026	145,026
Cash in/out	000KHR	-1,448,183	230,213	230,213	230,213	230,213	230,213	230,213	230,213	230,213	230,213	230,213	230,213	230,213	230,213	230,213	230,213	230,213	230,213
Internal Rate of Return	%	14.2%																	
NPV at 4.5%	000KHR	1,193,265																	

Case 2		Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14	Y15	Y16	Y17
Electricity price	KHR/kWh		400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
Electricity value	000KHR		127,896	127,896	127,896	127,896	127,896	127,896	127,896	127,896	127,896	127,896	127,896	127,896	127,896	127,896	127,896	127,896	127,896
Depreciation	000KHR		85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187
Net profit	000KHR	0	42,709	42,709	42,709	42,709	42,709	42,709	42,709	42,709	42,709	42,709	42,709	42,709	42,709	42,709	42,709	42,709	42,709
Cash in/out	000KHR	-1,448,183	127,896	127,896	127,896	127,896	127,896	127,896	127,896	127,896	127,896	127,896	127,896	127,896	127,896	127,896	127,896	127,896	127,896
Internal Rate of Return	%	4.9%																	
NPV at 4.5%	000KHR	47,005																	

Case 3		Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14	Y15	Y16	Y17
Electricity price	KHR/kWh		300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300
Electricity value	000KHR		95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922
Depreciation	000KHR		85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187
Net profit	000KHR	0	10,735	10,735	10,735	10,735	10,735	10,735	10,735	10,735	10,735	10,735	10,735	10,735	10,735	10,735	10,735	10,735	10,735
Cash in/out	000KHR	-1,448,183	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922
Internal Rate of Return	%	1.4%																	
NPV at 4.5%	000KHR	-311,202																	

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For reference: Electricity price at other Asian Countries

- Actual Electricity cost in Phnom Phen Cambodia is 720KHR/kWh (USD 0.18)
- Electricity Price in nearby countries are as follows (June 2018 from Global PetrolPrices.com)

Country	USD/kWh
Myanmar	0.02
Malaysia	0.06
Vietnam	0.07
China	0.08
Taiwan	0.08
Thailand	0.12
Hong Kong	0.14
Singapore	0.16
Cambodia	0.18
Philippines	0.19
Japan	0.27

Electricity Cost in Cambodia is relatively expensive comparing other nearby countries.
Cost reduction is expected near future.
Thailand level is USD 0.12/kWh, (480KHR/kWh)
Malaysian level is USD 0.06/kWh, (240KHR/kWh)

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Table 5-1: Urban water system parameters

Items to be Analyzed and Recorded in Ta Khmau WTP	Parameter	Parameter			Exception	Formal Monitoring Examination level		
			Permissible limite			A	B	C
		Unit	National Drinking water Standard	Requirement for Ta Khmau WTP		Daily	Quarterly	Annually
	Microbial							
	E.Coli or thermoteloerant	CFU or MPN / 100 ml	0	0			B	
	Chemical							
	Aluminium (Al)	mg/l	0.2	0.2	in the case that alum is used		B	
	Ammonia (NH_3)	mg/l	1.5	1.5			B	
	Arsenic (As)	mg/l	0.05	0.05	for the case of groundwater source			C
	Barium (Ba)	mg/l	0.7	0.7				C
	Cadmium (Cd)	mg/l	0.003	0.003				C
	Chloride (Cl^-)	mg/l	250	250			B	
●	Chlorine Cl_2 * (free residual)	mg/l	0.1-1.0	0.1-1.0	for the case of using chlorine for disinfectant	A		
	Chromium (Cr)	mg/l	0.05	0.05				C

Items to be Analyzed and Recorded in Ta Khmau WTP	Parameter	Parameter			Exception	Formal Monitoring Examination level		
			Permissible limite			A	B	C
		Unit	National Drinking water Standard	Requirement for Ta Khmau WTP		Daily	Quarterly	Annually
	Copper (Cu)	mg/l	1	1	for the case that household plumbing uses copper pipes			C
	Fluoride (F)	mg/l	1.5	1.5	for the case of groundwater source			C
	Total hardness as $CaCO_3$	mg/l	300	300	For the case of groundwater source		B	
	Iron (Fe)	mg/l	0.3	0.3	case of groundwater		B	
	Lead (Pb)	mg/l	0.01	0.01				C
	Manganese (Mn)	mg/l	0.1	0.1	case of groundwater		B	
	Mercury (Hg)	mg/l	0.001	0.001				C
	Nitrate (NO_3^-)	mg/l	50	50			B	
	Nitrite (NO_2^-)	mg/l	3	3			B	
	Sodium (Na)	mg/l	250	250	case at coastal areas			C
	Sulfate ion (SO_4^{2-})	mg/l	250	250			B	
	Zinc (Zn)	mg/l	3	3				C

Items to be Analyzed and Recorded in Ta Khmau WTP	Parameter	Parameter			Exception	Formal Monitoring Examination level		
		Unit	Permissible limite			A	B	C
			National Drinking water Standard	Requirement for Ta Khmau WTP		Daily	Quarterly	Annually
	Physical							
●	Colour	TCU	5	5		A		
●	pH	n/a	6.5-8.5	6.5-8.5		A		
●	TDS or Conductivity	mg/l or µS/cm	800 or 1600	800 or 1600		A		
●	Turbidity	NTU	5	1		A		
●	Taste and Odour	-	Acceptable	Acceptable		A		

*Residual chlorine must be daily analysed in production system and fortnightly (two weeks) at end points of networks (water supply system with more than 3001 connections). The number of samples is dependent on situations of end points of networks of each unit or service provider. We can analyse thermoteloerant coliform bacteria for E Coli.

**Conductivity is an acceptable alternative to TDS. The above limits assume that Conductivity is twice TDS, but this relationship should be confirmed at each site if conductivity is used.

*** Whether the analysis of taste and odour by operators is acceptable depends on users.

Source: National Drinking Water Quality Standard (MIH)

Minutes of Discussions
on the Preparatory Survey for the Project for
Expansion of the Water Supply System in Ta Khmau
(Explanation on Draft Preparatory Survey Report)

With reference to the minutes of discussions signed between Phnom Penh Water Supply Authority (hereinafter referred to as "PPWSA") and the Japan International Cooperation Agency (hereinafter referred to as "JICA") on 29th March,2019 and 28th June,2019, and in response to the request from the Government of Cambodia dated 8th August 2017, JICA dispatched the Preparatory Survey Team (hereinafter referred to as "the Team") for the explanation of Draft Preparatory Survey Report (hereinafter referred to as "the Draft Report") for the Project for Expansion of the Water Supply System in Ta Khmau (hereinafter referred to as "the Project").

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

Phnom Pehn, 21st November, 2019

Dr. Shigeyuki Matsumoto
Leader
Preparatory Survey Team
Japan International Cooperation Agency
Japan

H.E. Dr. Sim Sitha
Director General
Phnom Penh Water Supply Authority (PPWSA)
Kingdom of Cambodia

ATTACHEMENT

1. Title of the Preparatory Survey
   Both sides confirmed the title of the Preparatory Survey as "the Preparatory Survey for the Project for Expansion of Water Supply System in Ta Khmau". However, PPWSA suggested that the spelling of "Ta Khmau" should be changed to "Ta Khmao" in accordance with the official website of Cambodian Government in the later stage. The Team agreed with it and would take necessary procedure to officially revise the spelling of the title in the later stage.

2. Contents of the Draft Report
   After the explanation of the contents of the Draft Report by the Team, the Cambodian side agreed to its contents. JICA will finalize the Preparatory Survey Report based on the confirmed items. The report will be sent to the Cambodian side around March 2020.

3. Cost estimate
   Both sides confirmed that the cost estimate including the contingency explained by the Team is provisional and will be examined further by the Government of Japan for its approval. The contingency would cover the additional cost against natural disaster, unexpected natural conditions, etc.

4. Confidentiality of the cost estimate and technical specifications
   Both sides confirmed that the cost estimate and technical specifications of the Project should never be disclosed to any third parties until all the contracts under the Project are concluded.

5. Timeline for the project implementation
   The Team explained to the Cambodian side that the expected timeline for the project implementation is as attached in Annex 1.

6. Expected outcomes and indicators
   Both sides agreed that key indicators for expected outcomes are as follows. The Cambodian side will be responsible for the achievement of agreed key indicators targeted in year 2026 and shall monitor the progress based on those indicators.

[Quantitative indicators]

Indicator	Baseline Data (Year 2015)	Target (Year 2026) 【3 years after completion of the new facilities】
daily average water supply amount (m^3/day)	11,440	30,000

[Qualitative indicators]

- Improving the water quantity and water pressure from tap
- Improving public health
- Increasing house connections for poor households
- Maintaining affordable water tariff for poor households
- Enhancing PPWSA's O&M capacity of WTP by technical transfer
- Creating a goodexample of O&M of WTP by SPC in Cambodia

7. Undertakings of the Project

Both sides confirmed the undertakings of the Project as described in Annex 2. With regard to exemption of customs duties, internal taxes and other fiscal levies as stipulated in (2) 5 of Annex 2, both sides confirmed that such customs duties, internal taxes and other fiscal levies, which shall be clarified in the bid documents by PPWSA during the implementation stage of the Project.

The Cambodian side assured to take the necessary measures and coordination including allocation of the necessary budget which are preconditions of implementation of the Project. It is further agreed that the costs are indicative, i.e. at Outline Design level.

Both sides confirmed that the area in the Niroth WTP and PPWSA's land in Kampong Samnanh Village in Ta Khmau city shall be provided during the EPC period for the stock yard free of charge as stipulated in (2)13 of Annex 2.

Both sides confirmed that PPWSA would be in charge of sludge disposal from the sludge basin as stipulated in (3)5 of Annex 2.

Both sides also confirmed that the Annex 2 will be used as an attachment of G/A.

8. Monitoring during the implementation

The Project will be monitored by PPWSA and reported to JICA by using the form of Project Monitoring Report (PMR) attached as Annex 3. The timing of submission of the PMR is described in Annex 2.

9. Project completion

Both sides confirmed that the Project completes when all the facilities constructed and equipment procured by the Grant. The completion of the Project will be reported to JICA promptly, but in any event not later than six months after completion of the Project.

10. Ex-Post Evaluation

JICA will conduct ex-post evaluation after three (3) years from the project completion, in principle, with respect to five evaluation criteria (Relevance, Effectiveness, Efficiency, Impact, Sustainability). The result of the evaluation will be publicized. The Cambodian side is required to provide necessary support for the data collection.

11. Environmental and Social Considerations

11-1. General Issues

11-1-1. Environmental Guidelines and Environmental Category

The Team explained that 'JICA Guidelines for Environmental and Social Considerations (April 2010)' (hereinafter referred to as "the Guidelines") is applicable for the Project. The Project is categorized as B because the Project is not located in a sensitive area, nor has sensitive characteristics, nor falls into sensitive sectors under the Guidelines, and its potential adverse impacts on the environment are not likely to be significant.

11-1-2. Environmental Checklist

The environmental and social considerations including major impacts and mitigation measures for the Project are summarized in the Environmental Checklist attached as Annex 4. Both sides confirmed that in case of major modification of the content of the Environmental Checklist, the Cambodian side shall submit the modified version to JICA in a timely manner.

11-2. Environmental Issues

11-2-1. Initial Environmental Impact Assessment (IEIA)

Both sides confirmed the IEIA report will be approved by Ministry of Environment in January, 2020. The Team requested that the IEIA report would be approved before Cabinet approval by the government of Japan in February.

11-2-2. Environmental Management Plan and Environmental Monitoring Plan

Both sides confirmed Environmental Management Plan (EMP) and Environmental Monitoring Plan (EMoP) of the Project is as Annex 5, respectively. Both sides agreed that environmental mitigation measures and monitoring shall be conducted based on the EMP and EMoP, which may be updated during the detailed design stage.

11-3. Environmental and Social Monitoring

11-3-1. Environmental Monitoring

Both sides agreed that the Cambodian side will submit results of environmental monitoring to JICA by using the monitoring form attached as Annex 6. The timing of submission of the monitoring form is described in Annex 2.

11-3-2. Information Disclosure of Monitoring Results

Both sides confirmed that the Cambodian side will disclose results of environmental and social monitoring to local stakeholders through their website / in their field offices.

The Cambodian side agreed JICA will disclose results of environmental and social monitoring submitted by the Cambodian side as the monitoring forms attached as Annex 6 on its website.

12. Other Relevant Issues

Project Outline

12-1. Outline of the Comparator Facility

The Team explained final version of comparator facilities as Annex 7. The location of bulk water in the Ta Khumau WTP treatment process is added to the final version. PPWSA understood it.

12-2. Emergency Response against Unexpected Raw Water Quality

The Team explained emergency response of the following two cases.

a) In case turbidity becomes higher than 1000NTU, intake amount shall follow PPWSA's instruction as same as other PPWSA's treatment plants.
b) In case serious issue (such as toxic substance or oil discharge) happens, SPC can autonomously reduce or stop intake operation to avoid serious damage on WTP facilities and contaminated water supply to customers, and report to and discuss with PPWSA as soon as possible.

If above restricted intake conditions continue untill remaining water in the service reservoir is empty, both parties do not have responsibilities to suspend water supply.

PPWSA agreed those suggestions.

12-3. Responsibility of Damage of the Existing Elevated Tank

Both sides confirmed that EPC contractor/SPC would have responsibility against any damage on existing elevated tank due to EPC contractor/SPC's fault and PPWSA would have responsibility against aged deterioration. Before construction commences, both EPC contractor and PPWSA will evaluate the condition of the existing elevated tank.

12-4. Risk Allocation of Strengthening of Sludge Treatment Regulation

Both sides confirmed that the risk of strengthening of sludge treatment regulation was categorized in legal risk (change of project specific law) described in Annex 8, and necessary cost for additional facility and treatment to meet strengthened regulation would be borne by PPWSA. In case PPWSA outsource the task such as facility planning and additional O&M to SPC, PPWSA additionally needs to pay appropriate outsourcing fee to SPC.

12-5. Disinfection Method

Both sides confirmed that on-site chlorination system for disinfection method shall be included for requirements in the bidding documents.

Requirements

12-6. Items of Requirements

Both sides confirmed the following items shall be included for requirements in the bidding documents at this time and requirements would be finalized in the later stage.

- WTP capacity of nominal 30,000m^3/day
- 10 years O&M period
- Intake tower type
- On-site chlorination system
- Volume of service reservoir of 5,000 m^3 or more
- Pressure of 4 bar at off-take point
- 24 hours supply
- Water quality standards described in Annex 12
- O&M manual in both Khmer Language and English
- Prevention against adhesion of shell inside raw water transmission pipe
- 5 % of production loss ratio from intake to the bulk meter
- prevention of oil inflow into the WTP

Contract Terms

12-7. Insurance for WTP

The Team explained that Japanese companies requested to add insurance cost for WTP on off-take price to lower the hurdle to participate in the Project, because they operate PPWSA's asset so that there is possibility for them to accept liability for damages to the facilities or the third party.

The Team also explained options for this request with reference to Annex 9.

PPWSA explained that it has responsibility to cover asset insurance. Both sides agreed that insurance other than PPWSA's coverage can be included in off-take price in case initial off-take price is less than or equal to 500KHR/m^3, and social insurance for the staff dispatched from PPWSA will be covered by PPWSA.

12-8. Third party monitoring during O&M

PPWSA explained that third party monitoring would not be necessary during O&M period in the previous meeting. However, the Team explained that any monitoring would not be included in consultant service by Grant during O&M and suggested third party monitoring to assure good condition of WTP. PPWSA took note of it.

12-9. Chemical Procurement

Both sides confirmed that the necessary amount of chemical for O&M by SPC could be procured by PPWSA at the same price as PPWSA's. PPWSA explained that the procurement planning starts in September every year, so SPC should submit necessary amount of chemical for one year consumption by September and follow PPWSA's specification. The Team took note of it.

12-10. Frequency of Revision for the Unit Price of Bulk Water

The Team suggested that the frequency of revision of off-take price would be basically yearly base to mitigate inflation risk and electricity price variation risk on SPC in accordance with the risk category both sides had previously agreed. PPWSA explained that Board of Director and Ministry of Economy and Finance cannot accept yearly variable off-take price because water tariff cannot be revised in accordance with inflation rate. PPWSA suggested every three years or more for recalculation of off-take price.

Both sides agreed that initial off-take price shall be less than or equal to 500KHR/m^3 and that off-take price should be reviewed and adjusted at the end of third year, sixth year and ninth year from the effective date of O&M period. Both sides agreed such revision and

adjustment should be in accordance with the formula described in Annex 8. The off-take price shall be revised only when the value calculated by the formula exceeds the previously-agreed off-take price. When the value calculated based on the formula exceeds 500KHR/m^3, SPC should verify the cost structure based on inflation rate and electricity cost.

12-11. Contract Structure

The Team explained two options of contract structure for the Project described in Annex 10 and JICA decided Consortium for EPC+ local SPC for O&M would be more feasible for the Project with following reasons.

- It may take time to establish local SPC , register tax exemption and implement other necessary procedure to start the activity of local SPC. This might cause the miss of the critical pass of intake construction which should be commenced in November, 2021. And, it leads to the delay of the Project.
- Japanese companies which attended the project briefing session expressed the concern about above situation. This may cause no applicants for the Project.

Both sides agreed that Consortium for EPC+ local SPC for O&M would be selected for the Project.

12-12. Dispute Settlement during O&M

The Team proposed dispute settlement during O&M described in Annex 11. PPWSA took note of it. Both sides confirmed this would be finally decided through contract negotiation between PPWSA and SPC.

12-13. Payment Currency

The Team explained that some Japanese companies expressed their preference for the payment in US dollar. PPWSA explained only Khmer Riel can be applied for the payment to SPC, because water tariff is paid by KHR and most of expenses of SPC is also paid in KHR in accordance with Cambodian Procurement Law.

12-14. Contract Terms

The Team explained the latest version of contract terms described in Annex 8. Following items have been revised from the previous version.

- Emergency response against unexpected raw water quality
- Timeline for the project implementation
- Invoice settlement (mentioned below)

・Requirements for the Operation

12-15. Invoice settlement

Deadline of payment from PPWSA to SPC was tentatively decided within two months after the invoice receiving day in the previous meeting.

The Team suggested 30 days as a deadline in consideration with the opinion from Japanese companies in order to maintain sound cash flow. PPWSA agreed with it.

Others

12-16. Report to the Board of Directors of PPWSA

The Team requested PPWSA to report to the Board of Directors about the result of the Preparatory Survey espescially the project scheme of Grant Aid with O&M, off-take price based on the comparator facility and bidding system in December, 2019, because the Japanese side would enter into the formal appraisal process at the government level. Both sides confirmed PPWSA would report to the Board of Directors on 5th December, 2019.

Annex 1 Project Implementation Schedule
Annex 2 Major Undertakings to be taken by the Cambodian side
Annex 3 Project Monitoring Report
Annex 4 Environmental Check List
Annex 5 Environmental Management Plan
Annex 6 Environmental Monitoring Form
Annex 7 Outline Design
Annex 8 Term Sheet
Annex 9 Insurance and limited equity contribution
Annex 10 Contract structure
Annex 11 Dispute Settlement
Annex 12 Water quality monitoring items

Annex1

Project Implementation Schedule